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Awards

Frank Gehry Named Recipient Of Eleventh Pritzker Prize

This year's Pritzker prize jury reached beyond the pillars of modern and post-modern architecture to honor the personal vision of California architect Frank Gehry: "His sometimes controversial, but always arresting, body of work," said the jury, "has been variously described as iconoclastic, rambunctious, and impermanent, but the jury in making this award commends his restless spirit that has made his buildings a unique expression of contemporary society and its ambivalent values."

In 1976 Gehry said, "My approach to architecture is different. I search out the work of artists and use art as a means of inspiration. I try to rid myself and the other members of the firm of the burden of culture and look for new ways to approach the work. I want to be open-ended. There are no rules, no right or wrong."

Gehry was born in 1929 in Toronto and moved to California in 1947. Although he could not afford college at that time, he began taking night courses at Los Angeles City College and later transferred to the University of Southern California, from which he graduated in 1954. He then joined the firm of Victor Gruen Associates.

A lasting influence during the early years was his stint with the Army at Fort Benning, Ga., in 1955. There he designed men's dayrooms; and the military landscapes of corrugated metal, plywood, and asphalt shingles would reappear in his architecture. In 1956 he attended the Harvard graduate school of design to study urban planning but left because of philosophical differences with the program. In 1961 Gehry and his family moved to Paris, where he worked in the firm of Andre Remondet. In 1962 he returned to Los Angeles and set up his own firm. During the 1960s he designed in accordance with the prevailing modern esthetic.

In the 1970s his architecture began to change and to reflect his growing interest in the relationship between painting, sculpture, and architecture. "There's an immediacy in paintings. You feel like the brush strokes were just made," Gehry said. "How could a building be made to look like it's in the process? And how can the expressive and compositional attitudes of painting be explored in a building? That's what led me to explore opening up the structure and using the raw wood techniques and developing buildings that look like they just happened."

Wesley Harrison

Gehry on his interest in fish: 'The primitive beginnings of architecture come from zoomorphic yearnings and skeletal images.'

Although there had been earlier works exhibiting Gehry's unique style (most notably the Ron Davis house and studio in 1970-72), the design for his own house in Santa Monica, Calif., most clearly embodies Gehry's intentions. It was a turning point in his career.

"I felt I could use the project for R&D. I had to start all over again—literally start over again. I had to rebuild the practice from scratch," said Gehry. "It has been both scary financially and gratifying personally."

For that house Gehry took the shell of a pink, 1920s California bungalow and wrapped corrugated metal and chain-link fencing around it, thereby creating a series of transparent screens. Corrugated metal acted as a fence between the street and the backyard. The house is lined in plywood and braced with beams. Tilted, glazed cubes are windows.

Upon completion, Gehry's house aroused much outrage but also praise. In 1980 it won an AIA honor award. Altogether Gehry has received more than 25 national and regional AIA awards, the Brunner prize, and three honorary doctorates, among other awards.

Now in its 12th year, the Pritzker architecture prize is named for Jay A. Pritzker, a Chicago attorney and president of the Hyatt Foundation, which sponsors the prize. The prize was conceived by the late Carleton Smith, chairman of the International Awards Foundation. The Americans who have won the Pritzker prize are Philip Johnson, Kevin Roche, I.M. Pei, Richard Meier, and Gordon Bunshaft; international architect winners are Luis Barragán, James Stirling, Hans Hollein, Gottfried Bohm, Kenzo Tange, and Oscar Niemeyer.

Gehry was "shocked," he said, and delighted to learn of the jury's decision. "You fantasize about the prize but never expect to get it." The $100,000 award, Gehry said, will enable him to participate in the more "idealistic" and social endeavors, such as design of low-cost housing.

—Nora Richter Greer

Zurich Postal Complex Wins 1989 R. S. Reynolds Award

The largest postal distribution center in Switzerland, designed by the Zurich architecture and planning firm of Theo Hotz, has been selected for the 1989 R.S. Reynolds award for distinguished architecture using aluminum.

The postal center sits on the western edge of Zurich as a "modern city gate," in the words of Hotz. It is 820 feet long, 440 to 544 feet wide, and 100 feet high, and in it 300,000 packages and 10,000 mailbags are processed every day. It has a train station with 14 tracks, a ramp for road vehicles with 29 loading bays, and giant conveyor belts for sorting and distribution.

Most striking is its aluminum-clad exte-

continued on page 26


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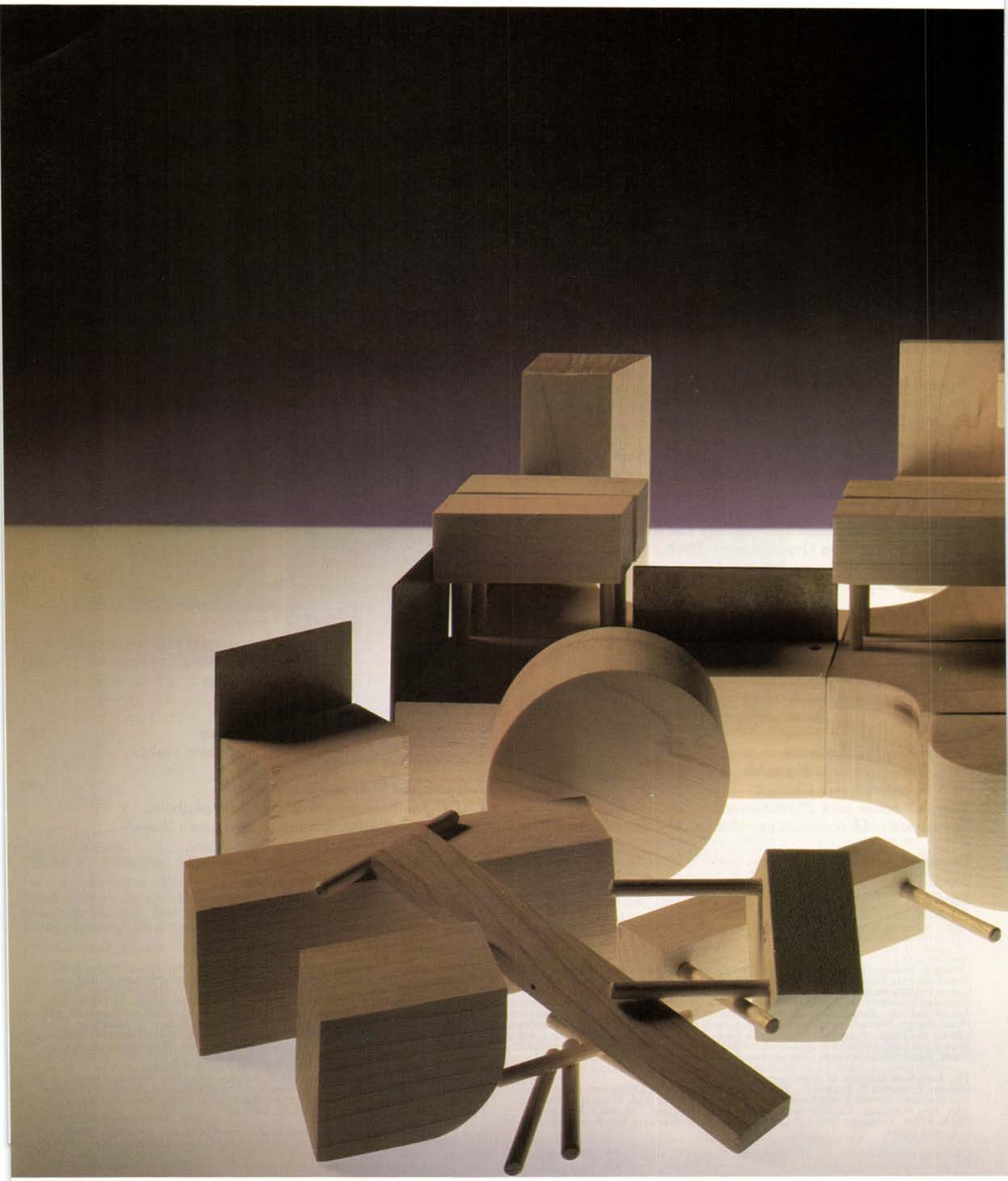
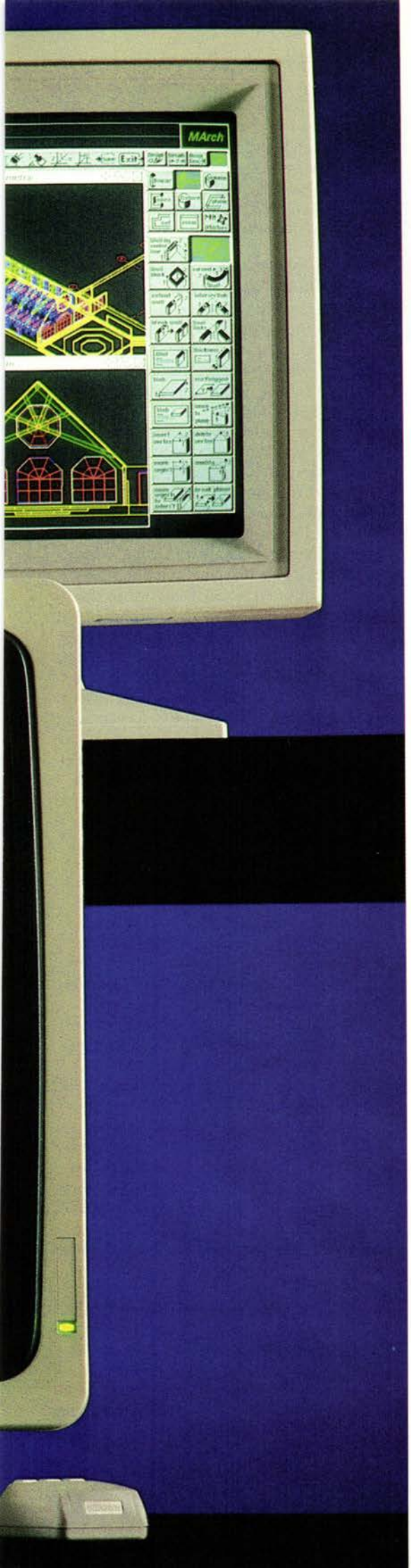
CONTENTS

"This system, unlike any other on the market, gives designers an opportunity to practice their craft." *John Tilton— Tilton & Lewis, Architects, Chicago.*





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INTERGRAPH

ModelView image of the Pacific First Center, Seattle, designed by The Callison Partnership, Ltd., Seattle and San Diego.

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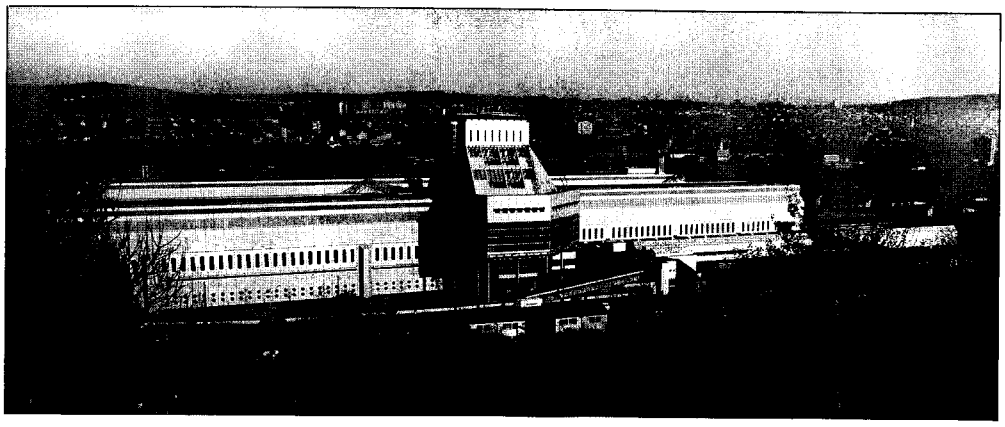


Awards *from page 23*
rior, designed as an expression of its high-tech operations inside. Repeated the entire length of the facades are small round and oblong windows that contribute to this high-tech image. "We chose a few high-quality materials and straightforward construction methods to produce simple, repetitive, industrial elements in an effort to create an architectural unity," Hotz said. For the exterior, aluminum three millimeters thick was shaped through a deep drawing process (a manufacturing process used to form car bodies). It then was finished with a natural-color enamel.

The windows were kept small to conserve energy. Other energy-conservation measures include reclaiming and recycling the heat generated by the motors driving the conveyor belts and re-using rainwater from the 387,500-square-foot roof in cooling towers and humidifying units.

Large, flexible interior spaces were created by designing the load-bearing members independent from the spatial divisions. A small tower contains staff facilities including a restaurant, recreation rooms, rest rooms, apartments, and locker rooms.

Overall, Hotz wanted to "explore the expressive potential of aluminum, its suitability as a unifying element, its high standard of structural and physical performance, and its esthetic values." The postal center opened in April 1985.

The jury said, "The working floor of asphalt and total mechanization respond to a pragmatic flow of endless packages and letters, while the supporting service areas and relief spaces provide spirited relief for the postal employees." The jurors for the 1989 Reynolds award were Ted Pappas, FAIA, chairman; Lawrence Booth, FAIA; and Canadian architect Michael Kirkland.

Education

Architects, Academicians Debate Diverse Topics at ACSA Meeting

Five public debates, in Oxford Union format, were the high points of the annual meeting of the Associated Schools of Collegiate Architecture in Chicago in March. The first, most star-studded debate fizzled, but some of the others were sparklers. At the end of each, in the Oxford tradition, members of the audience left the hall by one of two doors to record a yea or nay vote. Since these voters were academics, it came as no surprise that (a) many were slow to make the commitment of leaving the hall at all and, (b) when they did, the nay vote won in every case where it was an option.

Stanley Tigerman, Chicago architect and teacher, and John Whiteman, now head of the Skidmore, Owings & Merrill Foundation, planned the conference and cooked up the debate propositions. "This House Believes That My Ideology Is Better Than Yours" was the topic of the first, pitting Peter Eisenman against Leon Krier in a nostalgic rematch of two ancient antagonists now gone soft in the gut.

Krier stated, with customary eloquence, the same radically conservative views he has stated for more than a decade. Eisenman presented himself, as he always does, as an entirely new personality with an entirely different set of convictions from those of his last previous public appearance. Had one not been prepared for this customary metamorphosis, it would have been difficult to conceive of Eisenman saying, as he did: "The difference between Leo and me is that Leo draws architecture and I have to build it." This one-time academic obscurantist spoke feelingly of the problems of bringing in, at a budget of $85 per square foot, a new 750,000-square-foot convention center in Columbus, Ohio. Krier made some pithy formulations—"Traditional design creates objects of long-term use; modern design creates objects of short-term consumption"—but they floated past Eisenman without damage, as warships might pass in a dense fog. Eisenman, attacking tradition, spoke of the need for "presentness" in architecture, but presentness, as a member of the audience pointed out, seemed to be exactly what was lacking in the debate. Eisenman blew whatever credibility he had in his summation when he noted, absurdly, that "the only book I re-read for this debate" was Nietzsche's *Thus Spake Zarathustra* and then quoted a banal and irrelevant passage. Nevertheless, he won the vote handily.

Debate Number Two was between the team of Judith Hull and Mark Jarzombek (yea) and Jennifer Bloomer and Jeff Kipnis (nay) on the proposition "Historians Are Better Equipped to Teach Theory Than Others." The nays won, perhaps on the strength of a brilliant and witty performance by Bloomer.

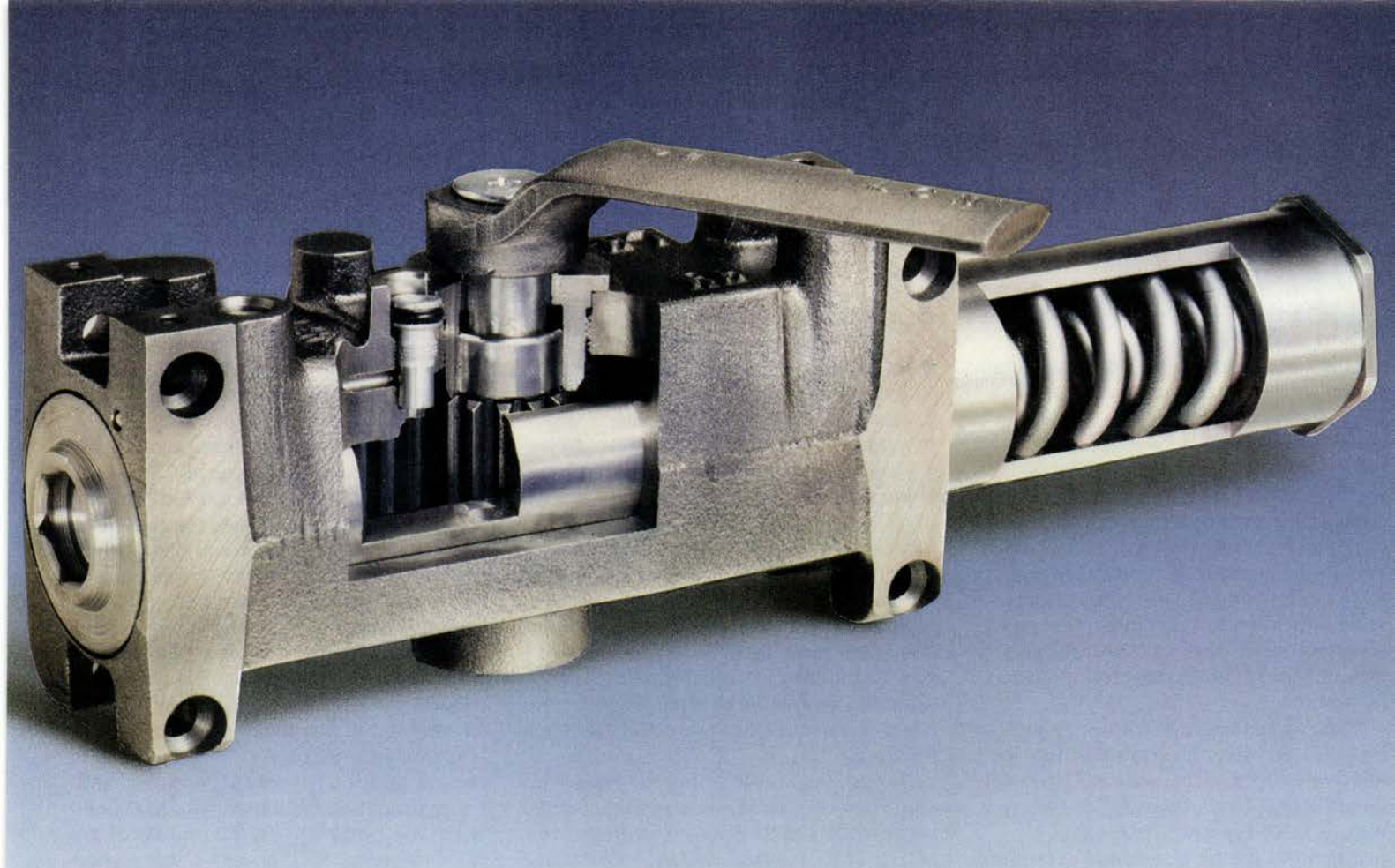
Number Three set Thomas Beeby and Thomas Gordon Smith (yea) against John Whiteman and Ann Gergren on "Architectural Education Can Only Proceed from Previously Established Architectural Forms." This was the best debate. Gergren delivered a feminist critique of the architecture of the past as being the expression of "a bound woman" in the sense of "the binding and confining power of architecture, a particular inside excluding a particular outside," and argued that teachers of architecture should "expose the politics" behind it. Smith told us not to be afraid of classicism but to use and re-invent it as a communicative visual language. Beeby and Whiteman disagreed to considerable purpose. Beeby acted more the practical teacher and suggested that the first thing to do is fill up a student's head with information, including the past, from which he or she can later, as a designer, abstract ideas for interpretation and transformation. Whiteman argued that the past should never be taught without a full exploration of its political and economic setting "or else we can't see through the pictures we make to what we're doing."

The fourth debate was over whether "Architecture Must Serve the Existing Order," with David Dunster and Bruce Graham (yea) against Diane Ghirardo and Michael Sorkin. It was extremely entertaining but not especially substantive. A fifth debate, pitting Michael Hayes and Catherine Ingraham (yea) against this writer and Paul Gapp, dealt with the proposition that "Sooner or Later Critics Will Sell Themselves to the Highest Bidder." As a participant, I forgo comment on that one.

Scattered among the debates was an amazing range of symposia in which the conference attendees, most of them teachers in architecture schools, presented papers on a fantastic variety of topics, many of them very interesting. Also prominent on the agenda was much schmoozing and repositioning of attendees in relation to the 15 or so deanships that are now open at American schools of architecture.

—Robert Campbell

News continued on page 28



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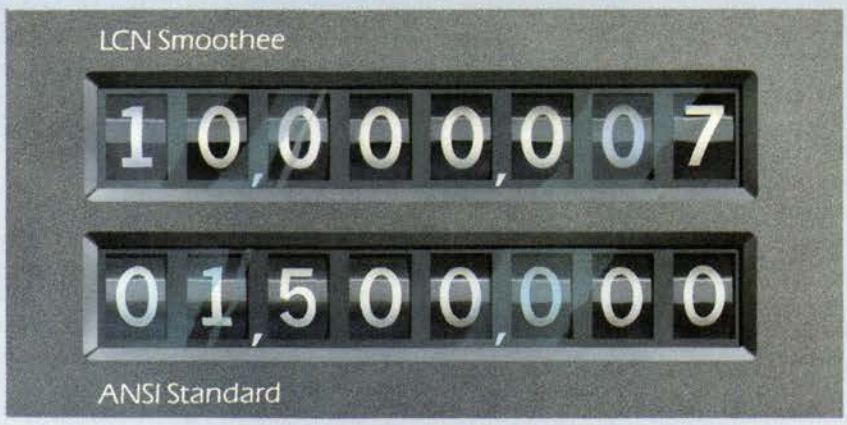

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Venturi's House for His Mother Wins AIA 25-Year Award

This is the little house that started it all. Robert Venturi's house for his mother, located in Chestnut Hill, Pa., and completed in 1964, has won this year's AIA 25-year award. Cited by the award jury as a "seminal work of postmodernism," the house has spawned a generation of architects who have borrowed freely its gabled billboard front, square and semicircular windows, and applied ornament. The house's carefully modulated scale, intricate layering of space and material, and contradictory quirkiness have been less negotiable, leaving that same generation of architects at a loss to reproduce its power.

"One aspect about the house, a test that it's good architecture, is that it now looks relatively ordinary because it's had such an influence," says Venturi. "It has combinations of big and little scale, a pediment at the front, applied decoration and a nonstructural arch, a lunette window in the back, windows with panes that are symbolically windows. It's all over the place. Young people don't realize that now, because all of those elements have become so accepted but were unheard of at that time in late modern architecture."

For Venturi, the house's impact on architecture during the past quarter-century has been a mixed blessing. "It makes you happy in a way and sad in another," he says. "We haven't done a skyscraper yet to put the house on top of. Sometimes your ideas aren't used very well, with the same quality, or they're misunderstood."

The continuing influence of his mother's house on Venturi's other work is evident in projects being designed by Venturi, Rauch & Scott Brown today. "I think we've been using that house in many ways," comments Venturi. "It's essentially symmetrical with a classical, hierarchical buildup toward the center, but at the same time, by circumstance, it becomes asymmetrical near the edges—that's very much a characteristic of what we do a lot. Many of our houses have had the abstract pediment quality. We use the window with the horizontal crossbar. The combination of little and big scale, the hierarchy of scale—all of those things are in our work. We've done a lot of different buildings, our buildings come out of context and each one is different, and we've evolved since then, but it is our most fundamental, elemental building."

Venturi began designing the house in 1961, working on the design for several years while simultaneously writing *Complexity and Contradiction in Architecture,* which was published in 1966. "I don't associate the writing of the book and the design of the house at all," he says, but many of the ideas explored in those pages are evident in the house. "They did go hand-in-hand," Venturi acknowledges.

Vanna Venturi moved into the 1800-square-foot house on April Fools' Day, 1964. "My mother loved the house," says Venturi. "At first she thought the marble floor in the dining area was a little pretentious. But she was proud of it." After *Complexity and Contradiction,* Vanna Venturi had lots of visitors. "She was a widow, and she enjoyed showing it to a lot of handsome young architects," adds Venturi.

Venturi house as it appears today.

He also lived in the house for a number of years. "One thing I remember about it vividly was that the interior light was very beautiful. That was just sort of luck, but partly because we used canvas cloth shades that gave the light a slightly warm color. There was a beautiful aura in the house."

As an occupant of his own creation, Venturi found the house a testing ground for details that would be refined in later work. "I imagine any honest architect would admit that when you finish a building there are some things you're very proud of and other things that you didn't do right. There are the inevitable few details—it's usually details—that plague you. Its detail should have been a little gutsier." As an example, Venturi mentions the parapet walls at the house's front and back, which read as thin screens behind which the plan twists and turns. "The parapet shouldn't have been eight-inch block but either 12- or 16-inch. The hardest thing when you're young is to know detailing. That you have to learn over time." Within a few years of its completion, the taupe gray stucco exterior was painted green. "There was a famous architect, " recalls Venturi, "and I won't mention his name, who said one color you never use on the outside of a house is green. So I thought it was a good idea to make it green."

After Vanna Venturi's death in 1975, the house was purchased by Thomas and Agatha Hughes, a University of Pennsylvania history professor and potter, respectively, who have lovingly maintained the house with the architect's consultation. Apparently they're very attached to the house, according to Venturi; this was demonstrated a few years ago when Thomas Hughes was offered a chaired position at MIT and turned it down, citing as one reason the fact that they would have to move.

Venturi's own appraisal of the house has changed over the years. In *Complexity and Contradiction,* he dwelt on its mannerist tendencies, its lineage found in Michelangelo's Porta Pia, in Palladio and Alessandro Vittoria's Villa Babaro at Maser, and in Vanbrugh's Blenheim Palace. "This building recognizes complexities and contradictions," he wrote. "It is both complex and simple, open and closed, big and little; some of its elements are good on one level and bad on another; its order accommodates the generic elements of the house in general, and the circumstantial elements of a house in particular."

After studying Las Vegas, Venturi began to appreciate the house's more symbolic qualities. "Some have said my mother's house looks like a child's drawing of a house," Venturi stated in a 1982 lecture, "representing the fundamental elements of shelter—gable roof, chimney, door, and windows. I like to think this is so, that it achieves another essence, that of the genre that is house and is elemental."

—Michael J. Crosbie

News continued on page 33

Ten Chosen to Receive AIA Honorary Membership

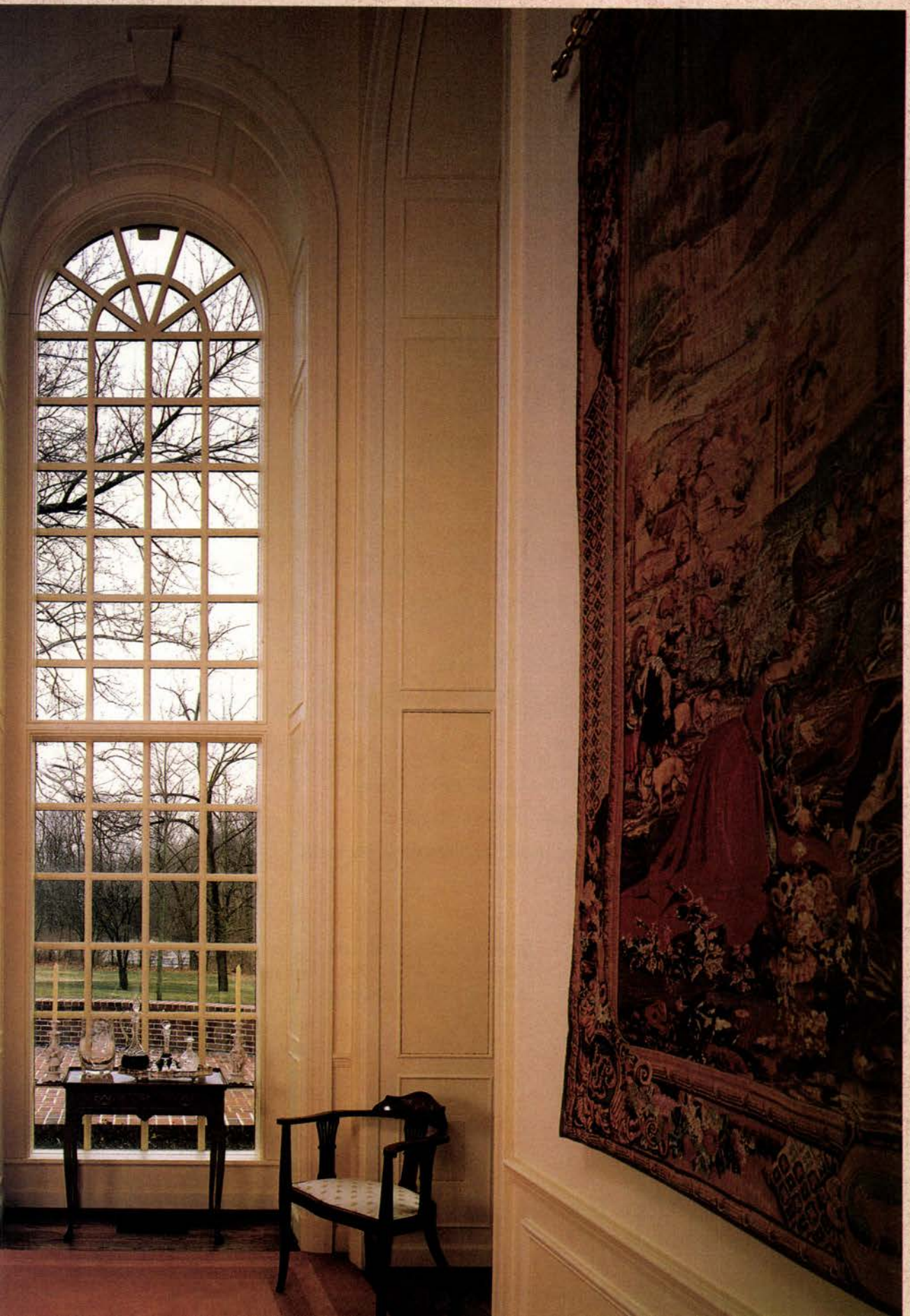
AIA has elected 10 honorary members in recognition of their outstanding contributions to the architectural profession and the allied arts and sciences. The honorary memberships will be presented during AIA's national convention in St. Louis, May 5-8.

The honorees are:

- Lois Craig, associate dean of the school of architecture and planning at MIT. From 1972 to 1977, Craig directed the U.S. government's Federal Architecture Project, a program established to improve the design of federal government buildings.
- James P. Cramer, executive vice president and chief executive officer of AIA. Cramer has been evecutive vice president of the AIA Minnesota Society, president of the AIA Service Corp., and president of the American Architectural Foundation.
- Ann Davidson, executive director of the Kansas Society of Architects. In that position since 1974, Davidson has helped to create an intern development program.
- David Gebhard, professor of architectural history at the University of California, Santa Barbara. Gebhard has written and lectured extensively about all aspects of architecture, particularly that of the American West. He is curator of the University of California Architectural Drawing Collection and former director of the University Art Museum.
- George Latimer, Mayor of St. Paul, Minn. Elected in 1978, Latimer has been credited with helping to bring a "true renaissance to St. Paul" and with spearheading the revitalization of the city's Lowertown neighborhood. He is a past president of the National League of Cities and is now chairman of the organization's Urban/Rural Task Force.
- Evelyn B. McGrath, executive director of the Florida Central Chapter/AIA. McGrath was executive secretary of AIA's New York Chapter for 21 years before joining the Florida Central Chapter in 1981.
- Laurie D. Olin, landscape architect of the Philadelphia firm Hanna/Olin Ltd. Olin's firm has worked on a variety of major projects including Battery Park City Esplanades in New York City.
- Jay Arthur Pritzker, Chicago attorney, businessman, and founder of the Pritzker prize for architecture (see page 23).
- Barbara J. Rodriguez, executive director of the New York State Association of Architects. Since joining the state chapter in 1978, Rodriguez has played a major role in numerous legislative lobbying efforts and initiated a program to bring together architects and deans of the state's nine schools of architecture.
- Connie Wallace, executive vice president of the Tennessee Society of Architects and editor of the society's magazine, *Tennessee Architect.*

News continued on page 35

"Their home was elegance and grace defined."



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Technology

Housing Industry Facing Possible Infusion from Japan

For more than half a decade now, the U.S. home building industry has been worrying over the threat of a Japanese invasion of its markets. But that danger seems to be limited. While premanufactured housing from Japan and some European countries has been appearing in various regions of this country, it comprises very little of the total market share and no dramatic gains are foreseen in the near future.

Hidden in that threat, however, is a far more pervasive problem: advances in home building technology abroad are being brought to U.S. shores packaged in components perceived by consumers as having better design and higher quality than their American counterparts. Almost unnoticed, many of the components of home construction have been entering the country on a piece by piece basis, creating the current situation of formidable competition. Increased domestic use of foreign appliances, building components, and building products is a far greater immediate threat than the import of factory-produced houses, according to the Department of Housing and Urban Development.

"Unlike entire factory-built housing systems, these specific products can be easily absorbed into the existing methods and processes of domestic residential development and product distribution," HUD cautioned in a white paper on the topic.

Building, with its related services, is the nation's single largest industry with a value of $400 billion of new construction put in place each year. Of that, residential construction comprises $170 billion.

Historically, says HUD, the residential industry has been insulated from foreign competition and the global economy because of its decentralized, flexible, and low-capitalized nature. Likewise, American builders and manufacturers have been content with domestic markets and have not sought out export sales. In 1982, the United States had a building product trade surplus of $400 million. By 1987, however, the balance had plummeted to a deficit of $2.34 billion. The trade balance for building products—bricks, cabinetry, drywall, hardware, plumbing fixtures, etc.—is consistently negative. The only major exception is unprocessed lumber.

There are a number of complex reasons for this development, according to HUD. Foreign economies recently have become affluent enough to produce housing products that would interest an American market. On top of that, Scandinavian countries are now so well housed, and their population growth so minimal, that they have an overcapacity to produce housing. Firms in those countries are aggressively entering foreign markets to cover fixed overhead costs. Even more importantly, says

continued on page 37

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Technology *from page 35*
HUD, foreign housing industries offer higher-quality housing and housing products, produced more efficiently than those found in the United States. The quality of Japanese and Scandinavian housing and components is considered extremely high in terms of structure, mechanical systems, and finish.

Improved foreign housing quality results in some degree from government-subsidized research programs that are virtually non-existent in the United States. For example, Sweden spends about $150 million annually on housing research, and one Japanese manufacturer alone spends approximately $100 annually.

In a national workshop HUD and the Department of Commerce determined that higher-quality domestic housing is needed in order to limit housing industry imports to this country and ultimately to increase the demand for U.S. housing exports. The workshop participants also declared that, although many high-quality subsystems are produced in this country, the means by which they are assembled into finished housing units compromises quality.

—Elena Marcheso Moreno

BRIEFS

Stoneyard Institute Workshop
The Stoneyard Institute of the Cathedral of St. John the Divine in New York City will hold its third annual summer program—two weeks of intensive training in stone cutting, carving, and construction—July 24 to Aug. 4. The program, which is limited to 18 participants, is for students and professionals in architecture, art, engineering, and preservation. The application deadline is June 2. Contact: Office of the Summer Program, The Stoneyard Institute, Cathedral of St. John the Divine, 1047 Amsterdam Ave., New York, N.Y. 10025.

Cedar Shake & Shingle Competition
The biennial design competition of the Cedar Shake & Shingle Bureau, cosponsored by AIA, will honor projects in six categories: single-family, multifamily, and vacation residences; commercial and institutional buildings; remodeling and restoration; and interiors. The competition is open to all architects and designers; there is no entry fee. The application deadline is June 9, and entries must be submitted by July 14. Contact Frank Welch, Cedar Shake & Shingle Bureau, 515 116th Ave. N.E., Suite 275, Bellevue, Wash. 98004.

Posters of Public Urban Places
A poster competition and exhibit on the design of public urban places will be part of the fifth and sixth International Making Cities Livable conferences in Venice, Italy, July 4-8, and in Charleston, S.C., Oct. 24-28. The entry deadline is May 30. Contact Suzanne H. Crowhurst Lennard, Making Cities Livable Conference, P.O. Box 7586, Carmel, Calif. 939211. □

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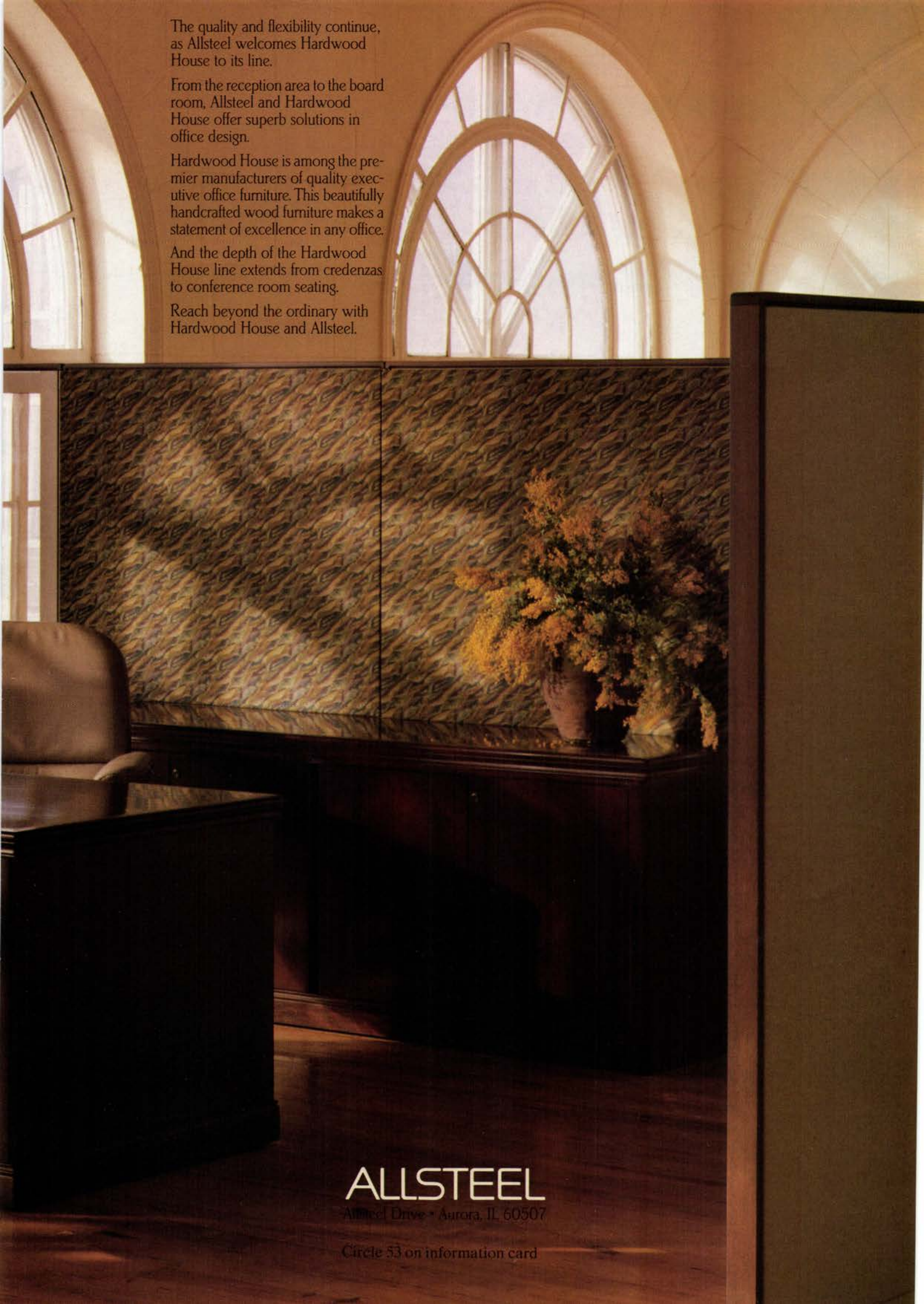

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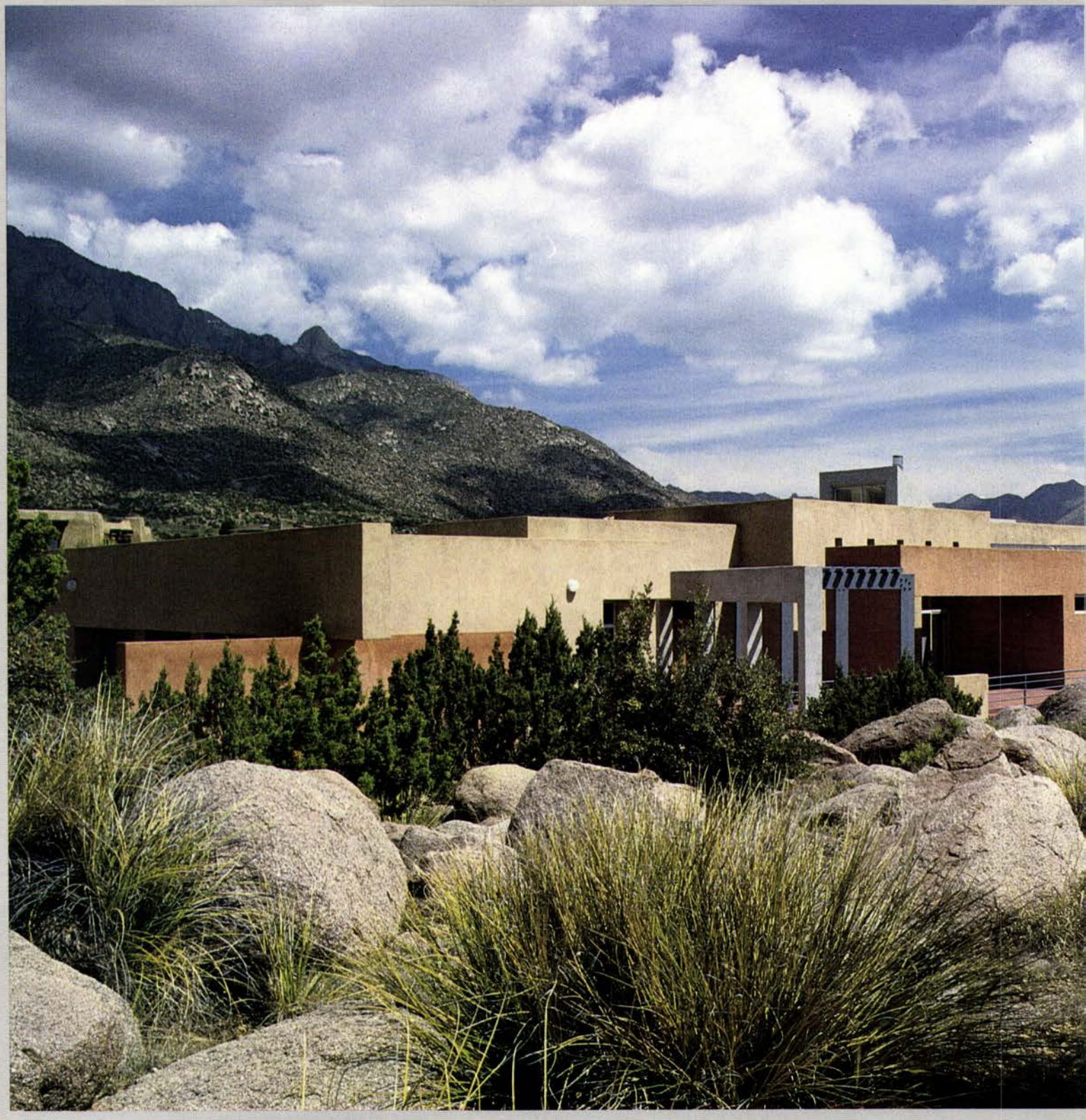
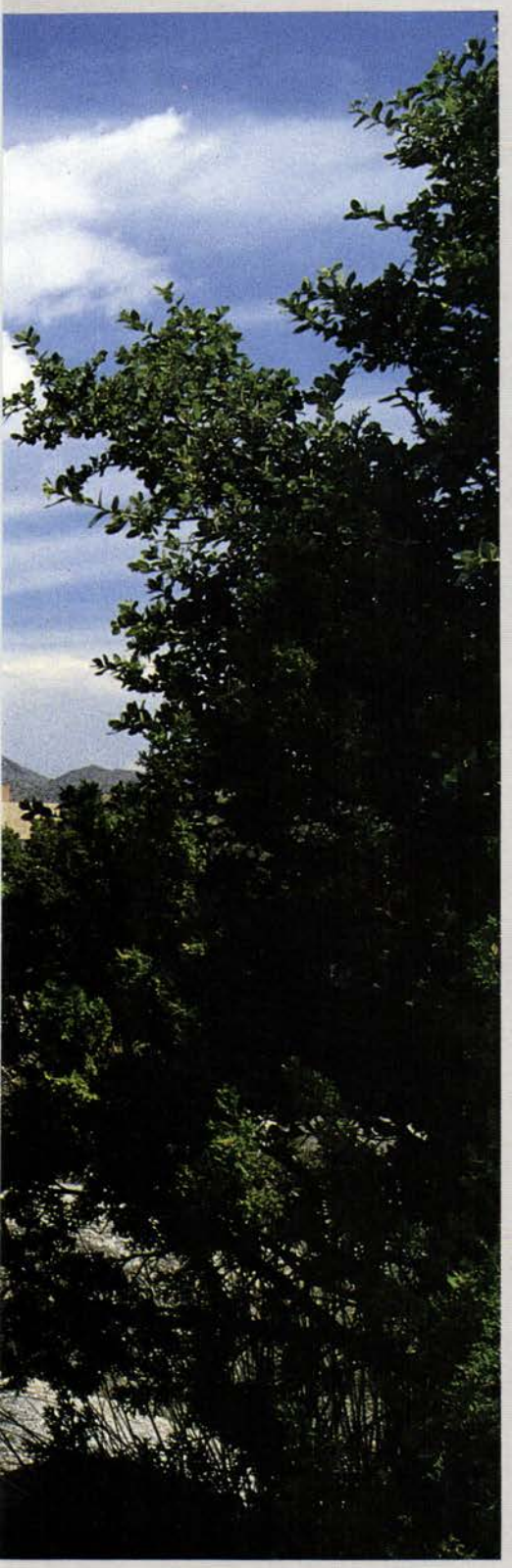
AIA Component Awards

By Lynn Nesmith

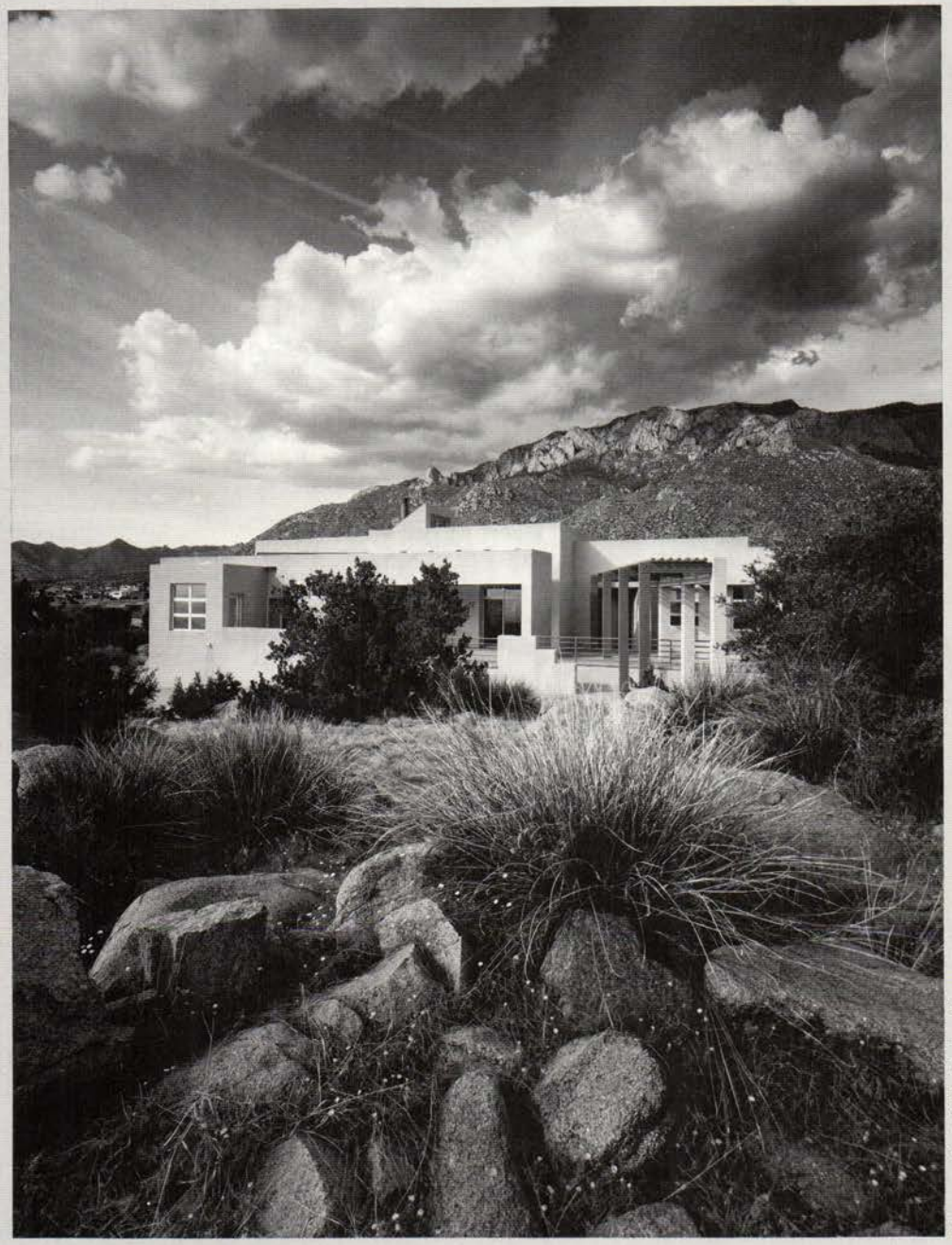


Each year, as companions to the national honor award winners, we present a sampling of buildings that have been honored by AIA's state, local, and regional component organizations. These other award winners help illustrate the general quality and variety of work being completed around the country. Although space limitations prevent the publication of all the winners, the selection that follows attempts to represent a cross section of geographical areas, building types, firms, and approaches.

The premiated buildings include a '50s cafe in Southern California, a firehouse in Indiana, a restored carousel in Louisiana, and a simple yet elegant synagogue on Long Island, N.Y. The presentation here begins in the Southwest, travels up to the Pacific Northwest, and then goes east.



New Mexico Society of Architects. Friedman residence, Albuquerque (left and below); Westwork Architects, Albuquerque. Located between two rugged granite outcroppings in the foothills of the Sandia Mountains north of Albuquerque, the house incorporates an embracing layered entryway that serves as a counterpoint to the simple, traditional forms and materials. The main living area is placed at the center of the house with patio areas on both the northeast and southwest sides. The master bedroom suite with an adjacent sun room provides a quiet retreat and views toward all directions. "This house uses bold traditional Southwestern forms and sits dramatically in the landscape with conviction," wrote the award jury.



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Component Awards

New Mexico Society ..... above
Ventura County Chapter 50
California Council 50
Central Valley Chapter 54
Spokane Chapter 59
Seattle Chapter 59, 62
Texas Society 64
Houston Chapter 64
Michigan Society 66
Wisconsin Society 66
Minnesota Society 71
Indiana Society 72
Columbus Chapter 76
Architects Society of Ohio 76
Iowa Chapter 78
Kansas City Chapter 78
Louisiana Chapter 213
New Orleans Chapter 213
North Carolina Chapter 213
Virginia Society 214
Georgia Association 214
Pittsburgh Chapter 216
Chesapeake Bay Chapter 216
Boston Society 218
New England Regional Council 218, 223
New York State Association ... 218, 226
Rhode Island Chapter 223
Philadelphia Chapter 226
New Jersey Society 229

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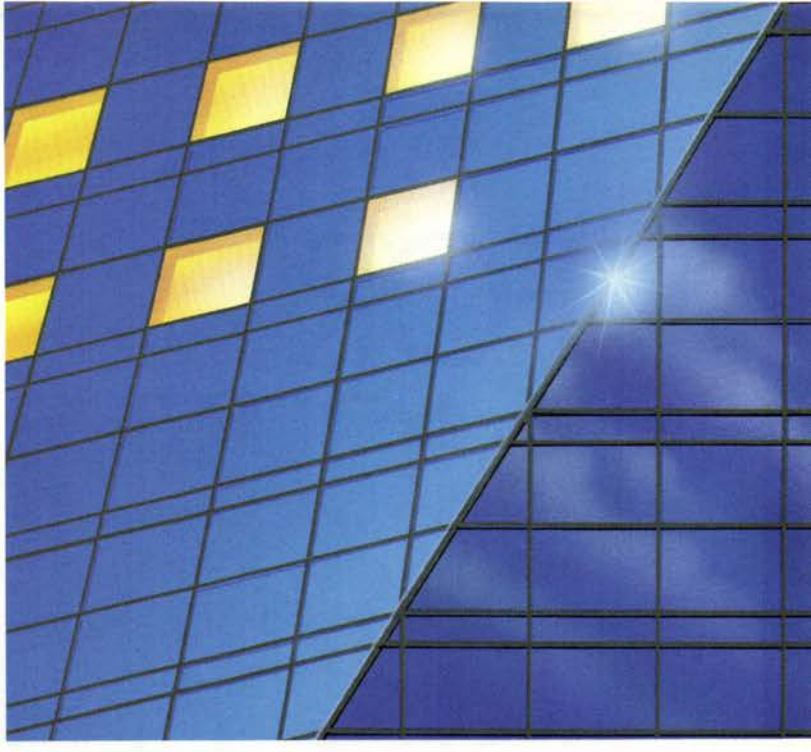
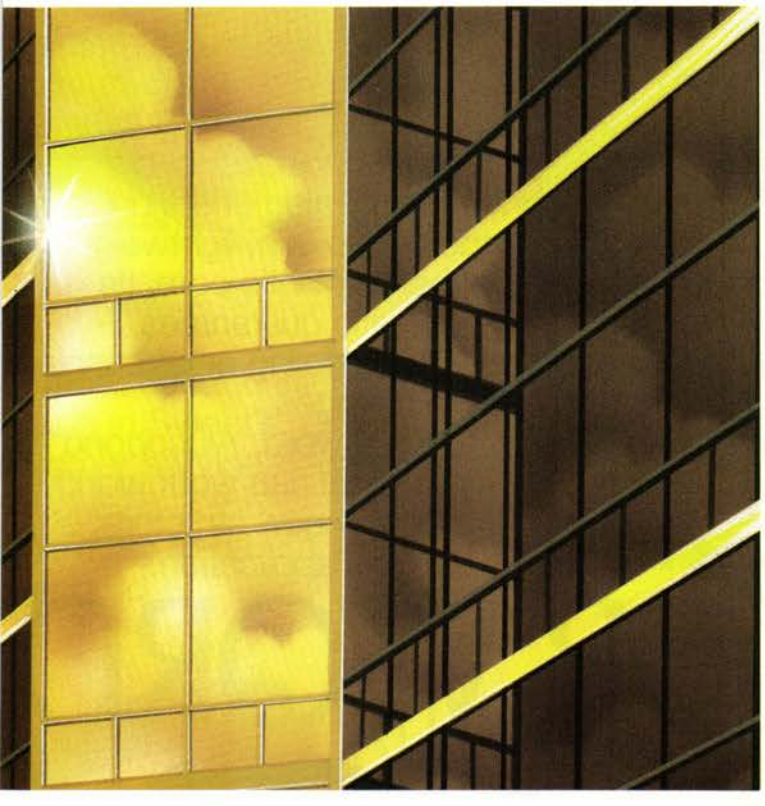
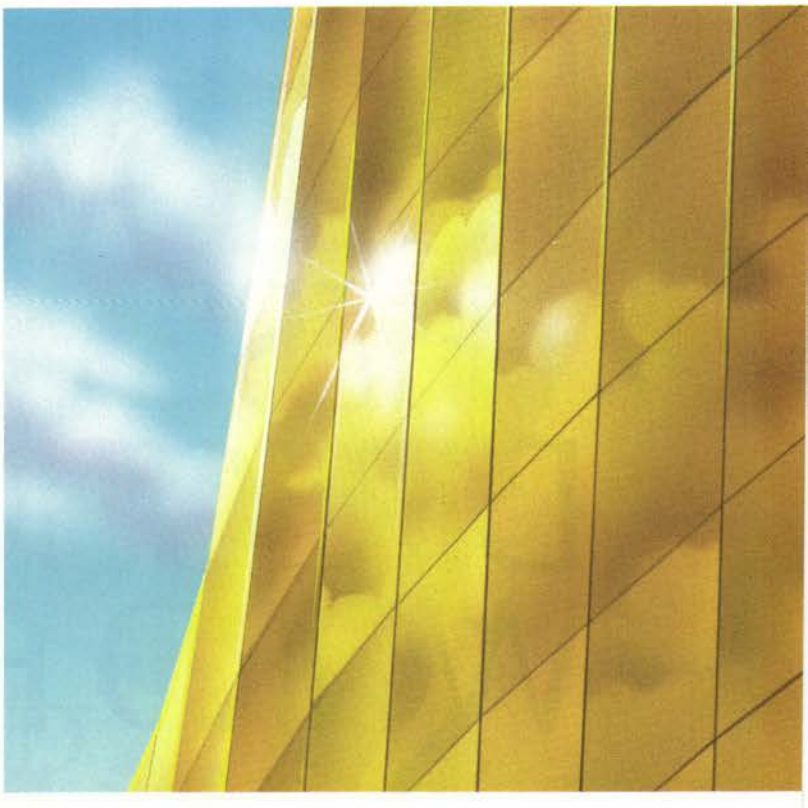
Ventura County Chapter. Cabrillo Village farm workers' housing, Saticoy, Calif. (above); John V. Mutlow Architects, Los Angeles. The original migrant farm worker camp, built in the 1930s, was threatened with demolition in the mid-'70s before the workers acquired the camp from the owners. In addition to renovating the existing cabins, the new owners added a complex of 39 residential units. The architect grouped two-, three-, and four-bedroom row houses around a common green and flanked them with private front and back gardens.

California Council. Glickman residence, San Francisco (right); Backen Arrigoni & Ross, San Francisco. The 2,575-square-foot, four-level house combines privacy with natural light through the use of glass block bay windows and slats on the remaining windows. Half-walls, stairways, and bookcases define the major living spaces. The interiors feature neutral colors and simple surface textures.

Dennis Anderson







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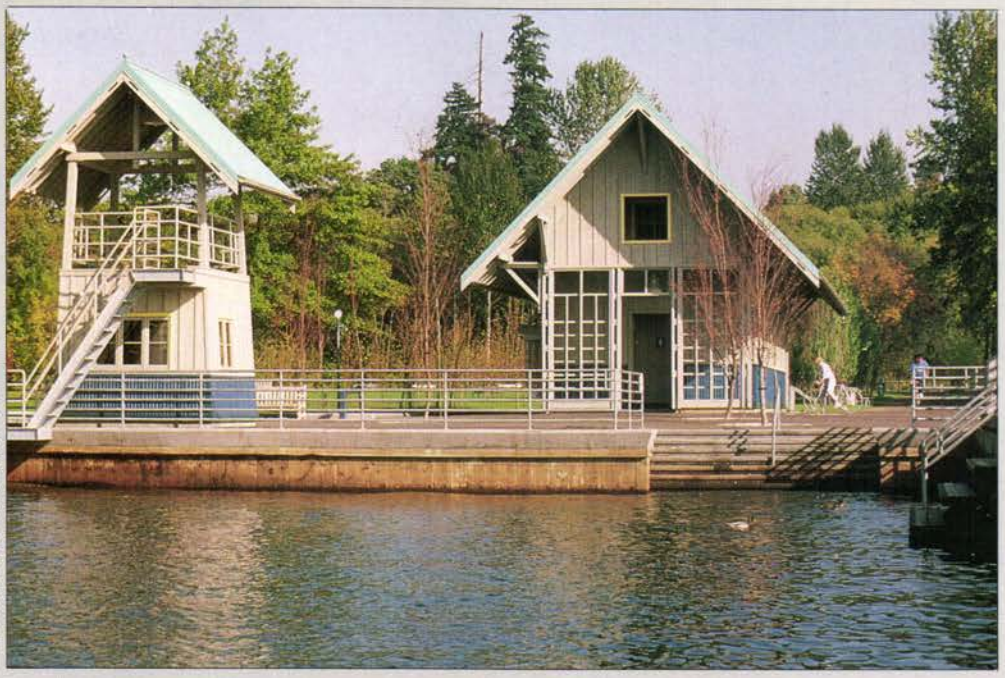
Steve Simmons

Central Valley Chapter. Fabulous Fifties Cafe, Carmichael, Calif. (top); Niiya Calpo Hom & Dong, Sacramento, Calif. In converting an existing restaurant to a '50s theme cafe, the architect set two cars into the side of the building with their front halves just inside the restaurant as booths. The exterior is finished with a gleaming white stucco; the interior color scheme is pink and turquoise. A glass block tower along the north wall houses a jukebox.

Bert's Diner, Sheldon, Calif. (above); Monighan+Terry Architects, Sacramento. The entry of this new diner is centered between two circular walls of glass block, which provide space for two large round tables. Booths were placed along the perimeter walls; the small kitchen has an exposed service line and a pass-through cooking counter. The exterior is a custom-fabricated stainless steel skin, highlighted with neon lighting and signage.

Kroma International



Linda M. Feltner/Roger Sherman

Spokane Chapter. Don Kardong Pedestrian Bridge, Spokane, Wash. (top); Zeck Butler Architects, Spokane. The adaptive use of this bridge, donated to the city by Burlington Northern Railroad, provides a pedestrian and bicycle trail between downtown and a residential neighborhood. A series of five overhead passages and viewing platforms in different heights and configurations interrupts the 500-foot-long bridge and reinforces the concept of the bridge as a gateway. Various colors were used on the latticework of the viewing platforms, and steel and wooden framings recall the original materials.

Seattle Chapter. Newcastle Beach Park Structures, Bellevue, Wash. (above); Jones & Jones Architects, Seattle. Located on a 29.4-acre site along the shores of Lake Washington, the park complex consists of a lifeguard office, bath house, and caretaker's residence. The architect designed tall and narrow buildings with wide overhanging eaves and simple features to recall vernacular buildings and to provide visual and spatial extensions for the compact interior spaces called for in the program. The bath house extends the major axis of the site while creating an edge to the shoreline plaza and swimming area.

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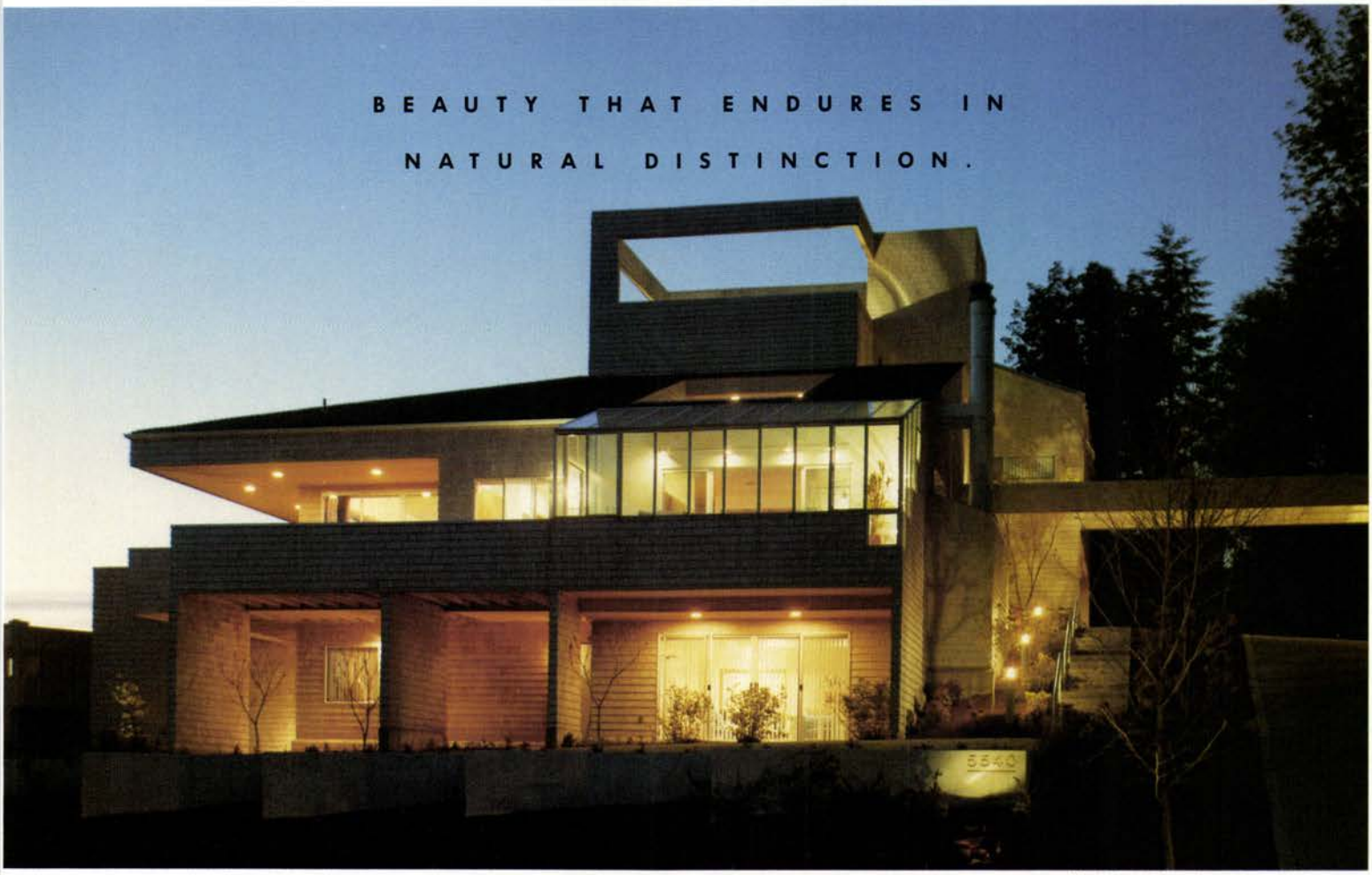
Seattle Chapter. The Inn at Semiahmoo, Blaine, Wash. (above); The Callison Partnership, Seattle. Sited at the end of a mile-long sand spit that once served as an Alaska Packers cannery, the 200-room hotel and conference center has splendid views of the ocean to the west and mountains to the east. The hotel is a four-story wood frame structure that utilizes shingles and beveled cedar siding. The large, simple massing recalls the abandoned cannery buildings, and the hierarchical roof modulations announce public functions and differentiate private areas. Further articulation of eaves, decks, windows, and doors adds proportion and definition to the exterior. Trussed canopies mark the public entries, and large windows maximize natural light. Although the cannery buildings were derelict, the existing buildings and materials were used when possible. The fish-sorting building, on a pier over the water, was converted to a restaurant, and the main lobby fireplace and entry paving are constructed with brick from the cannery's old steam plant.



Martin Henry Kaplan, Architect AIA

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Texas Society of Architects and Houston Chapter. Schulte ranch house, Round Top, Tex. (above); Cannady, Jackson & Ryan, Architects, Houston. Sited on a hilltop with spectacular views down a mile-wide valley, this weekend house is an assemblage of traditional forms and materials derived from vernacular Texas farmhouses with elements organized in a straightforward and classical composition.

A long, winding driveway leads to a graveled entry courtyard flanked by symmetrical wings of the house. The formal front door, with columns and pediment, opens onto a corridor connecting the two wings. A 200-foot-long porch with gabled forms wraps around the sides and rear of the house. The exterior is clad in pine siding painted traditional barn red with blue, black, and white detailing; the structure is typical platform construction on piers and wood beams.

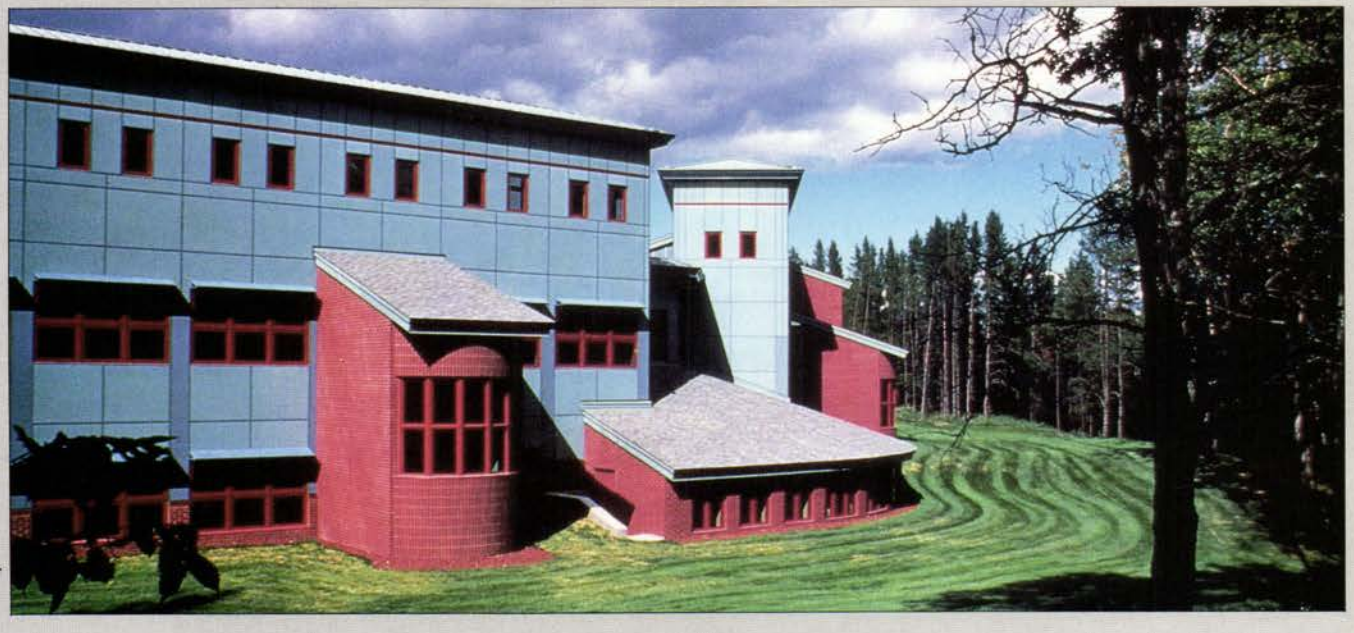
The main interior space, set along the east-west axis, is a large, double-height living room, finished in pale pine with exposed diagonal wind bracings. The kitchen and study occupy the first-floor intersections, with bedrooms located on the upper level.

The award jury praised Cannady for "reading the landscape and traditions and building on them while coming up with something new and fresh. Beautifully presented—Texas as text."

George Heinrich

Minnesota Society. Barbour residence, Minneapolis (above); F. John Barbour, Architect, Minneapolis. Located on a sloping corner lot, this house has prominent overhangs, large bay and corner windows, and bleached redwood siding detailed with a maroon grid pattern. The Prairie School character of the exterior carries through to the interior. The living room, dining room, kitchen, and study rotate around a skylighted stairway with bedrooms on the second level repeating this circulation pattern. "No arbitrary half-moons or split pediments here," wrote the jury, "This house is honest architecture."

State of Minnesota Service Center, Brainerd, Minn. (below); The Wold Association, St. Paul. In consolidating regional state government services, the architect organized the 34,000-square-foot facility into three components. The tall spine, cased in blue-green metal panels detailed with red window casings and horizontal stripes, runs the length of the complex and houses the circulation core. The main office component is a two-story wing clad in blue wooden siding; private offices are housed in sloped-roof, one-story appendages. The employee cafeteria, library, and conference rooms face the river.



Phillip MacMillan James

Indiana Society of Architects. Fire House No. 13 and Canal Maintenance Facility, Indianapolis; Browning Day Mullins Dierdorf, Indianapolis. One of the first new buildings to fall under the jurisdiction of the city's Lower Canal Improvement Plan, the fire station is a five-bay facility housing dormitories, recreation space, and a kitchen for 20 firefighters, as well as administrative support functions and training facilities. The sawtooth plan provides a series of bays for the fire trucks while responding to the triangular site and reducing the apparent scale of the building. A rusticated base of alternating courses of split-faced and ground-faced masonry rises to a full-height wall; above the masonry the stucco exterior finish is trimmed with wide bands of painted flashing and punctuated with deep windows.

Dan Francis/Marden Photography

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Columbus Chapter. Fairfield Harbour, New Bern, N.C. (top); Richard Trott & Partners Architects, Columbus. The overall massing of this 9,000-square-foot restaurant and mini-conference center at the mouth of the Neuse River was conceived as two structures paired side by side and woven together by a lower flat roof that houses the support and circulation systems. An entry pergola wraps around the curved facade and serves as an overscaled stairway. A blue metal roof and cedar detailing respond to the nautical setting.

Architects Society of Ohio. Scripps Hall school of journalism addition, Ohio University, Athens, Ohio (above); Richard Trott & Partners Architects, Columbus. A small library was renovated and enlarged to house the school of journalism. Although its site was prominent, the library pavilion never had "campus presence" because of its orientation away from the main lawn. A grass amphitheater carved into the site leads to a new entrance re-orienting the building and giving it a new presence.

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Iowa Chapter. 4 Sons Convenience Store, Des Moines (above); Stouffer & Smith Architects, Des Moines. A bold red entry announces the store, located in a skywalk system, while a red checkerboard floor tile defines the main circulation path. Free-floating yellow forms accent this spine. The jury's comments ranged from "tacky" to "junk food architecture" to "appropriate, even the lettering style."

Kansas City Chapter. Ten Central Car Park, Kansas City, Mo. (below); PBNI Architects, Kansas City. This 410-car parking facility for a pair of office buildings recalls the forms and texture of an adjacent restored Beaux-Arts building. In order to maintain a friendly street facade, the entire front elevation, with the exception of the driveway, is devoted to retail use, including a small theater and cafe.

ARCHITECTURE

This year's annual review of new American architecture follows the customary format: first a set of buildings chosen by the editors, then essays on architectural trends, then this year's national AIA honor awards. Before and behind all this is a selection of AIA component award winners and, in the Technology & Practice section, a triad of fascinating articles on research, among other useful things.

The essays this year assess the decade now in its waning months. Actually this is the first of two installments of views of the '80s. In December there will be another collection of essays, led by our own overview, then a series of evaluations of some of the decade's most notable buildings. As usual we are enormously grateful to the authors of the essays, both those who appear this month and those scheduled for December.

One of the clear trends of the '80s has been a continuation of the variegation that has marked the tall buildings added to our nation's skylines. This trend, of course, began in the '70s, and its pied piper was Philip Johnson in collaboration with John Burgee. In the current decade that role has been assumed by Kohn Pedersen Fox, which seems to be building towers in every U.S. city with a population over 50,000. We planned to publish three of them in this issue, so it seemed logical to attach them to a profile of the firm, a departure for the annual.—*D.C.*

Boston's 'Best New Piece of Public Architecture'

Hynes Convention Center; Kallmann, McKinnell & Wood. By Robert Campbell, AIA

A convention center that is neither a huge cube of black mirror glass, nor a vast block of concrete, nor yet a gift box wrapped in bright high-tech frippery, nor an underground concourse with a park on top—can such a building be conceived?

Conceived it has been, and not only conceived, but built. The new John B. Hynes Veterans Memorial Convention Center—to give it its full, ludicrous, all-things-to-all-constituencies name—differs from other major American convention centers in that it appears to be a place intended for human habitation rather than a fish warehouse or bird sanctuary or bus garage or high-security bomb factory. The Hynes is clearly a real building, with a roof and a base and floors and windows, with recognizable parts and materials and an attitude to the street and even a front door.

But it's far more than that, although that alone would have been a unique achievement for this forlorn building type. The Hynes is the the best new piece of public architecture in Boston, one of the few buildings of our own time that can be at least mentioned in the same breath with the masterpieces of a century ago, with the Boston Public Library or Trinity Church.

The architect, Kallmann, McKinnell & Wood, faced a daunting problem. Most convention centers, everywhere in the United States, are nothing but walled containers. The convention center is not a building type that suggests rich possibilities for architectural expression. All the life takes place deep inside, in deliberately windowless showrooms and lecture halls.

How can such a building be made *public?* How can it open itself, with sociable trust, to the life of the street and the city? How can we, standing across the street and looking at it, be encouraged to fantasize ourselves inside and thus begin the crucial act of interacting imaginatively with the architecture?

The architects have solved this essential problem by bringing the human part of their building—the lobbies and corridors where

Right, Hynes Center seen through a Back Bay street. Below, the remodeled box is at left and part of the addition at right.

Photographs © Steve Rosenthal


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NO STOPPING ANY TIME

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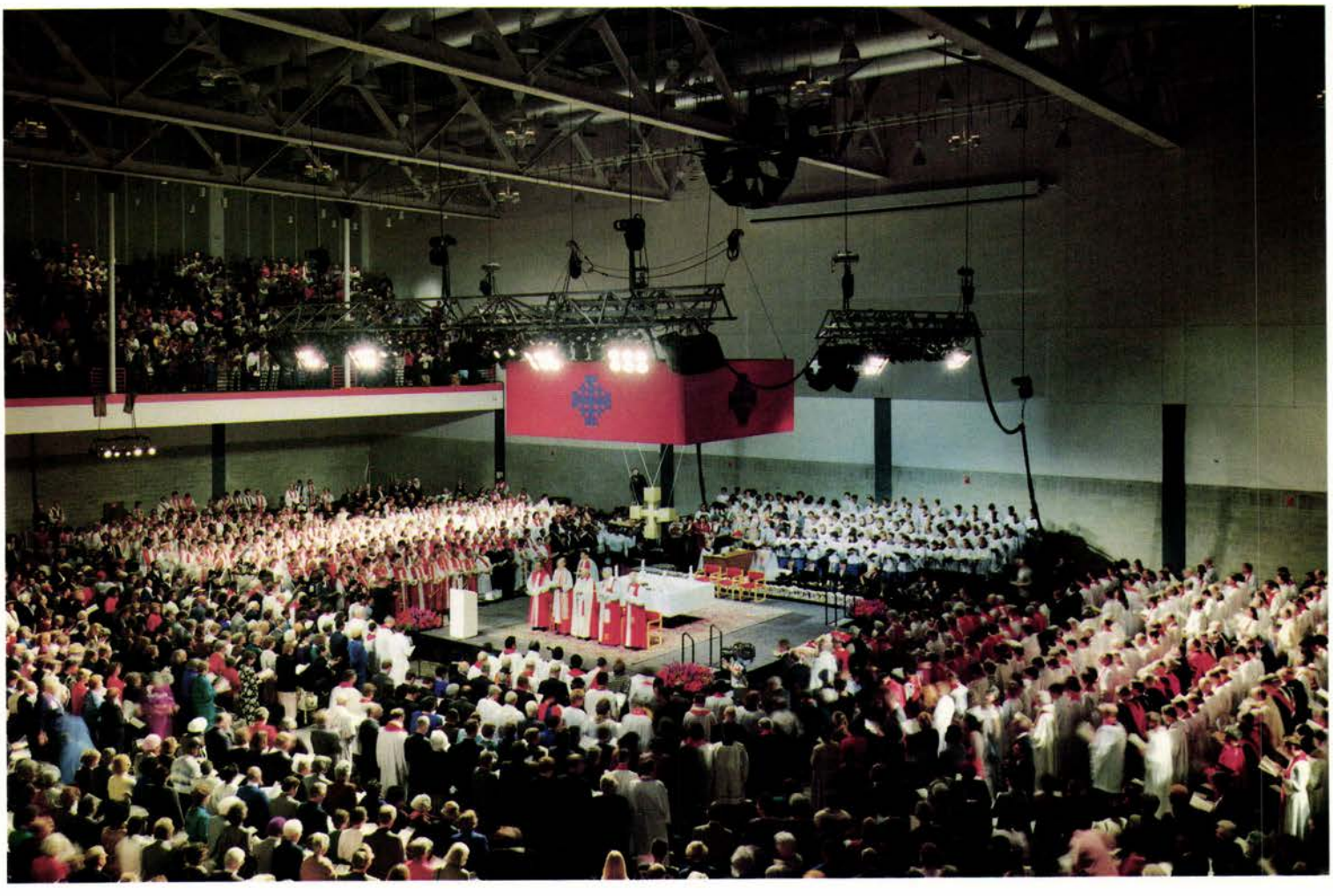

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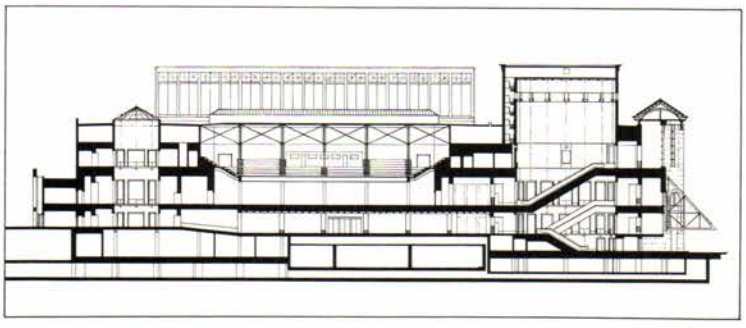

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conventioneers walk, meet, and party—out to the street front of the building. Luckily this is a north-facing facade that can accept generous windows. Some of the windows even have curtains. So far from being a blank wall, the entire major street frontage of the Hynes, on all three floors, is a row of windows, windows that connect the life inside the building to the life outside in the street.

Somehow, KMW persuaded the client, the Massachusetts Convention Center Authority, to fund another essential of good public architecture: wasteful, inefficient interior space. All those lobbies and corridors are big enough to function as great public living rooms. This is especially true at the top level, the third, where the lobby along Boylston Street is a stunning public gallery, two stories high and a city block long, vaulted at the ceiling, flooded with light, and opening to a view over the roofs of the Back Bay with the Charles River and Cambridge beyond. This gallery is one of the great rooms of Boston of any period. Part of its impact derives from the fact that it has been carefully prepared for. As you rise through the Hynes on its various stairs and escalators—rising toward this gallery—you are always moving up from darker and smaller spaces into brighter and larger ones, until you reach the top and emerge, as a climax, into the explosion of space and light that is this superb gallery.

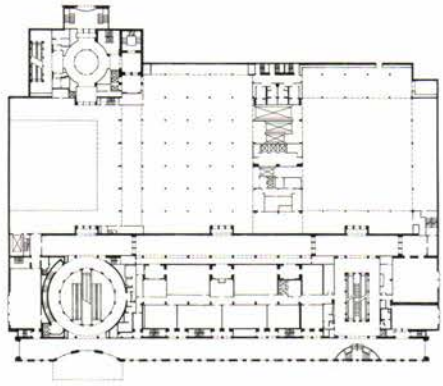
There are many more things to praise about the new Hynes. Not the least is its success in completely hiding the old Hynes. For the Hynes of today is not an entirely new building, although you can't tell that either inside or out. A hideous old blockhouse, the former Hynes still exists, completely renovated, inside the new. What the architects have done is to wrap the old building on two sides with the new one, which contains a great variety of meeting rooms and auditoriums that cater to the newer kind of convention crowd, more interested in holding a symposium than in staring at boats or tractors. The old contains, as it always did, big loft spaces for product displays.

The Hynes is unique in one other way as well. Instead of being sited out on the Interstate or in a downtown neighborhood of wholesalers, it stands on a street in one of Boston's best residential and shopping neighborhoods, the Back Bay. The Back Bay has its public monuments—the library, hotels, churches, clubs—but it has no other public building of the size of the Hynes. KMW has succeeded, or at least has come amazingly close to succeeding, in giving its building the rhythm and texture of the traditional Back Bay block without at all compromising its proper grandeur as a major civic institution. The Hynes is a very big thing in a neighborhood—or on the edge of one, at least—that is made up generally of much smaller things. Yet the Hynes is respectful in every way that it could be without abandoning its public character. The granite of its exterior matches the granite of the Boston Public Library a few blocks down Boylston. The spacing of its columns and windows matches the rhythm of housefronts. Its height matches closely the heights of older buildings across the street, including the Tennis and Racquet Club, which KMW renovated and in which the firm now has its own offices.

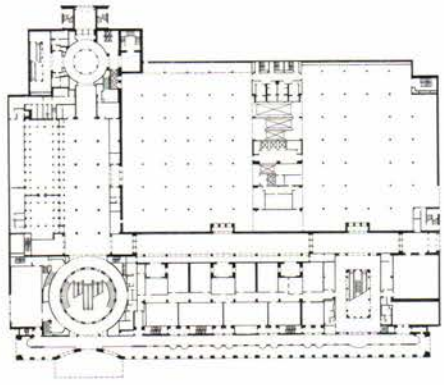
Things would be better if the ground floor along the Boylston sidewalk could have been lined with commerce instead of, as it is, by a relatively useless arcade. But the owner didn't want shops. In their absence, the arcade is a device for giving the building an articulated base and a sense of transparency along the sidewalk. It also is an extraordinary urban space in its own right.

Much has been written in recent years about the importance of the "street wall" in traditional cities. KMW has interpreted that concept in an amazingly literal way. The architects have conceived of the Boylston Street facade as one long wall, pierced but never violated by rhythmic windows and by the openings of the ground-floor arcade. Even at the main entrance, the continuity of the street wall isn't ruptured. Instead, the entire facade,

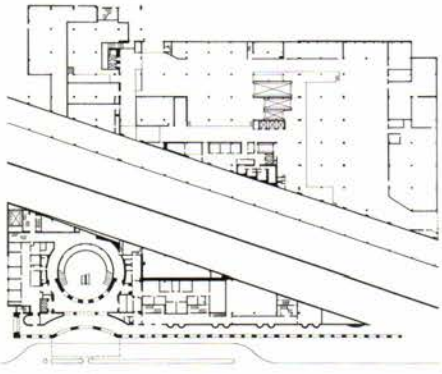
Top, the Boylston Street gallery that fronts the 'hideous old blockhouse' of the original convention center. Far left, the consecration of Episcopal Bishop Barbara Harris in the convention center last February. Left, a corridor etched in red.



Second level



Plaza level



Lower level

unbroken, cups back in a welcoming curve, while an enormously bold glass canopy juts forward to signal the entrance. The balance here, between continuous wall and invading entrance, is exquisitely kept. In the larger cityscape, the Hynes's entrance terminates an important vista up Gloucester Street from the residential Back Bay. That vista is made absolutely wonderful by the delicacy with which KMW has placed its bold entrance just enough off the axis of the street, to emphasize the primacy of the street grid over the monumentality of any single building.

The wallishness of the Hynes reminds you that the houses on nearby Commonwealth Avenue also line up to make block-long walls—walls that shape the space of the street into a great outdoor corridor. The Hynes has restored a similar feeling of streetspace to this long-fragmented end of Boylston Street.

On the facade itself, the architects have played a conscious and rather sophisticated game of trying to relate the new Boston to the old. At the sidewalk, the Hynes begins with a traditional material—granite—cut into shapes that recall, in a diagrammatic way, the details of the buildings of Boston past. But, as your eye moves up the facade, strange things happen. The warm-toned granite gives way more and more to steel and glass, materials more expressive of our own time. At the top, simple blue-black steel plate girders, like those of a bridge, span the window tops and support the roof. It's as if the Hynes's granite skin were being progressively peeled back to expose the steel skeleton of which the building is actually made. This pseudo-narrative gives the facade a lot of interest and gives the architects the chance to play with more than one material. And it helps create the clear bottom, middle, and top. The effect is truly elegant.

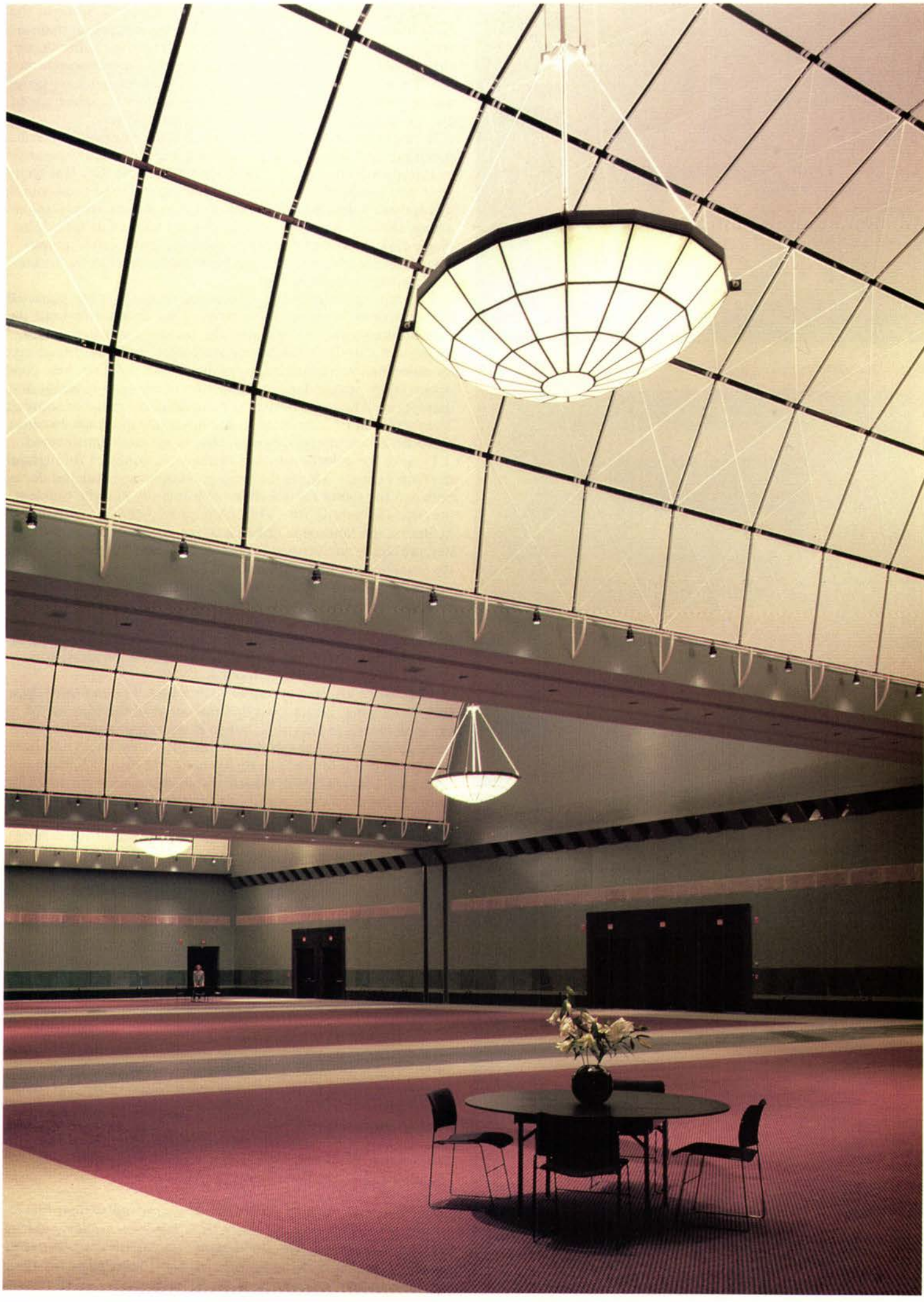
Viewed from the street, the facade dramatically expresses what's going on inside. The tall third-floor windows tell us there must be a grand piano nobile inside, like the ballroom floor of a palace or the upper-floor reading room of the Boston Public Library. The windows don't lie: behind them is the great public gallery.

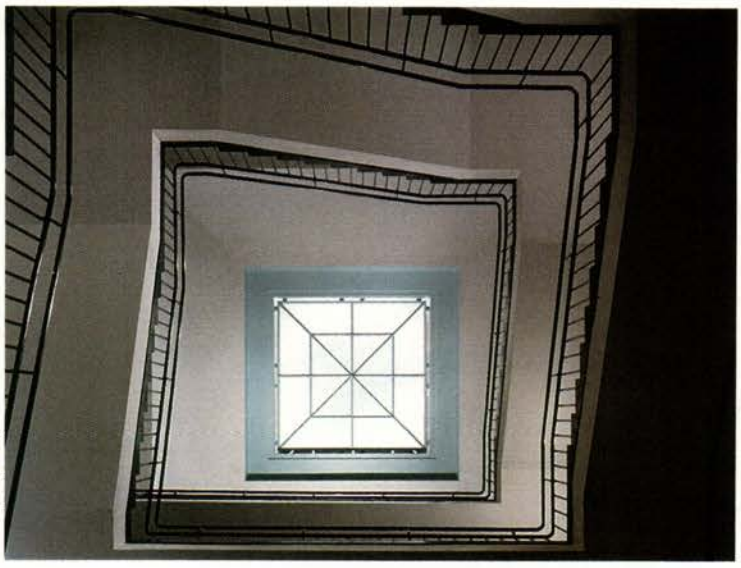
One thing you don't notice about the Hynes is the fact that much of its ground floor is mere headroom for the Massachusetts Turnpike, an Interstate highway that barrels at an angle through the entire length of the building. You don't notice that because, as soon as you enter, you are whisked up a rapid escalator while your attention is distracted by the extraordinary interior space.

This, the center of circulation, is a mighty drum, a great vertical cylindrical room that rises the full height of the building and pokes up through the roof. Escalators rise in its middle, and stairs climb its curved walls. Architects will quickly recognize, as one source, the classic Stockholm Public Library by Gunnar Asplund, where the drum houses the lending room as well as stairs. At the Hynes, the cylinder form does many things. On the exterior it makes a round foil for the long, flat street wall. Inside it makes the circulation memorable and thus organizes your perception of the whole interior. You are always emerging from and returning to the drum as you move about the building. From it, you can see straight through the building to the rear door where the Hynes opens onto the plazas of the Prudential Center complex—plazas that connect, over bridges, with two convention hotels and a shopping mall. From the drum, too, you can look down the long Boylston Street galleries at all three levels. You can see out to the streets of the city at each landing. Unlike so many convention centers, the Hynes is never a maze, never disorienting. You always know where you are in the building and where the building is in the city.

The next thing you probably notice after the drum is the quality of materials. Where else can you find a convention center whose floors are surfaced not in bland terrazzo but in patterned inlaid granite of different colors? Where else do ordinary meeting rooms have coved or vaulted ceilings, so that they will feel like complete, self-contained rooms instead of like mere segments of some endless space that has been arbitrarily partitioned off?

Left, inside the circulation drum. Right, vaulted ballrooms that can be used separately or as one great luminous space.





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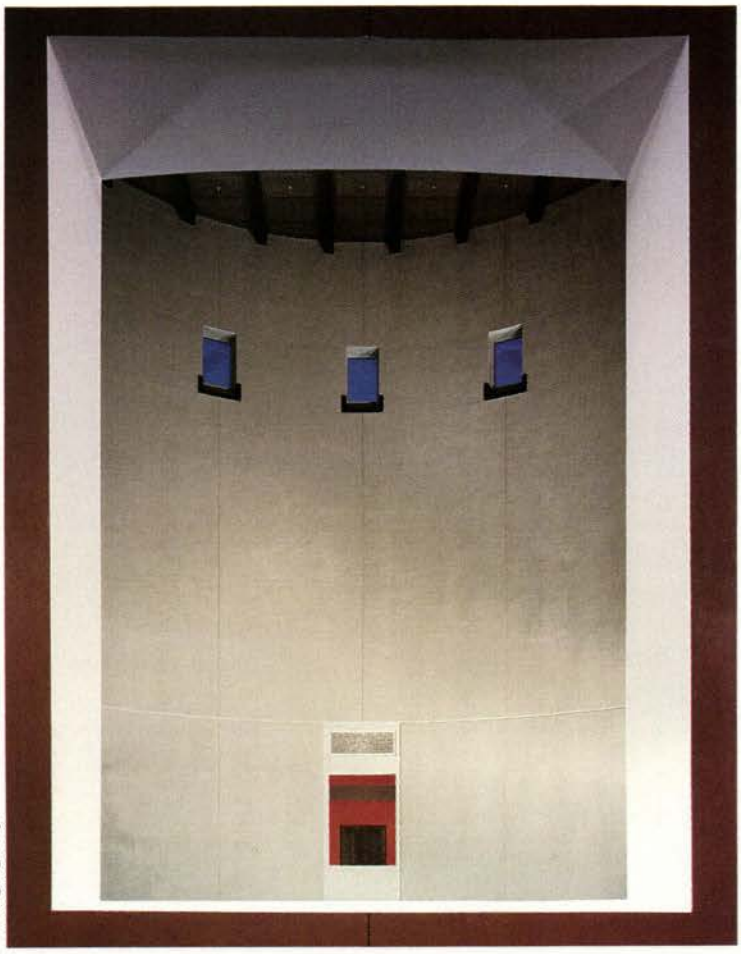

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A few questionable things also should be noted. Some of the circulation areas, especially on the lower levels, are perhaps a little too dark. Wide wooden benches in the great galleries are elegant but seem overwrought in shape and uncomfortable in use. There's a lot of hidden pocket area in the plan, which serves well to create a sense of depth at room entrances but which might also perhaps have been put to some practical use.

Besides the top-floor gallery, several other interior spaces are remarkable. A trio of vaulted ballrooms can be used separately or thrown together as one big room. Either way, they feel complete and beautiful. The transverse hall on the third floor, which serves these ballrooms as circulation and reception area, is astonishing. Its walls are bright red, and down both of its sides huge blank dark doors (many of them false panels) seem to march. The effect recalls some of the grim Valhalla interiors by the German painter Anselm Kiefer.

This red room reminds us of a certain angst that has persisted in the work of this remarkable team of architects ever since its extraordinary debut in 1962 with the competition-winning design for Boston City Hall. Kallmann-McKinnell buildings are always far more than accommodations of the client's program. Like good poems, they offer a dense compaction of possible readings and metaphors. They also derive from an amazing range of sources. They are eclectic in inspiration but never in expression, because the sources are always digested, abstracted, and transformed.

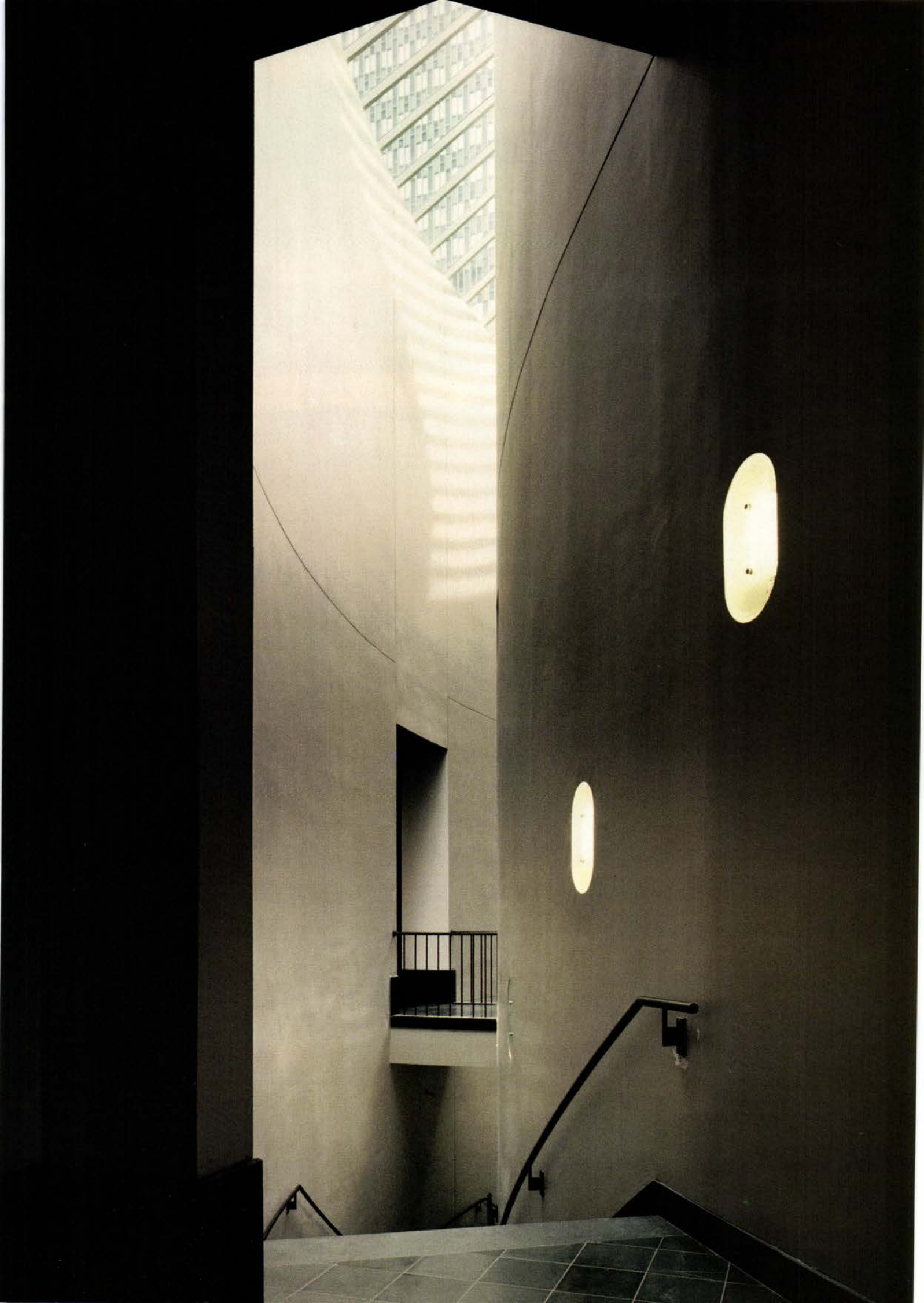
Despite the eclecticism, one theme does continue throughout the firm's career. This is the tension between survival and decay, between the temporal assertions of humanity and the timeless processes of nature. At KMW's American Academy of Arts and Sciences, the landscape chews into the architecture at one corner, presaging an eventual reversion to nature. At the firm's fine Becton-Dickinson headquarters in New Jersey, an atrium floorpiece—a collaboration between the architects and artist Michael Singer—takes the form of an excavation that seems to contain building materials but also mysterious artifacts. It is at once the fresh breaking of earth for the new and an archeological digging up of the old, and it relates the building to the process of its making and its eventual unmaking.

The Hynes has that metaphoric richness. The red third-floor hall, suggesting the set for a dramatization of the Masque of the Red Death, is part of it, but so is the more hopeful movement of rising up through the building from darkness into light. The great drum reminds us of Asplund, but also of Stirling in Stuttgart. Though KMW's work always seems tectonic and fully built, as opposed to pictorial or narrative, it is amazingly rich in ghostly messages, references, metaphors, and demarcations.

With the completion of the Hynes, KMW has created more significant public architecture in Boston than any other architect or firm since Charles Follen McKim. KMW has emerged as a sort of designated civic architect. It seems likely, too, that the firm, long saddled with its reputation as designer of the now hopelessly unfashionable (though still powerful) Boston City Hall of 1968, is about to re-emerge into the consciousness of the profession and of architectural schools and historians in the United States. Hynes is in many ways the best and most interesting of recent Boston works of architecture and deserves that kind of attention.

Perhaps the Hynes presages something else: an era in which Americans again will be ready to spend as much money on the public realm as on our private worlds. Perhaps Bostonians are once again realizing that a wonderful private world—a great car, house, stereo, art collection, whatever—means little unless there's a great public realm to walk out into. It was just such thinking that created, a century ago, the public streets and squares of the original Back Bay. The Hynes is a fitting addition to that great piece of urbanism. □

This page, from top: skylight entices visitors up to light-filled gallery; view into meeting room from Boylston Gallery looking across the granite-tiled floor anteroom; the stark and sleek 'mighty drum' of the full-building-height rotunda. Facing page, top floor of stairway that wraps around the rotunda.



IBM's Colorful 'Place in the Sun'

In Westlake, Tex., Legorreta Arquitectos, Mitchell/Giurgola. By David Dillon

Photographs © Richard Payne, AIA

Westlake doesn't show up on many Texas maps, and its neighbor Southlake appears only as a speck on the fringe of Dallas/Fort Worth Airport. Together they have a population of 3,500, enough to support a Dairy Queen, a Circle E convenience store, and the Flying Burrito restaurant.

But this pastoral tranquility is disappearing as IBM relocates its regional headquarters to the area. Two thousand employees already have made the move, with another 2,000 to follow in the next few months. Nearly 2 million square feet of space have been completed. Within 10 years this 900-acre swatch of rolling north Texas prairie is expected to contain a dozen corporate headquarters, mainly electronics and communications firms that are considered the salvation of Texas's depressed and chemically dependent economy. As many as 20,000 people eventually may work and live in Westlake and Southlake, making a city where only farms and pastures existed before.

IBM Westlake—now rhapsodically renamed Solana or "place in the sun"—is the latest satellite city to go into orbit around Dallas and Fort Worth, taking its place in the regional galaxy next to Las Colinas, the Galleria, and the Dallas Parkway corridor. Although not the largest of these new urban centers, it is arguably the most thoughtful and instructive.

Above, overview shows integration of roads and buildings. Left, the Marketing Center, a multi-jointed building.

From a distance, Solana is only a magenta pylon and a cadmium-yellow column poking above the tree line on either side of State Highway 114. Southlake residents once threatened to sue IBM over these colors, claiming that they were loud and un-Texas. And they were right. The colors are loud and Mexican and were introduced by architect Ricardo Legorreta, Hon. FAIA, to give Solana a distinctive psychedelic presence on the rural horizon.

"I wanted to make color part of the entire design, not something added on," Legorreta explained. "Instead of saying I will make a wall and paint it red, I said I will make something red and it will be a wall."

But bold color is only one of the things that sets Solana apart from other corporate campuses in the region. The Texas Highway Department, in a rare burst of inspiration, permitted Legorreta to design the bridges and underpasses leading to and from the project. So, instead of taking another nondescript off-ramp, with a traffic island and a stop sign, visitors exit Highway 114 into a dramatic outdoor room, complete with plazas, fountains, and tall, slender obelisks. The adjacent berms and slopes, planted with fruit trees, are like miniature orchards that mediate between the raw prairie and the artful parterres around the individual office buildings. Legorreta also placed two red stucco walls parallel to the overpass, further evidence that this is a gateway rather than simply a freeway interchange.

Those who drive to the Westlake side of the project find another surprise: two long, low parking garages, with arcades and double rows of trees, that create a baroque forecourt for the office complex. Seventy-five percent of the parking at Solana is covered; this is an unusually high ratio for a suburban development. Equally impressive is that the parking garages have been used to make public spaces instead of being appended crudely to the backs of buildings. Here the UPS driver feels he has arrived at Vaux le Vicomte.

Freeway interchanges and parking garages, though not the main attractions at Solana, demonstrate how meticulously the entire project has been planned. It is not a typical suburban scattering of discrete buildings on individual sites but rather a series of precincts or rooms in which the automobile has been accommodated and also tamed. There are edges, boundaries, and hierarchies. Roads keep to the high ground, with the buildings set

Photographs © Richard Payne, AIA

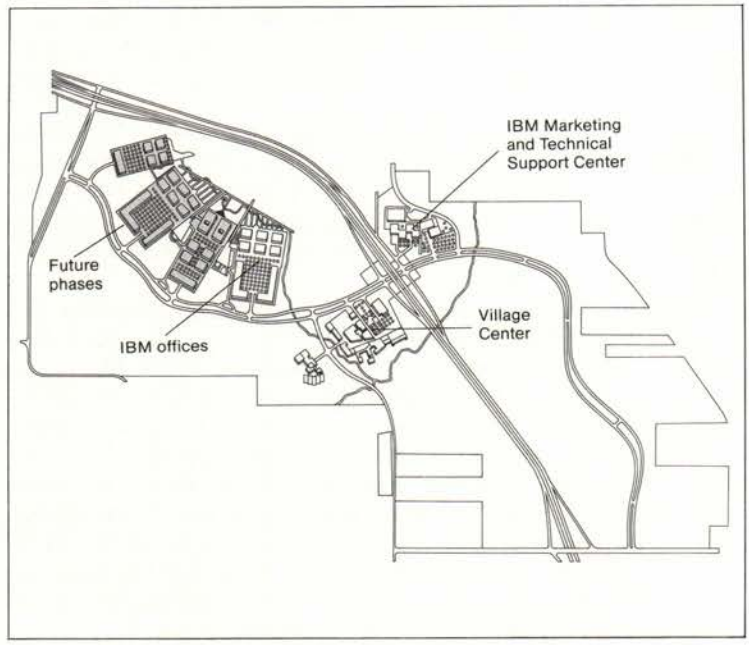
in low areas against a background of trees and rolling hills.

Solana is a joint venture of IBM and Maguire Thomas Partners. Maguire Thomas hired Legorreta Arquitectos to design the IBM complex in Southlake, as well as the hotel, shops, and office buildings that make up the Village Center across Highway 114. Mitchell/Giurgola designed the Westlake campus, which consists of six five-story office buildings, two parking garages, a cafeteria building, and a computer center. Landscaping for the entire 900-acre site was done by Peter Walker/Martha Schwartz, while the master plan was the responsibility of Barton Meyers, AIA, in consort with all the other key participants.

Assembling so many stars on one team could have been a disaster, like George Steinbrenner's grand designs for the New York Yankees. Yet one of the pleasures of Solana is how well the individual pieces work together. Whatever the stylistic differences, they reflect common objectives and a shared point of view.

Everyone agreed at the outset that the site was the most important element, not simply because it had a history and an identity that were worth preserving. The challenge was to put buildings in the place yet to allow the place to shine through. Consequently the architects agreed to build only on 10 percent of the land, leaving the remainder as fields, meadows, and woods. One hun-

Facing page above, the Village Center, patterned after a plaza in a small Mexican town; below, entrance axis of the IBM office complex. Above, cross axis of the same complex, showing interior courtyard with pools and pergola.



dred fifty acres have been replanted with the wildflowers and prairie grasses that once flourished there. Buildings have been kept below the tree line—roughly five stories—so that they always are seen across a landscape. In form and materials they are Southwestern, though without the usual postcard clichés. Connecting these far-flung pieces is a network of lakes, streams, ponds, and pathways that represents an architectural stylization of the natural features of the site. Within these general guidelines the architects were free to do as they wished.

The most distinctive single building at Solana is Legorreta's Marketing and Technical Support Center, a low, multijointed structure with large stucco walls, small mullionless windows, and five interior courtyards. CEOs from around the world gather here to inspect IBM's most sophisticated new products. The center was intended to be a compound, a place apart, and Legorreta responded by turning the building in on itself.

Visitors enter the Marketing Center through a tall vaulted room,

Courtesy of PHH Neville Lewis © Peter Paige

painted blue, with a slatted arched window at one end and a spartan reception desk at the other. It is Giotto's chapel updated for the computer age, ideal for putting customers in a receptive frame of mind.

Beyond are the numerous offices and conference rooms where IBM's latest modems and mainframes are given their whizz-bang presentations. Here the interiors—by PHH Neville Lewis—are nearly as spare as in the vestibule chapel: white walls, Mexican tile floors, oak trim, and a few latia ceilings, like those in Legoretta's resort hotels.

But the real interior decoration is the gardens, designed by Legorreta and Walker/Schwartz. They give the building a clarity and openness belied by its stolid stucco exterior. The main entry courtyard, with its cedar trees, misting fountain, and magenta sunscreen, is an intense contrast to the cool, dark, barrel-vaulted lobby. Another courtyard, clearly inspired by Luis Barragán, consists of willow trees and a series of narrow, rectangular reflecting pools. A third is a spare gravel space with benches around the edges and a few small trees. Here is an interior world of crisp geometry and carefully framed views that manages to be restful rather than manipulative. After an hour in these green spaces, any sales pitch becomes bearable.

Above, Legorreta's long entrance to the Marketing Center. Facing page, above and below right, vaulted Marketing Center lobby, moodily lit from small windows; below left, grand stairway leads from this vaulted room up to offices on second floor.

The Village Center is intended to be an intimate and informal counterpart to the corporate preserve, the small town at the edge of the army base. Instead of Cancun and Barragán, Legorreta borrowed from the markets and plazas of small Mexican towns. So far, the Village Center consists of restaurants and retail spaces opening onto a paved courtyard with fountains, trees in large clay pots, and a soaring (and enigmatic) fuscia pylon that could be a commercial version of a Mayan stela. Opposite the plaza are two spec office buildings by Legorreta—architecturally the weakest parts of the development—and the beginnings of a 300-room hotel. If Solana is to have a civic realm, the Village Center is it.

Compared with Legorreta's underplayed vernacular designs, Mitchell/Giurgola's Westlake complex appears formal, rigid, almost classical, with buildings arranged foursquare on a neat rectangular grid. Romaldo Giurgola, FAIA, has continued the Southwestern theme by cladding most of the buildings in red

Courtesy of PHH Neville Lewis © Peter Paige

Courtesy of PHH Neville Lewis © Peter Paige

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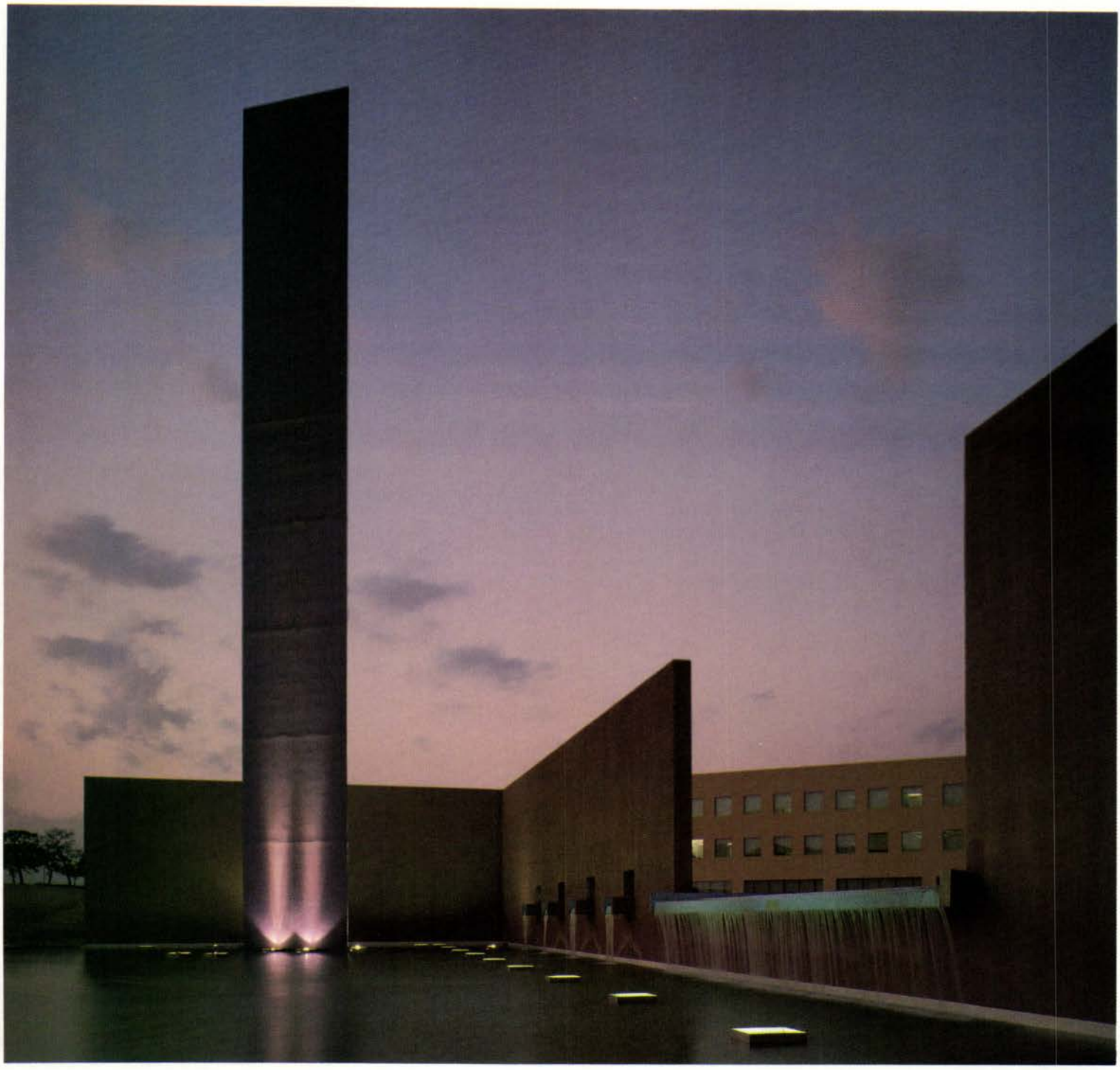


© Jim Hedrich, Hedrich-Blessing

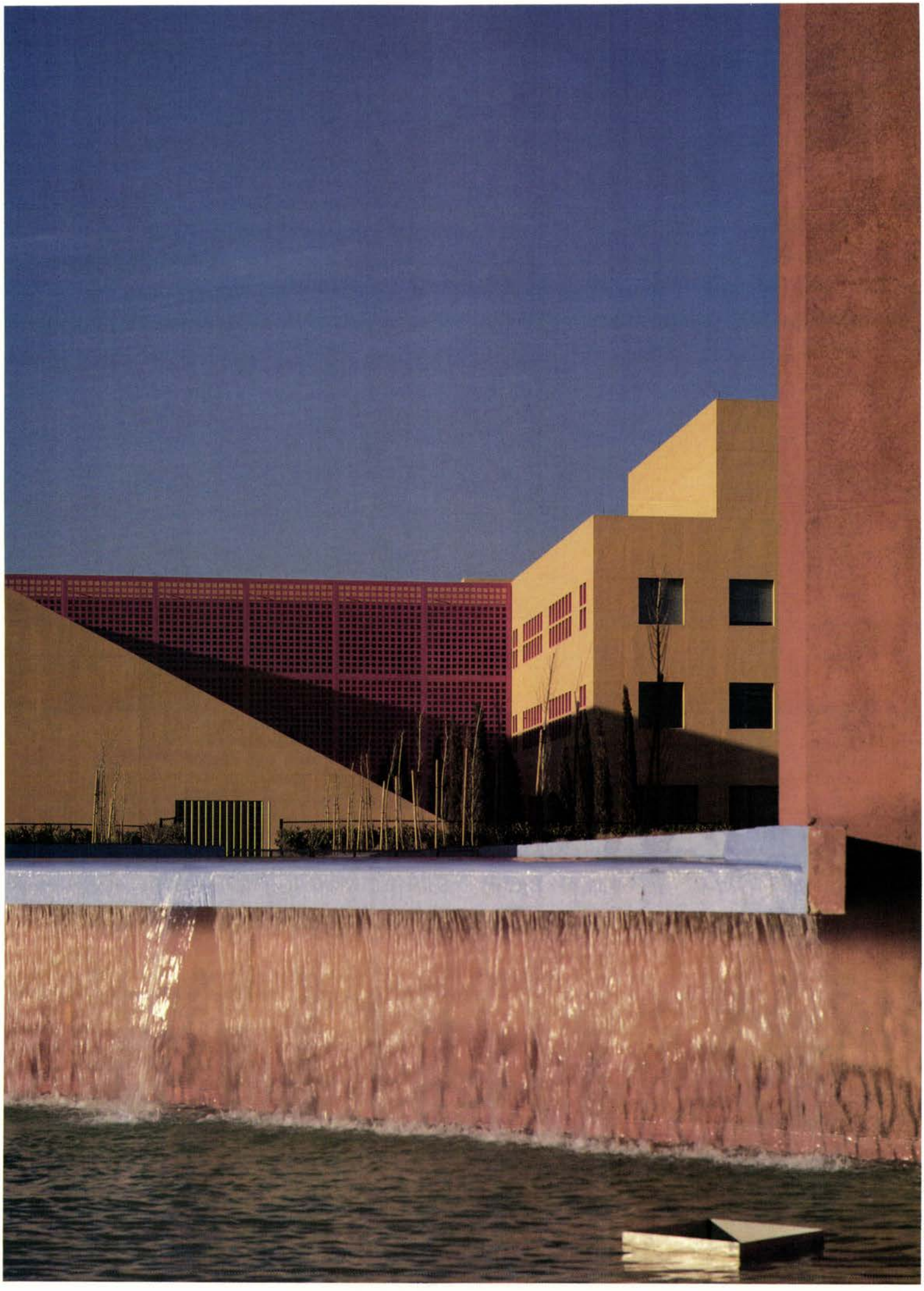
or tan stucco, yet the general feeling is of another place, suggesting at times the firm's Volvo headquarters in Sweden. In keeping with the master plan, Giurgola distributed the 900,000 square feet of office space among six identical buildings, each five stories tall and tucked into a natural hollow on the site. And, whereas the Marketing Center turns inward toward gardens and courtyards, Mitchell/Giurgola's buildings turn outward toward the landscape. Arcades run along the base of the buildings, while on the upper floors the perimeter is a wide corridor that gives everyone a view of the surrounding woods and prairies. The space between the buildings is a long symmetrical courtyard with trellises and reflecting pools, like a formal garden in a country estate. The one splash of traditional corporate high design occurs in the cafeteria building, one end of which is clad in polished gray granite and features a grand stairway that comes straight from the Volvo headquarters. The idea here seems to be that, because in a remote place like Solana lunch becomes a major social event, employees should have an elegant place in which to eat it. Nice thought, but somewhat schizophrenic as a design. The other cafeteria interiors—by CRS Sirrine—carry on the low-key Southwestern motif to more pleasing effect.

Weaving around and through the entire project are the paths, ponds, streams, and parterres shaped by Walker/Schwartz. It will be years before this work can be fully appreciated, yet already it has set the tone for Solana by showing how large buildings can be set in a landscape without obliterating it. The obvious development pitfalls—ubiquitous parking lots, overscaled buildings, gratuitous diversity—have been avoided. There is order at Solana but also diversity in the form of hills, lakes, boulevards, hiking trails, public spaces, and private retreats.

Above, purple pylon and fountains at Village Center. Right, one of the entry fountains at the Marketing Center.

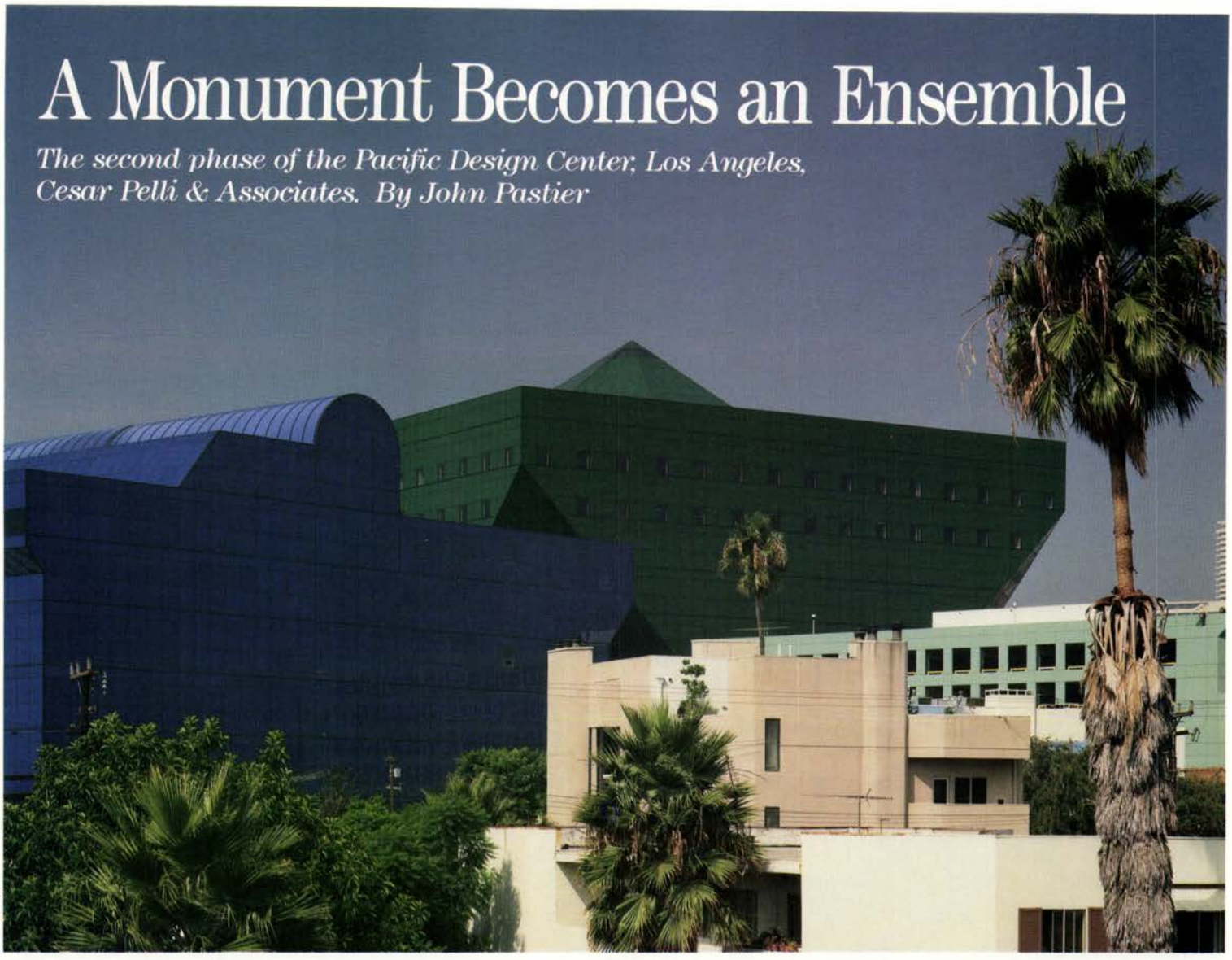
The real test for Solana will come a few years from now, when the second generation of corporate tenants arrives and decides it wants to tweak the original master plan. Build a little taller, perhaps, or creep a bit closer to the highway for better exposure. Many good plans have crumbled under this kind of assault. Maguire Thomas says it won't cave in. "We are under no pressure to start a helter-skelter development," says managing partner Robert Maguire, "and we won't do it. We won't lose control."

Phase I of Solana is so good, so filled with lessons for other developers of the new American landscape, that one can only hope that Maguire is a man of his word. □



A Monument Becomes an Ensemble

The second phase of the Pacific Design Center, Los Angeles, Cesar Pelli & Associates. By John Pastier



Photographs © Joe Aker

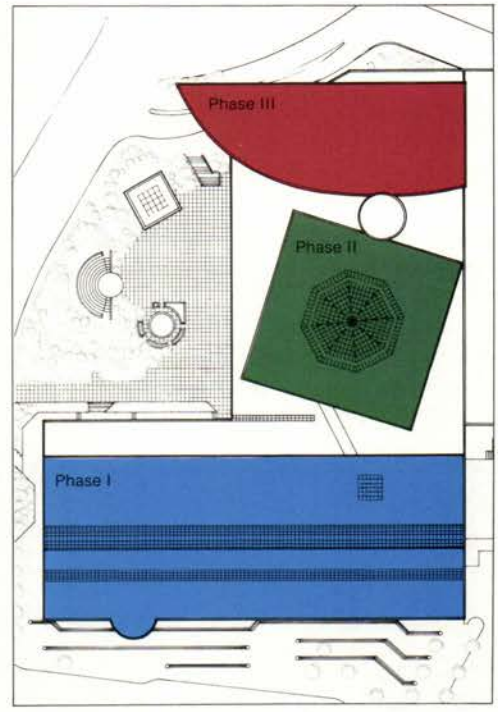
Since it was built in 1975, the Pacific Design Center has weathered an initial flurry of controversy to become a respected landmark of Southern California modern architecture. Dubbed the Blue Whale, Cesar Pelli's abstractly sculpted ultramarine monument has come to embody Los Angeles' unconventionality and variegated urban fabric. In a city where most of the good buildings are small, domestic, and removed from easy view, this pristine, freestanding object is one of the few large and easily visible buildings to achieve both professional and popular recognition.

Its startling color, unusual form, and sharp break in scale from its residential surroundings, the very qualities that once were so controversial, are also what made it memorable. Pelli's skills at sculpting a huge and essentially windowless mass and in creating a complex reflective skin are what made it so refreshing and at the same time impressive.

Thanks in no small part to the quality of the building, the PDC has been an economic success. Business proved so good that its management asked Gruen Associates to design an expansion a few years ago. The reasoning was that Gruen had been the original architect and was still in business just two miles down San Vicente Boulevard from the Whale. The flaw in the reasoning was that Pelli was no longer directing design at Gruen and wasn't asked to be on the team. The result was an unimpressive grouping of three silver hexagonal towers that seemed unaware of the Blue Whale's existence, an achievement comparable to not noticing the elephants in the second act of *Aida.*

Although this obvious despoliation of a local landmark never attracted the attention of any architectural watchdogs in the daily press, it did create a disturbance in the design community and eventually spawned a strong critique in the Los Angeles AIA chapter's monthly tabloid, *LA Architect.* After this and after personally hearing many complaints about the Gruen scheme, the late Murray Feldman, the PDC's manager, realized that design quality and designers' good opinions were not to be taken lightly in a building devoted to the design profession, and he worked out a Solomonic arrangement whereby Pelli would design the expansion while Gruen would be responsible for the contract documents.

This solved the problem of design talent and continuity, but it also put Pelli in a difficult spot. He was faced with the problem of adding on to a building that was never meant to be altered in any way. "When I designed the original," he says, "I was sure it would never need to be expanded. And had I known it would need to be, I never would have designed it the way I did." Its long extruded shape lent itself to augmentation only along its major axis, but adjacent streets and residences foreclosed such a move. Vertical expansion would have been functionally, esthetically, structurally, and economically problematic. The architect's own stylistic inclination also had changed dramatically during the intervening years. Furthermore, he says, "when the PDC was built it was nowhere in particular, but now it is in the downtown of [the new city of] West Hollywood." (The municipality's civic center will soon be built across the street.) He likened his situation to that of a character in a Jorge Luis Borges story who set out to rewrite *Don Quixote* using Cervantes's exact words but in a way that would have an entirely different meaning from the original.



Drawing by Ceasar Pelli

Facing page, the 'Blue Whale' and its new green sibling rise above their low-scale West Hollywood neighbors. Top, the new wing sits on a two-story blue base perpendicular to the old wing. Drawing by Pelli shows the future addition of a red wing.

After pondering the problem, Pelli concluded that the best design strategy would be to treat the original building as one of several contrasted "fragments" on the site. This would allow it to retain its form and identity while also freeing the newer components from the need to repeat the color or shape of the older building. This would also nicely accommodate the need for expansion in two separate phases.

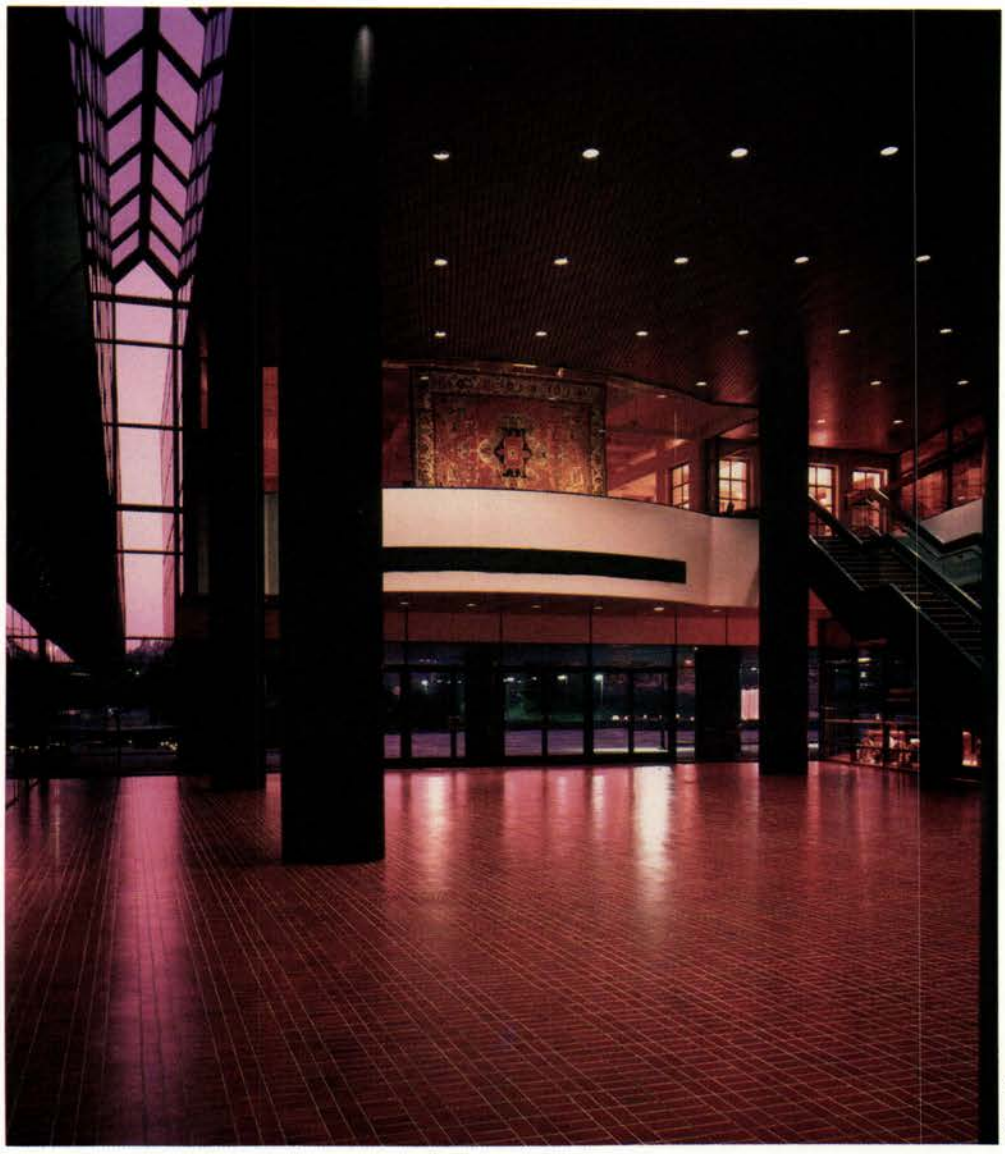
Earlier in his career, Pelli was fascinated with the notion of organizing his buildings to permit – indeed, to express – the processes of growth and change. Part of this approach, embodied most fully in the brilliant but unbuilt U.N. City megastructure for Vienna, Austria, was to create an open-ended esthetic wherein the growing building would look complete and convincing at any point in its evolution. This was accomplished rationally by permitting growth in three directions and along a dozen or so axes. Other constructed buildings incorporated similar philosophies on a less elaborate scale. Ironically, few of them have required enlargement and none of those have been expanded as planned; yet a building that was never meant for expansion turned out to require a total of 1.7 million square feet of additional showroom space and parking, more than tripling the built area of the original.

The result of these weighty demands is one of the most remarkable transformations in recent architectural history. What was originally a functionally and esthetically self-sufficient building is now a piece of a larger and richer composition. What was once a freestanding object in space is now part of a space-shaping ensemble. And what was originally simple and suburban has become complex and, at least by local standards, urban. Most significantly, what was once a fine building that apparently could only be diminished by any addition has been made significantly better. Although the solution was ad hoc and intuitive rather than anticipated and systemic, it is highly convincing.

The second phase of the PDC, recently completed, consists of a twisted but symmetrical 450,000-square-foot, green-glass element housing showrooms, a conference center, and a restaurant; a freestanding art gallery; a parking structure; and a new plaza at what was once the rear of the old building. Phase 3 will consist of a 600-car garage expansion and a 375,000-square-foot showroom wing in the form of a curved wedge clad in dark red glass.

Unlike its blue ancestor, the green element does not lend itself to a snappy nickname. "Green Apple" has been offered, but its cantilevered sharp-edged shape contradicts any attempted biological metaphor. If anything, it looks like a child's toy or a machine part. Inside, that form translated into simply shaped floors, octagonal at lower stories with diminishing corner chamfers on higher levels finally producing a square at the top. This primary volume is capped by a roof and skylight in the shape of an octagonal pyramid that forms the top of a three-story, 90-foot-high central atrium. Fire codes prevented a full-height central space for this nine-story building; in compensation, there are three internal two-story atria vertically stacked below the uppermost one. These four octagonal spaces and their balconies

Below, the abutting cylinder houses the main circulation path and provides expansive views. Right, the interiors of the new wing repeat the red tile and linear metal ceiling of the original. Far right, the newly created plaza provides a public space for events and performances.



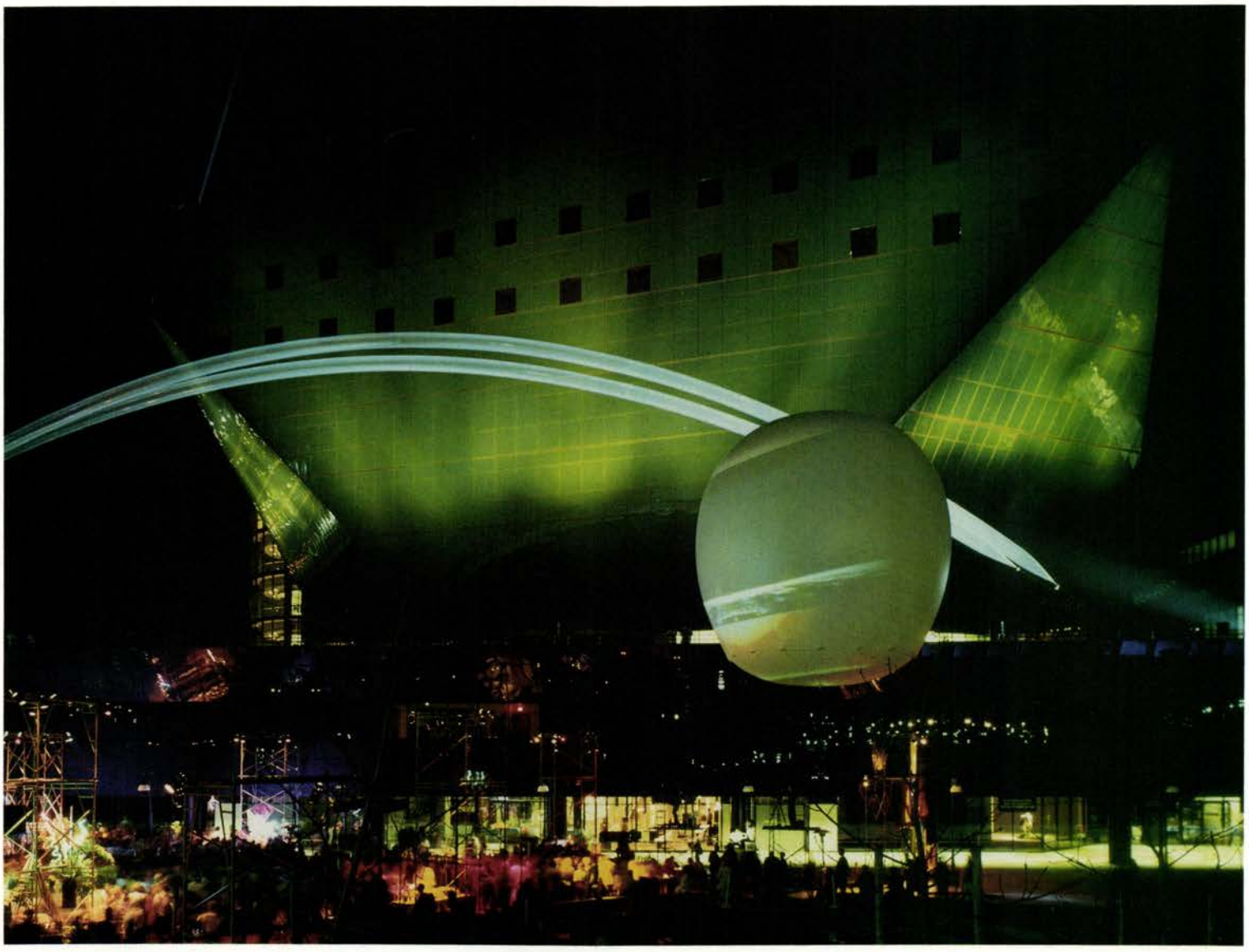
embrace much of the horizontal circulation in a rather compact floor plan. This scheme contrasts sharply with the Blue Whale, where a long plan and decentralized vertical circulation produced intentionally long and irregular internal corridors. Like the original building, the green one has a dramatic cylindrical escalator bank permitting sweeping views of the city. The newer bank projects even farther from the face of its building, since it later will act as a hinge between the green and red wings. At that point in the PDC's evolution, its function as a belvedere will be sharply reduced.

The circulation spaces of the green wing are rather simple, with only the topmost atrium showing any overt expressive ambitions. This is only logical since the tenants themselves supply considerable visual diversity and excitement. The showrooms are all individually designed, and most of them have frontages that are as open as possible. Many of the smaller spaces augment their impact with mirrored walls. The residential and contract furnishings carried by the tenants are on prominent display, and a healthy competition has gradually raised the quality and sophistication of both the storefront designs and the showroom interiors. In its 13 years of operation, the PDC has evolved from a sedate internalized decorators' row to a lively gallery environment that is part bazaar and part museum of design, in proportions that depend on the occupants' inclinations in a particular section. In such a setting, any attempt at creating a strong architectural framework would only come into conflict with the evolving differentiation and ingenuity of the tenants.

Outside, Pelli has been less modest in his design ambitions. The tight juxtaposition of superscaled blue and green forms creates a dramatic visual tension and a truly urban set of spatial relationships that is rarely encountered in this city of disconnected experiences. One corner of the green block comes perilously close to the Blue Whale, and, since there is a grid shift of roughly 16 degrees between the two sections, it is easy to imagine one or the other in motion. There are both toughness and poetry in this composition: two great architectural beasts of different colors co-exist like sleeping giants that may one day wake up and do battle.

At greater distances, this relationship is equally effective; if anything, foreshortening underscores the angular and formal tension between the two elements. Due to its placement and nearly 200-foot height, the green block strengthens the landmark quality of the complex. It creates a more dramatic and complete presence than the Blue Whale did when seen from the sloping streets and foothills to the north, and it announces itself axially along the twisting course of Melrose Avenue at even greater distances than the earlier building. The green addition has magnified the scale of the PDC and thus heightened its almost surrealistic relationship to its surrounding neighborhood of cottages and low-lying storefronts and apartments. In a city where the unexpected has become commonplace, it has restored the possibility of surprise.

Dramatic and serendipitous from afar, its exterior is welcoming and almost intimate at closer range. In part, this is because Pelli defused the tension between green and blue at ground level. The new section sits on a two-story blue base perpendicular to the old wing. Pelli explains that the figure-ground relationship was designed to reverse itself at the third floor. At the lower lev-



© Adrian Velicescu

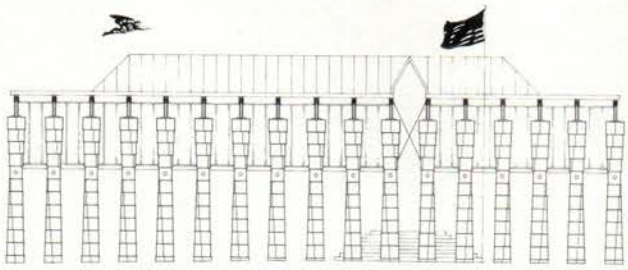
els, which are urban and public, the plaza is the figure and the building is the ground, whereas higher up the angled buildings constitute the figure and the intervening space the ground. In this way, Pelli had the best of two worlds: expressive geometric and spatial relationships perceived at a distance, and urban regularity and order on the occupied ground plane.

Although architecturally bounded on two sides, the plaza also fronts on the inclined and sweeping curve of San Vicente Boulevard. Far from being an urban street, it is more like a suburban highway, and creating a convincing space alongside its swath was not an easy task. It was accomplished by Pelli's partner, landscape architect Diana Balmori, through astute manipulation of the sloping site and playing off formal versus informal geometries and planting versus paving. From the road, one is naturally drawn into the plaza by gravity and by the obvious destination of the two buildings. From the plaza's inner portions, the highway is nearly invisible because of planting and a rise in the ground that also serves to contain the space, at least at eye level. Thus, the open space is a park near the street and a hard-edged plaza near the buildings. Eventually, the concluding red building will bound this area on a third side, but for now that task is accomplished implicitly and surprisingly well by the relatively small, cube-shaped Murray Feldman Gallery standing to the north.

There is also a small semicircular amphitheater that straddles the boundary between paved and vegetated zones. A fountain occupies the hardscaped portion, while a meandering path and inviting groups of wooden benches punctuate the landscaped zone. An unequal checkerboard of red, green, and natural-toned concrete covers the plaza.

If there is a flaw in this project, it is a certain lack of quality in execution. The PDC owners, a consortium of several corporations located outside Los Angeles, have been frugal clients from the start. Pelli has responded intelligently to tight budgets on both occasions, using economical off-the-shelf materials and relatively undemanding building techniques, but at times one would like to see the occasional rich surface and elegant detail, particularly since the building is devoted to tenants who specialize in those very things and is trafficked by buyers who value them. It is rather like the cobbler's children going barefoot. And, while the Blue Whale was put together reasonably well, the expansion is afflicted by some clearly substandard workmanship. The plaza paving colors, especially the greens, are washed out, and the surfaces are somewhat shabby. The Feldman Gallery is clad in a warm concrete that would have been beautiful had it not been scarred by severe pouring irregularities that are visible a hundred feet away.

Apart from construction quality, the PDC is microcosmic evidence of Los Angeles' ongoing urban maturation. It has evolved from a freestanding building fronting a huge parking lot to a rich amalgam of park, plaza, and dynamically composed structures, accommodating more automobiles far less obtrusively. While there are many good single buildings in town, most do not play a part in everyday life. The PDC is not only large and supremely visible, it is also one of the region's few good building groups, and probably the only one that wasn't either built all at once or master-planned from the start. Best of all, it still isn't complete. Cesar Pelli has given the city not only a wonderful surprise but also the pleasure of anticipation. □



North elevation

User-Friendly School Additions

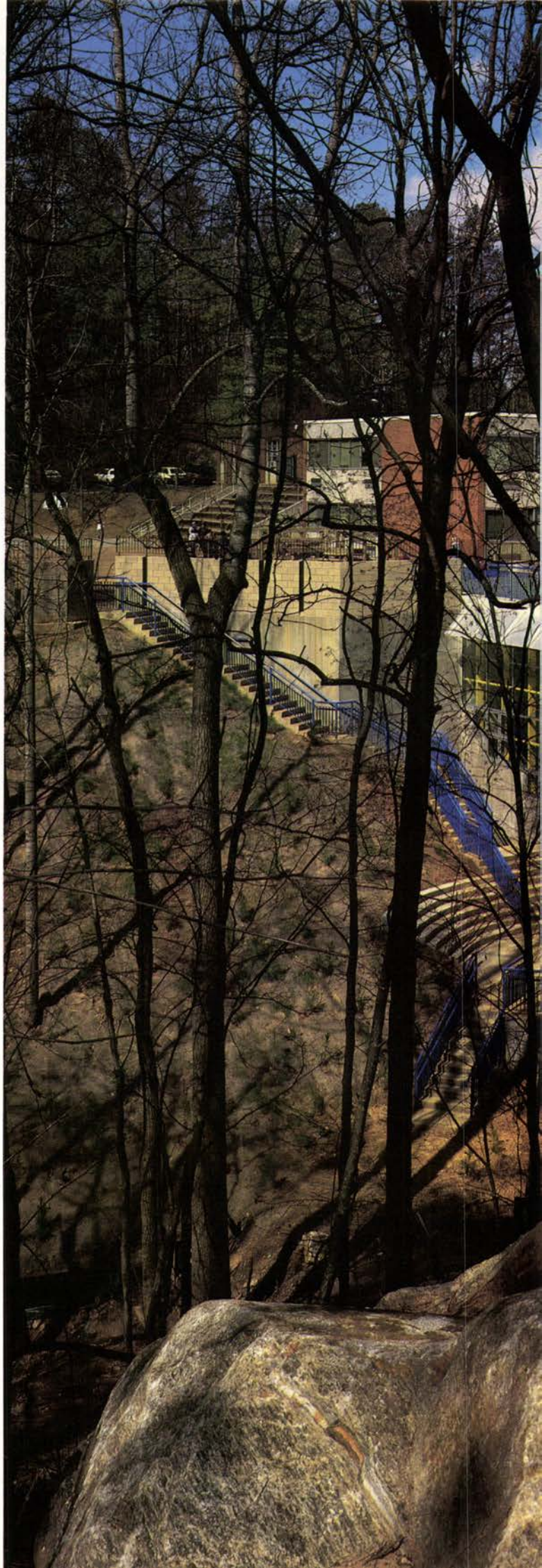
To Trinity School, Atlanta, Lord & Sargent.
By Allen Freeman

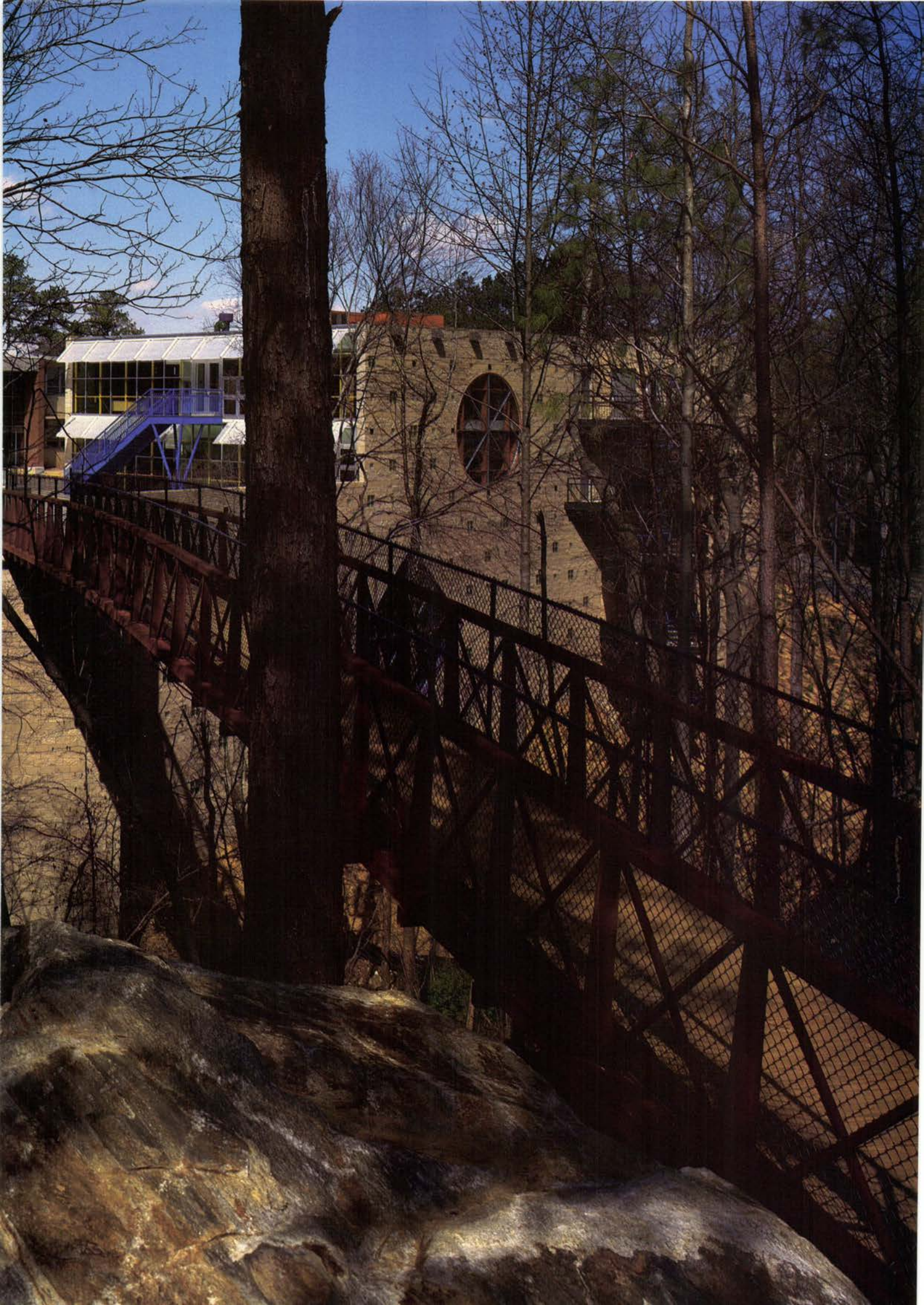
Two robust new additions give identity and character to a formerly drab Atlanta public school that now houses the private Trinity School for children age 2 through 12. Forms and allusions are clear, casual, and unforced; the designs spring logically from the site and from materials. This is user-friendly architecture for children that doesn't pander or condescend. It happily accommodates their expanding psyches and fires their imaginations.

The Atlanta public school system built the former Birney School in the late 1950s "just as dull as they could," observes Chuck Johnston, who was Trinity School's headmaster from 1980, when the private school first occupied the building, until a year ago. Trinity added four classrooms that first year and four more a few years later, all eight cast in molds much like the original building's. Now Lord & Sargent has appended a 3,000-square-foot porte cochere entrance block (drawing above and photo below) that houses administrative offices, and into the side of a spectacular ravine the architect has set a three-story, 18,400-square-foot building (right) comprising a gym/auditorium and library.

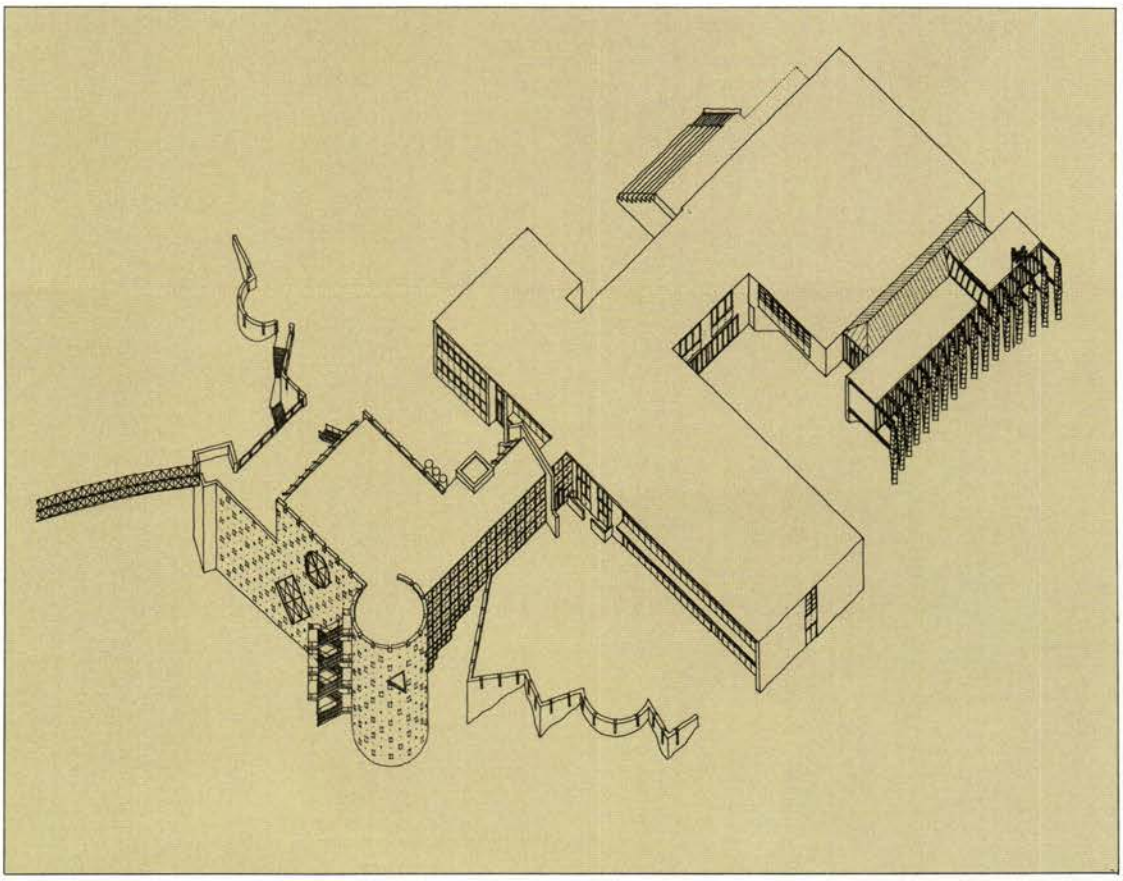
The larger addition to the southeast end of the school is seen through the tall trees from Northside Parkway. A fat turret, pierced by a slightly tilted triangular window, joins a wall whose top takes a giant step and is penetrated by a large round window with red mullions and a larger square one with blue mullions turned on a point. Runoff spouts at regular intervals crenelate the tops of the wall and turret. A stair tower zizzags down the turret, and a pedestrian bridge spans the ravine from the top of a smaller, squared tower. Glass block inserts stud the split-face concrete block facades, and at night when the school is lighted from within

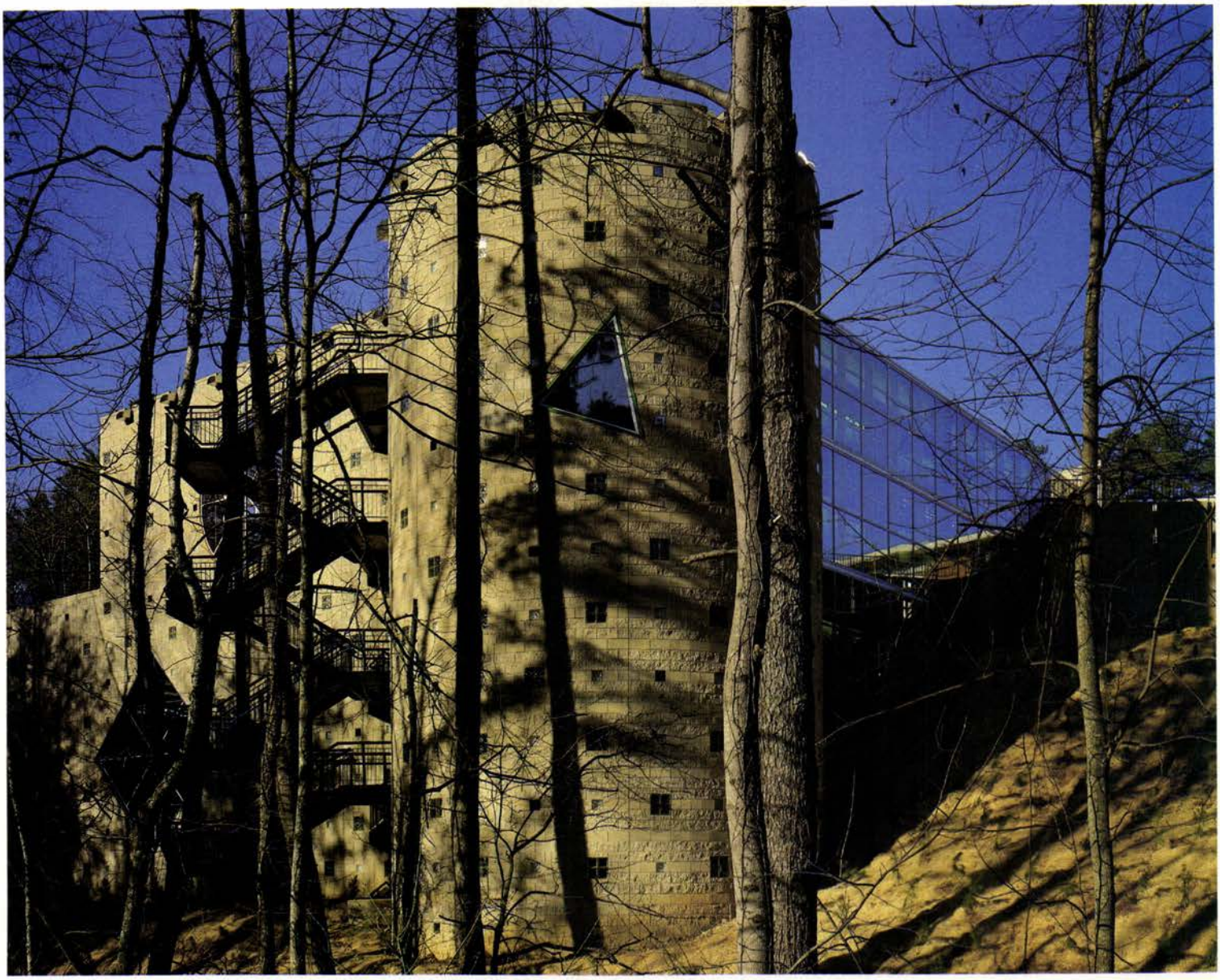
Right, the gym/auditorium from across the ravine; bridge leads to playing fields. Below, the colonnaded entrance addition.

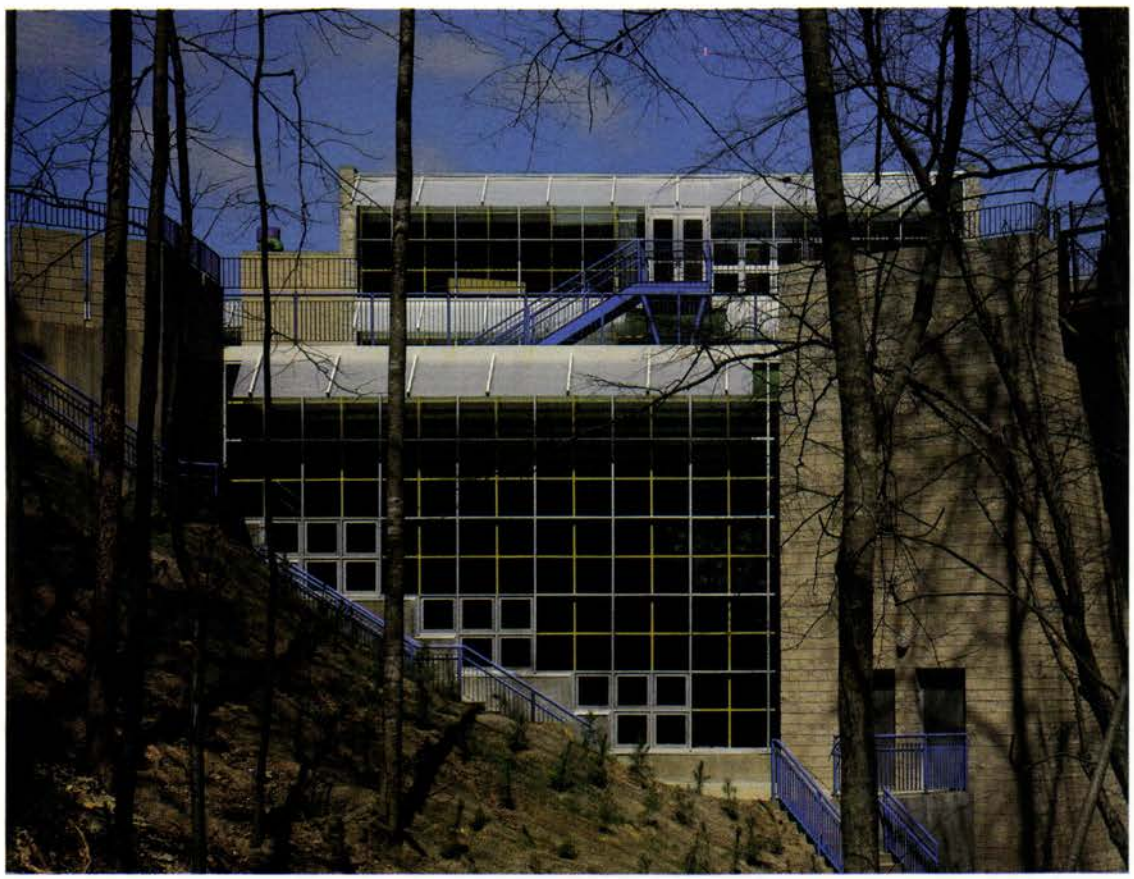




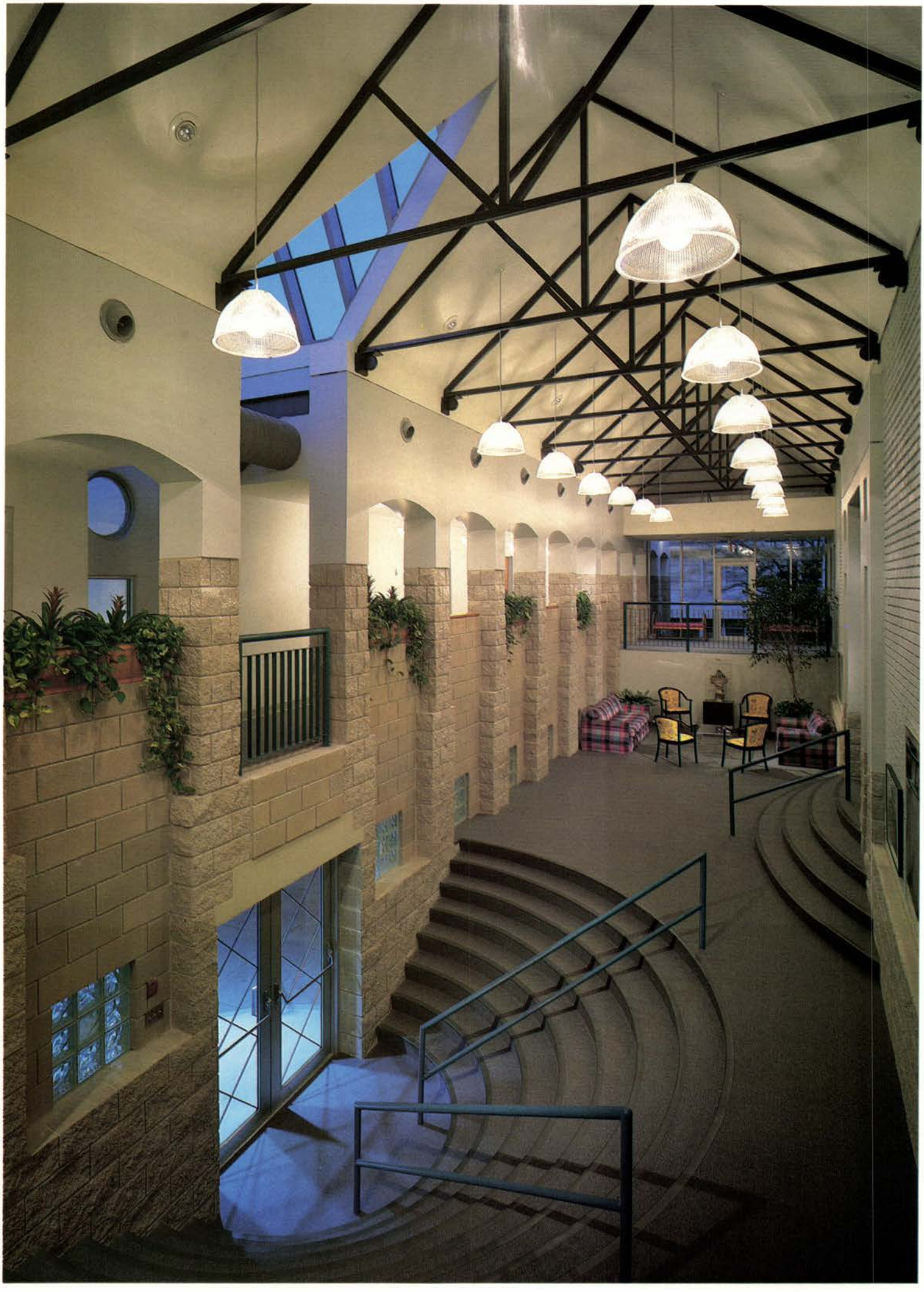
Photographs © Jonathan Hillyer Photography, Inc.



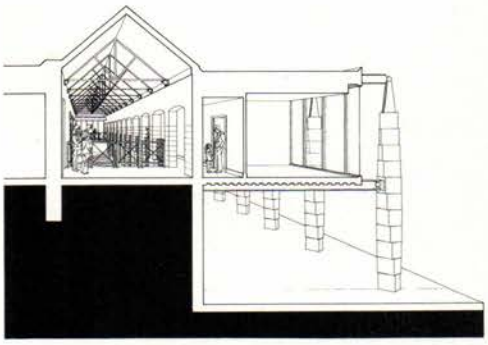




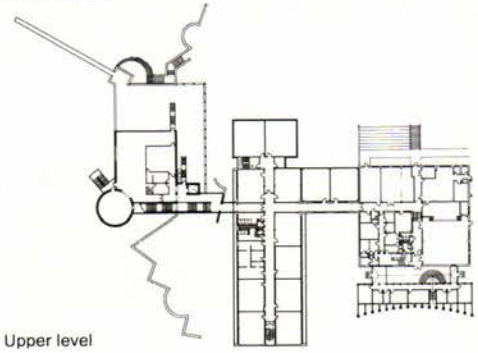
Facing page, the library block from the southwest. The paved area is the roof of the gym/auditorium. Fire stairs are poised on wheels. Left, the same stairs above the gym's south-facing window wall. Above, the turret rises 52 feet from the ravine floor.



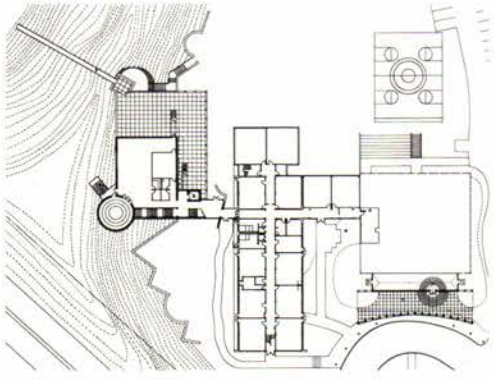
Left, the lobby just inside the entry colonnade. Brick wall at right in the photo is the school's former front facade. Right, the preschool activities center above the gym, with the bottom half of the large circular window on the east facade. The top of the circle is a window into the library.



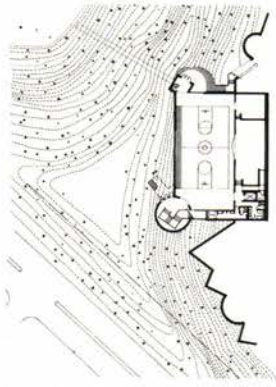
Main entrance



Upper level



Entry level



Lower level

they glow in a harlequin pattern over which the triangle, circle, and square mysteriously float. It's a storybook castle, of course, but not quite. You have to apply a little imagination.

The north and south elevations are elegant, glassy versions of the catalogue modernist facades on the original school. They are punctuated by translucent sunscreen awnings and by a pair of cobalt blue fire stairs, each poised improbably on a single wheel. Terry Sargent drolly explains these unlikely constructions as the architects' response to redrawing a fire exit "at about four different spots" to accommodate changing plans by the school's library consultant. The second staircase, which had remained unperipatetic, makes a matched pair.

Outdoor play space is at a premium on this hilly site. The bridge across the ravine connecting the school to playing fields expanded those resources while providing "adventure that captures the extent to which this is truly a place for kids," says former headmaster Johnston. The roof of the gym provided a paved play area as well. Cubical bollards along its edges assure that fire trucks, which could overload the structure, stay off. The bollards also suggest battlements.

Castle imagery stops with this addition. The addition on the northwest side of the school is stylistically unrelated (except for a small triangular window recalling the one on the turret). The school entrance, pulled back from Northside Parkway, is reached via a steep driveway. A porte cochere, long enough to launch children into four car-pool vehicles simultaneously, edges a turnaround. Seventeen totemlike columns made of 11 stacked concrete cubes form a slightly convex colonnade. The cubes rotate as they ascend, creating an illusion of entasis from some angles; all of the cubes are actually the same size. Exposed trusses are

literally pinned to the columns at their tops and midpoints, imparting a vigorous machine/modernist esthetic.

The unassuming entrance, located to the right of center under the porte cochere, is indicated by a glazed, transversely oriented peaked roof above and a half-circle stoop below. Inside the wide entry lobby a semicircular cutout—a reciprocal stoop flipped on its head—continues up eight steps. Another half-circle stoop rises within this room to a doorway through which you penetrate the school's original front facade, now an interior wall. Offices and conference rooms line up along the front on the second level.

You reach the "castle" addition through the institutional halls of the 1950s building, and the contrast between old and new is pronounced. The turret contains two round rooms, one of which tiers down in concentric circles for preschoolers' storytelling. You descend a long staircase into the turret's lowest level and swing around into the gym/auditorium. This is a spare room characterized by a ceiling of exposed structural concrete Tees, window walls on the north and south, and masonry side walls—one set off by the big, square, rotated window. This felicitous fenestration seems capricious from the parkway, but it imparts to the big room an almost Gothic quality.

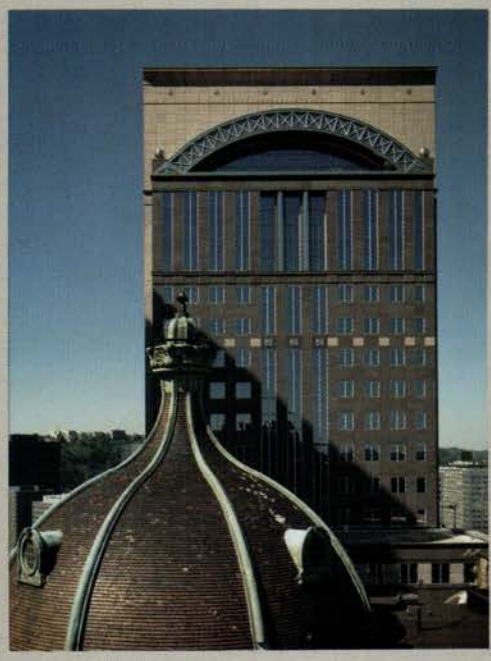
Terry Sargent calls the school "kindergothic." □

Above and right, the long staircase at the edge of the gym descends into the base of the turret. Behind the turret's small square windows in the photo at right are reading and storytelling rooms. Left, the gym, with proscenium stage facing the square window. Interior walls, like the exterior's, are split-face and smooth concrete block.


EXIT

The High Rise of Kohn Pedersen Fox

By Walter McQuade



The CNG (Consolidated Natural Gas) tower is the most elegant recent building in downtown Pittsburgh. It has the strength to survive in Steel City but great suavity in its gray-brown granite cladding and tripartite form. The form resulted from trying to make the most of a Z-shaped site and also draw the existing Midtown Tower, with its idiosyncratic dome, into a whole-block composition. In between CNG and Midtown Tower a lovely little plaza was created at the terminus of a major thoroughfare, taking its materials and detailing from CNG's fine base. CNG took its 60-foot dimensional module from Midtown Tower, and the slab nearest to the older building approximates its height. The second-tallest slab has a defined edge at the same level. There is a similar edge at the third level, and monotony is further avoided by columned reveals. The building's most distinctive feature is its vaulted truss roof, its arc reflecting nearby bridges across the Allegheny.

In the late 1970s, when the American Telephone & Telegraph Co. decided to move uptown in Manhattan and build itself a new block-long skyscraper bastion on Madison Avenue, Kohn Pedersen Fox was too young a firm to stand much chance of getting the commission. Expectably, it fell from the client's shopping list early. Equally expectably, three large and internationally renowned firms were invited to make final pitches to the board of directors: Philip Johnson/John Burgee; Kevin Roche/John Dinkaloo; and Hellmuth, Obata & Kassabaum.

Whereupon E. Eugene Kohn called up Philip Johnson and suggested that Kohn Pedersen Fox form a joint venture with Johnson/Burgee to win the job. He was serious.

That kind of coolly hopeful, perhaps even impudent push is vintage Gene Kohn—the tall man with the prematurely white hair, black brows, alert eyes, and ceaseless nervous energy.

Today, less than a decade later, Kohn Pedersen Fox is on a lot of clients' short lists, and Kohn himself is becoming a legend within the profession as the most competitive architect of his time.

Move over, George Hellmuth, Nat Owings, Uncle Dan Burnham, Stanford White, H.H. Richardson (who said, "One, to get the job; two, to get the job; three, to get the job"). Make way for Kohn.

Getting on the short lists, however, only opens possibilities. It is Kohn's design partner, William Pedersen, who has gone on to fulfill them, amazing the profession and the public with his baroque-modern creations in cities around the world. In its 12 years, the firm, Kohn reports, has built or has under way an astonishing 50 major buildings in 28 states and six foreign countries. Moreover, most of these are skyscrapers, the kind of assignment a young firm usually can only dream of.

Skyscrapers provide an architect almost everything: fame, profit, a chance to be judged against other designers in the urban silhouette. There is even a kind of immortality, for skyscrapers generally outlive their creators. Uncountable numbers of people see and notice them from the streets, from other buildings, even from airplanes. By this measure, Bill Pedersen and the other KPF design partners—Arthur May, William C. Louie, and Robert Evans—controversial as their work may be, like it or not, are making a large impact.

Kohn is always trying to get architects to talk more with each other, as an alternative to "the usual adversarial relationship," as he puts it. One of his coups while New York Chapter/AIA president was the party he promoted last May at the Museum of Modern Art, attended by a wide range of architects, painters, musicians, and other creative artists to celebrate the awarding of the French Legion of Honor to I.M. Pei. Although Pei and Philip Johnson had been on the outs for years, Kohn persuaded Johnson to attend. Toward the end of the party Pei walked over the bridge in the museum garden to where Johnson was seated, and the two embraced.

Kohn Pedersen Fox opened its doors on a day when rockets went up over New York Harbor—July 4, 1976. The three had solid experience behind them. Kohn, a Penn graduate, had worked as a senior designer for Vincent Kling, design director at the New York office of Welton Becket, and head of John Carl

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Mr. McQuade, author of several books on architecture, was a long-time senior editor of Architectural Forum *and a member of the editorial board of* Fortune. *Captions are by staff editors.*

Warnecke's New York branch; he subsequently became president of that company and a partner. Fox, another Penn man, also worked at Warnecke as a senior vice president, after experience with Kahn and Jacobs. Pedersen, a Minnesota native, studied architecture there and at MIT, worked for such architects as Pietro Belluschi and Eduardo Catalano, and in 1965 won the Rome prize and two years of study in Europe. On the Rome prize jury was Pei, who invited Pedersen to join his office when he returned home. There for four years he worked on the design for the East Building of the National Gallery of Art. It was Kohn who lured Pedersen away to the Warnecke office by offering him the chance to design more autonomously. Five years later the two left Warnecke, along with Sheldon Fox and planner Patricia Conway, to found their own firm. Besides planning, Conway now heads the interiors office of Kohn Pedersen Fox Conway.

Like many architects, Pedersen has a face that might be described as well designed—a slender, strong jaw, short nose, honest Midwestern eyes. His face has outdoor color; early every morning he jogs in Central Park near his West Side family apartment, then sometimes plays the piano for a while before heading for the office. He looks 10 years younger than his age, 50. At client conferences he is steadily articulate but relaxed, and he and the harder-driving Kohn together make a most persuasive team.

Despite the Bicentennial fireworks, 1976 was not a brilliant year for launching a new architectural ship. In the United States, architecture as a profession seemed to be sinking, with the big offices turning for jobs to the Middle East. But Kohn, in retrospect, says it was a fine time to get going. "Starting in the depression," he says, "was the best thing we did. When things are slow, potential clients will see you." For advice he consulted a dozen people big in building and financial circles, including developers he had worked with. They later helped steer commissions to the peppy, hardworking, fledgling office. "When people give you advice," Kohn says, "they become your supporters."

The start was slow. None of the partners drew a salary in the first six months, and the handful of employees were not compensated for three months, although they later were paid retroactively. Although Kohn, Pedersen, Fox, and Conway had recently, while still at the Warnecke office, together completed a sizable complex for the Lutheran Church in Appleton, Wis., their first independent commission was the renovation of an armory in New York City into ABC Television studio space and offices. In 1977 came a 25-story office building in Lexington, Ky., done in association with a local architect. Then ABC came back for another serving of production space near lower Central Park West, and out of that grew the design of a 14-story building, the firm's first iconoclastic statement, a little reminiscent of *de Stijl.* The most prestigious job the partners landed in their first year was an airy AT&T regional center in Virginia, begun in 1977.

By the time the firm was a year old, Kohn Pedersen Fox was in the black and the office was beginning really to flex its architectural ideas. From the beginning the designers were postmodernists among New York practitioners. They did not have to switch into that movement as some of the other large offices have since done; they rode the first wave.

The KPF approach to architecture is grounded in three tenets: first, a frank and literal connection with the historical past, sometimes in blunted reproduction; next, an emphasis on matching the building to its urban context, without relinquishing the impact of the new; finally, a certain confidence in intuition. They intend their towers to resonate, like Empire State, like Chrysler.

Within this framework, however, the four design partners—Pedersen, May, Louie, and Evans—go their own ways, each interpreting for himself what he thinks the firm wants. Pedersen does no crits and refuses the title of design chief. Shelly Fox says, "I don't think we're 100 percent unified, and I don't think it's necessary. They each approach our design philosophy in their own way. I think the strength of the firm comes from the interplay of these people, one against the other and one with the other." It is Kohn who matches commissions to these designers, based on stylistic preferences and the nature of the clients.

Left and below, the 31-story apartment building at 180 E. 70th St. in New York City demonstrates elegantly a KPF response to the persistent persuasions of context. The classical detailing and measured distribution of the building's massing create equal harmony with surrounding turn-of-the-century towers and town houses, old-New-York homes of wealth and class. The punched-window brick tower steps out to a nine-story element on the 70th Street facade, underlining the building's front-door presence and matching the scale of that block. The Third Avenue facade rises in five setbacks of unequal heights, adding interest to the city's vistas. At street level, the dignified, etched limestone base defines a well-scaled piano nobile fronting numerous community facilities that surround a garden atrium.

Right and below, four translucent, lighted 'sentry boxes' top the 66-story 900 Michigan Ave. in Chicago. The building accommodates a mixed-use program of office space, residential condominiums, and hotel rooms in its 58-story-tall, limestone- and glass-clad tower, while its eight-story base houses retail space and a lobby for the hotel. The base, clad in a harmonious blend of granite, marble, and limestone, picks up the scale and texture of the surrounding streetscape. The building's setbacks signal its changing occupancies, while use of three-part 'Chicago window' patterning unites the length of the facade and strengthens the building's ties to its surroundings.

Arthur May, admitted to partnership in 1980, is the acknowledged classicist of the firm, although off duty he is a fine painter in the abstract idiom. Among May's achievements are the insertion of a new hotel and an office building into the border of antique Logan Square in Philadelphia, deftly respectful to the old environment. One of the projects on his drawing board now is a large new national headquarters for the American Association of Retired Persons, in Washington, D.C., next to Judiciary Square and near the old Pension Building, now the National Building Museum. It is to be 350 feet long, of brick, limestone, and concrete (when May wants to increase contrast or save money). Vertically it will be a series of pavilions, with niches to separate them. It has a bottom, a middle, and a top, and also arches and Tuscan columns, deliberately attempting to speak the old language.

About his avocation, painting, May says, "I have a wish to separate art and life—architecture being life, art a comment on life."

William C. Louie, of Chinese descent, was an early protégé of Pedersen's and became a partner five years ago. A fastidious detailer, he may be the toughest taskmaster in the office, tightly controlling his designs and assistants. Kohn thinks Louie may in time become the most distinguished designer of them all. Clients, he says, never complain about Louie's projects—complaints, of course, would be addressed to Kohn. One of Louie's best designs is the low-cost Arbor Circle office building in Parsippany, N.J. His biggest current project is the 52-story Mellon Financial Center in Philadelphia.

Robert Evans, the newest design partner, handles clients so well he doesn't need a project manager, says Kohn. He is assigned to jobs with complicated technologies such as TV studios, where not only clients but various engineers have to be dealt with.

Partner Robert L. Cioppa also came from the Warnecke office. An architect who took a higher degree at the Stanford graduate school of business executives, he is skilled at making presentations and also backs up Kohn and Fox in management. The final partner is Lee Polisano, another expert manager.

Behind the design partners are 13 associates, whom Kohn talks about like a doting father. Kohn is probably the only architect who has been known to show in a client presentation a slide of the office's softball team. The rapid expansion of the firm has helped lure the young talent; and Kohn's, Pedersen's, and Fox's ownership shares are down to about 23 percent each.

It was Pedersen who set the firm's design direction in the early years with two widely noticed projects. One was the now renowned office building at 333 Wacker Dr. in Chicago, designed in 1979. Set on a triangular site beside the river that wanders through the central city, 333 Wacker is a marriage between context and theatrical lyricism. On one side the 30-story building fits into the rigid street pattern, with a formal stepped entry and an art deco street wall. On the other side a long glazed wall curves tautly, beautifully. This building has become a new symbol of the city, an architectural image to remember.

Pedersen's second major design was a larger complex, the expansion of the headquarters of Procter & Gamble on the east side of the central business district of Cincinnati, one of the first commissions KPF won competing with several of the most famous architecture offices in the country; it is another example of the firm's contextual approach. To a boxy old horizontal office building Pedersen added two 17-story octagonal masses with pyramid-shaped roofs, plus three lower wings that together perfectly catch the character of the conservative old merchandiser of soap. The silhouette of the group was kept low in deference to the rest of the inner city; the roofs are finished in terne-coated stainless steel and copper, picking up the accents of Cincinnati's older skyscrapers. An enormous paved plaza, with grass panels, flags, and trees makes the group a good citizen, if a rather formal (some have said fusty) one.

Asked to characterize KPF's current work, Pedersen replied, "I would say it's changing," a somewhat mysterious answer. The fascination with history is, if anything, growing and becoming more exacting, especially in May's buildings. Conway says, "I don't think the application of a particular kind of ornament drawn from history is wrong as long as its purpose and syntax are correct. As children display characteristics of their parents, so should buildings."

But along with this endorsement of the premodern, much of the firm's newer work displays a 1920s type of inventiveness, giving the buildings particular presence in the routine glass-walled urban maze. Some of the office buildings now on the boards verge on the grotesque. Sometimes, up close, it is as if the facades wear costume jewelry, and the skyline bristles with spikey protrusions—anything but flat.

Yet one characteristic continues: the preoccupation among the partners with trying to fit their work into the existing cityscape. Pedersen says, "We are dealing mostly with the tall building, but we focus on making the tall building a contributing piece of the urban fabric. In the 1920s and '30s it was that. In the '50s and '60s it was thought of in a different way, and the urban fabric eroded as a result."

He wants to combine with other buildings for continuity. "Modern architecture," he says, "has to be redirected to a focus on how it manages its edges. Besides the earth line and the skyline, there are lateral boundaries that develop connections with adjoining structures—this is important to me. A building can connect to the fabric, yet have a tremendous individual integrity."

This does not mean simply matching the neighbors in style, but sometimes redirecting the flow of the city. Pedersen is designing the final westernmost building of Rockefeller Center, aligning it with the Exxon building and the RCA. The building will stand uptown at the end north of the Times Square redevelopment, across the street from a Kevin Roche tower now under way. Pedersen's building will be fairly subdued on its Rockefeller Center side, wearing much the same vertical pinstripe. But the western facade will pivot in design toward the bright lights of Times Square, displaying some decorative lighting of its own.

He has also designed a nifty smaller skyscraper to be built on the view of a lake in Bellevue, Wash., near Seattle. The facades away from the water view he keeps congenial with their neighbors across the street. But where there are no neighbors except the lake, the facade has a multistory curved panel in glistening glass, a reminder of 333 Wacker. "Like a sail," Pedersen says.

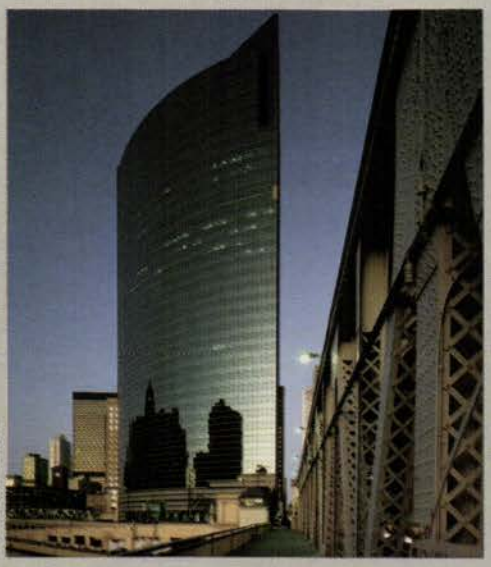
Despite the level KPF has reached so rapidly, its rivalry with other firms has allowed the partners no relaxation. Some jobs simply walk into the office, says Kohn, but overall, "it's getting harder, not easier. At first we got amazing commissions. Looking back I wonder: why did they pick us? A little later, however, we went through a dip, after our newness had worn off. In the second and third year it was harder to get work. But after the first designs were finished, it picked up again, because people saw the finished buildings, like 333 Wacker, and got excited.

"Now it is tough again," he says, "because now we are on the same level with I.M. Pei, Burgee and Johnson, SOM, Cesar Pelli, Roche, Helmut Jahn, HOK, etc."—in other words, the high-rise establishment. "Cesar's a charmer, very hard to beat. Philip Johnson's a legend—how do you beat him?" Despite his words, however, KPF has beaten both Pelli and Johnson on occasion.

Kohn Pedersen Fox does most of its work for speculative builders—only 20 percent corporate and 10 percent institutional. This makes the present lull in commercial office building a particular threat to the firm's velocity. However, the firm now is drawing commissions for large jobs abroad. Most of Pedersen's present work is in London, Frankfurt, and Montreal. KPF has built in Australia and begun in New Zealand. Its support network continues strong among such respected architect-pickers as Cushman Wakefield and Urban America. And it has Gene Kohn.

In the Kohn Pedersen Fox central headquarters on four floors of an imposing old office building next to Steinway Hall on West 57th Street, there are, by design, no doors on the partners' private offices. One Friday last February I wandered into Kohn's space and asked him about the rumor of KPF 's opening branch offices. He acknowledged that some of his West Coast clients were hinting about his opening a branch in Los Angeles.

"And," he said, "maybe we should tiptoe into London." That night he was to fly there. He had appointments for 17 meetings and presentations in the British capital the following week.



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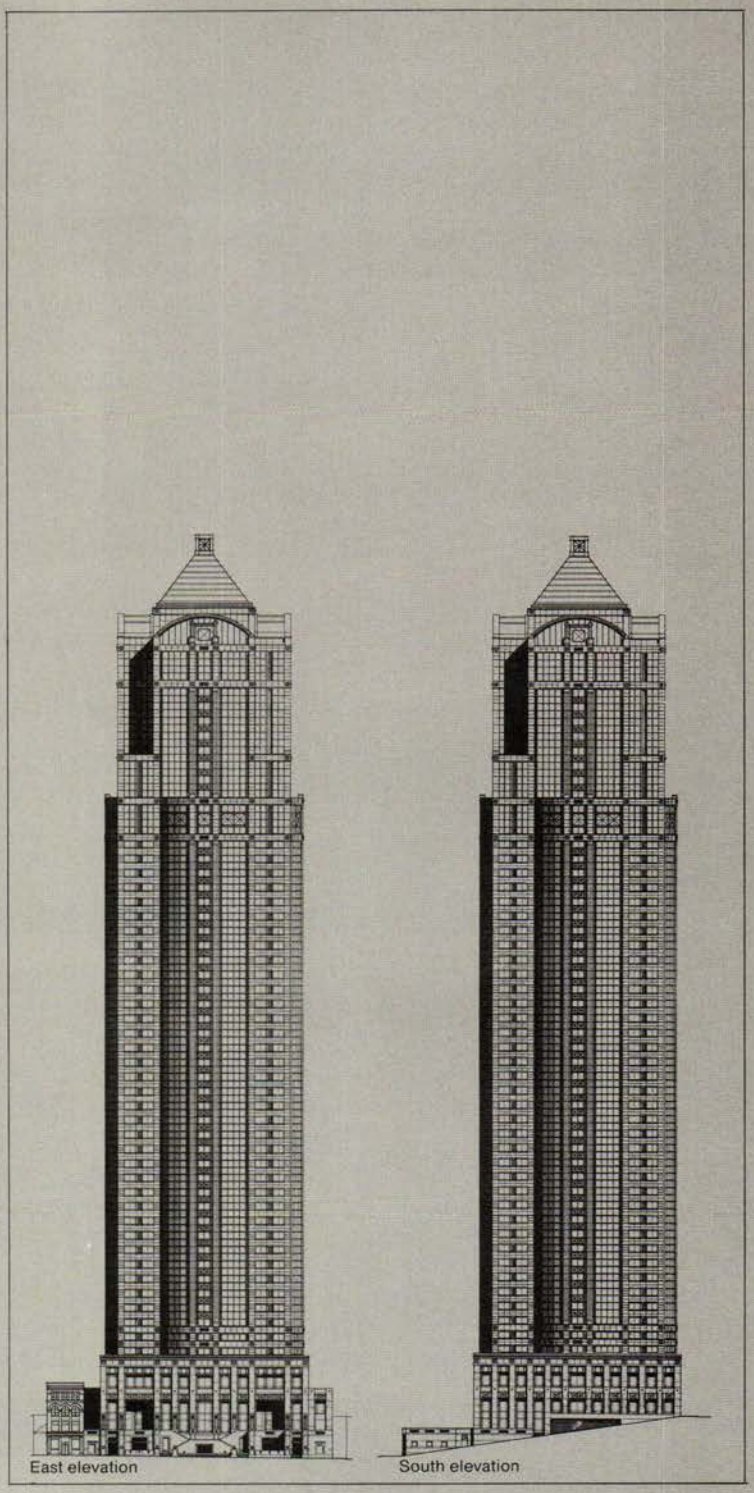
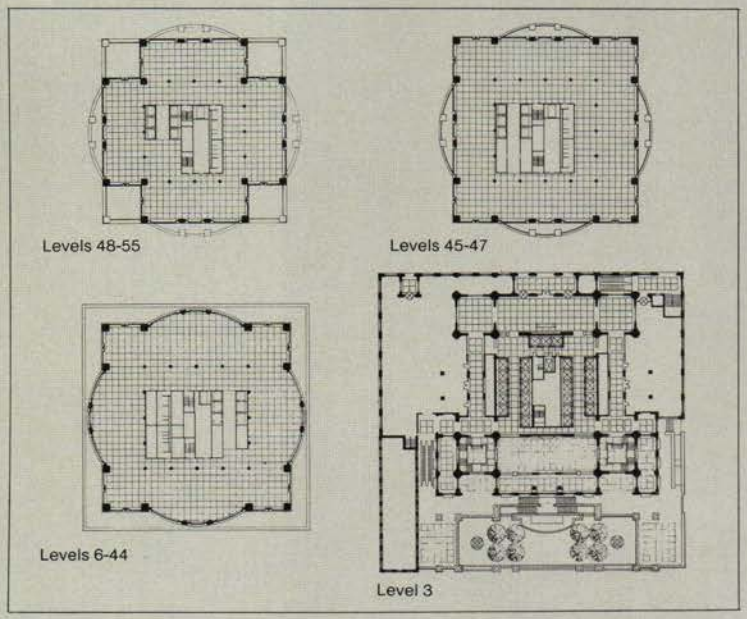
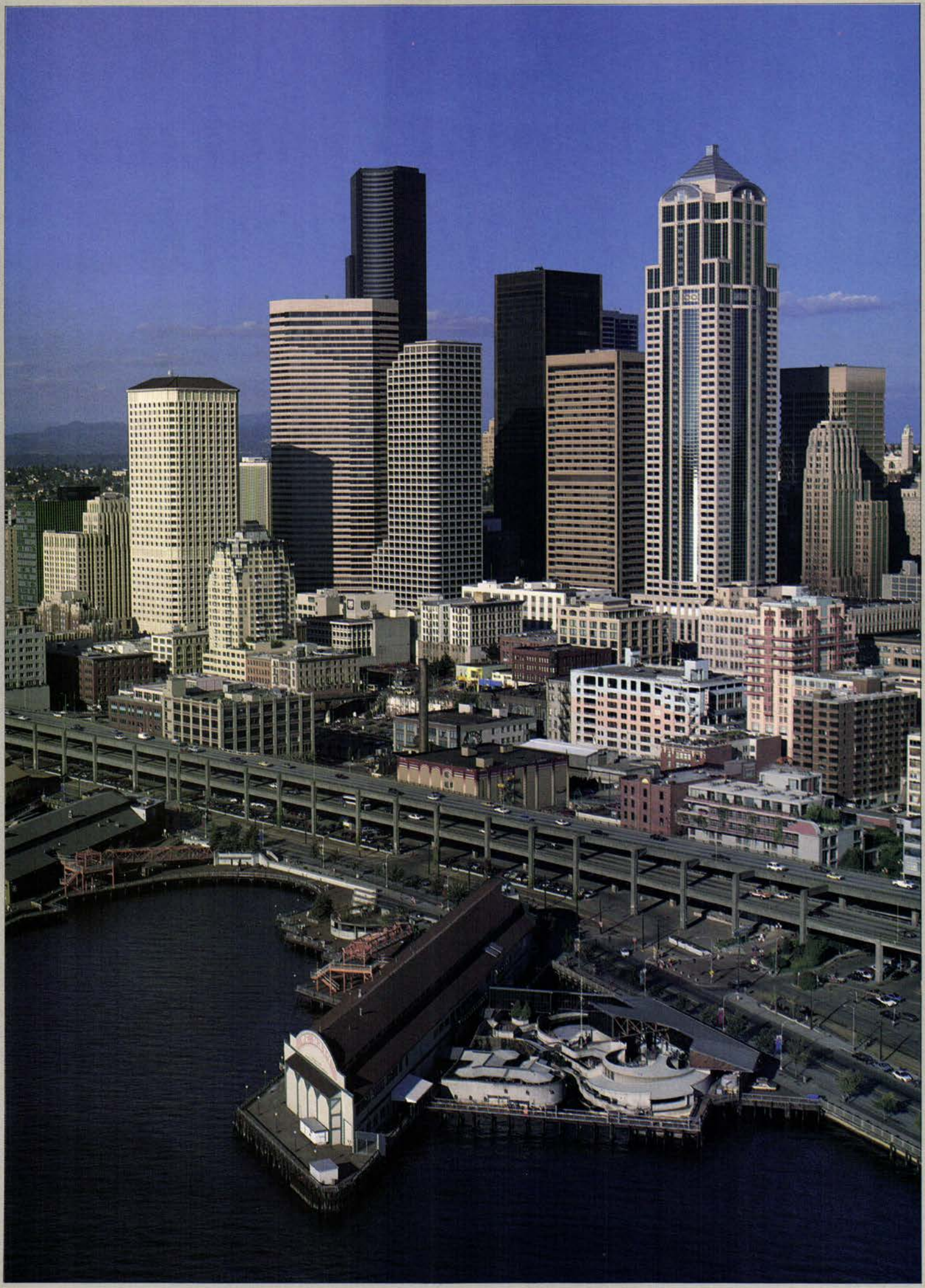
A panoply of KPF's projects indicates the breadth and growth of the firm's work. Presented counterclockwise, it begins above with the twin octagonal towers of the 'premodern' Procter & Gamble General Offices Complex in Cincinnati, and the renowned office building at 333 Wacker Drive, Chicago. The Wacker Drive photograph shows the 30-story building's tautly curved facade. To the left is the design for the American Association of Retired Persons in Washington, D.C., with its apparent contextual nod to the nearby National Building Museum; and the 420,000-square-foot Goldman Sachs U.K. corporate headquarters in London, also on the drawing boards. Below and left is Ameritrust Center in Cleveland, a 60-story bank headquarters hotel. The middle photograph shows Rockefeller Plaza West, New York City, the final building to complete the Rockefeller Center Complex, housing offices, an education technical center, and a link to the complex's underground concourse. To the right is the 56-story Mellon Bank Center Office Building, the new giant on Philadelphia's skyline.





Washington Mutual Tower in Seattle is arguably KPF's best recent work and perhaps the best recent addition to any U.S. skyline. Seattle's skyline has grown rapidly, and this is the first of the new towers to draw as much praise as resentment locally. This is due partly to its cheerful blue-green and beige colors and partly to its crest, which echoes that of the beloved and now restored Smith building, Seattle's premier skyscraper (appearing on the lower right of the cover photo). The three-story base is a rectangle, keeping the street line on three sides and melting into a plaza on the down hill side (left elevation). The tower itself is a tube rising within a square. The faces of the tube are expressed as continuous bays with 30-foot-square corners. From the 48th to 55th floor the plan becomes cruciform. The bays terminate in arches flanking the pyramidal crest. □



Assessing a Decade Whose Only Constant Has Been Change

A set of essays responding to the questions: 'How would you characterize the architecture of the '80s? Have you discerned any trends, the beginnings or endings of any significant movements? What individual works have been most representative of the period?

Richard Guy Wilson: 'Show biz made a pernicious impact.'

Already historians and political commentators have labeled the 1980s "The Reagan Imperium," and for those interested in the arts or architecture a question arises as to the possible connections. Political epithets applied to architecture are not unknown—the terms Georgian and Victorian were originally political, and in this country we use "WPA Moderne" and "General Grant" as stylistic identifications. The Grant label is not flattering since it implies a connection between the nation's most corrupt (until recently?) Presidential Administration and the bloated, mansard-roofed behemoths that came to symbolize political machines, graft, and payoffs. Sadly, we have not yet identified either a "Camelot" style or a "Tricky Dick" idiom though, perhaps unwittingly, the Kennedy Center and the Watergate complex in Washington, D.C., serve the purpose for the respective Administrations.

The Reagan Reign in architecture in the 1980s has meant a flashy, show biz, surface-deep glamour along with an open worship of $$$ and conspicuous consumption. In 1980s America, flash and greed are not sins—they have replaced modesty and service as virtues. American architecture in the 1980s adopted the slogan "more is more" in the strangest display of overscaled ornament, oddly placed temples, pediments, Roman thermae windows, and columns that any historical period has ever seen. Glitz and shine are everywhere: there are now at least 20 different types of marble to compete with all the gold-plated, chrome, and brass fixtures. Certainly not all of this has been bad. A return of some sensuousness to architecture compared with the roughness of hammer-bashed concrete is to be welcomed, but there is an overly plump quality to much of American architecture—too many flocked finials and anodized pediments that need Dr. Mies's 10-day guide to slim thighs.

Historic preservation continued in the 1980s; though, in trying to meet the "real world" of real estate and developers, it found itself like the virgin in the back seat of a car: an innocent flirtation leads to deeper problems. Architects who earlier had viewed preservation with suspicion now found it a money-maker and embraced it. But while preservation was adopted it scarcely made a dent in the grittier issues of the built environment. Increasingly the city and indeed the entire environment are privatized: we are in danger of having all our social functions taken over by the shopping center.

Show biz made a great and pernicious impact upon architecture. Instead of being known for good work, just being known became the goal of some figures in the architectural and art worlds. Andy Warhol, a relic of the 1960s, became the archetypal '80s artist—empty of meaning, but known. Architects became celebrities, or superstars; being published in glitzy magazines or gossip sheets was the highest accolade. On a more positive note, in the 1980s architecture moved into the public eye in television programs, specialized bookstores, and exhibits of architectural drawings, artifacts, photographs, and furniture. Museums actively collected and tried to interpret architecture to an ever more sheeplike public. With all this attention came a possible problem: is architecture just one more collectible, a disposable commodity?

The style of the 1980s is pomo. Postmodernism, which began years earlier as a critical inquiry concerning history and modernism, became a style—pomo. This is a well known path; movements always lose their intellectual substance and become styles taken up by lesser hands—the spec builder, the shopping center developer, the design studio critic. Now this is

not to say that everything has been awful. Some real masterpieces have been created—Michael Graves's San Juan Capistrano Library is one—and there have been some quality designs, such as Kliment & Halsband's Columbia University computer center and Hardy Holzman Pfeiffer Associates' Best Products headquarters. At a much lesser level, shopping centers may not be any better, but at least they have entrances.

The other significant development has been the re-appearance and the serious discussion of straitlaced revivalism, "neotrad" (neotraditionalism), or perhaps better termed "retread." The political connections are obvious: the new intellectual respectability of conservatism and also the neoconservatives, or those old-line liberals who found new and great virtue in far-right polemics, have their equivalents in the former architectural modernists who converted to neotrad. Of course revivalism, especially in the form of the colonial, never really disappeared; it survived very well in the hands of the contractor and (what we euphemistically call) provincial architects such as Philip Shutze and Jimmy Means down in Georgia. But now in the 1980s traditionalism in architecture has an intellectual respectability not present since the 1920s. In this re-appraisal of history I might point not immodestly to the role of historians in re-evaluating the past. Also, I do not mean to accuse all of the neotraditionalists of conservative politics, since in many cases their responses were derived from context and quite appropriate. By this I mean work such as Hartman-Cox's addition to the commerce school at the University of Virginia or Kevin Roche's announced scheme for the Jewish Museum addition.

Certainly an aspect of both neotrad and pomo has been the revived interest in classicism, which has ranged from straightforward revivals to more abstract open trusses and cylinders. Art deco has found appeal as a classically based modernism. Classicism as the true academic system, in that it has a heritage of written *texts* (a favorite word of the '80s), found a haven in the schools; and there has appeared a new classicist personality, similar to Jerry Falwell in its proclivity for strict interpretation with about the same depth. The hope of some classicists for a development similar to that of the Beaux-Arts or the American renaissance at the turn of the century is already doomed. The problem of the postmodern mind, which includes all of us, is that we know too much—we realize there are alternatives and the clock cannot be turned back to a time that never existed.

Already a new wind is blowing, and, while historians are not astrologers, it does not take much to sense that molded stone dentils are but one answer. The problems are too diverse to allow for single solutions. As in politics, polemics are a subterfuge for facing issues. Have the '80s been an interlude? A time of avoiding reality? Is architecture simply window dressing? Or does it speak to deeper—cultural and social—concerns? Yes, we have had our fads; decon (deconstructivism) arrived and left within four months, though we now have to work our way out of "exploded" or "caved in" buildings for a few years. But we are living in a modern world and, while old-line modernism is certainly out, the fast-approaching millennium will bring a retrospective sensitivity and a quest for a new approach. Recently I have heard several architects openly say, "I am a modernist, not a . . . ," words unthinkable two years ago. The buildings of the 1980s that will be remembered will be some of those noted above and those that seem to escape immediate concerns and assume the air of timelessness, such as Fay Jones's little chapels (below, Thorncrown) down in the woods of northern Arkansas.

Illustration by Brian McCall

Joseph Esherick: 'No movement has had sticking power.'

The architecture of the 1980s could be characterized by a notable increase in variety of building types and approaches to design. Some of the variety has been movement-directed. While some of the movements may appear to have had initial significance, none seems to have had significant staying power. Some, postmodernism for example, have attacked what was claimed to be one style with another style. A result has been a proliferation of acceptable forms that identify the movement; the speed with which the movements marketed these forms and thereby arrived at an apparent stability is remarkable.

Some branches of some movements have invoked history, but what history and whose history is not easy to say. History as we have known it appears to have given way to instant, invented history, invested for the particular project. It must make historians cringe.

Some movements—for example, "energy-responsive design" and "contextualism"—struggling along with modest success, probably suffer from the awkwardness of their identifying names. As movements they have had a more notable effect legislatively or administratively, but their influence pervades much of what is done. Thus, energy issues, because they now are embedded in codes and regulations, become an underlying current that goes through all work. Contextualism is less formally mandated but has become an administrative tool of planning bodies and community action groups.

What didn't happen in the '80s is perhaps more interesting than what did happen. The promise of new building forms based on a greater sensitivity and responsiveness to energy issues hardly appears to have been met in spite of impressive demonstrations of the previous decade—for example, the various "demonstration" buildings built by the State of California—nor does responsiveness to human issues seem to pervade the work of the '80s. Housing that might be available to any but the relatively well-to-do has all but disappeared, and the individual architect-designed house, the proving ground for so many young architects in the past, is now a rarity.

European architectural forms have had a broad impact, but, curiously, European building technology, indeed even Canadian building technology, seems to have had relatively little impact on the work in this country.

In any attempt to characterize the '80s, one needs to look not just at the resulting phenomena and the movements but also at the forces influencing, if not driving, the whole process. Projects such as the suburban office park and regional and subregional shopping centers founded on the use of the private automobile, and the related sharply zoned residential areas of apartment houses, town houses, and single-family residences, each Zipatoned to its own specific area, are development-driven, and the client structure is entirely different from what obtains with the private client or most public-body clients.

We are beginning to see a new "patron" structure with a symbiotic relationship between the developer and the press, galleries, and the media generally. The developer and publisher alike need notably identifiable products. The architecture of utility or of quiet domestic pleasure—of the ordinary world—is probably too dull and too stable to satisfy the developers or the media's need to sell. Both require a significant difference and some kind of uniqueness, some sort of thematic, perceptible image that fits with an explanation

(and in the hands of skilled performers it may be hard to tell which came first, the image or the explanation, or which is the architecture and which is the description of the architecture).

I sympathize with the journals and the museums—how can one, in a limited space or on the flat plane of a page, describe even so simple a piece of architecture as a house or a workshop and what it is like to live in it or work in it? In the effort to produce significant differences there is a paradoxical driving out of diversity. As hard as the image-making forces try to establish new directions, they do not seem to be able, perhaps from their remoteness from the heart of the matter, to do more than reinforce new orthodoxies.

With luck, we may see in the '90s a broadening of the disclosure. Certainly it ought to be becoming apparent to the managers of some of the movements, with their emphasis on acceptable form described in a private language, that the results are not broad cultural integration but Balkanization. What I think we need is an open and understandable discourse, especially one that can include so many who have been left out (or have opted out) of the discussion.

Margaret McCurry: 'The seeds were planted in the '70s.'

What has characterized this decade of the 1980s is the condition that all the leading players were on stage or in the wings in the '70s. In fact, their most original work was conceived in the previous decade; it was executed in infinite permutations throughout the '80s and, inevitably, at the conclusion, has become mimetic.

Pluralism, the umbrella "ism" of the past two decades, is still extant, but beneath this firmament other isms have waxed and waned. The most controversial, least codifiable ism of the 1970s—postmodernism—was a sincere, romantic search for historical roots on the part of its creators. Its penultimate chapter was written in the late '70s with Michael Graves's design for the Fargo-Moorehead Cultural Center Bridge. In the '80s the movement has degenerated into a style that lost its vitality as it filtered down through the grass roots and languished in the hands of less talented sycophants. That postmodernism has lingered through the '80s and will continue to limp into the '90s is a testimony to its usefulness as a style. Historicism, its most comprehensible component, is after all the embodiment of the laical sensibility.

What has been significant about postmodernism—and its offshoots of vernacularism, contextualism, and regionalism—is that it reconnected architecture

Illustrations by Brian McCall

with mass culture and re-established the roots that modernism so willfully pruned. What will remain of it are these roots, from which new movements inevitably will grow.

This decade began with the publication of Frank Gehry's Santa Monica house (above)—the precursor of the much maligned and little understood deconstructivist movement. But it is significant that this influential work was not the outgrowth of applied literary theory but rather of artistic intuition.

Attempts to deconstruct a building literally as one would an architectural text have met largely with frustration. By definition architecture is the art of three-dimensional spatial construction, and no two-dimensional language—no matter how it is structured—can span between these two constructs. An architectural construction can certainly have a "text," it can certainly be "read" (often through many layers of meaning and memory), and its totality can even be partially deconstructed into three-dimensional components (witness Gehry's Loyola law school). However, to attempt to totally deconstruct a building is by definition to disunite its structure and thus to destroy its significance as architecture. That the revolutionary spirit of deconstructivism, too, is waning was signaled by the show last summer at the Museum of Modern Art, which, as it legitimized the movement, assured its acceptance as a style, thus prey to the dilutions of stylists.

The 1980s will end with a lot of sound and a little fury, but not without signifying something. The diverse isms of the decade will propagate and nourish new movements as architects, with their usual irreverence for prominence and insatiability for recreation, continue to embrace new attitudes. As these movements unfold, America will at best continue to revere and restore the monuments of its past while remaining optimistic with respect to the creation of significant new forms in its future that respond to new ideas and technologies.

The question for the 1990s is whether these new forms will be original or will retain traces of their former selves reassembled, reconstituted, or reformed—and, as such, will there be scars?

David Gebhard: 'A replay of the egocentric 1920s.'

While no moment can ever fully re-enact an episode of the past, there are nonetheless periods of time that do share points of similarity. The Reagan years we have just lived through share many salient points with the 1920s, so revealingly summed up in F. Scott Fitzgerald's *The Great Gatsby.* Both the decade of the 1920s and that of the 1980s represent an age that has sought to serve egocentric individuals' needs, particularly expressed through material aggrandizement. During the first decades of our century there was a shared feeling that those who controlled wealth had express obligations to use that wealth to help solve pressing social and economic problems. Not so in the '20s, nor in the '80s; the new rich in both decades made it plain (with a few exceptions) that their obligations were singular, to themselves.

As in the '20s, the architecture of the '80s tended to be a plaything of the rich. Modesty and reticence seemingly disappeared from the scene. Architects and their products participated in this scene, and, as Ruskin, Sullivan, and others had observed, the buildings of the period tellingly sum it all up. Again, in the early years of the century, those involved in business were often the principal supporters of the City Beautiful movement, of housing for the working class, and of the garden suburb and city. What is the legacy of the 1980s business community? With the fewest of exceptions, those involved in building within our major urban centers have left us very little. When a public space—a plaza or a spot of greenery—has been provided, it has generally been the result of public and government pressure, not of a private expression of obligation.

The urban buildings themselves, especially the high rise, openly declare through their excessive bulk and height that it was the financial ledger that prompted them, and little else. And in upper-middle-class suburbia, the accumulation of wealth has been expressed through oversized houses too large for their sites.

The fashion of postmodernism, similar in certain ways to period revivalism in the '20s, has provided both architect and client with a wide variety of possible images to select from. The classic postmodern image of pediments, columns, and piers, of hipped or gabled roofs, shares a remarkable number of similarities with the rage for the art deco style at the end of the 1920s and on into the early 1930s. Both of these images could be (and were) seen by the public as being up to date and modern and at the same time somewhat traditional. Both were looked upon by the public (and quite rightly so) as tran-

sitory occurrences of fashion. Each of these modes quickly developed a limited set of recognizable design elements, which could be seized upon by any architect who wished to produce an up-to-date image.

Side by side with the classical postmodernist imagery has been the increased urge to return to one or another of the historic styles—whether to the "heroic" phase of the International Style of the 1920s or to the French Norman château. This sally into the past has been vividly reflected, in everything from high-rise buildings to our 6,000- and 7,000-square-foot modest little suburban homes.

The '20s, too, expressed a similar catholic taste, but what that decade produced seems far more satisfactory than what we have brought forth. Why is this? The answer, I suspect, lies partially within the whole realm of beliefs held by society, but it also resides specifically in the architectural profession itself. In the 1980s the architecture of high seriousness proceeds from the world of the High Art object; the architects of the 1920s zeroed in on episodes of the past, which they sought to instill in their own buildings.

A governing principle of these Beaux-Arts-educated architects of the '20s was an obligation to produce objects of beauty and romance. One can search diligently through the buildings of the 1980s, many of strong character and of forceful ideological content, and not discover one considered beautiful. While a few of our major architectural practitioners have sought out and expressed a sense of romance, this has not become a governing quality of the decade.

In a remarkably perceptive manner the architect Louis La Beaume observed in the pages of the September 1928 issue of the *Journal of the American Institute of Architects* (in response to a plea for the modernist cause by Lewis Mumford), "It is all very well to hold an esthetic theory, but to let it loose at the wrong time may prove calamitous." In looking back at the 1980s, we too might ask whether the heavy pretensions of postmodernist theory have in fact produced a decade of architecture that later we will look back upon with great love and fondness. A guess would be that the visual evidence of the buildings may well be overshadowed by the intellectual world of theories, let loose (perhaps) at the wrong time. La Beaume had argued that in the '20s the task of the architect was not to mirror the "sordidness, the seriousness, the steadying business of life"; rather, it was to provide a means of "escape from the real world, which, though chaotic, we do not regard as picturesque, into a world of dreams." Perhaps this then is the essential difference between the architecture of the two decades: in the '20s we had a loving, childlike escape to fairyland; in the '80s, a carrying on of the modernist principle of expressing (in this instance) the sordidness of the age.

Robert Frasca: 'The profession is market-driven.'

The past 10 years have reminded us that style in itself has little to do with making beautiful rooms and places. Before 1980, the thinking in my professional lifetime had been confined to a single style, and, although modernism seemed inert, the alternatives to it were confined mostly to paper. In the '60s, we had been retaught to admire our heritage but we hadn't been able to develop a new vocabulary that had the flexibility to satisfy our society's diverging values. Suddenly there was an alternative. Postmodernism burst on the scene like an African sunrise, and it probably seems more vivid to me because it started in my hometown with the Portland Building. The movement quickly popularized architecture because it had struck a respondent chord in the consumer, something the other variants of modernism hadn't accomplished.

Because much of the profession is market-driven, before the decade was half over the jury was in and the results were mixed. The originators, such as Venturi, Graves, and Moore, had for the most part built well, but some of the most skilled practitioners of modernism who coerced themselves into trying their hand at it often ended with disastrous results. Postmodernism had in part changed the way we thought about buildings, but we saw some wretched results in the name of the "context." The style was as easily corrupted as modernism in serving the purposes of the most heinous client. It caused us to remember that what we admired about historic styles was not that they were intrinsically beautiful (although ugly buildings, like ruthless men, gain dignity with time) but that they had been built carefully and thoughtfully. Being stylistically ambitious was not a substitute for building well. Postmodernism reminded us also that nature has always been niggardly when it comes to human talent and that beauty and ugliness come in all styles.

In evaluating what produced the best of the decade nothing has changed. As always, the best architects recognized what the problem offered and then went beyond it. It required sometimes a powerful vision, such as Romaldo Giurgola's wonderfully heroic capitol at Canberra, and other times a modesty of purpose, as in Kallmann, McKinnell & Wood's carefully crafted American Academy in Cambridge, Mass. In some cases, these architects really had not involved themselves in the polemics of the decade. For example, Fumihiko Maki and Richard Meier, at opposite ends of the planet, continued to build beautifully and consistently. The National Museum of Modern Art in Kyoto and the High Museum in Atlanta (below) are both products of a dedication to principles developed over a long time. In other cases, exceptional buildings go beyond their own site boundaries. Arata Isozaki's MOCA in Los Angeles enlivened an otherwise deadly renewal area while building beautiful rooms for viewing art. Exceptional buildings dignify that which is around them, as does James Stirling's fine museum in Stuttgart.

These high points (not coincidentally) are not building types that deal with the problems typical of our cities, but that doesn't make this decade especially conspicuous in the history of our art. We continue to celebrate beautiful objects mostly because the artistic opportunities presented by more fundamental problems are modest. The important issue of the next 10 years is the same as it was for the past 10: that is, one of healing an urban environment that has been almost terminally wounded from half a century of bad judgment and indifference.

If the last decade began with the precepts of Robert Venturi, the next begins with the sensibilities of Frank Gehry. It is because the more everything becomes the same, the more we want to celebrate that which makes us unique, and Frank Gehry is first and foremost a regionalist (some

Illustration by Brian McCall

"Landscape and Architecture in the Twentieth Century." All were attempts to develop a new understanding of the relationship between the two arts.

The work of Emilio Ambasz in San Antonio, the work of Fay Jones, and Mitchell/Giurgola's Parliament House in Canberra (above) can be interpreted as erasing the figure-ground relationship between architecture and landscape and creating, instead, reciprocal contexts.

A theory of preservation: A great deal of work has been done on the "scientific" history of architecture—"what really happened when"—and scientific work has been done in the field of historic preservation by paint scratchers and dirt scratchers. Missing is a critical theory for determination of excellence, standards for what to save and how. Preservation cannot be a tool for some other agenda. The fuzzy-headed and sentimental view that "old is good" is no longer good enough.

We need to understand more deeply how to integrate our history into the present. In New York in the '80s we have witnessed the creation of a new building type: the skyscraper perched on top of a landmark. How are we to judge these efforts? How are we to design them? What are we saving when we save an old building? We have an obligation to develop an intellectual basis for a theory of preservation.

A theory of craft: We have a rich heritage from the postmodern movement, in its return to interest in how things are made. "Postmodern" began with painted wallboard but ended with the re-introduction of a wide range of materials that had not been used for a long time. We have 20 kinds of marble and granite intermixed, wood paneling with inlays of gold and mother-of-pearl. "Modern" has also increased the palette significantly. We have Gehry's chain link, we have copper, we have mill-finished stainless steel and shattered glass. A new respect and love for the craft of making things has emerged. There is a new interest in detailing; not in ornament, which suggests that old battle of the styles—but in detailing and in the techniques of construction.

In the '90s, we may see this interest in craft extend beyond detail, into engineering as a source for form.

A theory of civic design: This is a concern that is not yet visible as an esthetic but may be more important than all the rest. We are beginning to see a new call for civic responsibility, a return to large-scale planning to solve large-scale problems.

The increasing privatization of the environment no longer can obscure the necessity for a civic public spirit. We no longer are content with soap company skyscrapers as our cathedrals and shopping center malls as our public spaces. Too many citizens are excluded from these so-called public places. We need a real civic architecture, and real city planning—public works provided by the public authorities for the benefit of the public.

New program types are needed to address the growing concern for civicness: airports and highways as gates to the city, public spaces for public celebrations, schools that are centers of community activity, housing for the homeless. Le Corbusier said, "To design well you need talent; to program well you need genius."

We are coming to the end of a cycle of community control. Started as an antidote to mindless large-scale planning, community control has become an institutionalized system that prevents growth and change. We need a large-scale civic vision of our future. We are ready to contribute to a collective plan to improve our individual experience.

Samuel Mockbee: 'An infatuation with fashion.'

If the last decade can be described as 10 years of cultural stasis, it certainly seems fair to say that architecture has suffered symptoms of the same malaise: a state of inertia marked by reflections of a mythical past transformed by nostalgia and by an inability to address the challenge of the future.

Fortunately, however, a new framework seems to be emerging, one that can develop into a commitment to an architecture engaged with the essential characteristics that shape our culture. As Kenneth Frampton urged in his essay *Towards a Critical Regionalism: Six Points for an Architecture of Resistance,* "the primary principle of architectural autonomy resides in the *tectonic* rather than the *scenographic."* A coherent and articulate architecture can be achieved through a commitment to the tectonics that create our buildings. This, along with a design extracted from the idiosyncratic attributes of context, site, and climate, can invoke an appropriate cultural expression. Through "maintaining a high level of critical self-consciousness" in utilizing these contextual and tectonic qualities, architectural design can achieve exceptional results. The best architecture produced during the past few years has conscientiously responded to Frampton's concerns.

But what of the less desirable aspects of the past decade? Much of the body of work presented to the public reflected a languishing posture of nonadvancement due to three factors.

First, much of the work of the past 10 years betrays an infatuation with fashion. As evidenced in the popular media, the public was never more attuned to embracing architects as trend-setters and architecture as a consumable product. Sadly, architects acquiesced, producing glib artifacts without lasting value, elevating planned obsolescence to the grand scale.

As polemicists controverted over the year's fashion, architects declined to engage a design committed to maintaining a framework of meaning. Fundamental issues were obfuscated by a pursuit of the stylistic. The deficit was principally pursued through a design based on antecedent. This dependence on sentimentality seems now to be waning.

Second, the inability to move forward was due largely to a lack of criteria for judging the merit of the architect's intent. (Even the freedom associated with pluralism is not value-free.) Without such criteria, architecture seemed incapable of viable interconnection; content has been unintelligible, our cultural artifacts fragmented.

Third, fragmentation was amplified by the rejection of the modernist's optimism rooted in the idea of technological progress. Since the mid-'60s, we've been hindered by this manifest lack of faith in progress. The consequence is an abundance of eminently unprofound designs that can only be described as gratuitous representations.

Considering the technology that shapes our present environment, architecture of the past 20 years or so has been left behind. While increasingly sophisticated technological advances have developed, architects have not appropriated those advances. Seemingly unwilling to grasp that (for better or for worse) technology is a logical and ongoing product of our cultural evolution, we have not weaned ourselves from obsolescent technological equipage. With some notable exceptions, the inability or unwillingness to articulate the technological component of our society has precluded architects from participating actively in the tectonics that shape the very buildings we design.

For architecture of the coming years to perform as a meaningful simulacrum of society's foremost ideals and characteristics, it has to reject the pursuit of ephemeral stylization. To avoid in the future labels that quickly expire through overuse and misappropriation, architects of the next decade should aspire to produce a body of work unshackled by the lexicon of fashion. In developing an architecture that relates to cultural experience, an earnest engagement with that experience is necessary. Beyond that, criteria of critical evaluation need to be employed to adjudicate that engagement. An architecture that cogently utilizes its technological and contextual locus can produce a built environment that responds to our social responsibility.

Peter Forbes: 'Pulling stylistic rabbits out of a hat.'

In the two years since our last analysis in these pages, there has been every indication of an incredible acceleration in the stylistic paroxysms of architecture. I am piqued with excitement and trepidation to see what happens in the next two, let alone 10 years as we hurtle toward the millennium.

Sadly, architecture continues to be involved almost exclusively with style—in Mies's words with "inventing a new architecture every Monday." That imperative, to keep pulling stylistic rabbits out of a hat, is a difficult exercise, and the results have not been particularly successful: postmodernism, happily, seems to have collapsed, proving that structural sheetrock can support only so much literary allusion, and seems to be flourishing only in north Jersey strip development and, of course, Disney World.

Historicism, of which Boston has been a particularly sad victim, continues to wallow along in its ¾-inch-thick "rusticated" stone; suspended, weightless brick; instant shingle style; and colonial windows with snap-in mullions: fin-de-siècle nostalgia for a simpler time with all the modern conveniences of a consumer society discreetly hidden behind false fronts. In Boston they even prop up *old* fronts, emasculated remnants of once-honorable buildings, and hide whole high rises behind them in an ostrichlike hope that the new building, if not seen at street level, will somehow not truly exist.

Deconstructivism, the most recent of polemical statements, is suddenly in vogue and threatens to be built, probably much to the surprise of its philosophical originators. There is a curious dichotomy between built space that houses functions and people (remember people?) and a theoretical position that self-consciously proclaims an "architecture against itself" and champions "madness and play over careful management." However delightful and exciting it is to work within this style, there is an unsettling dervish quality to its constructs as it whirls across the land in a celebration of self-destruction. One has the sense of being in a Goddard movie, impotently observing an impending auto wreck.

And what of poor old modernism? It is still kicked around by each successive wave of stylists, still accused of being sterile and unresponsive, of pandering to the lowest common denominator (although postmodernism is invading that market). And, although as a discipline and intellectual construct modernism has much that remains valid, or else there would be nothing to kick around, as a *style* modernism has all the faults of other styles. That is, all these styles of the '80s are hollow expressions of fashion's whim. Will the buildings for the spring collections have hemlines three inches or six inches above the knee?

For the most part, architecture of the past decade has continued to be either, as I said in 1987, a nearly total philosophical void or, more recently, the product of a philosophy of hermetically isolated vacuity. Viewed from outside the profession, or even from outside the United States, our architecture's posturing and indecision must be both perplexing and disturbing. Clearly the oscillations of style are exceeding any notion of valuable "stylistic breadth" or "architecture of inclusion." Rather, we are confronted with apparently random gropings, massaged by both a jaded market and an architectural press panting for the next stylistic titillation. Ironically, the paper architecture of the impoverished '70s, which was created only for publication as a substitute for reality in built form, has been replaced by constructed buildings that only achieve "reality" when they are photographed, published, and pigeonholed in the appropriate stylistic niche—a crazed extrapolation of Descartes' tree falling, unheard, in the forest.

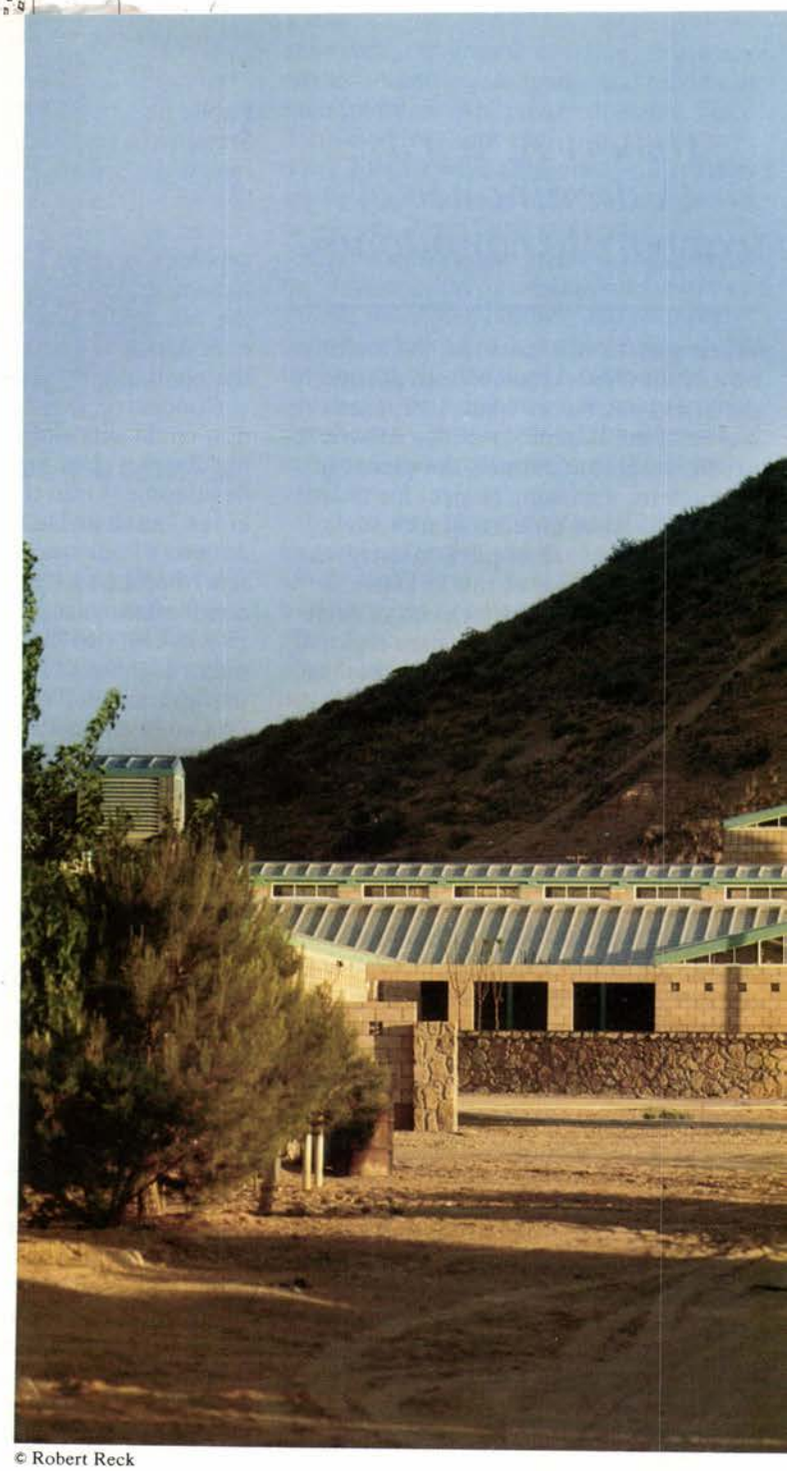
What we are witnessing is a profound confusion in architectural values and in the societal values that inevitably shape them. If there is a definable spirit of the age, it is anxiety. And, God knows, there is plenty to be anxious about: a very dicey economic situation, rampant social ills, impending ecological disaster, etc., etc. However, rather than these identifiable sources of anxiety, the fundamental cause of nervousness seems to be concern about our unknown future. Not only are we approaching a new century, a new millennium, but we are in the middle of enormous structural changes in our society and its institutions. Shifts to an unprecedented global interdependence, incredible scalar changes in economic disparities, sheer quantities of people, information, *things,* and, by inversion, sheer scarcities of space, resources, arable land, and, most of all, *time* are inducing fundamental shifts in our perception of reality.

For the first time in history we are, if not comfortable, at least conversant with the notion of infinity. Even young children, with the initiates' tolerant amusement at the special effects in "Star Wars," are informed about light-years, black holes, supernovas, and the like. We are about to launch a telescope into space that can "see" 12 billion light-years, and we know space continues beyond that. Maybe forever. At the same time, and also for the first time in history, there is *widespread* capability to totally destroy life on this planet. Maybe forever.

We live in this magnetic field between infinite continuity and instantaneous oblivion. It is a highly charged atmosphere that

1989 AIA Honor Awards

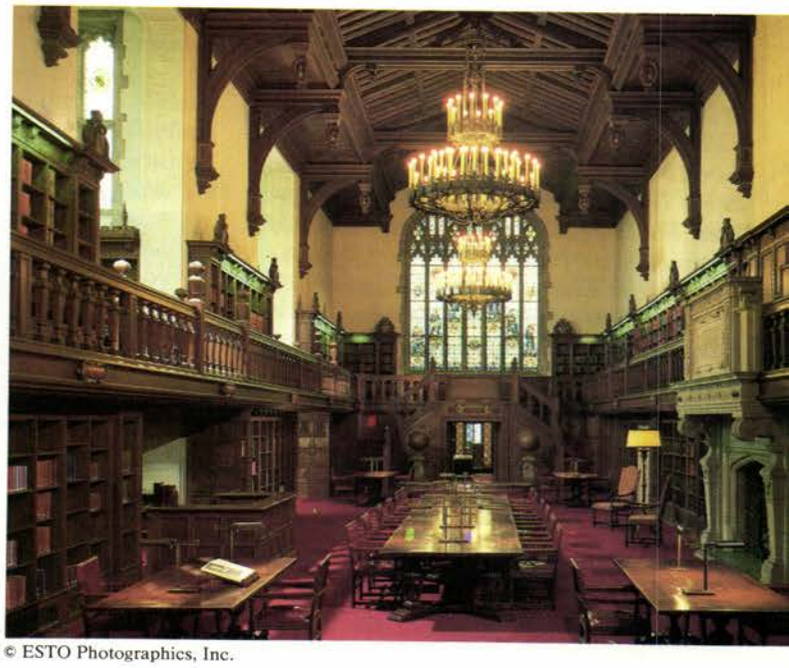
Most of 1989's 12 honor award winners are modest in scale, the largest being the school at right. Jury chairman David Childs, FAIA, says the panel debated whether a complex, large-scale project must have "the same degree of perfection and consistency that a more modest undertaking—simple in terms of size, program, and client—can perhaps more easily achieve." By their votes, the majority of these jurors said yes, it must. But they recognize the importance of larger-scale designs and urge firms to offer more urban design and planning projects next year. Joining Childs on the jury were Peter Bohlin, FAIA; Steven Ellinger, Assoc. AIA; Brendan Gill of The New Yorker*; Kathleen S. Hoeft, AIA; Joyce S. Lee, architecture student; Jaquelin T. Robertson, FAIA; Michael Rotondi, AIA; and John Whiteman, AIA. Our coverage begins with two works previously shown in these pages.* —Allen Freeman



© Robert Reck

The Folger Shakespeare Library in Washington, D.C., is a little like a Milky Way: a smooth crust of decoish stripped classicism covering nougaty Elizabethan and Tudor interiors. Paul Cret designed it in the late 1920s for a prominent site on Capitol Hill. The building forms a wide, shallow U, with the Folger Shakespeare Theatre in one wing, support space in the other, and the reading room (right) and a parallel exhibition gallery along the wide front facade connecting the wings. As described in our November 1983 issue, Hartman-Cox put two levels of new stacks underground along the rear of the building; almost totally rearranged existing support and office space; and inserted within the U a vaulted reading room (far right).This room, classical in proportion and appointments, employs a variety of techniques, including skylighted slots down the center, to admit natural light with a minimum of glare. The nonstructural vault is suspended from a steel frame. Hartman-Cox's addition, like Cret's original, is clad in marble.

The jurors said, "Careful attention has been paid to every detail, from the delicately fluted columns on the exterior to the well-crafted architect-designed tables." The new reading room is "a dignified space that blends well with the original building, yet has a thoroughly modern identity of its own."



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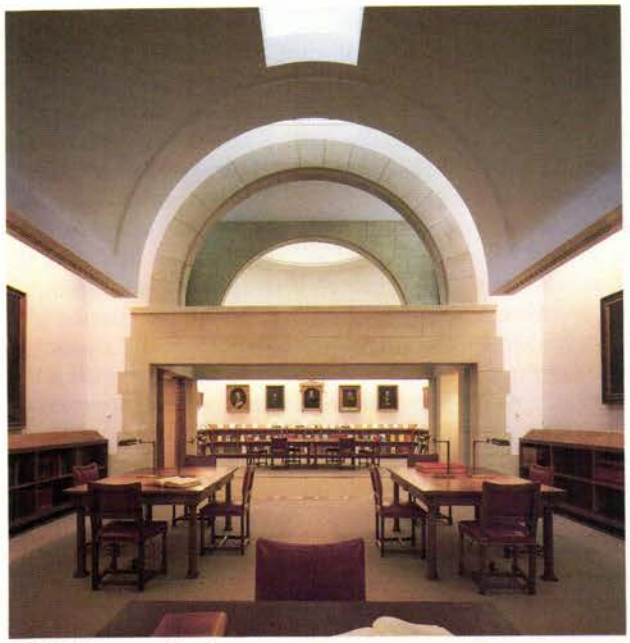

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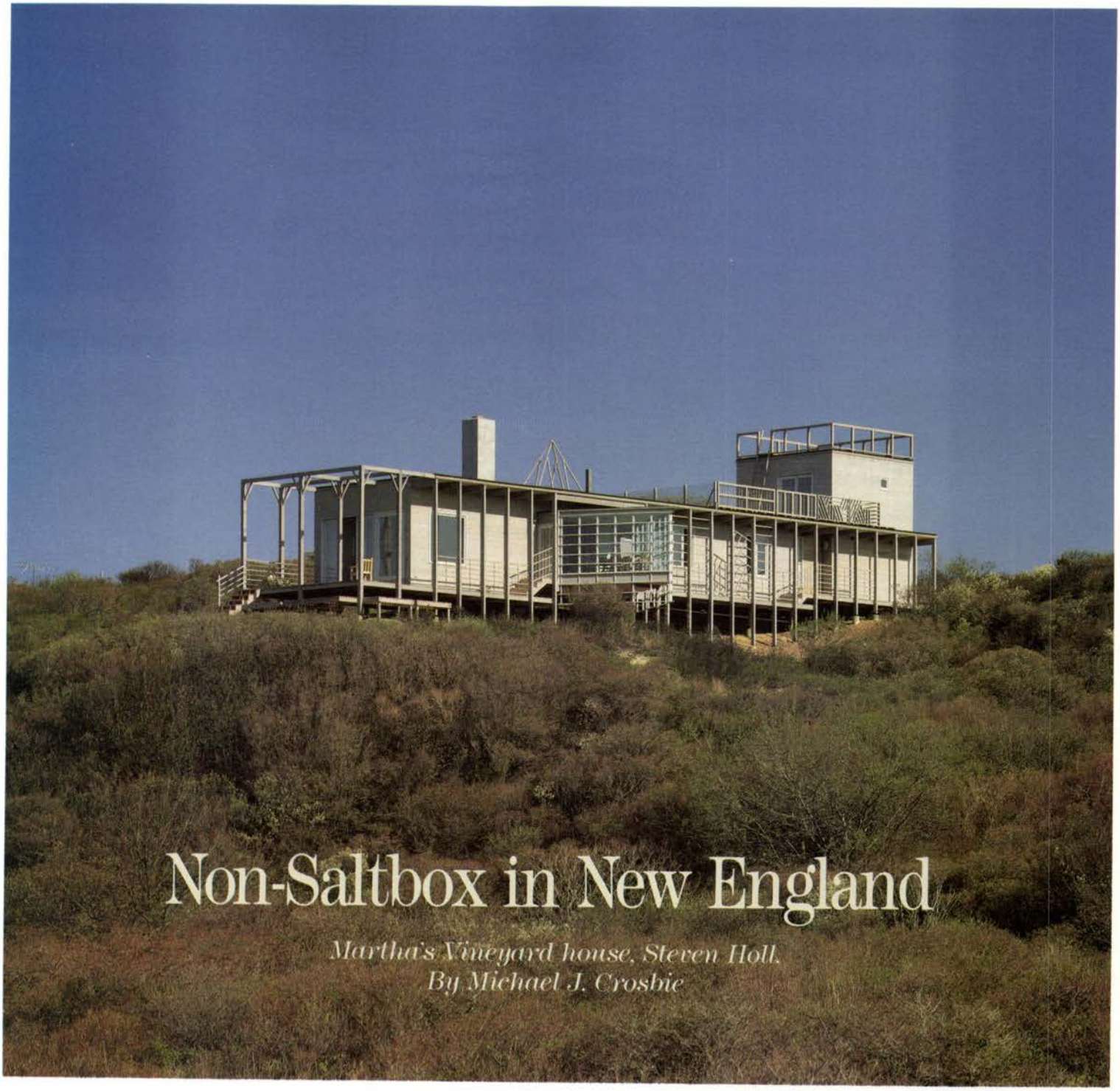
Desert View Elementary School in Sunland Park, N.M., is one of three identical schools that Perkins & Will and Mimbres Inc., designed for the Gadsden Independent School District. Each school's site is demarcated by a circular rock wall that forms a boundary between irrigated land and natural desert. The rock walls, sloped metal roofs, soft earth-toned masonry walls, and decorative wrought-iron railings make the schools seem at home in the community, which is located just across the Rio Grande from El Paso, Tex. The buildings have "a rigoriously rational design that translates the local vernacular into convincing civic architecture," Contributing Editor David Dillon wrote in these pages last August.

The plan is organized into three sections by function—one for classrooms, another for school offices and a library, and a third that comprises a multipurpose pavilion and a cafeteria. This third section, which is shared by the community, and an entry tower are the most prominent elements in the design and are oriented toward a public entry plaza.

Desert View is "comfortable and durable," said the jurors. "With its expansive corridors, child-size scale, and brightly lit interiors, this school supports the idea that learning is a joy." The children seem to think of it as theirs, observed Dillon.



Non-Saltbox in New England

Martha's Vineyard house, Steven Holl.
By Michael J. Crosbie

It is easy for an architect designing for a site on Martha's Vineyard to fall under the spell of the Massachusetts island's traditional architecture—the exuberant Victorian cottages of Oak Bluffs, the prim and proper sea captains' houses of Edgartown, or the gray shingle-clad capes and saltboxes along the coastline. It is also easy to design in such idioms, given the Vineyard's strict building restrictions of setback, height, and materials. Steven Holl, AIA, chose instead to derive inspiration for this 1,600-square-foot weekend house from an older, indigenous, and less celebrated building tradition—that of the island's first inhabitants.

"I wasn't inspired by the modern interpretation of the saltbox," says Holl, "or those big, rambling Sternesque houses. I was trying to get back to the spirit of New England, and in doing that was reading Melville." In *Moby Dick* Holl found a passage about the island's Indians covering the skeleton of a beached whale with skins and bark, transforming this found object into shelter. That image of a sun-bleached frame used as an armature for building permeates Holl's beach house. It is an apt metaphor given the program's economy and Holl's interest in "expressing the building's concept in its constructional reality."

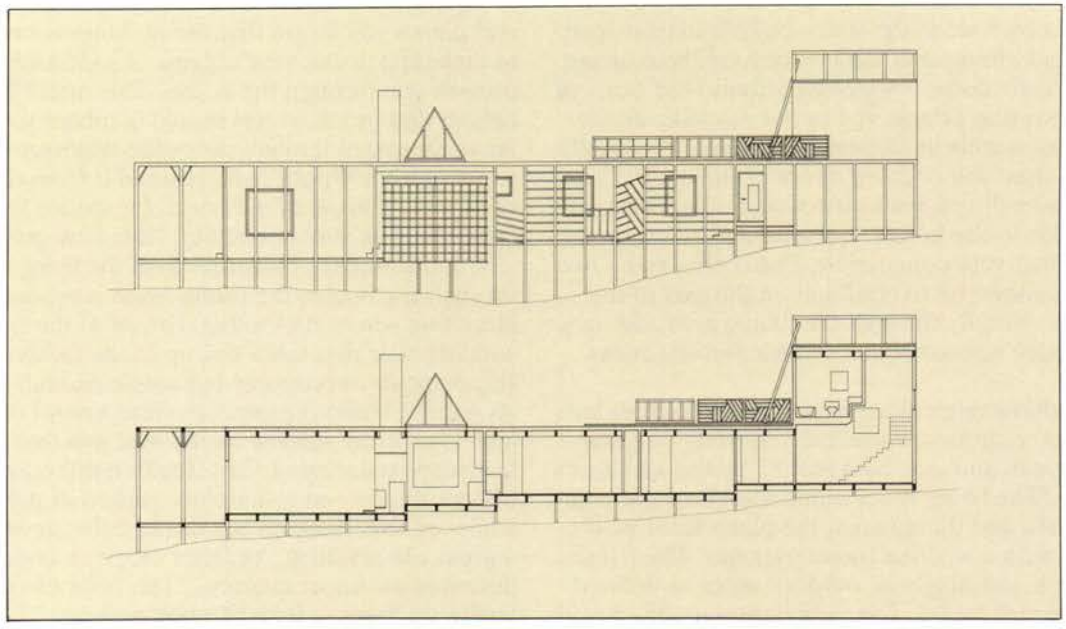
The house rides the brow of a hill that overlooks a marsh and the ocean beyond. One approaches it from the south, climbing the grade. The two-story cube seems to brood on the hill and hides the rest of the house from the path. Then the open-framed veranda appears, and then the triangular dining room, which juts from the house like a shark's tooth. You are immediately drawn to the veranda; you mount it like a gangplank and begin to notice the intricate pattern of shadow on the enclosure's smooth cedar walls, which are tightly clad, as if wrapped in taut skin. The shadows are from a collision of railings woven into the building's frame, as if found from some other structure, their junctures with the frame planed smooth and held in place with a cartilage of copper rods. The building's frame meets the ground on point foundations and rides the grade like a roller coaster.

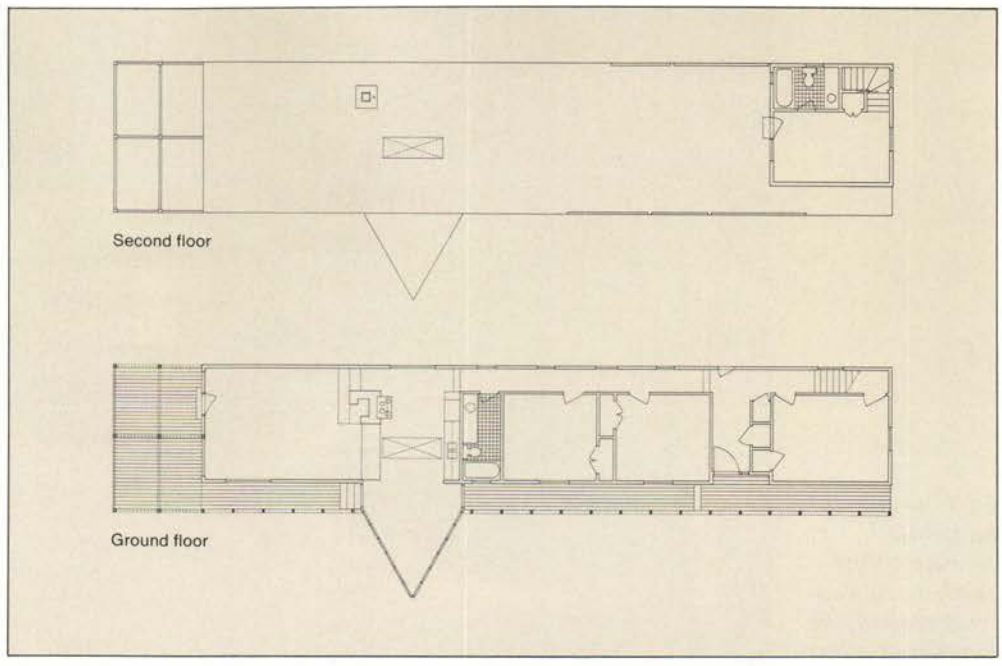
Entry is through a door on the veranda just around the corner from the cube's edge. The foyer is compressed and uneventful, and one immediately moves to its end to find a long spine, this one a narrow and enclosed version of the entry veranda, which extends from one end of the house to the other and strictly dictates your movement through the house. You instinctively turn left, continuing in the direction that leads to the water. Two

Photographs © Paul Warchol

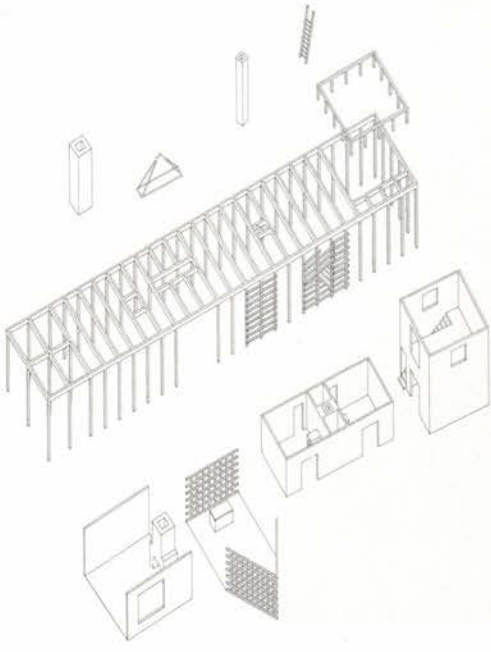
Left, weekend house on Martha's Vineyard, as viewed from marshland, appears as a box within a rigid frame. Pyramidal structure on roof denotes kitchen.

Above, house as viewed from driveway. Long veranda leads to front entry and dining room beyond. Left, east elevation has little fenestration to maintain privacy from nearby houses.





Drawing below depicts house's elements as they relate to the frame structure that weaves them together. Below right, view toward Gay Head from angular dining room. Trapezoidal dining table of Holl's design forces perspective. Facing page, view from living room with its hand-painted canvas carpet reinforces presence of frame and circulation spine.



guest bedrooms and a bath are to the west—cell-like in their spareness. The kitchen and dining area are just beyond them, down two steps, and with their discovery you have found the heart of the house, a cross-axis that orients you to the prowlike dining area with its trapezoidal table and hanging light fixture of Holl's design. For the first time you become aware of the ocean. The cantilevered dining area directs your view toward Gay Head and its lighthouse and also to the juncture of land and water, as the room's apex marks that very connection. The dining area's two glass doors, if open, allow you to continue on the axis of the veranda, as it passes virtually through the dining area and, in a sense, severs that space into an island, outside the relentless, rectilinear frame.

The living room, down three more steps beyond the fireplace mass, is quiet, with a traditional canvas rug painted with floating lines on a blue-green and gray background by the architect's brother, James Holl. The living room seems anticlimactic compared with the kitchen and dining area, the plan's focal point, marked on the roof with a wooden frame pyramid. The living room opens to a deck, seemingly an outdoor room as defined by the house's unadorned frame. The view here is unobstructed and makes you aware that the building is sited in such a way as to make the ocean view a game of hide-and-seek, a prize that propels you through the house. This might be frustrating if you believe that beach houses should bombard you with great, sweeping oceanscapes through plate-glass windows. Here Holl has taken a lesson from Wright (who learned it from the Japanese) and has saved glimpses of the ocean for special locations in the plan. Otherwise, as Holl points out, "the view gets boring."

When you reach the terminus of the living room and look back through the house, the frame again is prominent—4x10 beams marching across the ceiling. Far off at the spine's south end is a winding stair that takes you up to the master bedroom—a room shipshape in its economy but ample enough as a captain's roost. As a tower it allows protective views toward the house's approach, and it has a tiny window on the west wall that appears as a framed landscape painting of Gay Head's lighthouse. The upper deck offers solitude and a sculpture garden of pyramid and chimney, while another deck on top of the cube, accessible by ladder, is a great observatory. As Janet Odgis, a client for the house, describes the upper quarters, "The bedroom is just dreamy. When you're up there, it feels like you're flying." □

Photographs © Paul Warchol

The Colonial Idiom Stretched Vertically

Hansen house, Wilmette, Ill.,
Hammond Beeby & Babka.
By Nora Richter Greer

Photographs © Timothy Hursley/The Arkansas Office

A bit of wizardry was performed by Hammond Beeby & Babka for the design of the Hansen house in an established suburb of Chicago: a small house was made to appear much larger than it actually is and to borrow so successfully from the surrounding vernacular that it quickly was assimilated into the neighborhood fabric.

The suburb is Wilmette, Ill., set along the shores of Lake Michigan some 30 miles north of downtown Chicago. Developed primarily during the first three decades of this century, the eastern portion of Wilmette consists predominantly of stucco and brick houses that are large variations on the suburban foursquare. Mixed in are some older clapboard houses with generous wraparound porches.

The 175x50-foot site was small enough to be considered a side yard for the houses on either side. The challenge for Thomas Beeby, FAIA—and designers Tannys Langdon, AIA, Charles Young, AIA, and Karen Johnson, AIA—was to create a house that would stand its ground among its giant neighbors but also meet the owner's requirement for a small (1,500-square-foot) house with "quality spaces." To achieve the illusion of bulk, a basic colonial two-room house was stretched vertically into three

Facing page, the front facade bespeaks a Palladian symmetry. Above, the rear elevation (at center) is more informal with its bow-shaped sunroom.

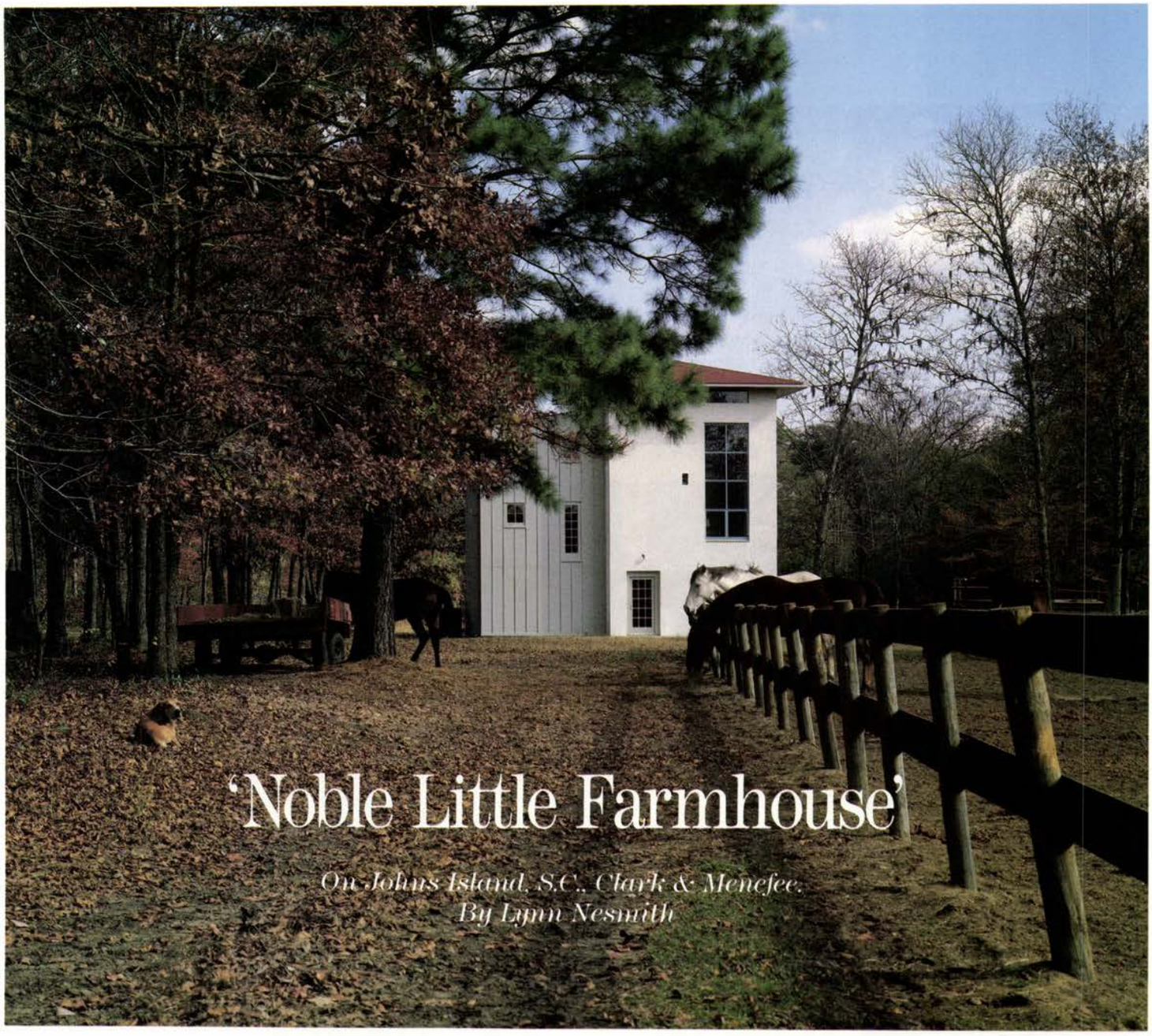
stories. The resulting height of 28 feet from porch base to hip roof is equivalent to its neighbors. Re-enforcing that verticality on the exterior are tall, narrow windows and a cupola (which doubles as a twin chimney stack) that stretches upward beyond the third story.

A wooden porch stretches past the house horizontally on all four elevations, bringing the house almost to the lot's east and west boundaries. The delicate, undersized columns and flat roof of the porch make the veranda appear light and airy, hardly an intrusion on the neighboring houses. The wooden porch is complemented by wooden moldings on the gray-painted, stucco house.

Inside, the house is small yet resplendent with natural light. You enter through a central doorway into a small foyer that leads into the 13.8x22-foot living room, the main features of which are the exceptionally tall, narrow windows and the fireplace on one side. Your attention, though, is drawn immediately to the less-formal, bow-fronted sunroom in the rear with its curved bench and abundant natural light that strikes the lightly stained oak floors. That same light wood is carried throughout the interiors. Tucked between the sunroom and the living room is a sliver of a kitchen, which suited the Hansens but is likely to be enlarged by subsequent owners.

The verticality of the exterior is expressed most strongly inside by the three-story staircase topped with a skylight set within the cupola. The second floor has one open bedroom (which could be divided in half) and a bathroom. The third floor, site of the master bedroom, is more regal, with light streaming in from portals in the eaves. A generous portion of the bedroom is given over to a Jacuzzi and sink, which is partially open to the bedroom. The remaining bathroom facilities are tucked in the corner opposite the stairs.

An overall sense of Palladian symmetry was broken when the southeast corner of the first floor was pushed outward for a breakfast room. This, however, is fitting because it suggests that this formal, villa-like house is more than it seems at first glance—that it has an exuberance and warmth that make it a welcome addition to the neighborhood.



'Noble Little Farmhouse'

On Johns Island, S.C., Clark & Menefee.
By Lynn Nesmith

Photographs © Mick Hales

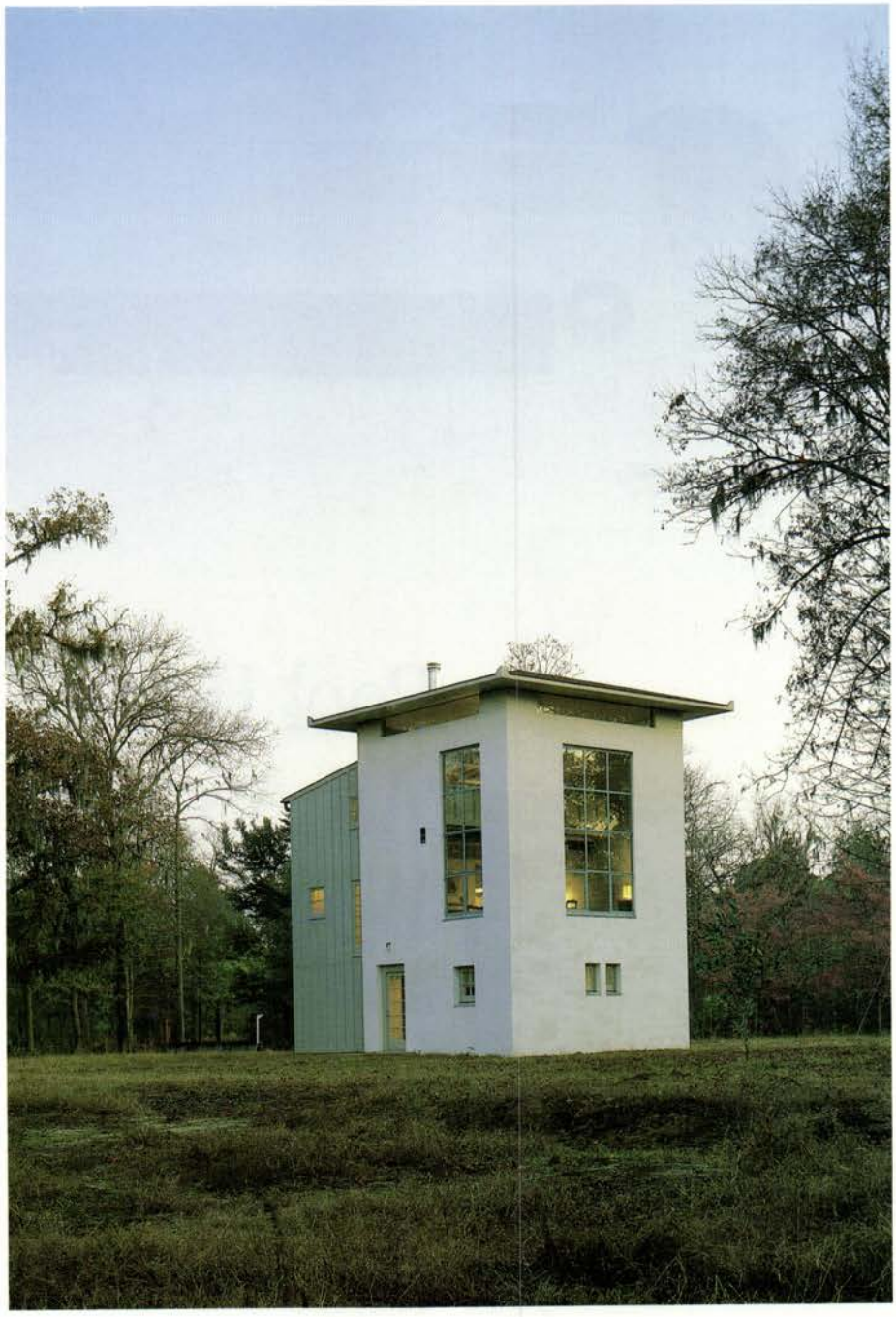
The Reid House by Clark & Menefee Architects stands tall among the pine and oaks draped with Spanish moss in the poor rural countryside of Johns Island, S.C. South of Charleston along the coast, where golf courses are replacing farmlands and marinas are filling marshes, Johns Island remains a vestige of the Carolina Low Country, not the romantic plantations along the rivers but the shacks and trailers of farmers who barely eke out an existence from the land. Yet "this noble little farmhouse" cited by the honor award jury as the "essence of repose and serenity" respects its modest neighbors.

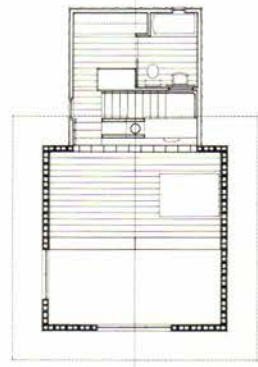
The client, a couple with two small children and a 100-acre horse farm, had been living in two abutting house trailers amid a collection of "stuff" ranging from boats and trailers to Cushman scooters to rusting appliances. As design principal W.G. Clark recalls, the architects were inspired to design a house that "could live with all this junk and at the same time could boss it around."

Clark & Menefee organized the house in a simple and straightforward plan with two components—a 20-foot-square, concrete block tower containing the main spaces and a wooden shed for the kitchen and bathrooms. The two elements are connected by a fireplace and a winding, finely crafted wooden stairway. The architects set the double-height living room atop a pair of ground-floor bedrooms for the children. The master bedroom is within a loft space that interrupts this main living area. An exposed steel beam supporting the balcony punctuates the walls with two small windows filled with glass blocks. A band of clerestory windows and two 14-foot-tall windows flood the living room with natural light and provide commanding views of the none-too-refined landscape.

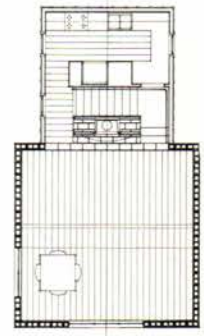
The house is made of the simplest and least expensive materials, in keeping with the humble buildings of the area as well as the Reids' budget of $100,000. The lean-to shed is wood-framed with painted plywood siding and battens, and the gently hipped roof is clad with asphalt shingles. Interior finishes are sandblasted concrete block walls, two-by-six painted pine floors with exposed pine floor joists, and painted plywood wall partitions—carefully detailed, says Clark, thanks to the talents of the contractor.

Two years ago Clark & Menefee was honored for the Middleton Inn, an understated modernist lodge adjacent to the historic, formal Middleton gardens. Clark says his goal is to make building "an act of understanding and adoration of the place." The Reid house, like the Middleton Inn, is appropriate to its time and place in a physical sense but also in a spiritual sense. "Incorporating the architecture of nearby buildings as well as more formal classical architectural elements," said the honor award jury, "this house is carefully proportioned and has an air of timelessness . . . as though a proud remnant from a past civilization." □

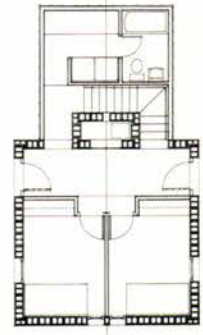




Third floor

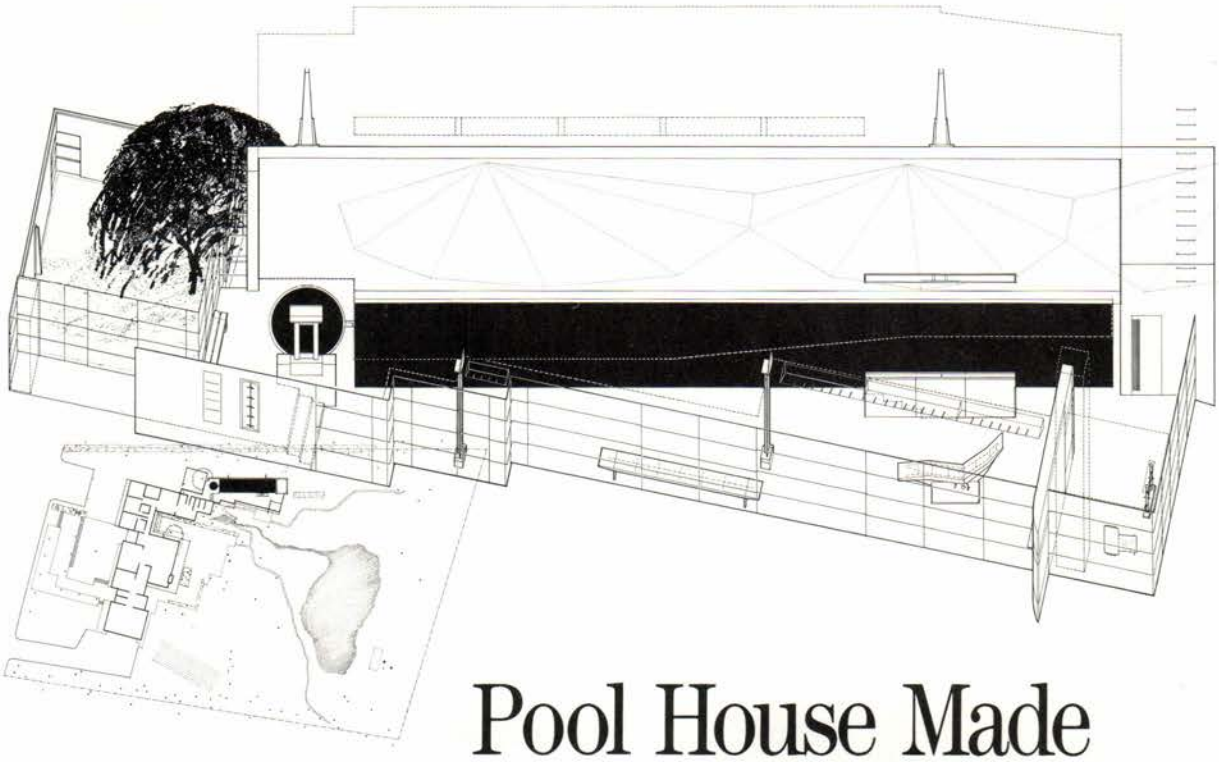


Second floor

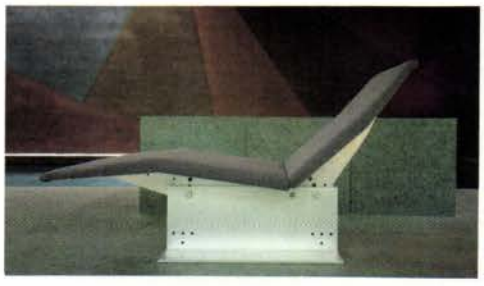


First floor

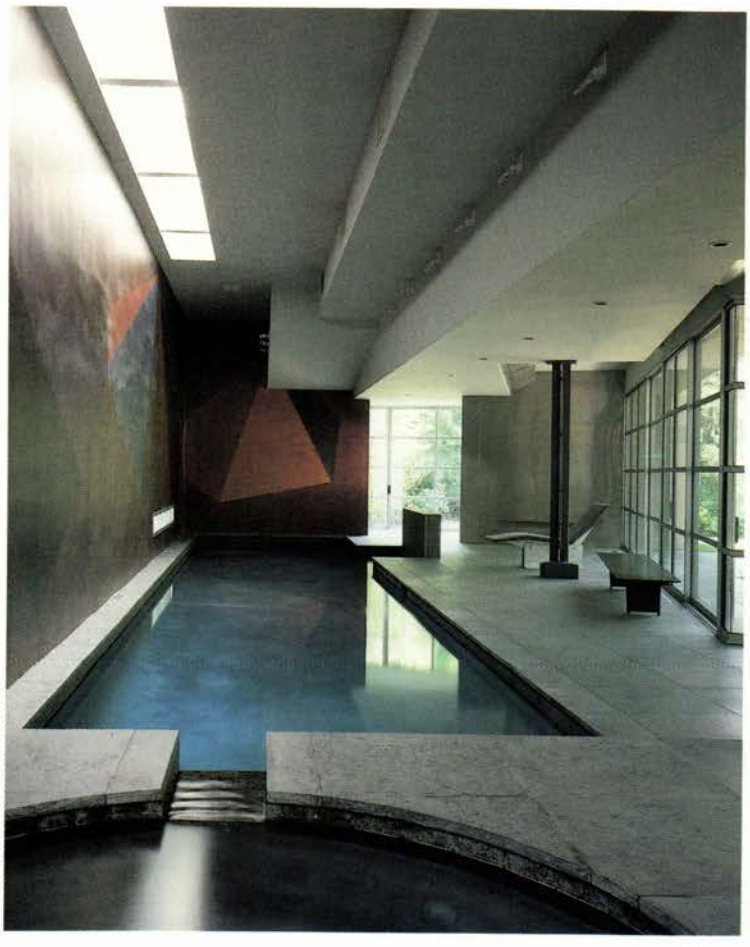
Facing page, the house, which is the main residence of a working horse farm, is sited at the end of a dirt road. Above right, the south and east elevations with their 14-foot-high windows. Right, the building's 'one grand interior space.'



Pool House Made 'An Accomplished Work of Art'



In Kings Point, N.Y. Tod Williams, Billie Tsien & Assoc. By Michael J. Crosbie



Photographs © Michael Moran

The clients for this pool house, which was designed by Tod Williams, Billie Tsien & Associates of New York City, are avid collectors of contemporary art. Their 1961 quasi-California modernist house in Kings Point, N.Y., is a veritable gallery; in fact a number of windows in the glassy living and dining rooms were replaced with sheetrock for more hanging space. The pool house, however, was not intended for art—its program focused on the therapeutic benefits of swimming. But avid collectors often collect even unintentionally, and the pool house that Williams has designed for them is in itself an accomplished work of art.

It is skillfully sited to provide some closure for the main house's backyard, which had been enlarged by the annexation of an adjacent property. Extending from the northwest corner of the house like a forearm, the pool house cradles a pocket of exterior space. Carved from the existing grade, the new landscape curls around evergreens and is traversed via rocks from a riverbank.

Against the voluptuous land form (achieved with the collaboration of landscape architect Tom Pritchard), the pool house cuts a sharp and pristine figure—a sort of machine in the garden. Its counterpoint is a garden in the machine—a resuscitated Japanese version with a split-leaf maple, moss-covered rocks, and neatly raked gravel. Before the pool house's construction, the Japanese garden was visible and accessible from the master bath. Now the pool house inserts a long finger of space between the bath and the garden. This is the way into the pool house from the main house's interior—through the master bedroom, a dressing room, and finally the bath—a succession of increasingly private spaces.

Facing page, above, one of two stainless steel chaise lounges designed for the 'sharp and pristine' pool house.

Williams notes that the juxtaposition of geometric elements is a recurring theme in his work, and one's apprehension of it in the pool house occurs at its threshold. In concert with the orthogonal grid of the main house, the pool house's glass wall steps and extends north. The addition's solid west wall is parallel to the property line, angled approximately 12 degrees away from the window wall. The overlapping geometry is expressed in the grid of the Lake Placid blue granite floor and is first viewed as you cross the threshold of the master bath.

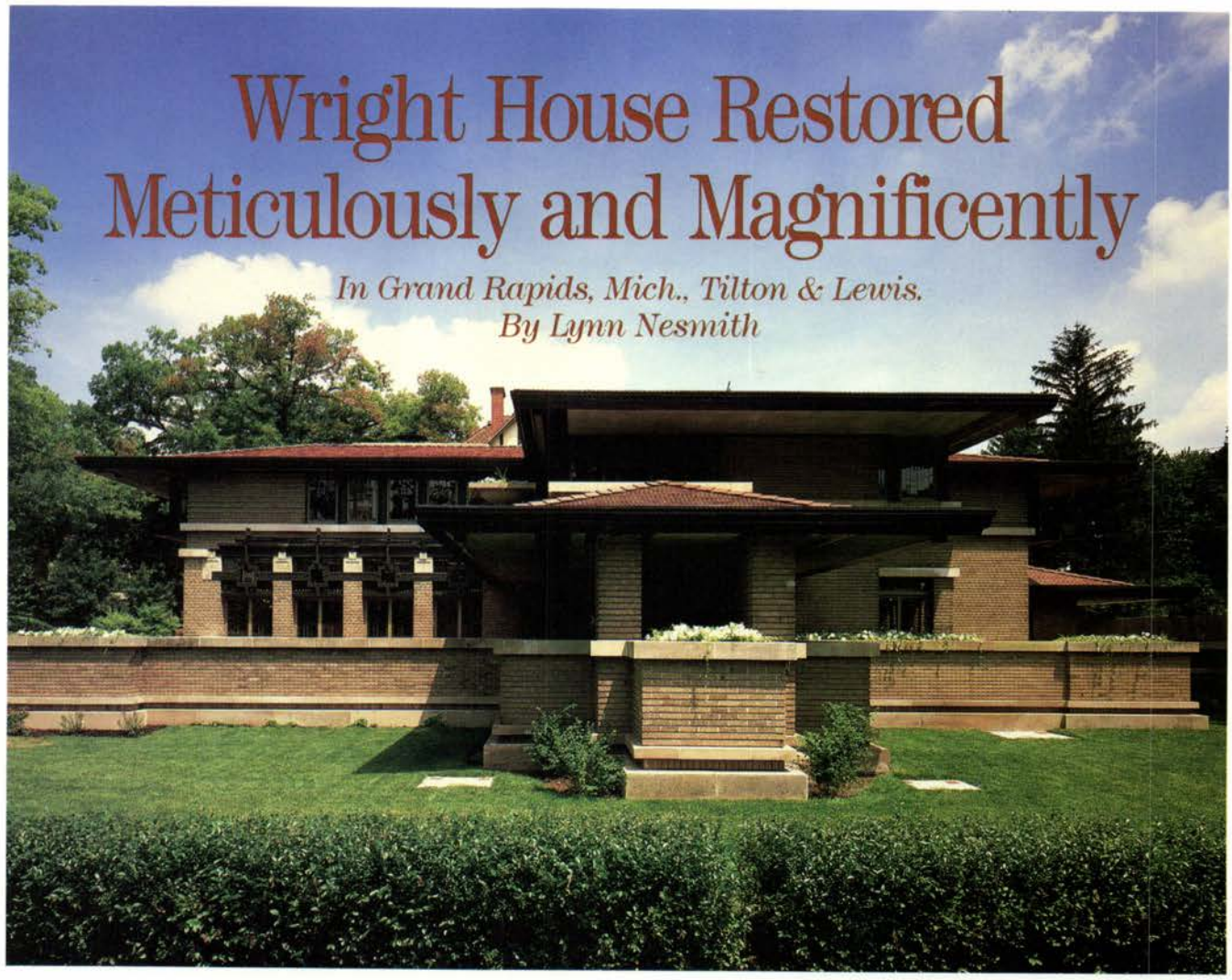
Momentarily, the Japanese garden averts your attention from the pool house, but through the garden you spy the circular Jacuzzi and become aware of the sound of its waterfall into the lap pool, whose long, thin shape causes your eye to race to the pool house's terminus.

There is something very primal about the space—the cool, natural materials, the sound of water, the spareness of the design. Three steel columns stand as sentinels, giving a muscular lift to the stepped ceiling as it cants up over the pool. An abrupt intrusion into the space comes in the form of a beveled, stainless steel wall, which cuts like a blade through the window wall. The pool house is furnished with two stainless steel chaise lounges and two dark blue stained oak benches.

A perfect counterpoint to the interior shades of gray is a mural by Sol LeWitt that stretches along the west wall. Williams had intended the wall to be tile. The client discovered in a New York City gallery a LeWitt painting of two pyramids, and, after seeing it himself, Williams encouraged the client to commission a painting for the pool house. The length of the wall and its return on the north side prompted LeWitt to expand the painting to three pyramids. The mural is most powerful when illuminated and viewed from outside, through the glass wall, as it causes the west wall to dissolve into an idealized landscape. □

Wright House Restored Meticulously and Magnificently

In Grand Rapids, Mich., Tilton & Lewis.
By Lynn Nesmith



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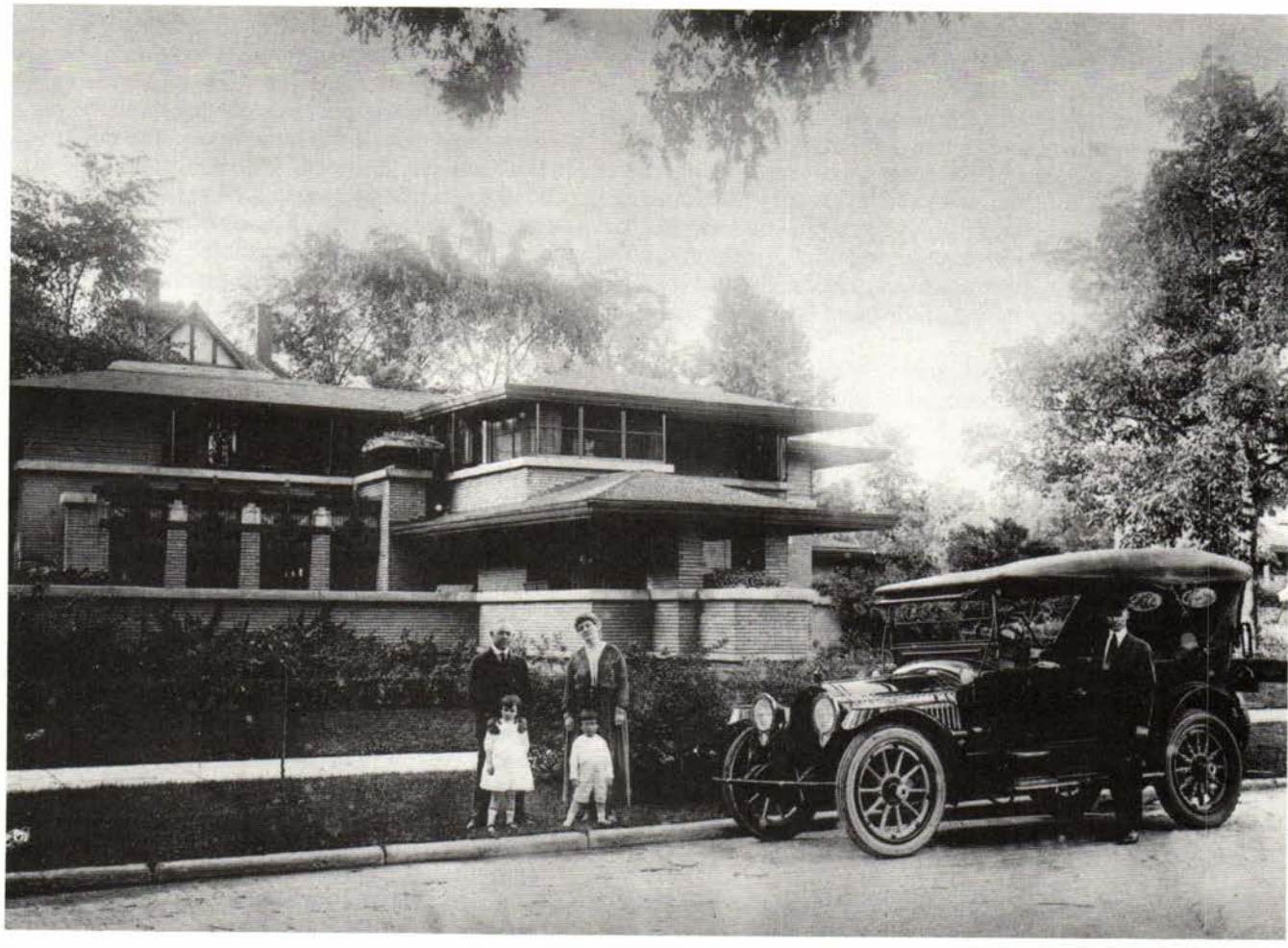


Courtesy of Steelcase

Frank Lloyd Wright's Meyer May house has been meticulously restored—from new steel structural members to original and re-created furnishings down to the photographs and books of the May family. As a re-created historical living environment rather than a period piece, the Meyer May house, in the words of the honor award jury, "radiates with the energy and enthusiasm of Wright himself and feels more like a private home than a museum."

Located in the Heritage Hill historic district in Grand Rapids, Mich., the house was designed and built in 1909 for Meyer S. May, a local clothier, and his wife, Sophie Amberg. Over the years numerous additions had substantially altered the exterior appearance, and the interior had suffered from many remodelings and conversion into several apartments.

Restoration began in 1985 when Steelcase Inc., a furniture manufacturer based in Grand Rapids, purchased the house for educational as well as public and corporate functions. (This tribute might be based on the corporate awe and appreciation Steelcase has for Wright, who some 50 years ago chose the company to manufacture the innovative workstations for his Johnson Wax building.)

Architect John Tilton of the Chicago firm Tilton & Lewis and preservation coordinator Carla Lind—as well as numerous art historians and decorative arts consultants—spent months researching the house's original design. Some of the most important reconstruction tools were found in the most unusual ways. The house was not as well documented as many of Wright's other buildings. After finding scant material in Taliesin's archives, Lind discovered original blueprints and decorative arts drawings in the archives of the Milwaukee Art Institute. She also used photographs and personal recollections of the May children.

Because of their findings, the architects decided to return the house to its 1909 appearance, which required demolition of a 2,000-foot addition and bricking in the south veranda. The bricks, limestone, and copper finishings from the addition were salvaged and used in rebuilding the original house.

The May house, which faces the street with set-back masonry masses, sheltering overhangs, low terraces, and outreaching walls, recalls many of Wright's other Prairie School houses from his prolific 1900-1909 period. The sculptural copper mullions and fasciae along the living room windows are among the earliest examples of Wright's decorative copper detailing.

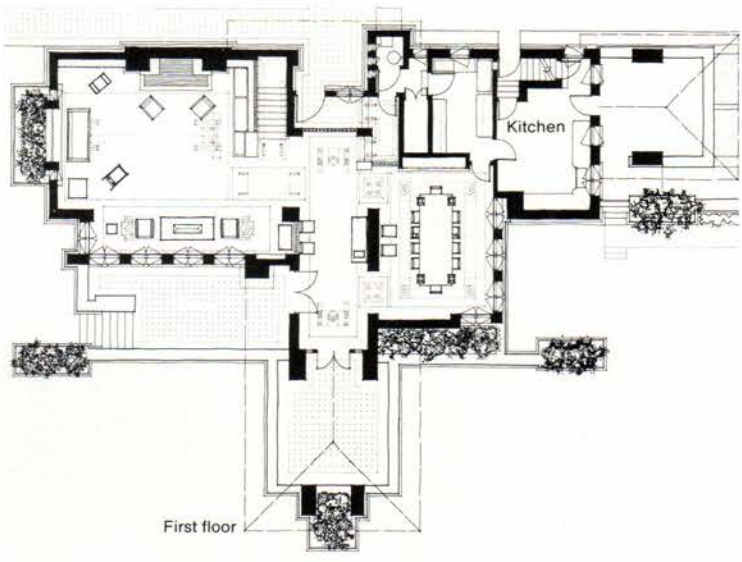
The 18-month restoration entailed almost complete dismantling and reconstruction of sections of the house. The cantilevered roofs on the west, east, and south sides were rebuilt using 19 tons of new structural steel beams, rafters, and columns to replace the badly deteriorated wooden structural elements. The roof was reframed, sheathed, and insulated, and new red clay tiles were produced to match the originals by the same company, which still had the paperwork on Wright's order.

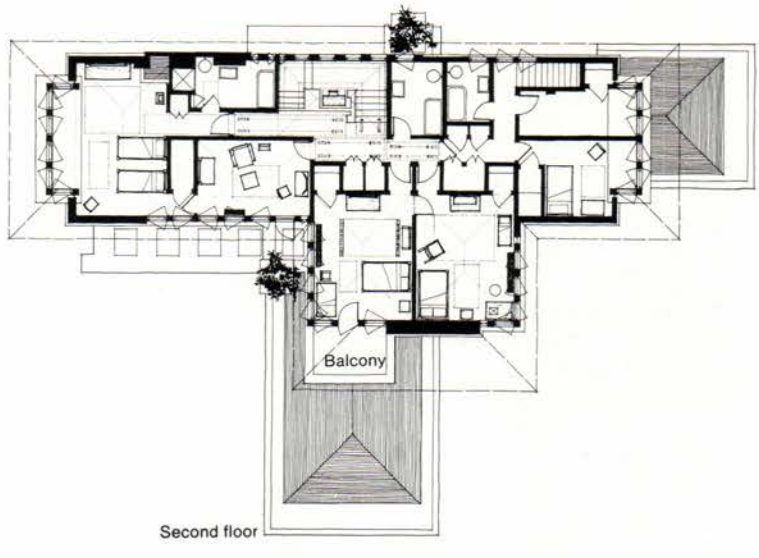
The entrance, at the rear of the house, is framed by vertical slotted windows and a shallow horizontal overhang topped with a concrete urn. Inside, the embracing foyer screened by a vertical oak lattice winds up a narrow stairway and opens into the

Bottom left, Meyer May with his children, Harriet and Richard, and the family housekeeper in 1919; top, restored house today. Below, the living room's massive fireplace, the 'heart of the house.'

Dave Kingma

Dave Kingma





Above, windows and skylights fill the living room with natural light, and oak moldings wrap around the windows, walls, and ceilings, emphasizing the free-flowing spaces. Facing page, above, south and east walls of the dining room feature more art glass windows with the pattern repeated in the table's corner lampposts. Right, master bedroom has a recessed bay of windows and on the north wall a smaller but similar version of the living room fireplace.

Dave Kingma

main-floor living spaces.Wright oriented the house for maximum southern exposure and employed skylights and large windows in the living room. Glass artisans removed and repaired 110 art glass windows and replicated six others. The copper-camed window patterns are repeated on embroidered linens and woven into the carpets. The warm earth tones of the walls and the abundant natural light create an almost magical glow, heightened by horizontal joints of golden glass in the brick fireplace.

Long ago the dining room table had been sawn apart and made into a firewood box. Period photographs revealed similarities to the table in the Robie house; the scale was determined from one surviving partial table leg. Four elaborate lampposts crown Wright's characteristic "room within a room" dining assembly.

Rooms are furnished with a mixture of original pieces, reproductions of originals, and compatible arts and crafts pieces from the period. A collection of 26 original furnishings was acquired from a Grand Rapids family. Many of the furnishings reflect the influence of Wright's associate George Niedecken of Milwaukee, who oversaw the production of Wright's custom furnishings. Niedecken also was responsible for the 80-square-foot hollyhock mural on the central pylon, which was found under six layers of paint. Cast bronze sconces were reproduced to match the few remaining in the house, and a foundry recast the fireplace grates.

Like so many of Wright's houses, this one makes a graceful transition from public to private spaces. As the stairway rises to the second floor, a wall of glass on the landing draws light into both the levels.

The Meyer May house is much more than a restored historic building or even a tribute to Wright. It is a work of art that has been brought back to life through the collaborative efforts of dozens of talented and caring individuals. □

© Jon Miller, Hedrich-Blessing

Allen Freeman

Civic Plaza with a Glazed Centerpiece

In Chattanooga, Derthick Henley & Wilkerson/ Koetter, Kim & Associates.
By Allen Freeman

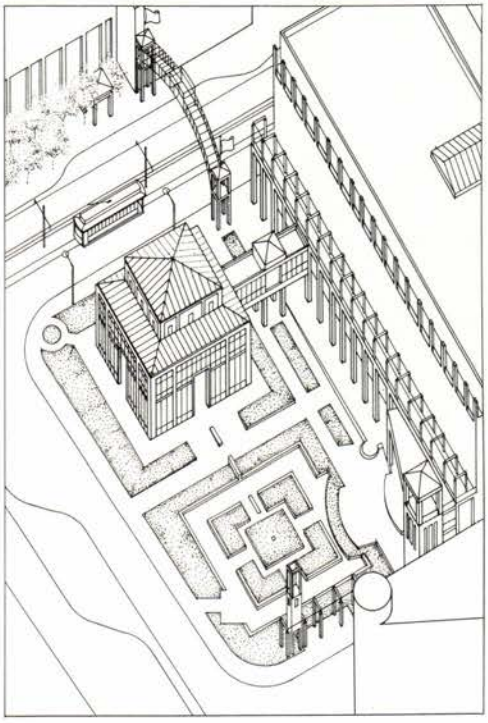
Functionally and visually, Miller Park Plaza is both edge and transition between civic and commercial realms in downtown Chattanooga, Tenn. Occupying about an acre on the south end of a built-up commercial block, it is hard-surfaced, rectilinear, and highly programmed. As such, it complements Miller Park, an unprogrammed, free-form, more softly landscaped space about twice its size on the block immediately to the south. The architects were Derthick, Henley & Wilkerson of Chattanooga and Koetter, Kim & Associates of Boston.

Three major complementary parts make up the plaza. A two-story spine with shops, offices, and a performance stage forms a backdrop along the plaza's party-wall northern edge. An unpartitioned pavilion the height of a three-story building occupies the southwest corner. The remainder is stepped and uncovered, with benches and fountains. Everything is red brick.

Excepting the commercial spine, which hasn't proved adequately hospitable to retail tenants, the plaza has come to life nicely in its first year. When the pavilion's glazed walls are closed, its acoustics are brightly appropriate for piano recitals and boy choirs attracting audiences of 150 or so. Open, it provides lunchtime shelter for weekday brownbaggers. Musicians requiring amplification—rock and symphonic—have performed with success to audiences of 500 to 1,000 from the open stage in the spine.

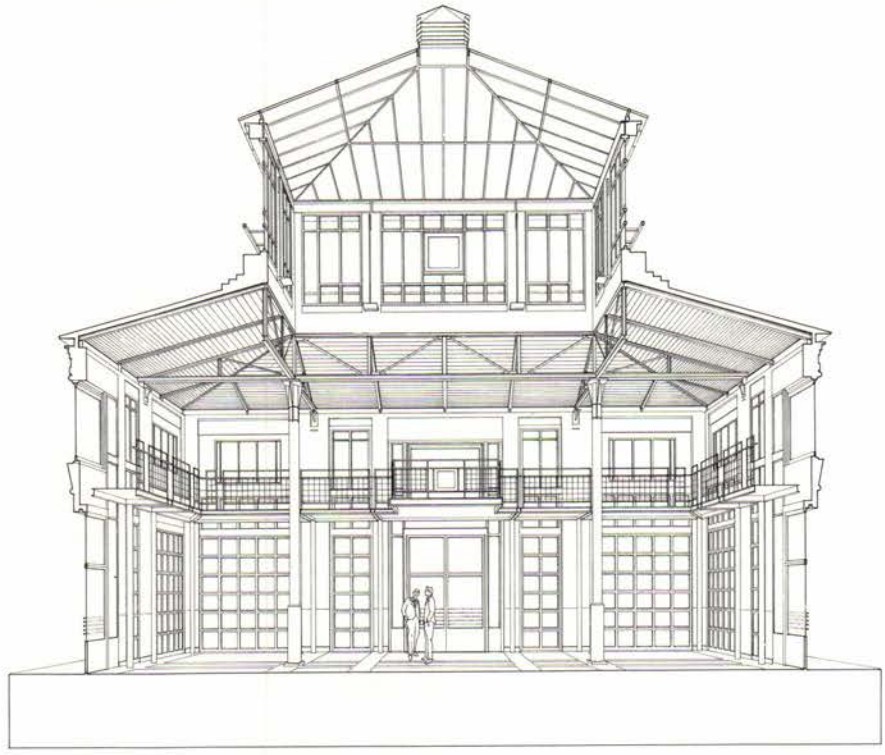
Miller Park Plaza is a public/private venture. The city provided the land, and the nonprofit Center City Corp. built it, with grants from two local foundations, and operates it. □

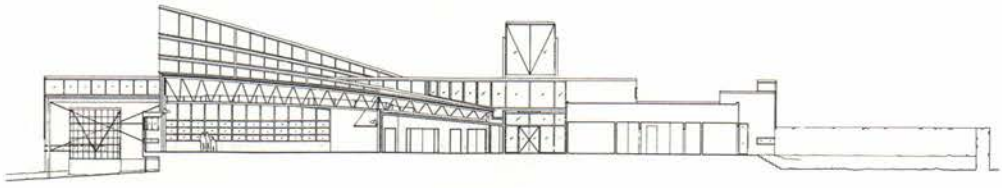
Allen Freeman



David Verrico

Facing page, Miller Park Plaza from the south, with the 13-year-old Miller Park in the foreground. The pavilion is at left and the open performance stage is at right. This page from the top, the plaza from the west, the interior of the pavilion, and the pavilion in section.





'Practical, Unpretentious, Open, and Family Oriented'

Clayton County, Ga., Library, Scogin Elam & Bray.
By Allen Freeman

Scogin Elam & Bray has won its second honor award in as many years for works that scarcely look related. Last year's winner was the High Museum at Georgia-Pacific Center, a controlled, compressed, and highly crafted cluster of intimate, interlocking galleries and ramps in an Atlanta skyscraper. This year's winner is a suburban library with an exploded form and an industrial esthetic. Despite their differences, the two works are alike in that they avoid historical allusion and are nonliteral responses to their very different contexts.

Clayton County is where Margaret Mitchell imagined Tara to be in *Gone with the Wind* and where Atlanta built Hartsfield International Airport. The library is part of an accreting light-industrial strip that hasn't yet reached the prevailing U.S. standard of mass-produced monotony, where "one is apt to pull alongside a pickup with a rack and ZZ Top blasting through open windows," as Merrill Elam, AIA, observes. In this context, she says, her firm's 33,000-square-foot library, costing a modest $68 per square foot, is a "filling station for living life, [providing] a puppet show, a cooking class, a seed catalogue, easy parking."

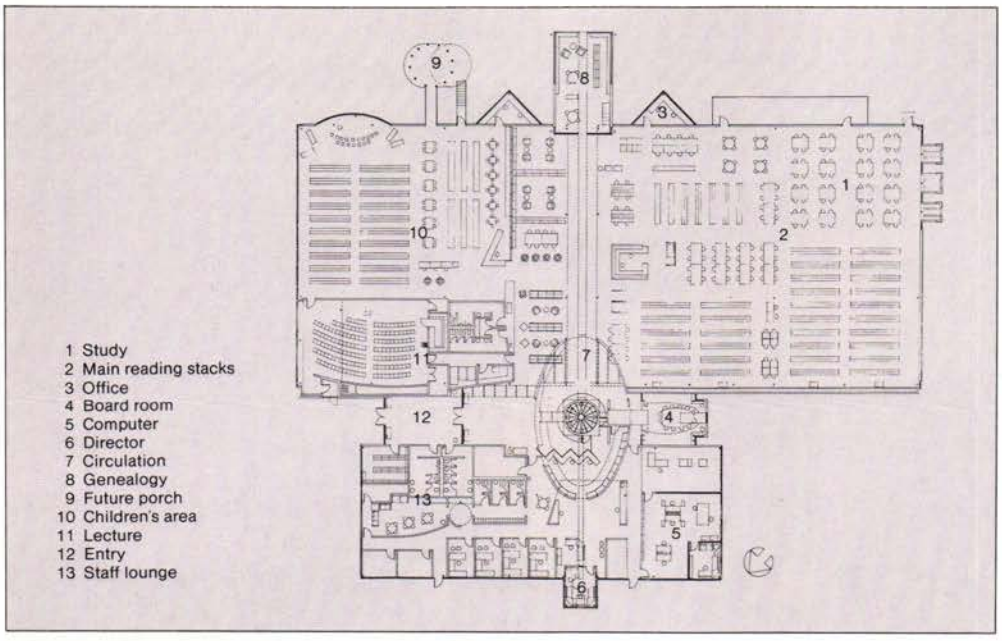
Seemingly born of free association, the exuberant facades spread under piney woods like suburbia itself. The rectilinear light tower suggests air control functions, and the roof rises in aeronautical forms. The splotchy black and white corrugated metal siding connotes library boxes. And finishes and exposed steel framing are factory grade.

Despite its unconventionality, says library director Carol Stewart, the building reflects the largely blue-collar Clayton County and its people because it is practical, unpretentious, open, and family oriented. She says the interior design is largely self-explanatory, even to first-time users, and lends itself to minimal staffing, that the stadium-type uplighting fixtures with metal halide lamps provide almost ideal, even illumination with little glare or shadow, and that the building is quiet even when filled with users. The interior is almost universally liked, Stewart says, and she is especially pleased that young people hang out there. Some older residents, however, have not warmed to the spirited facades.

The honor award jurors said, "This startling building defies the notion that libraries are stuffy places. . . . [It] bursts with movement and life."

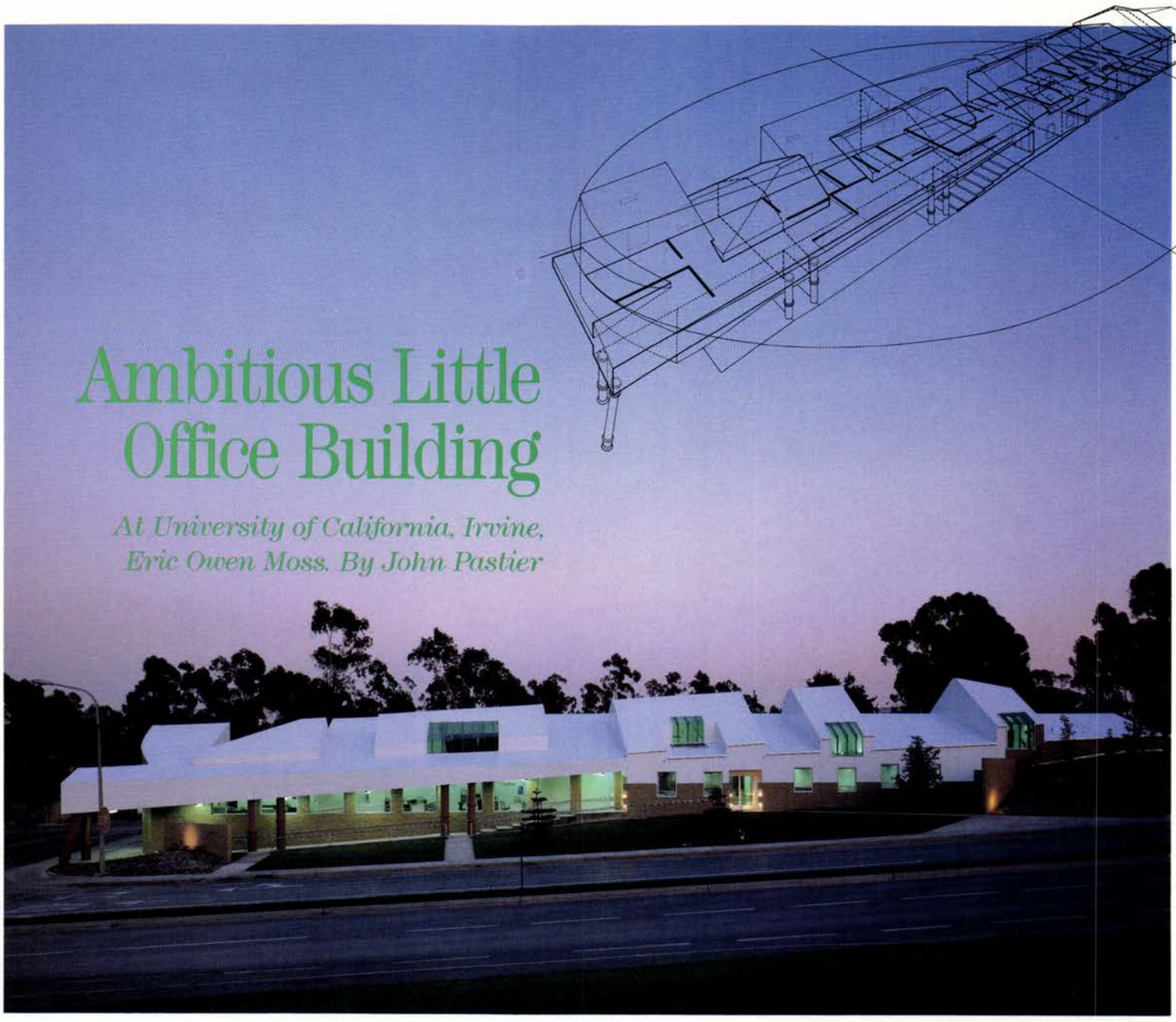
Above, the entrance facade faces north, with an axis running from the freestanding tower up the steps to the circulation desk directly under the rectilinear light tower. Facing page: below, a satellite dish-cum-chandelier is suspended under the light tower; above, story time in a bowed facade of the children's area at the northeast corner of the building.

Photographs © Timothy Hursley



Left, the main reading room in the building's southeast corner. Below left, a trio of windowed study cubicles on the south wall. Right, the periodical area adjacent to the major east-west axis. Bowed warren trusses have wood cords and galvanized steel webs; lights are standard stadium fixtures. □

Photographs © Timothy Hursley



Ambitious Little Office Building

At University of California, Irvine, Eric Owen Moss. By John Pastier

Photographs © Tom Bonner

The University of California, Irvine, was futuristically conceived by the late William L. Pereira, FAIA, a quarter-century ago and was built from scratch in affluent and booming Orange County about 50 miles southeast of Los Angeles. In recent years UCI officials have named a street after the campus architect, reworked his circular master plan, abandoned the ponderous institutional style of the earliest buildings, and given most of the small- and medium-sized design contracts to a variety of architecture firms with strong local or national reputations for design. In the process, UCI has acquired relatively inexpensive boutique buildings by stars such as Frank Gehry, Charles Moore, Robert Venturi, and Robert A.M. Stern, and now has earned its second national honor award.

This year's winner is the Central Housing Office Building, designed by Los Angeles architect Eric Owen Moss, AIA. It is almost tiny, as institutional buildings go, but as filled with incident and detail as many buildings 10 times its size. In its ambition, it is reminiscent of an elegant little Florida residence where the young Paul Rudolph used a tensioned-cable structure to span a mere 22 feet. Years later, he explained this choice of advanced structural technology by saying, "I could not wait."

Moss's effort is the converse of Rudolph's in that it uses relatively standard construction methods to achieve a complex and somewhat arbitrary building form. Venturi, whose new Management School is a few hundred yards uphill from Central Housing, most likely would call this active little building a duck.

Unlike many of its species, however, this duck is intelligent and witty. It can trace some of its ancestry to Gehry, particularly in its interior, but even more of it to a recent trio of Moss warehouse remodelings in Culver City, Calif., one of which was given an honor award last year.

The Central Housing Office Building is the administration center for student housing on campus. Its staff of 27 serves about 4,000 units, and, while there is some face-to-face transaction between student tenants and staff, normally walk-in use of the building is light. The building was sited to be roughly central to existing and planned housing complexes, and it occupies a prominent corner near one of the two main campus entrances. The site slopes upward about 20 feet; Moss, rather than accommodating this topography, challenged it by creating a long, narrow structure running perpendicular to the contour lines. This allowed him to maximize the project's presence along the more heavily trafficked road, and it gave him a sloping organizational datum that greatly influenced the building's section and main elevation.

Moss then proceeded to break down the building's scale through complex manipulations of its fenestration and roofline. As in so much of his recent work, the architect invented a complicated and arbitrary order and then elaborated upon it with impressive faithfulness. Nearly every element, no matter how apparently capricious, has a systemic rationale or two for its presence and form. Ostensibly random three-dimensional relationships take on rigor and discipline when analyzed in a site and roof plan. Seemingly anarchic window arrangements make relative sense after Moss explains their gestures.

Three views of the administration center for student housing that stretches along a sloped site: (facing page) front elevation, (top) rear elevation, and (above) narrow side elevation.

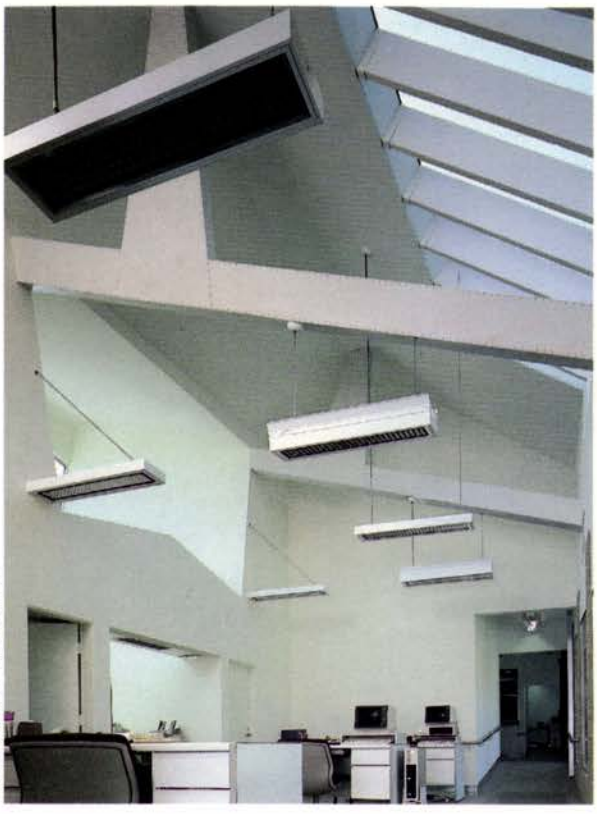
Writing about such a project is frustrating because even a cursory explanation of the architect's overlapping rationales for his many design decisions could not possibly be accommodated in an article of normal form and length. Perhaps James Joyce would have been able to do the building metaphorical justice, and he was not known for economy of expression. What follows will touch on some of the Housing Office's Byzantine logic but will leave many of its intentions unexplored. However, the building is an effective three-dimensional artifact inside and out, and a visitor needs little or no explanation to appreciate its object qualities and to experience its spaces.

Central Housing's long cross section reveals a ramped main corridor. Offices and exterior windows step up along this slope, but not as steeply as the site itself; as a result the south end of the building is largely engulfed by the hillsides and an internal stair is introduced to establish a second-floor level there. This upper story has very little area and is not occupied; instead it serves as a transition to a later wing if the building ever needs expansion. Interior ceilings and external roofs rise and fall in transverse slices reflecting offices and functional areas below.

The roof and ceiling lines form a complex pattern governed by one of Moss's geometric games. Externally, there are high-roofed sections alternating with lower ones. The former (and, for that matter, the dormer) components have ridge lines roughly parallel to the ground slope, while the latter, which can be considered the main roof, have a level ridge that is skewed to the building in plan, thus creating a complicated and illusionistic relationship with the higher sections and the rest of the building below. This line also corresponds to the major axis of an ellipse that organized much of the site plan but is not strongly sensed in the building. Because of its twisted orientation, this perfectly horizontal ridge produces sloping fasciae at the roof edges. The higher roof elements all contain skylights, and several of those turn the edge of the roof to become clerestories.

There is a calculated sparseness to the finish materials inside. In addition to the suspended lighting, there are clay sewer pipes used as flanking columns for the lobby's main desk, beautifully formed exposed and unpainted ducts that run flat against exterior office walls, and inverted T-shaped exposed trusses clad in sheet metal that sport precise rows of screw heads along their edges. In this spirit, the floor was designed to be exposed concrete, but poor execution, acoustic considerations, and foot comfort all led to the installation of gray industrial carpeting, much to the architect's disappointment.

One programmatic goal was the "de-bureaucratization of the work environment," a relatively easy task given the manageable size of the building. The department manager also abetted Moss's tendencies toward complexity by asking that each office be different. The request was honored with enthusiasm and provided an occasion to create the highly articulated roofscape.

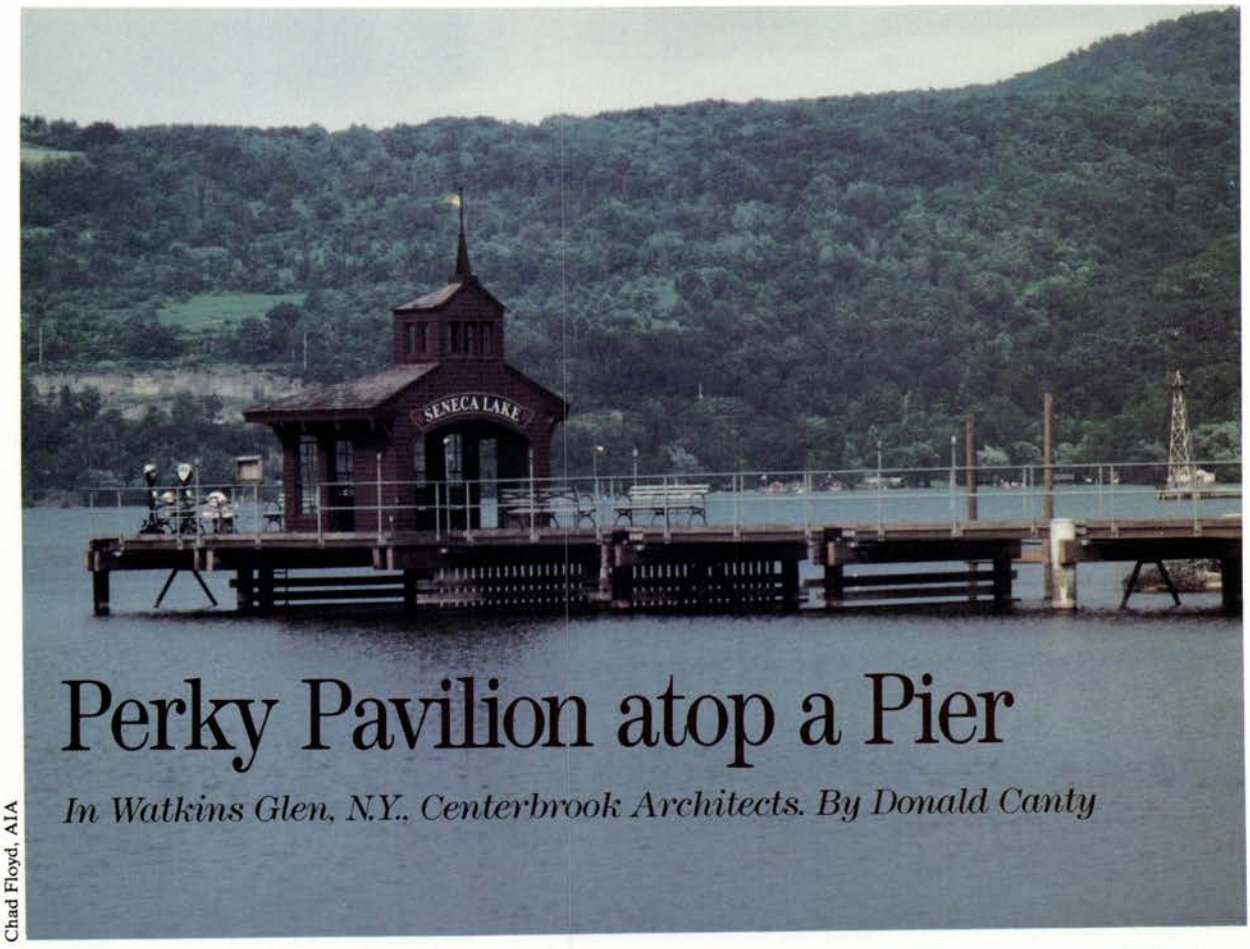


Inside the center workspaces are set along a ramped corridor and are marked by skylights and changes in ceiling heights. Columns (bottom photo) are clay sewer pipes.

Photographs © Tom Bonner

Outside, the building's main materials are prepainted sheet metal roofing, a warm-toned, split-faced concrete block, and that Southern California standby, stucco. Three pairs of terra-cotta-colored sewer pipes form an irregular colonnade and support a deep west-facing roof overhang that is sheared off dramatically at its north end. Moss perceived that corner of the building as potentially significant to pedestrians on this automobile-dominated campus, since it was part of a main path from dormitories to classrooms, and he acknowledged this circumstance by setting the corner column dramatically askew and by veneering the small sliced-off roof edge with purplish-brown marble, the only conventionally "fine" material found on the building. The architect reasoned that this would help create a sense of place along a well-traveled path, but despite the dramatic gesture the corner nevertheless strikes a visitor as a classically pedestrian-unfriendly bit of suburbia.

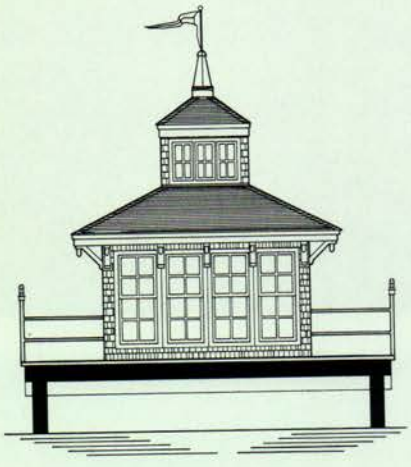
The honor award jurors engaged in a lively debate about the building. They concluded that "this provocative [design] explores the relationship between the natural and the man-made . . . [and] accommodates both the topography and the suburban character of the neighborhood. The . . . oddly shaped gable roof mimics the styles seen in the surrounding detached houses and seems to rise and fall with the contours of the land. The architect challenges our perceptions of form and materials, through the sharp angles of the roof, the juxtaposition of common with more elegant materials, and use of unusual windows, creating a building of powerful intensity." □



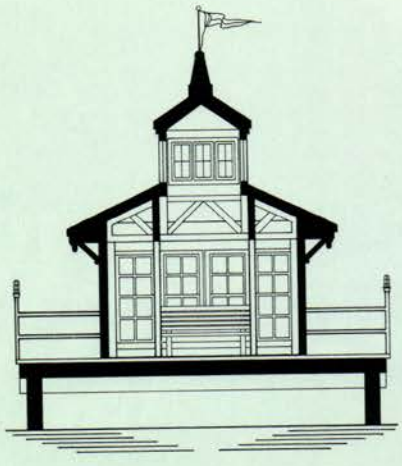
Chad Floyd, AIA

Perky Pavilion atop a Pier

In Watkins Glen, N.Y., Centerbrook Architects. By Donald Canty



North elevation



South section

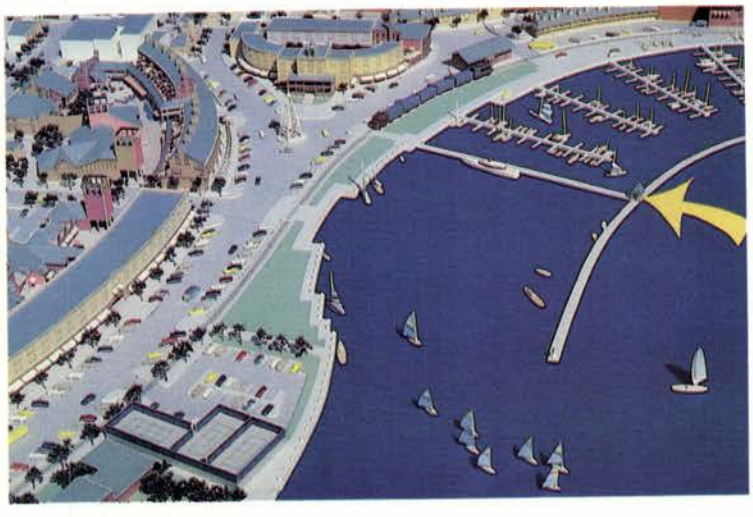
This pavilion is more than a little gem of a building, although that it is. It is also a symbol of a determined little town's rebirth, and the unusual role that architecture played in it.

Watkins Glen, population 5,000, has a beautiful natural site on Seneca Lake in the Finger Lakes region of New York State. At the turn of the century it was a popular resort, but over the years the flow of visitors slowed and the town had to rely unsuccessfully on agriculture as the base of its economy.

In 1980 the town decided that its economic salvation lay in a revival of tourism. To help do so it called in Centerbrook Architects, a firm with a considerable track record in working with communities pulling themselves up by their bootstraps. Centerbrook immediately focused on the lakefront, owned by Conrail and given over to derelict railroad sidings and marginal industrial uses.

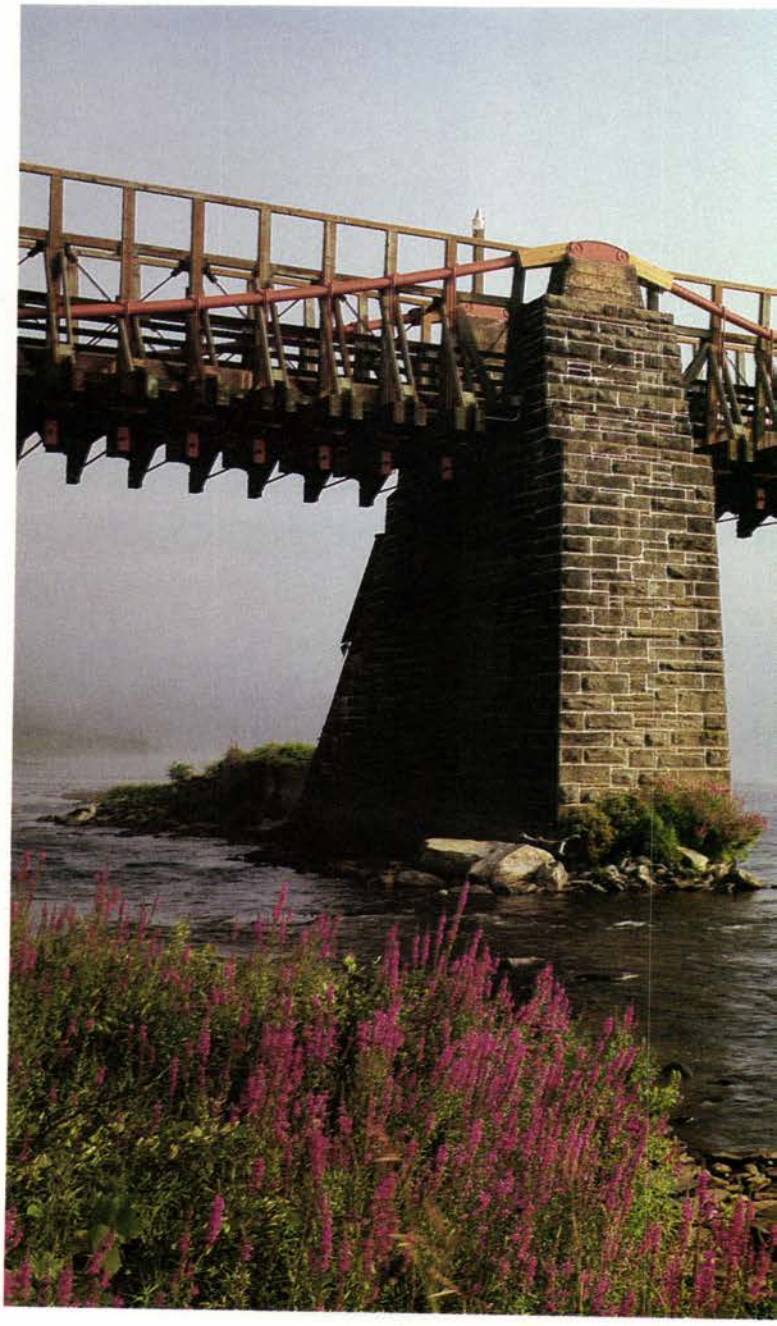
The town bought much of the waterfront back for use as a park. The first improvement was this fishing pier and pavilion. Architecturally, in the firm's words, the pavilion refers to Adirondack boathouses and also to the Victorian buildings of Watkins Glen itself. The lakefront now attracts 70,000 visitors a year. □

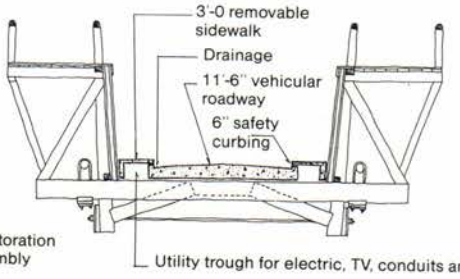
Below, an urban design model with the waterfront park.



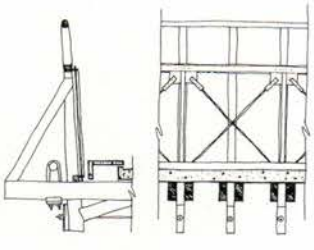
A Historic Aqueduct Restored as a Bridge

Across the Delaware, Beyer Blinder Belle.
By Amy Gray Light

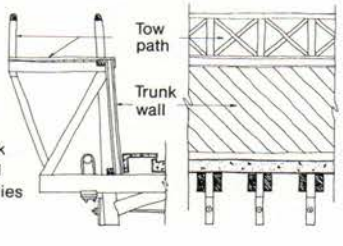




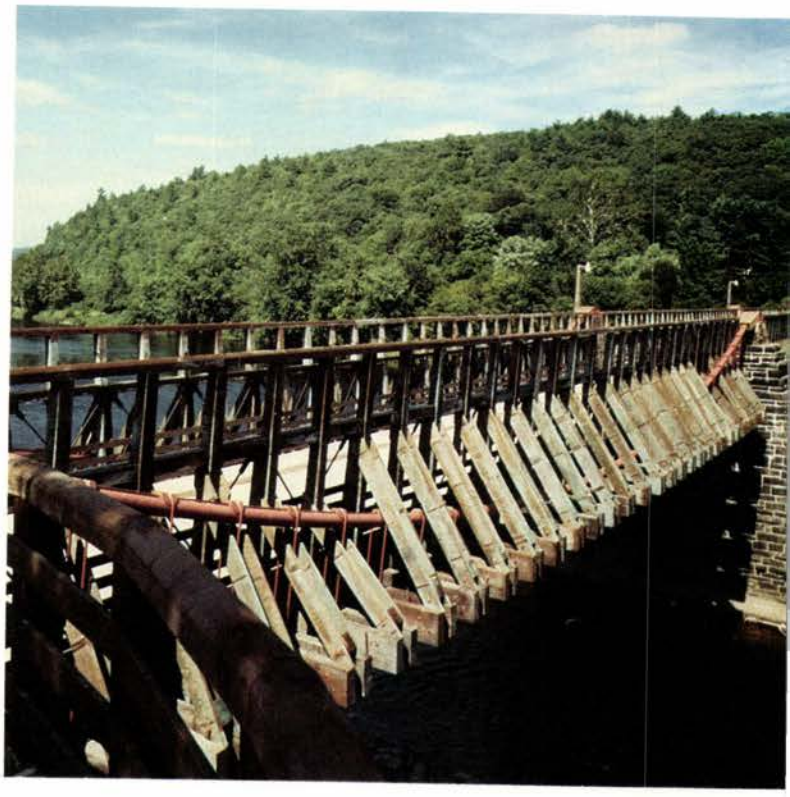
Proposed restoration of deck assembly



Phase 1:
Steel cross bracing without trunk wood wall veneers



Phase 2:
Inner/outer trunk wall veneers and towpath assemblies added



Photographs © Alan Schindler

The restoration of the Delaware Aqueduct by New York City firm Beyer Blinder Belle is remarkable in that the firm was able to restore the aqueduct to full use as a vehicular and pedestrian bridge and still remain true to the original 1847 design by John A. Roebling. James Marston Fitch, Hon. AIA, a partner in the firm and director of its historic preservation department, said it was greatly aided by the number of original drawings from Roebling's office.

The aqueduct's strategic placement, spanning the upper Delaware River between New York and Pennsylvania, assured its continued and varied use from the onset. A canal aqueduct built by the Delaware Hudson & Canal Co., it was abandoned in 1898 and then bought by private interests early in this century and converted into a vehicular toll bridge complete with tollhouse, in an area where no other bridge carried vehicular traffic. In 1977 the bridge was closed because of a partial roadway collapse, and in 1980 it was acquired by the National Park Service, which recognized its historic significance as the oldest rope-wire suspension bridge in the Western world, as well as the earliest surviving work of engineer Roebling, creator of the Brooklyn Bridge.

The Park Service immediately was faced with the challenge of restoring the artifact while appeasing a community impatient to have back its only access across the river, aside from a lengthy and hazardous 18-mile detour. The resolution was to make necessary modifications within the guidelines of historic preservation so that the structure could be used as a bridge for the present and reverted back to an aqueduct when a new bridge is built by one or both of the states. Fitch said that the Roebling-period masonry pylons, metalwork, and cabling, despite minimal corrosion, were all sound and in generally good condition. The wood construction constituted an earlier restoration; it was not original with Roebling.

The overall roadway width clearance is 17 feet. To correct the problem of oscillation and make the bridge sound for one-way vehicular traffic, a nine-inch concrete roadbed was placed across the aqueduct. The concrete is not visible, and from the riverbank the bridge looks similar to its early photographs, which served as restoration guides.

The traffic flow is regulated by signals, approach-road turnoff, and waiting lanes. Pedestrian safety is assured by barrier-free, grade-separated walkways on either side of the single-lane, alternating traffic pattern. The walkways also unobtrusively protect the superstructure from vehicular damage and serve as a place to conceal telephone, television, and utility cabling.

If an additional bridge is built, the roadbed will be removed and the aqueduct restored to its original state, with wooden cantilevered towpath walkways on either side. The west and east banks of the river also can be restored, at least enough to reconstruct the semicircular basins, called turning pools, where barges too long to make right-angle turns can maneuver. □

Above: diagonal view of completed bridge. Photos opposite show walkway. Drawings, from top, indicate: deck assembly, steel cross bracing (before veneer), and bracing with towpath assemblies.

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Base for Building Standards Research

The new national Center for Building Technology. By Douglas E. Gordon

Architects should know NIST, an acronym that recently emerged from the thick potage of federal government "alphabet soup." NIST stands for an organization with great, if not immediately apparent, impact on the practice of architecture. In August 1988, the National Bureau of Standards became NIST, that is, the National Institute of Standards and Technology, in part to highlight a new emphasis on encouraging better use of technology by U.S. industry. Of foremost concern to architects is the Center for Building Technology (CBT), one of 10 major centers within NIST's four national laboratories.

CBT, working cooperatively with a number of public and private institutions, runs the gamut of laboratory, field, and analytical research to produce technologies for prediction, measurement, and testing of everything from building materials, components, and environment to structural systems and construction practices. CBT also functions as the American liaison to international groups such as the International Council for Building Research, Studies, and Documentation (known as CIB, an acronym for the French name *Conseil International du Bâtiment),* an organization enabling international cooperation with 55 member countries. Additionally, CBT is an active participant in the U.S.-Japan Natural Resources Development program (UJNR). Its panel on wind and seismic effects, established in 1968, provides for cooperative activities of 16 U.S. and six Japanese agencies with participating representatives from private-sector organization, who meet to exchange technical data and information on the design and construction of buildings, bridges, dams, and waterfront structures.

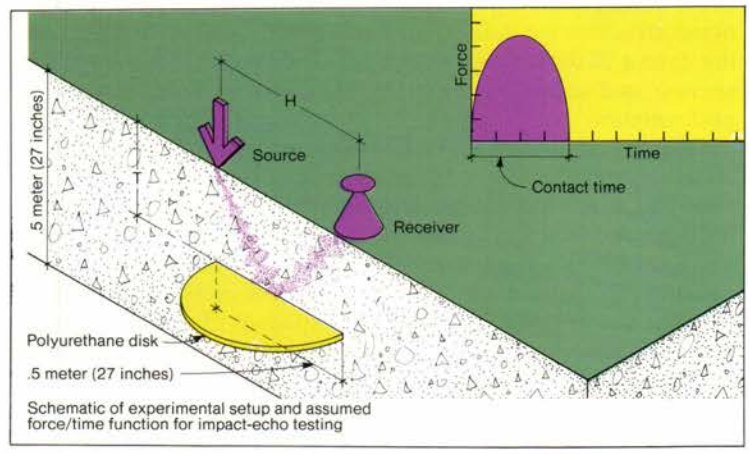
Architects are affected daily by the work at CBT because much of its research findings make their way into voluntary standards—such as those produced by ASTM and ASHRAE—that are widely referenced by building codes. CBT also provides a quality-assurance program used by more than 1,000 public and private laboratories that test materials, and it functions as the federal laboratory authorized to investigate physical causes of major building failures. Approximately one-third of CBT's $10 million budget for the 1989 fiscal year is from direct appropriation, while the remainder comes from other federal agencies for specific research projects.

The bulk of the Center for Building Technology's work is accomplished in the laboratory. (There have been many successful applications of CBT work: for instance, epoxy-coated reinforcement rods were first developed there, and Durcon, a computerized expert system for selecting the most durable concrete for a specific application, is now generating excitement in the construction industry.) The center's 115-person staff works in CBT headquarters, an interdisciplinary and comprehensive laboratory (complete with a 30x40x50-foot thermal performance evaluation climatic chamber and a 12 million-pound universal structural testing machine) located in Gaithersburg, Md., some 25 miles northwest of Washington, D.C. Its three principal divisions—structures, building environment, and building materials—host a wealth of continuing projects, only a few of which are described below.

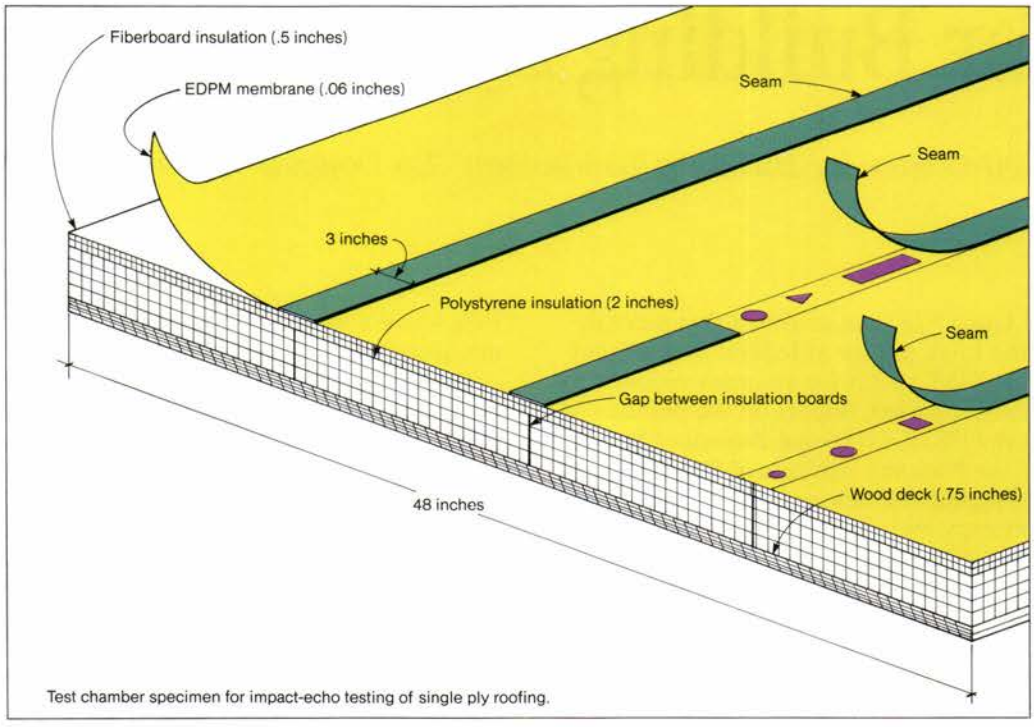
Laboratory study of flaw detection in concrete by the impact-echo method. It is easy to see the value of a nondestructive test method for locating defects such as voids, cracks, and zones of deterioration within hardened concrete structures, both for structural assessment prior to renovation of existing buildings and for structural surveys after damage has occurred. One approach, called the "impact-echo" method, now under study by the structures division of CBT, holds much promise for nondestructive testing of concrete.

The impact-echo method is based on monitoring the interaction of acoustic waves with the internal structure of an object. One of the problems of testing concrete as opposed to, say, steel is concrete's heterogeneous nature, and one of the ultimate objectives of the CBT work is to develop uniform criteria, in terms of instrumentation performance and capability, and measurement procedures for routine use of the impact-echo method. In this method, an impact source sends sound waves into the concrete; they are reflected back to a transducer (receiver) located close to the impact source on the concrete surface. A waveform analyzer hooked to the receiver stores digitized waveforms and analyzes the signals. By studying the reflected wave patterns, the user can detect even minute flaws in the concrete.

A commercial impactor, which was modified for the experiments, consists of a hardened steel plunger on the end of a cylinder that is propelled by a spring-loaded device. The impactor provides repeatability and a short contact time during impact. This is important because the smaller the contact time (30-60 microseconds), the smaller the flaws that can be detected. To simulate the flaws, researchers designed various defects in the concrete. Other variables found to be important include the distance from the impact point to the receiver, the type of receiver used, and diffraction effects by sharp edges of the concrete. To date, impact testing using a mechanically generated pulse is applicable only if the test object dimensions are large enough so that



Schematic of experimental setup and assumed force/time function for impact-echo testing



Test chamber specimen for impact-echo testing of single ply roofing.

specular reflections do not interfere with waves on the surface. More research is needed and the reported results are inconclusive with respect to the reliability of the impact technique, but nonetheless the results are encouraging. In addition to post-disaster and rehabilitation structural analysis, the impact-echo method may someday play a part in quality assurance programs of safety-dependent structures, such as nuclear containment vessels.

Investigation of the use of nondestructive methods for inspecting the seams of single-ply roofs. With single-ply roofing now accounting for over one-half of the membrane installed in this country, it seems timely to analyze those characteristics that contribute to single-ply systems' usefulness, such as watertight seams over the service life of the roof. Despite the importance of long-lasting, watertight seams, the quality of those fabricated in the field usually is assessed only at the time of roofing construction by visual observation and by manual inspection of the lap edge to ascertain that the seam is bonded at that location.

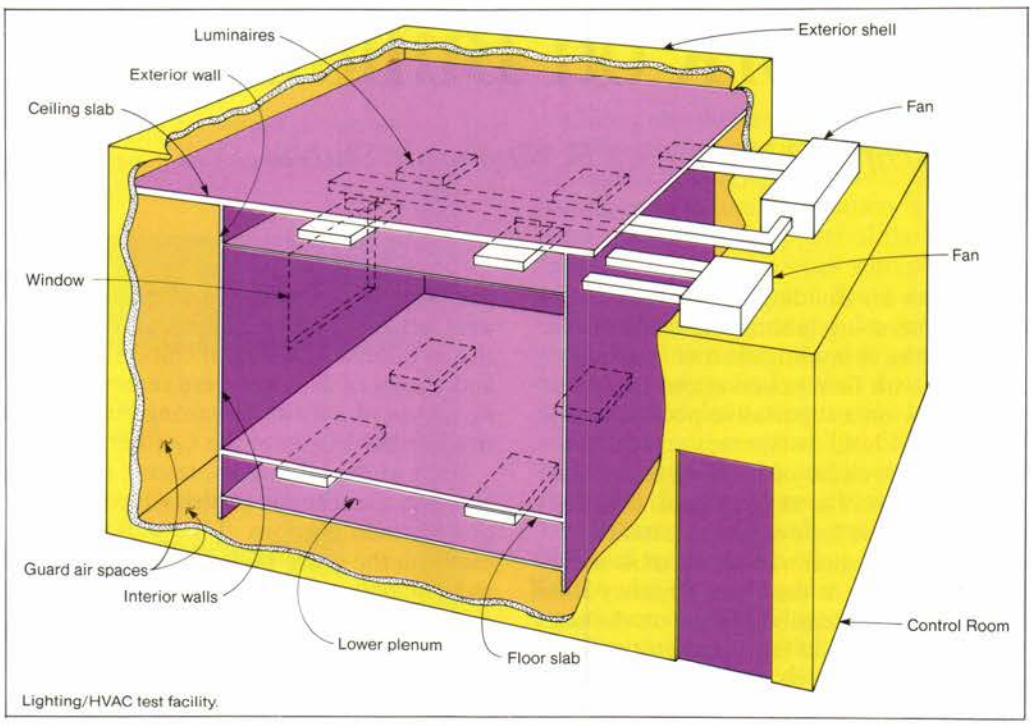
The development of nondestructive inspection methods has the potential of providing a quality control technique for examining the completeness of adhesive application and the resultant bond during the formation of seams in the field. In addition, nondestructive evaluation methods could be used to investigate the extent of disbonding if this problem were to arise during service, and to assist in extending knowledge of adhesive bond performance.

CBT investigations for nondestructive methods of testing for voids and delaminations in adhesive-bonded roofing seams comprise two major techniques: infrared thermography and ultrasonic impact-echo (see above). Of the two, the ultrasonic impact-echo method performed more reliably. The principal factor investigated in this method was the use of a wheel transducer (receiver) that has the potential to scan long expanses of seams quickly and at constant pressure. In the study, a wheel receiver mounted on a rolling platform was used to detect the presence of six voids in 48-inch-long EPDM specimens. An audio alarm sounded whenever a unique echo signal indicated a void. The impact-echo method picked up each of the voids in the specimens and did not give any false indicators of voids that did not exist. The results indicate that wheel transducers may be applicable for examining long expanses of in-service roof seams. The researchers recommend that a prototype apparatus be developed for additional laboratory investigation and field evaluation. Other types of membrane materials to which the method was applied included white EPDM, chlorosulfonated polyethylene, and SBS-modified bitumen. The study was conducted under sponsorship of the Naval Civil Engineering Laboratory.

The Interaction of Lighting, Heating, and Cooling Systems in Buildings. Lighting typically consumes the lion's share of electrical energy—in a commercial building, somewhere in the range of 25 to 50 percent of the total building electrical energy requirements. Not surprisingly, the performance of the dominant commercial light source, the fluorescent lamp, depends heavily on ambient thermal conditions—both lamp light output and power consumption varying with minimal lamp wall temperature as much as 20 percent under typical conditions. In addition, heat dissipated from the lighting system adds to the building's cooling load in the summer, and controlling peak cooling loads is of particular interest to electric utility companies as well as to customers who have to pay peak demand prices.

The NIST researchers posited that proper control of room thermal conditions could ensure that lamps operate at their most efficient level, so they set out to define quantitatively the effects of interactions between building lighting, heating, and cooling systems on the energy performance of the lighting system and cooling loads. The researchers designed, constructed, and operated a test facility to emulate an office space with recessed fluorescent lighting. Special design features to simulate realistic adjacent building areas provided realistic thermal boundary conditions for the test room. For instance, the elevated test floor slab accommodated a lower plenum beneath the floor (simulating a working office floor below), and all other room surfaces were adjacent to temperature-controlled guard air spaces.

The test facility was constructed on a slab 30½ feet by 21⅓



Lighting/HVAC test facility.

feet within the large NIST environmental chamber. The facility comprised two sections: a large, insulated shell enclosing the test room itself and a small, attached control room for housing instrumentation. Fluorescent lighting systems were placed in the room and in the plenum below. The luminaires tested were four units of four tubes each with parabolic diffusers. Return air was directed through the lamp compartment, through slots in the sides of the luminaire, or through the ceiling return grill. The electrical system was standard, and the test facility was instrumented extensively to monitor lighting power, cooling load, surface and air temperatures, heat flows, and light levels. A total of 398 measured parameters were averaged and recorded every two minutes during testing.

A computer collected data and controlled the heaters, fan, and other measurement parameters under a specialized computer program written in an extended version of Basic. Researchers collected and analyzed a unique set of steady-state and transient measurements, in part to develop a unique program to make data better "fit" between design calculations and measurements of cooling loads.

The researchers found that room air temperature changes of 5 degrees Fahrenheit produced changes of 4 to 5 degrees in the room surface temperatures and about 3 degrees in minimum lamp temperature. Lighting power and the light output varied by 5 percent for the range of conditions tested. The impact of these measurement results directly affects design considerations. For instance, the interim report stated that the lamp compartment return was found to be a very effective way to keep the lamps at a cool and efficient operating condition.

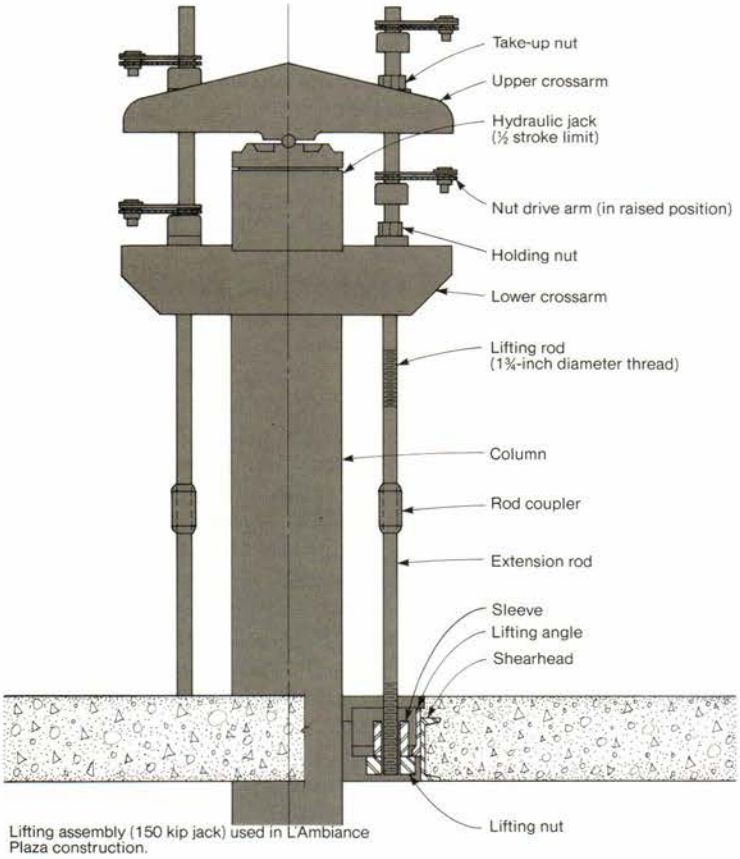
Among other design considerations, operating the fans at high speed in the morning and low speed in the afternoon was suggested as a way to reduce peak cooling load; reducing convection at the room walls allows for more heat storage in these elements; carpeting the floor forces more heat storage in the plenum (the most desirable heat storage location because it has minimal comfort effects); and increasing the mass in the floors or walls reduces peak cooling loads.

Preliminary results from this research showed that lighting systems can be constrained to operate at their most efficient level through manipulation of the thermal environment via air temperature, airflow rate, and return air configuration. Suggestions for future research include testing other lamp types and dimming controls as well as the effects of variable air volume operation.

Other CBT programs of interest to architects include chlorofluorocarbon replacement, computer-controlled mechanical systems, quantification of terms for building security components, heat transfer through windows and envelopes, IGES (a proposed universal computer graphics language), indoor air quality, analytical modeling of the effects of construction and connection sequencing, and seismic research into beam and column testing (monolithic versus precast-concrete connections), postearthquake reinforcement of infill and columns, and vertical and horizontal sheer reinforcement.

Not all of CBT's work is as down to earth as these projects. For instance, CBT's structure division is investigating computation procedures to enable highly accurate identification of dynamic response characterisitics of space structures. Researchers are developing measurement and test methods for computer-controlled high-speed actuators to reproduce rocket pulses required to position space structures. This work in turn should lead to research of earth-orbiting structures that will use the space shuttle's external tanks as a manufacturing environment in low earth orbit. This research—now in the first stages of study for feasibility—would contribute significantly to a leading position for the United States in the use of space for commercial and manufacturing enterprises.

CBT produces more than 100 written documents annually, in a wide variety of formats, describing ongoing research projects. A good place to start is the annual *Building Technology Project Summaries,* which names principal investigators, sponsors, and project scopes and objectives. The *Summaries* can be ordered from the National Technical Information Services, Springfield, Va., 22161. □



Lifting assembly (150 kip jack) used in L'Ambiance Plaza construction.

the site; hydraulic jacks, jack rods, nuts, and end fittings; shearheads and wedges; and a large portion of a floor slab with the shearheads and posttensioning strand intact.

The researchers conducted two types of laboratory tests. The first included standard tests for evaluating material properties and welding details: compression tests and splitting tensile tests on the concrete cores; tensile tests, metallographic and chemical analyses, hardness tests, and fracture analysis on the column steel and welds; and tensile tests on the posttensioning strand. The second type of test involved individual components and assemblies of the lifting system: tensile tests on the jack rods and attachments; and load tests on the shearhead/column assembly and the lifting assembly.

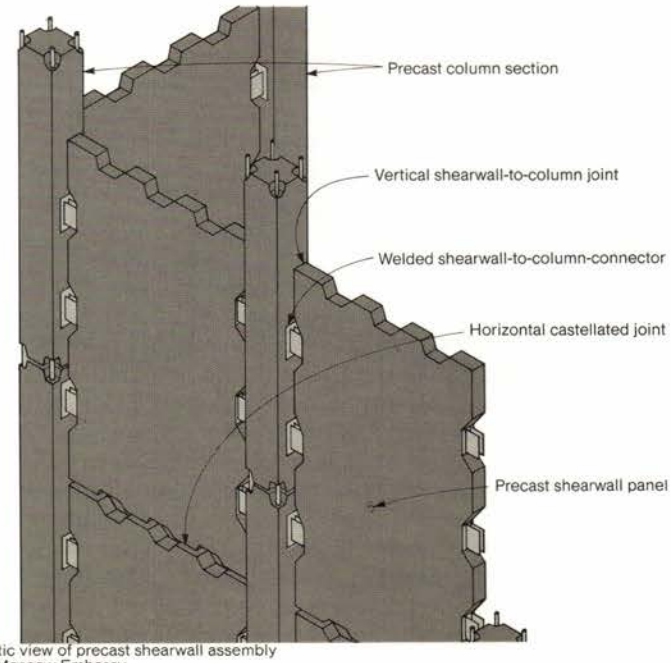
Also in the lab, several potential failure mechanisms were investigated. The report stated: "The most probable cause of the collapse was determined to be loss of support at a lifting jack in the west tower during placement of an upper-level package of three floor slabs. The loss of support was likely due to excessive deformation of the lifting angle in a shearhead followed by a lifting nut slipping off the lifting angle of the shearhead. The postulated failure mechanism was duplicated in laboratory experiments. The local failure propagated as loads were redistributed. The remaining jack rods...supporting the package of floor slabs slipped off the lifting angles and the slabs failed in flexure and shear. These slabs fell, causing the lower-level slabs to fail."

U.S. Embassy Building in Moscow. Not all of NIST's on-site investigative work is of building failures. In 1986, the Continuing Appropriations Act of the U.S. Congress directed NBS to conduct an independent analysis of the new United States Embassy office building under construction in Moscow. The analysis was to include an assessment of the structure as well as recommendations and cost estimates for correcting any structural or construction flaws. The researchers reviewed design and construction documents for the building, formulated criteria for assessment of a level of safety consistent with good U.S. practice and analysis for compliance with those criteria, performed analytical field and lab studies of the as-built structure, and developed remedial measures.

While the researchers judged the building to be of generally good quality, they recommended inspecting all of the joints between reinforced concrete columns and filling those found to be incomplete; bracing four steel-core columns to provide resistance to buckling; inspecting and completing joints between shear wall panels and adjacent components to provide lateral force resistance; removing and replacing cracked portions of parapet walls and anchoring the parapets to the structure below; and some other added safety measures to prevent progressive collapse, at an estimated cost of $1,123,000.

The on-site investigation comprised two site visits for the NBS team: a reconnaissance visit of three days and a "hands-on" visit of three weeks to allow a detailed investigation of the structural system and the building envelope. The as-built conditions of many of the joints between precast elements deviated significantly from the design, and they accounted for a good portion of the remedial action recommended. Progressive collapse apparently was not considered in the design. Its potential was identified and remedial measures developed for alternative load paths to prevent progressive collapse. The on-site inspection also included detailed visual examination of the exterior brick walls by a researcher who descended the facades of the eight-story building. This examination revealed substantial cracking, for which the researchers recommended vertical expansion joints at the corner piers, and a monitoring program to determine whether they are growing in extent or number.

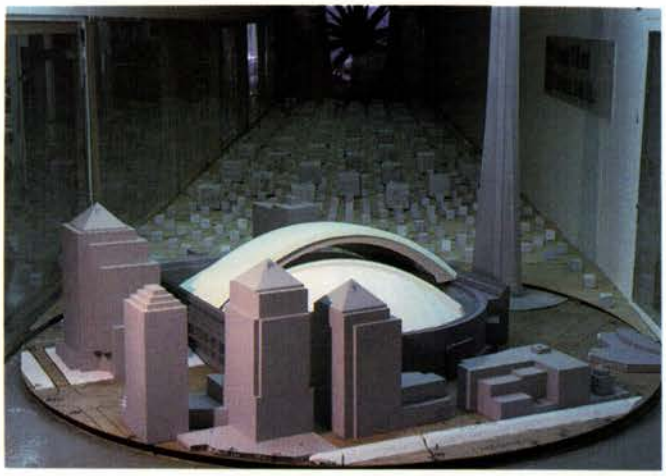
CBT recommendations have not been implemented, however. A separate study by U.S. intelligence concerns revealed that the prefabricated cladding panels were riddled with electronic eavesdropping devices. The embassy building, now unoccupied, is to be demolished entirely and reconstructed. □



Schematic view of precast shearwall assembly used in Moscow Embassy.

Canada's 'Environmental Ghostbusters'

Consulting on Climate.
By Douglas E. Gordon and M. Stephanie Stubbs



Nature's climatic hobgoblins—high winds, snow and ice, blazing sun—coupled with humanity's airborne pollutants both inside and out can wreak havoc with the finest of building designs. And, given the galloping complexity of building systems, traditional guidelines, such as standard equations and codes, often are inadequate. The quirky interaction of natural forces with the complexity of architecture and construction today have prompted many architects to turn to specialists for solving site-related problems. Enter Canada's "environmental gustbusters," Rowan Williams Davies & Irwin Inc. (RWDI), a consulting engineering firm specializing in microclimate studies.

RWDI's microclimate laboratory in Guelph, Ontario, 40 miles northwest of Toronto, was established in 1972 to carry out scale model studies on the effects of wind, snow, airborne pollutants, and the sun. It has been growing by leaps and bounds since its inception. The work, much of which centers on wind studies, entails water flumes, a boundary layer wind tunnel, sand, ground walnut shells, and much more to determine how environmental elements will behave.

RWDI President William H.D. Rowan, a structural engineer, posits that the firm's success is based largely on provision of a service long deemed useful to architects that now can be delivered in a timely manner. "We were prompted to become involved with environmental problem solving because it used to be that the only way that one could get that service was through the universities," he says. "Universities lost sight of the fact that normally an architect was designing a building *frantically,* and needed design information almost instantaneously.

"As a structural engineer [in a design firm], I experienced that situation—you'd make a research request, and six months later when you had the foundations poured and the building half-erected, you'd get the verified load information. By employing qualified, high-tech people, we've been able to help architects meet their deadlines—even if we have to work 24-hour days. We like to put forth the notion that this kind of environmental information can be routine, and can be counted on as input used at the right time—we provide the information to designers *when they need it.* Over 90 percent of our work is done while the designs are still on the boards. In our early days, more designers brought in buildings after the fact. But the design profession now is aware that these problems can be solved in the design phase, and it wants to avoid later pitfalls."

Rowan also believes that designers' increased interest in air quality has boosted his firm's business. "I don't know if it's due to more sensitive noses or to stricter regulations, but we're finding now that designers of buildings—labs, hospitals, and air terminals—are concerned with exhaust problems. For instance, if you have an expressway going by a high-rise building or a domed stadium, where does the pollution go relative to the building? Five years ago, when these questions were posed to architects, they really didn't know how to get the answers. Now that we can quantify these sorts of things, we can define the environmental problems and specify how to go about avoiding them.

"Another reason environmental project studies are becoming more prevalent is that the cost is dropping rapidly," Rowan continues. "A wind tunnel study 10 years ago cost in the range of

Left, a 1:400 model of the Toronto SkyDome and the buildings in its immediate surround undergo testing in RWDI's wind tunnel.

$50,000. Today, you're probably looking at $15,000 to $20,000, mainly due to the advances of technology. Consequently, the studies are being done for more kinds of buildings, instead of only for the very tallest."

Most of RWDI's engineers are specialists: climatologists, meteorologists, chemists, aeronautical engineers, mechanical engineers, civil engineers, structural engineers, and a number of architectural technologists. The firm has divided into specialty groups responsible for particular services, and a project team is assembled according to a job's particular needs. Following are some case studies of typical projects, as seen by the partners in charge.

Drifting snow control: Motorola building, Elma, N.Y., by Cannon. The Motorola building comprises a one-story, 280x480-foot production facility attached to a two-story, 20,000-square-foot office building. The production is electronics-oriented, so there is no special concern for air pollution; the major environmental problem is the building's location on a fairly remote site on the eastern tip of Lake Erie's infamous snow belt. "The production facility is oriented approximately east and west on a 40-acre site on the top of a hill in a fairly windy portion of the western New York area," says Douglas R. Francis, construction manager for Cannon. "Our concern was that the snowdrift accumulation might be a problem. We asked RWDI to do studies to ascertain where those accumulation areas might be, and then come up with suggestions for some remedial design to mitigate the snow buildup scenarios—where it would be a problem for the people or for their use of the building."

"There are loading docks around the building, a parking lot, visitors' entrance, fire roads—those are the sorts of things I am looking at from a snow control point of view," says Colin J. Williams, RWDI partner in charge of the project. "We're looking also at the snow-sensitive areas of the building itself: for instance, the Motorola building's atrium skylight.

On a study of this type, RWDI begins by performing a meteorological analysis of the site. It needs to know from which direction the wind blows, and when the wind is blowing snow. The RWDI team initially met with the architects to conduct a preliminary review, that is, to look at the project drawings and determine what sort of snow accumulation problems could occur. "The building was in early schematics—Cannon had a massing and an orientation that they could show us," Williams recalls. "At that stage of the building process, if necessary, we could suggest things like turning the axis of the building or moving the parking areas."

With that exercise completed, the RWDI team built a scale model of Plexiglas at a scale of 1:300. It was tested in the wind/snow simulator, a four-foot-wide channel through which water flows. "The water simulates wind flow," Williams says, "and by introducing sand particles into the water we can simulate drifting snow. Sand will collect around the model in the same way that drifting snow will collect around the building." Because it takes about 15 minutes to conduct a test for a given wind direction, the RWDI team can change the parameters three or four times an hour, and thus project what would happen if elements of the design were changed.

After conducting the first set of model tests, the team measured the snowdrift depth around the building, to ascertain where snow buildup was likely. "We then invited the clients to visit our labs," William says. "We showed representatives from Motorola and Cannon where we thought the building could have problems and also suggested various solutions in model form. This actually was a design process—we worked with rolled-up shirtsleeves, splashing in the water. It's a very visual process—you actually see the snowdrifts building up—so it's very appealing to architects who work with models and with three dimensions.

"During that kind of meeting, we experimented with various solutions and got immediate feedback from the designers. On the Motorola project, the potential problems we found included the large loading dock area—the orientation of the building and the docks would have caused large snow accumulations on the leeward side of the building. We recommended putting a parapet on the roof to distribute the snow further away from the leeward side of the building so that it wouldn't collect directly against the wall. During the client visit, by using the water flume, it was very easy to see the small particles of sand moving around the model—you could just trace the particles moving over the roof and falling down into this area."

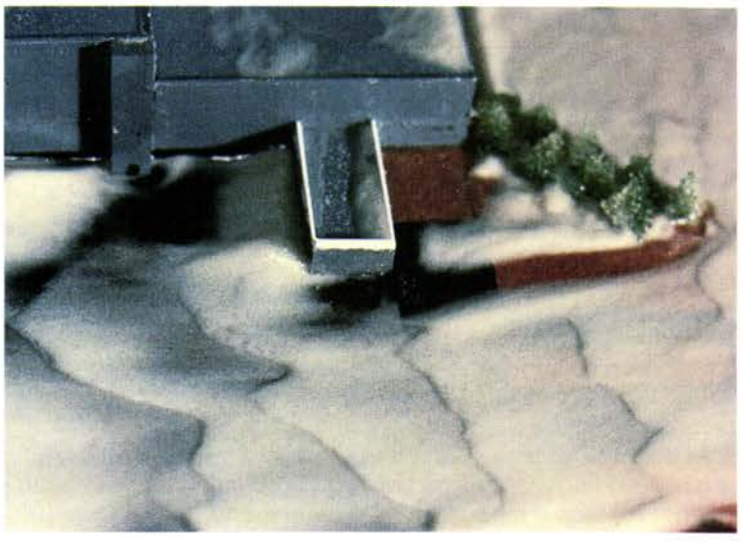
Williams says that the water flume test also showed that sand particle "snow" moving around the north and south ends of the building was getting into the loading dock area, and therefore suggested a landscaping and parapet solution. Francis says that Cannon was more than happy to follow the suggestion. "Those solutions came in the form of earth berms, which were cost effective because the cut and fill that we performed on the site to prepare for the building totaled about 75,000 cubic yards. Because we had a lot of dirt left over, probably about 50,000 yards' worth, we were glad to build berms with it, rather than find some other way to dispose of it."

Cannon also installed a snow barrier mounted on top of the facility, oriented roughly in an east-west direction immediately over the portions of the building being used for the loading dock and employee entrance. "The snow barrier will cause the snow-carrying air to lift up and carry the snow another 50 or 100 feet further away from the building, rather than have it—as RWDI's wind studies showed—drop directly down the face of the leeward side of the building, where we have all the loading docks," Francis says. "Clear docks are important to Motorola because this facility works with materials on an adjusted time delivery. Rather than inventory components, it brings in materials by truck the same day they are to be processed."

Some of the other building areas that RWDI studied include the visitors' entrance (it tried a canopy on the model, which wasn't very effective, whereas a coniferous shelterbelt worked well) and the atrium skylight, which received a snow-melting system at the skylight's base.

Sliding snow control: Maison des Cooperants, Montreal, by WMZH Architects. In Eskimo and other native languages, there are many words for "snow" because snow in all its nuances is important. In the labs of RWDI, there are many types of "snow" and snow tests for the same reason. For a small-scale study, such as 1:300, you cannot get a material that will bounce along like real snow, although a sand particle will *roll* around the same distance that a snow particle bounces. This makes sand an ideal snow substitute for drift studies, as discussed above. For studying snow infiltration at air intakes, RWDI will use sand in water, because its settling velocity is about the same as that of snow in air. To measure snow loading, ground walnut shells in air fit the bill. Because the researchers cannot simulate the cohesiveness of snow, they often will use actual snow on large- or full-scale mock-ups in a "cold room" if they want to measure how snow will stick on a surface.

"Generally, every snow project is different," says Glenn D. Schuyler, one of the firm's partners. "To start, we try to work with the design team to determine if there are any areas that



would have potential sliding snow problems, such as large sloped surfaces of glass or metal, or very deep sills or ledges." Like Williams, Schuyler says that his team looks over the building design and, using its past experience, flags areas that might be potential problems. "After that, you try to assess with the project team possible solutions to integrate into the design to reduce or eliminate the problems. The ways in which that can be done vary from job to job and from location to location."

The Maison des Cooperants, is a 35-story office building (one of the tallest in Montreal) with a cathedral-like roof to complement the real cathedral adjacent to its site. "The roof has shear, sloping surfaces, hence the sliding snow problem," says Schuyler, RWDI partner in charge of the project. "There is one very steeply sloped area of the standing metal seam roof that is not very large, but is pointing out over the street. In that location, the architect elected to add heat tracing under the roof surface to maintain a warm surface temperature. Any snow hitting the roofing will slide off very quickly; thus, you avoid both a buildup of snow on the surface and the formation of icicles. In principle, it is similar to a greenhouse."

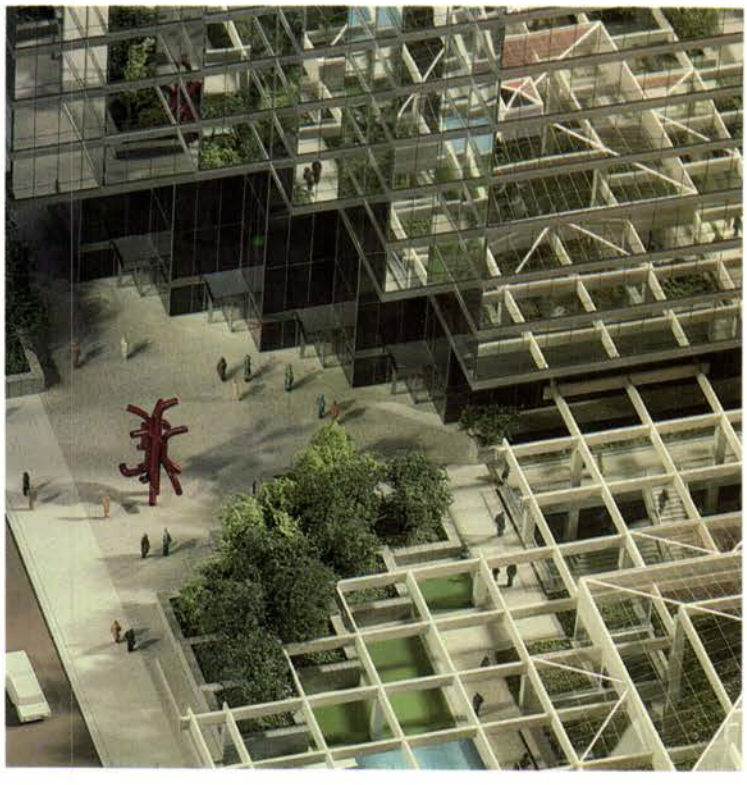
Schuyler says that on other areas of the building the architect maintained a small amount of heat loss through the surface, just enough to allow the snow that does fall and build up on the roof to reach a certain depth. The snow then slides onto a lower, flat roof, to a "storage zone" where it won't be exposed to high winds. "One of the other issues we considered was that whatever solution was placed on the roof be strong enough to stay there under the snow loads that will occur. You don't want chunks of sliding metal accompanying the sliding snow."

To study the Maison des Cooperants, RWDI conducted wind tunnel tests and water flume tests to ascertain how the circulation of snow would occur. "For instance, during the wind tunnel test, we looked for areas where wind speeds are lower, because this is where snow will tend to accumulate," Schuyler says.

Another important aspect of snow management that employs an active system (such as the Maison's melting system) is the control for activating the system. The control can be manual, that is, worked by building maintenance personnel, or automatic. Schuyler says it's good to combine both, and therefore sensors were installed on the roof of the Maison. "The sensors measure liquid water. They provide a small heated pad that melts the snow, then the water runs in and short-circuits a couple of contacts, which turns on the heat tracing. The sensors monitor temperature as well, because if it's 60 degrees Fahrenheit outside and precipitation is falling, you don't want the monitor to turn on the melting system."

Snow control on buildings such as the Maison des Cooperants depends on small details, Schuyler maintains. "For instance, we may treat a large area so that it melts snow and, we think, drains the melt water into a gutter. But if for some reason caulking is left off of an area or a piece of flashing is turned in the wrong direction, and the melt water is redirected to a different location, then a horrendous problem can occur even if 99 percent of the problem is solved. The work is very detail-dependent and final-construction-dependent. We monitor work we've done and talk to the client afterward to find out how the system is working. Generally, we recommend that clients watch their systems carefully. Even though a solution has been effected, Mother Nature is very devious and there can be a lot of situations that defy prior information. In the case of the Maison, which has been in operation for over a year, we haven't heard of any problems."

Pedestrian-Level Wind Control: North Carolina National Bank Tower, Dallas, by JPJ Architects, Dallas. It is no secret that tall buildings can create strong gusts at pedestrian level. Acting alone, like a wind-scoop, a building can send fast upper-level winds careening down to the sidewalk. Closely spaced with other buildings, it can create an urban canyon, again causing high-velocity, pedestrian-pummeling winds. The boundary layer wind tunnel offers a means by which these effects can be identified before construction and mitigated in the design with wind-blocking setbacks, awnings, and landscaping or re-orientation of pedestrian paths.



Above, shifting silica sand simulates snow drifts around a scale model placed under water. Right, a model of the trellises designed for pedestrian-level wind control in the open plaza of the NCNB building.

Peter A. Irwin, an RWDI partner who worked with the National Research Council in Ottawa before joining the firm, developed the sensing device used in the firm's pedestrian-level wind tests. "We want to measure the winds near ground level of the model at a large number of locations," Irwin says. "If you don't have enough locations, you can easily miss something."

The usual way, in the past, of measuring scale-model pedestrian-level wind has been to use a device called a hot wire or hot film anemometer, Irwin explains. The results are accurate, but calibration of the delicate instrument is difficult to control, he says. "The device I developed is essentially a small tube that protrudes from the surface of the model and is set into a hole that is somewhat wider in diameter than the tube. We measure the pressure at the top of the tube and the bottom of the hole. From the difference of the pressures, we then can calculate what the wind velocity is. The advantage of this simple, robust device is that we can use many of them on the model. That they look like scaled-down pedestrians is a fortuitous result. There is the concern that if you put too many sensors down on the model you are going to start interfering with the flow. These sensors are not likely to do so any more than a bunch of pedestrians walking around on the model."

RWDI's work with the NCNB building (originally called the First Interstate Tower) provides an example of a pedestrian-level testing situation. "The primary problem with the initial design for the Dallas building was the fact that it stands out by itself on the west side of town and the wind hits it very suddenly," Irwin says. "The wind flowed down the tower to the plaza, then accelerated across the plaza on the east side of the tower." To counteract the wind, the architect added trellises above ground level to shelter the area there. "Tests showed those trellises would be very effective," Irwin says. "In that case we also used our water flume with a stream of dye to illustrate where the flow was going. In another change from the initial design, one of the main routes from an outdoor cafe on the east side going into the tower was recessed below the normal plaza level so that the strong winds there passed above the pedestrian level. So a combination of trellises, sunken walkway, and extensive landscaping helped improve that design tremendously. In some areas, the winds were dropped by at least a factor of two."

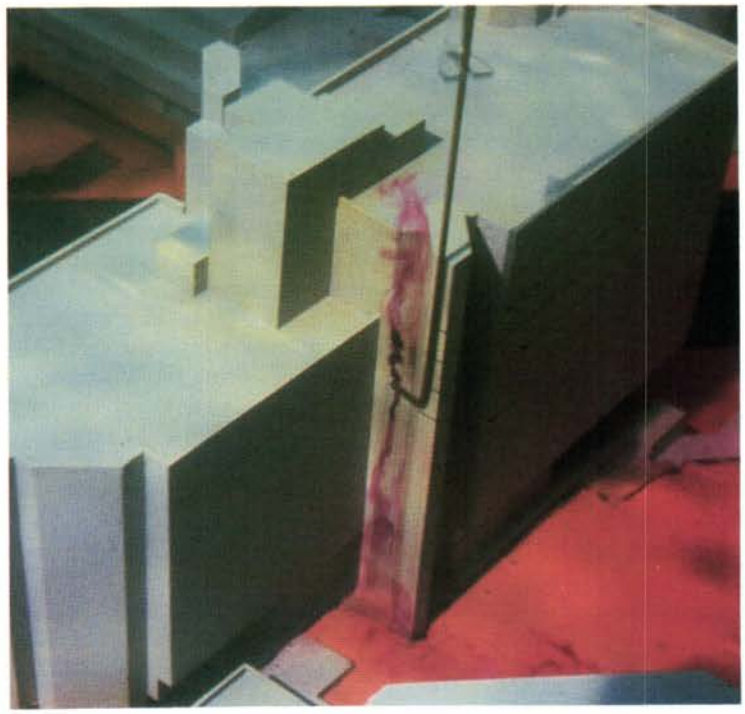
Bill D. Smith, FAIA, president of JPJ Architects, doesn't recall whether RWDI came up with the idea for trellises or just called for an unspecified wind-blocking element, but he does recall ready acceptance of the concept on the part of the design team. The trellises became a unifying landscaping element throughout the building site, he says. The sunken walkway also became a positive esthetic element. "Dallas has a walkway system a full floor below street level, with access through several buildings in town," Smith says. "But until this project was built, there was no grand entrance. The sunken walkway, which connects to a public plaza that was part of the initial design, serves as a symbolic opening to the lower-level pedestrian system. And it's fitting that this building serve as such a landmark since, at 72 stories and 2 million square feet, it is by far the largest building in Dallas."

During testing, partly because of the building's size and consequent exposure to the wind, the design team structural consultant, William LeMessurier, also considered the idea of a tuned-mass damper to minimize building sway in high winds (similar to the damper he devised for the Citicorp building in New York City). "During the wind-tunnel tests, we found that the Interstate tower experienced quite high motions as the structure was originally designed, primarily because of its exposure out on the west side of town," Irwin says. "In the end, instead of using the tuned-mass damper, the design team stiffened the building as a result of the wind-tunnel test, which solved the problem."

Wind Pressure Testing: IBM Atlanta, John Burgee Architects. On a tall building, the curtain-wall system needs to be designed to withstand certain levels of wind pressure, says Irwin. "Building codes specify wind pressures—however, it's recognized that they are a gross simplification of reality. So on a tall building, where you're investing a substantial amount on the curtain wall, you could really do with better information. The best way of getting detailed knowledge of what the real wind pressures are going to be on a building, bearing in mind how the wind is affected by all of its surroundings, is to do a wind tunnel test," he says. RWDI runs tests on about 30 to 50 tall buildings a year.

The 1:400 scale model for the wind pressure test of the IBM Atlanta Tower was made of Plexiglas—a convenient material with which to work, Irwin says—and was instrumented with more than 800 pressure taps (small holes in the surface of the model through which air pressure can be sampled). The model was tested in the wind tunnel with everything in the surrounding area of Atlanta also modeled.

In the pressure model test, RWDI often begins with a smoke visualization test. Introducing a stream of smoke into the wind tunnel shows any unusual flow formations, for instance a vortex springing off a corner of the building. Knowing where there might be high suction alerts the testing team to areas that need to be well instrumented. Smoke visualization also helps in client presentations. "Usually, when we're doing a large project, the client will visit for some meetings during the testing," Irwin says. "As part of that, we go into the wind tunnel and show them what the main flow patterns are on their building, including unusual flow patterns that might cause extra loadings or deflection of high upper-level winds to the ground level. Sometimes there are accelerated flow zones around corners or between two buildings



Right, a model during a water flume test, in which a stream of dye traces the path of wind down the face of a building.

that can form a channel, where you get a Venturi effect. The smoke flow shows what is going on in an easily understandable and visual way."

For the pressure-tap test, technicians monitor the turntable-mounted model at a minimum of 36 wind directions at 10-degree intervals. "We look at the pressure at every tap," Irwin explains. "And we don't look at the high average of each pressure tap only; we sample it for the equivalent of about an hour at full scale and look at the peak fluctuations—both the positive and the negative values, since those are the important things for the designer."

The correlation between model tests and actual full-scale buildings is quite good when the shape of the building is sharp-edged, Irwin says. Buildings with curved surfaces, however, create a scaling problem that testers overcome by applying special roughness on the wind-tunnel models. "Then we have to interpret the results with great care to make sure we do not underestimate what's going on," Irwin says.

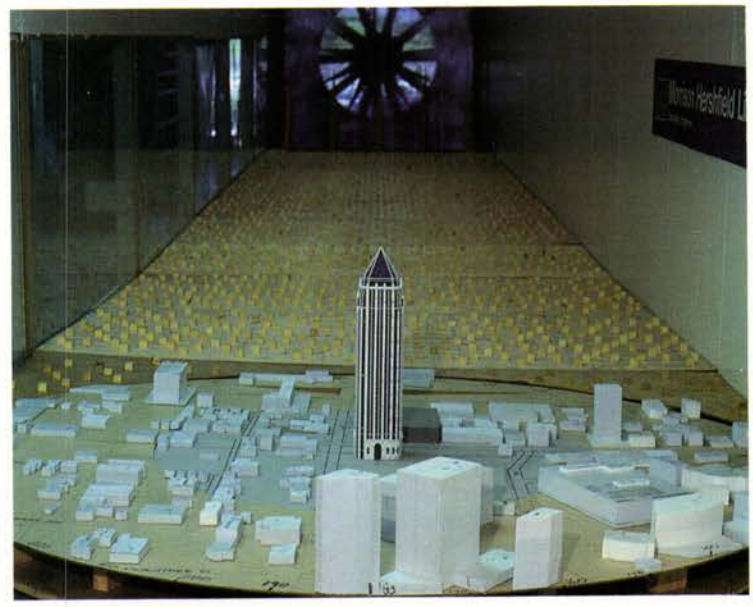
The tests for the IBM tower helped set performance levels of the design of the glass and other cladding elements and for design of the attachments of that cladding to the main structural system. The wind-tunnel testing also included a study of the structure's moment resistance.

The cladding study from the wind-tunnel tests, combined with meteorological data for the Atlanta area, resulted in a map of the contours of pressure one could expect on the building surface. The architect and curtain-wall consultant passed that information along as specifications to the curtain-wall manufacturer. This kind of information, where one might find particularly high suction areas on a building, often near to a corner, tells the engineer where the manufacturer needs to strengthen the connections. Whether the whole building cladding is designed to resist the highest suctions expected, or only those areas of highest expected suction are reinforced depends a lot on the philosophy of the design team, Irwin says.

"Other things we take into account when we specify the design pressures for the winds on cladding are the internal pressures and the likelihood of flying debris during a windstorm" he says. "There are many details we must consider. For instance, with hotels or residential high rises the windows may be operable, which means they might be left open in a windstorm. An open window has quite a significant effect on the internal pressure of the building, and is particularly important in tall apartment buildings where the internal space is broken into quite small partitions. The windows in a corner room, for example, could experience very high internal pressures if, say, a window on an adjacent corner is open facing into the wind.

"The loads that we specify are the equivalent of what you would get out of a code, only they are more accurate. It is normal practice for safety factors to be used on the code load, and the design team—not us—applies somewhat similar safety factors to our test results. In some cases, we might recommend certain safety factors because we know what the level of uncertainty is and what an appropriate safety factor might be."

RWDI also conducted wind-load tests on the IBM tower structure, which required a different model. "For the scale model," Irwin says, "we use what is called a high-frequency force-balance model. It is a simple, stiff, lightweight model that we mount on a special measuring device instrumented with strain gauges. We measure the overturning moments at the base. The structural engineer also provides us with information on the internal structure of the building, which we combine with our wind tunnel



The Plexiglas model of the IBM Atlanta building, above, underwent extensive wind tunnel testing that included 800 pressure taps.

information and the meteorological data to provide recommended structural loads. Another thing we examined on the IBM tower was the kind of motions people might experience inside the building and whether they are out of line with accepted criteria. There was no real problem. The IBM tower has a concrete structure and accelerations came out to be moderately low."

Indoor Air Quality: Presbyterian-University Hospital, University of Pittsburgh, by Burt Hill Kosar Rittelmann Associates. Laboratories, hospitals, and complexes put out a lot of exhaust gas into the air. "Architects and building owners are very much aware of the controversies that exist across North America concerning exhaust gases that might be coming into buildings," says Anton Davies, RWDI partner, "whether it is from a diesel truck beside an air intake or a group of fume hoods on the roof with the wind blowing in the wrong direction. So an architect will send us a set of drawings on a complex, and, if our quote is accepted, we construct a scale model for testing, as we did in the case of the hospital complex. The complex is huge—the tower is 21 stories and is surrounded by big buildings, all putting out stuff."

"We wouldn't design a major facility without wind testing," says John Brock, Burt Hill Kosar Rittelmann's project manager for the hospital complex. "With the higher liability environment today, if there is reason to believe a building may affect the air quality of its surroundings, the time to explore these issues is well spent. In addition to air quality testing, we had RWDI perform wind-tunnel testing for the cladding loads. We were using a two-inch limestone facing on steel backup. The loading test helped us develop optimum cladding connections.

"The testing didn't result in any surprises," Brock continues, "but by quantifying our assumptions, we were able to proceed with confidence. For example, when we were concerned we might have to raise a lab exhaust stack and an incinerator stack, RWDI's testing indicated that the stacks didn't need to be raised after all. We also considered putting an air inlet at mid-height on the building because of diesel exhaust from a nearby bus stop. Tests confirmed that mid-height was good because it put the air intake appropriately far from the lab exhaust above and the bus exhaust below. This hospital is a major, ongoing project, and it's conve-

nient every time an issue such as these comes up to call RWDI and have them run a test on the existing model."

The wind-tunnel model is scaled at 1:400, very similar to the models for other kinds of tests RWDI conducts. The test involves release of tracer gas from the smokestacks and other pollutant sources on the scale model, including cars and trucks on the roads or in garages. Monitors, placed where people congregate or where air intakes are planned, measure tracer-gas concentrations in those locations.

"We typically identify where all the exhaust ports, stacks, and cooling towers are," says Davies. "In the hospital project, we also looked at the helicopter landing area, fume hood locations, and the exhausts for the emergency diesel generator and the incinerator, and piped tracer gas into the model simulating all those sources. At air intake locations, we put receptors that pull in enough air at those points to allow us to measure the concentration of the tracer gas. We know how much of the tracer gas we're emitting, so, by measuring the concentration at the intake, we get a dilution ratio. Given that we know what is coming out of the exhaust—a solvent or acid mist, for instance—and what the concentration is, we then can determine what happens at that air intake."

Quite often, a client who comes to RWDI at an early stage hasn't decided where the air intakes or exhausts will be located, Davies says. At that stage, a simpler process of smoke visualization shows the client where the fumes will go with respect to the stack placement and gives the client an impression of the best locations for air intakes and stacks and how high the stacks should be. A visual demonstration with smoke is a good place to start but doesn't take the place of actually doing the concentration measurements, Davies says.

"When measuring concentrations at the air intakes," he says, "we generally look at five different wind speeds across the model to simulate crosswinds. We usually measure at 24 15-degree angles." However, rotation increments sometimes can depend on the type and sensitivity of the experiment, Davies explains.

"Once we have this matrix of information, we can merge in the wind history of the site," he says. "We then can determine the range of contaminant levels that a receptor will experience through the course of a typical year. If those levels exceed the national ambient air quality standards, or whatever standards exist for that substance, then we know we've got a problem."

More often than not, air quality problems do not pose a health hazard. Instead, odor perception is the main complaint. "There are a lot of substances, like hydrogen sulfide, that are extremely odorous," Davies says. "People smell that and think it must be doing something harmful to them. Hospitals are particularly susceptible. They already contain a lot of chemical smells, so we don't want to aggravate the situation by pulling exhaust air right back into the building. For example, staff members of a hospital in Edmonton, Alberta, were taking their own blood samples because they were sure they were being poisoned by diesel exhaust fumes. Fumes were getting into the building, but not at harmful levels. Because the people could smell it, though, they were sure they were being affected."

Diesel fumes, although not particularly harmful, are a constant source of annoyance, according to Davies. For that reason, emergency diesel generators, which get turned on maybe 20 minutes to a half-hour a week, are a major source of air quality complaints in buildings. One reason is the smell; the other is the lack of attention to properly exhausting emergency generator fumes, he says.

Garage ventilation is another area of concern. "For example, in a recent study of a garage at the peak hour, 27 percent of the vehicles were exiting at the same time," Davies says. "That's a lot of cold starts, putting much more pollution in the air than the normal code approach would suggest. So we look at how much pollutant one car puts out, what kind of ventilation the garage has, and what must be done to improve the air quality, which usually means additional makeup air.

"When we do studies, we consider the other sources of pollution that already exist in the area as well as those that will be added as a result of the new building. Say we have a garage across the street that has open sides and plenty of natural ventilation. When we put the new building in, that natural ventilation may disappear because the wind is blocked. When that happens, we have to add in fresh air in some manner, which may mean additional mechanical systems. Although some building owners may not be sensitive to the buildings around theirs, many are. In the case of the Pittsburgh project, the effect of this building on its neighbors was especially important," Davies says.

The recommendations RWDI makes for improving air quality levels typically leave the architect with a lot of design flexibility. "We might see, for instance, that 1 percent of the exhaust from a stack is going into an air intake," Davies says. "Now most of the time these stacks are operating at such low emission levels that you could put your head in the stack without adverse effect. But the idea is to make the stack diffusive enough that there isn't a problem even if a researcher somewhere breaks a bottle of solvent in a fume hood, so we might recommend that the stack be built up another six feet to better dissipate the exhaust—changing its height but not its location. Of course, even that can be a struggle if the architect doesn't care to see a tall stack on the building. But unfortunately, if you are emitting a gas, you need to get up as high as you can get to minimize the impact and get dilution working for you.

"For a typical building, we do some site investigation and some full-scale testing. We don't do a lot of the latter because all you can do with one tracer-gas release is look at the impact of one wind speed and one wind direction. That's the beauty of the wind tunnel. You can look at all wind impacts in a relatively short time."

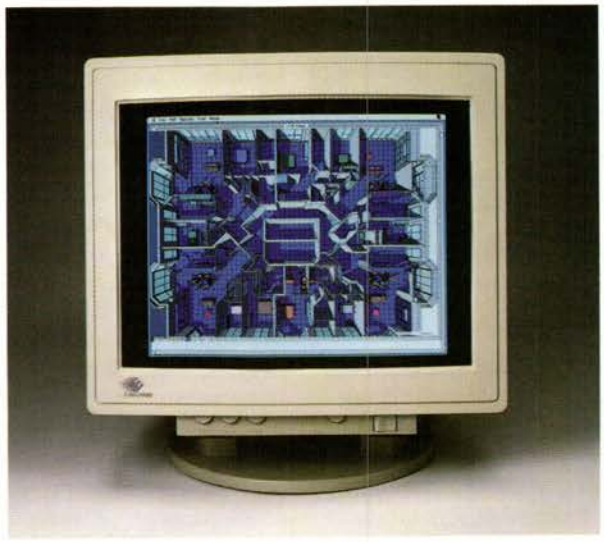
Sometimes RWDI's projects run the gamut of environmental testing. A case in point is the Toronto SkyDome, due to be completed this June, the world's first retractable-roof stadium. The RWDI engineers report that their involvement with the SkyDome encompasses almost every kind of study they do—snow, ice, pollution, wind pressure, cladding—all on the equivalent of a 30-story building.

All of RWDI's project-specific services are enhanced by its in-house research, which enables the firm to develop techniques and a data base on which to build. This research includes extensive lab testing of ventilation systems, special-purpose wind tunnels, and field measurement and instrumentation. In addition to buildings, RWDI has been involved with environmental testing of long-span bridges, communications towers, town planning sites, ship exhaust, and wind screening for dust control for coal production.

The recent growth at RWDI has been phenomenal—the firm almost doubled in size over the past year, growing from 45 people to its current staff of 85. RWDI services more than 300 studies a year, about 80 percent of them for architecture firms, more than half of which are in the United States. □

Adapter and Monitor Combinations

By Oliver R. Witte



Displaying an image on a computer screen requires a series of carefully coordinated electronic handoffs. Graphics software runs on a processor that controls the monitor by way of a display adapter. The adapter is an electronic controller board that fits in a slot inside the computer box. Cables attach it to the monitor. The adapter translates computer language into video language so that it can be displayed on the monitor as pixels, or dots of light.

This article focuses on the adapter and monitor combination, now the most explosive area of computer technology affecting architects. An adapter and monitor typically consume 10 percent to 30 percent of the cost of getting started in computer-aided design. That doesn't include the additional expense of updating existing equipment before it has been fully depreciated. (There is almost no market for used adapter boards and monitors.)

The tie between software and adapter board is crucial, too. If a CADD program, or any software, is to create graphics, it must contain coded instructions, called drivers, intended to match the software to a specific make and model of adapter board. Each driver takes days of work by highly trained programmers, and those drivers usually must be rewritten for each new major release of the software. The most popular CADD programs usually are the first to offer complete support for the newest and best adapter boards. Then, in turn, the adapter board must be matched to the monitor specifications.

Choosing a display system keeps getting more complex as options and vendors proliferate at a dizzying rate. There is less standardization in display systems than in any other aspect of desktop computing. Complicating the choice even more is the subjective nature of quality inherent in any visual system. The most important criteria are in the eye of the beholder, which means that decisions are best made after personal inspection and, if possible, a trial period.

The simplest advice usually is to select the program first, to choose an adapter supported by the software, and then to find a monitor supported by the adapter. But some CADD programs, especially the less expensive ones, support rather few adapter boards. Furthermore, a CADD program might technically run on a specific adapter board but support only some features. Some adapter boards are so powerful that an architect might want to disqualify any CADD program that does not support them fully.

Productivity is the overriding criterion in choosing a display system and pixel density is the most important aspect in the sharpness of the image. At 320 pixels horizontally by 200 pixels vertically (320x200), a diagonal line looks like stair steps and a circle looks jagged. In general, the higher the pixel density the rounder a circle will look. Alternatively, bit mapping addresses individual pixels, which are turned on or off depending on the desired shape and color of an object. An example is a paint-type program.

The choice of adapter board/monitor combinations has expanded rapidly in the past eight years. In 1981, buyers had their choice of a monochrome display adapter (MDA) and monochrome monitor, which generated only text at a resolution of 720x350 pixels, or a color/graphics adapter (CGA) and color monitor, which could display text and vector graphics (based on line segments) in 16 simultaneous colors but at a resolution of only 320x200. A year later, vector graphics on a conventional 720x348 monochrome monitor became available. In 1984, the 640x350 enhanced graphics adapter (EGA) displayed 16 colors from a palette of 64, while the professional graphics controller (PGC) had 640x480 resolution and could display 256 colors, the minimum required to approach realism. The board also enabled colors to be placed directly, by means of polygon fill. Two years ago came the video graphics array (VGA) with 17 options. Its basic graphics mode is 640x480 with 16 colors from a palette of 262,144; another option allows 256 simultaneous colors, but with software-requirement and resolution trade-offs. The many clones of IBM's VGA that have followed push the resolution while more or less maintaining VGA compatibility.

At the most basic level, a PC monitor operates on the same principle as a television. The screen image is the result of a single point of light moving so quickly across the screen that, to the human eye, it appears to be a whole display screen full of points of light. For instance, the first color/graphics monitors had a horizontal scan rate of 15.85 kHz (the beam of light makes 15,850 passes horizontally across the screen per second).

Scan rate is one area where graphics boards and monitors *must* be compatible. When the enhanced graphics adapters came out in 1984, with a 22 kHz horizontal scan rate, they weren't compatible with the older and slower 15.85 kHz CGAs. Because the VGA monitors, introduced in 1987, have adapters that can be operated in 17 video modes, they offer perfect emulation of ear-

Montreal architect John Nicholas Guet created this rendering with Mac Architrion and colored it with Pixel Paint using an E-Machines graphics card and Sony Trinitron monitor.

Courtesy of Robi Graphiks Ltd.

This Point Line-generated museum interior is on a Mitsubishi 6905 monitor and Pixelworks Clipper graphics board (1,280x1,024 resolution with 256 colors).

lier boards. But VGA boards, with a 31.5 kHz horizontal scan rate, are not compatible with earlier monitors. Manufacturers helped the situation with variable-scan-rate monitors that adapt themselves, within limits, to the requirements of the adapter board. Most major monitor manufacturers offer multiscanning capability, although some contend that multiscanners are fuzzier than monitors with a fixed frequency.

Interlacing refers to the electron gun on a monitor repainting only every other vertical line with each horizontal pass. The danger is flicker, which is minimized by using medium- to long-persistence phosphor (what glows when a pixel is lighted). If the phosphor glows a long time, the delay before the pixel is rescanned is not noticeable. But what might become noticeable if the phosphor glows too long is ghosting when an object is moved. The vertical scan frequency of a VGA monitor is 70 Hz, noninterlaced. If the vertical scan rate falls below 50 Hz, viewers begin to notice the image being traced (flicker). Although scanning is done by the monitor, interlacing is a function of the adapter board. Any monitor can run interlaced or noninterlaced. With so many subjective factors to consider, shopping for a matched graphics board and monitor is anything but simple. The following checklist will help to avoid premature disappointment:

Cost. The least expensive monochrome adapters and monitors cost less than $300. The ultimate in a display system for desktop computing today could cost as much as $10,000.

Software support. CADD vendors publish lists of peripherals they support. Unless the program supports an adapter board, it won't work. Some programs offer different levels of support.

Simplicity. Regardless of what a dealer promises, count on having to get involved. The expectation that a display can be installed and forgotten doesn't reflect the reality of rapidly changing technology. If the hardware doesn't force a change, the software will. Monster manuals written for electrical engineers, a gaggle of switches, and cables sticking out of every pore represent primitive, not refined technology.

Speed. The graphics board plays a major role in the time it takes to redraw the screen. The monitor does not. To boost speed, vendors are adding memory and installing graphics coprocessors on their adapter boards. Another technique to supercharge the adapter board is display list processing. The board holds in RAM a list of vectors needed to display the drawing. As the architect moves around the plan, the board redraws the screen from information in the display list. Only a few board vendors offer this technology today, and rather few CADD vendors support it. But the speed is breathtaking. Panning from one side of a drawing to another takes place at almost the same speed as shifting one's gaze from one end of the drawing board to the other. When making speed comparisons, use a drawing at the upper end of the size you normally generate. In a small drawing, everything happens quickly.

Panning and zooming. This is what takes most of the time in large CADD drawings. There are at least three ways to do this: software, hardware, and display list processing. Software pan and zoom is what is done conventionally by a CADD program; the user instructs the program to change to another view, forcing a recalculation of vectors. One of the first CADD programs to offer a hardware pan and zoom allows the operator merely to push the cursor to the edge of the monitor, moving the drawing instantly—about two screens up and one across. Zooming in further merely enlarges the pixels, making a narrow line look thicker. In display list processing, the adapter board, not the software, recalculates the vectors. With properly supported software with 752 by 564 resolution, imagine a screen divided into 45 rectangles; the operator can pan from one to another as fast as it takes to press the arrow key. Or the operator can go instantly from a view of the entire drawing to fill the screen with an area as small as one of the 45 rectangles with no change in resolution.

Resolution. A sharp screen image reduces the need to pan and zoom. The operator can view more of the drawing at a time. But how much resolution is enough? The perception of resolution is affected by factors such as color, brightness, density of dots, dot size, dot shape, scan rate and bandwidth. Any resolution lower than 640x480 is no longer a good value. Medium resolution today means 800x600. High resolution begins at 1,024x768. Lots of colors create the illusion of high resolution. In comparing display systems, make sure the drawing is as sharp at the edges as in the center. A 640x480 resolution looks much sharper on a 13-inch monitor than on a 19-inch monitor.

Compatibility. Few subjects are more complex. The most important aspect is compatibility with software: the CADD program in use, other software such as your spreadsheet, word processor, and windows. Also make sure the adapter board fits in your computer. The adapter board, of course, must support the monitor; don't assume that all multiscan monitors will accept output from all boards.

Flexibility. You might not want maximum flexibility, which imposes penalties in price and performance. But if you are able to dedicate a computer to a specific function, such as CADD, you can get better results for that function.

Technical support. Regardless of promises made by the dealer, an 800 number to the manufacturer is comforting if you're buying a high-performance graphics board. Try calling it and asking a question.

Color. If rendering is important, don't settle for less than 256 colors and polygon fill. If you also want high resolution, expect to pay for an adapter with a graphics coprocessor on board. But if you can get by with monochrome, you can get a larger screen without excessive bulk and high resolution without a high price. A compromise might be a gray scale system that represents continuous tones of black.

Stability of the manufacturer. No one wants to own orphan equipment. You can't get technical support or upgrades, and the software vendors stop writing drivers for discontinued equip-

L. Berry Taylor, Microtecture

L. Berry Taylor, Microtecture

Graphic rendition of CADD files is not always monitor-dependent. The Datacad-generated church model, left, was processed through an Nth Engine graphics card at 1,024x768 resolution. The image on the right is a Datacad Velocity rendering of the same design developed into a slide directly from a floppy disk.

ment as they upgrade their programs. Even a major manufacturer may stop writing drivers for older cards, but if there are enough users a third-party vendor often will take up the slack.

Legibility of text. This is a function of both the adapter board and monitor. In the IBM system, different boards produce character boxes with differing numbers of pixels. The CGA character box was 8x8 pixels. VGA in monochrome text mode uses a 16x9-pixel character box, which is much easier to read. At this resolution, a spreadsheet can be displayed in 132 columns and still be readable.

Slots required. Normally, one board takes up one slot inside the computer. But some graphics boards get so fat they need two slots. One Weight Watchers Special takes up three slots. Make sure you have room inside your computer for the board.

Upgradability. Some manufacturers are starting to offer low-cost video adapters that can be upgraded later to achieve their full power.

Length of cable. If you plan to stand your monitor on your computer, this isn't a problem. But if you plan to separate them, a short cable could be disqualifying. Standard lengths range from 33 inches to 78 inches. Be clear about who will supply the cable; most high-resolution monitors do not come with cables.

Number of monitors. Some CADD programs support dual screens. They put commands and data on the smaller, monochrome monitor and free the larger, color monitor for graphic display. It makes no sense, according to this reasoning, to take up a big chunk of an expensive screen for housekeeping information. A few CADD programs work better with two monitors. Such a program puts its data base information on the smaller monitor. Making these kinds of programs run in single-screen mode can be difficult enough to require a careful look at how it's done.

Multiscan. Monitors that can support a wide range of scanning frequencies are compatible with more graphics cards than monitors with fixed scanning frequencies. Moreover, multiscanning might be necessary to get the higher resolutions of extended VGA adapters. But a multiscan monitor might not look as crisp as a fixed-scan monitor. And just because a multiscan monitor can support most current adapter boards is no guarantee that the next generation of boards will not require a scan rate higher than the monitor can handle.

Size of monitor. Large monitors permit the operator to see more of a drawing, thus reducing time wasted in panning and zooming. But a big monitor colonizes a lot of valuable real estate in the typical office. Some architects prefer a smaller monitor with a faster graphics card. Typical monitor sizes range from nine inches to 21 inches. The size is the diagonal distance of the glass area of the screen. The visual (drawing) area usually is an inch less. If a 19-inch monitor is selected, minimum resolution is generally considered to be 1,024x768. One company has a highly regarded 11.6-inch monitor that deserves consideration if space is tight.

Flicker. If the display runs interlaced, spend some time studying the screen to see whether you can detect a flicker. If it bothers you, don't buy it.

Ghosting. When you move a line, it should not continue to glow or leave ghostly trails.

Linear distortion. Vertical lines should be straight. Check both edges.

Shape of the monitor. Options range from the strongly vertical to the strongly horizontal. One company sells a square monitor. Most monitors are rectangular at a ratio of 4:3.

Curvature of the screen. Most screens are slightly curved. A very few manufacturers offer a virtually flat screen. Lines are ramrod straight, even at the edges.

Glare. This is highly subjective and can be tested only in your office—another reason for seeking a money-back guarantee.

Appearance. Shape, color, and design of the housing affect the esthetics of the display. An office that takes pride in its decor should consider how a dominant feature like the display will fit in.

Convenience. Check tilt, swivel, and placement of controls. They should support an appropriate range of preferences. One kind of monitor has seven switches, eight image controls, eleven video connectors, and five video outputs. Do you need all that?

Adjustments. Brightness affects the perception of resolution, but turning up the brightness on some monitors merely increases the size of the image—an undesirable effect called "blooming." Some monitors are noteworthy for achieving brightness without bloom. Some monitors enable a user to control the image on the screen so that a circle always looks round rather than oblate.

A brief survey of architects serving as CADD evaluators for this magazine indicates no trend and certainly no consensus on which display system is best. □

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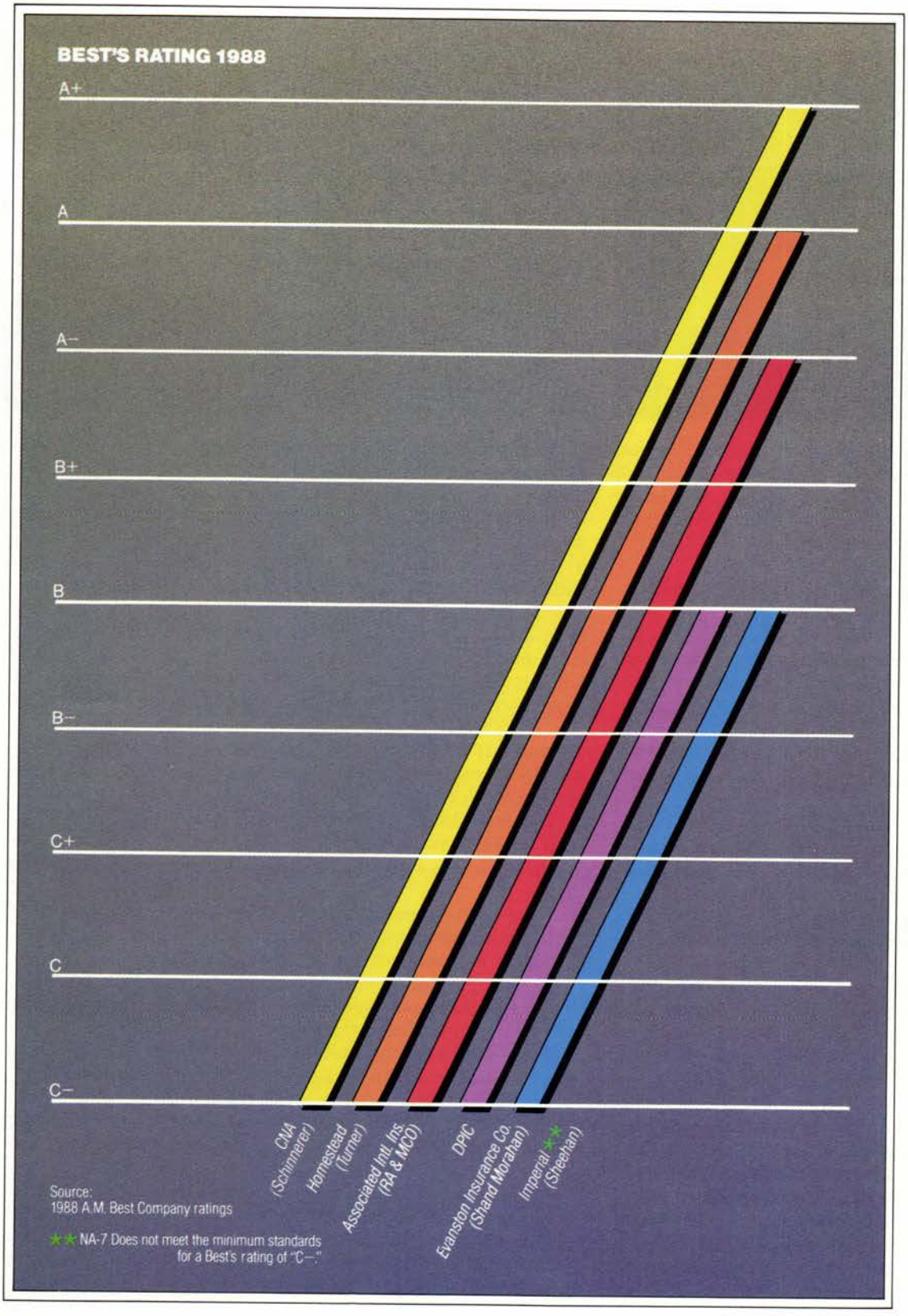

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Using Geotextiles as Vertical Drains

In the last 20 years the term *geotextile* has come to encompass a wide range of products. These predominantly synthetic "fabrics" take the place of traditional materials such as stone, lumber, sand, and pipe to reinforce, drain, and filter soils. To produce geotextiles, manufacturers primarily use petroleum-based polymers, which are extruded into filaments, films, strips, and strands. These threadlike elements in turn are woven, knit, drawn, or heat-bonded into mats, grids, webbings, and corrugated or alveolate structures.

This article will be confined to geotextiles used as vertical drains to dewater and accelerate soil settlement; horizontal filters and drains to prevent water seepage around foundations; and soil reinforcement to stabilize embankments.

Vertical drains

Vertical drainage systems improve the vertical transport of water; they are not used to prevent soil settlement. To the contrary, vertical drainage systems *accelerate* final settlement. Initially, loads applied to poorly permeable soil layers are taken up by the water contained in the pores of the soil. The difference between pore pressure on the loaded soil layers and the normal hydrostatic pressure on surrounding soil is called "excess pore pressure." This excess pressure creates an artesian effect under the loaded area, displacing the groundwater into surrounding areas under less pressure. With the loss of the pore water, the layers of soil are slowly compressed, and the grain structure of the soil gradually takes up the pressure. This settling can take years or even decades, and often it isn't uniform. It is disconcerting to watch your building slowly sink into the horizon but even worse if it doesn't do so evenly.

Installing a vertical drainage system can accelerate soil settlement so that it is complete before construction of the building begins. The introduction of a drain that penetrates the layers of soil changes the natural vertical movement of water to a horizontal movement toward drains. The horizontal flow of water accelerates, because the horizontal permeability of most stratified soils.

Until recently, vertical drains were constructed by drilling holes through the stratified layers of soil and filling the holes with very permeable sand, which acted as the drain. Today, geotextiles can be used in place of sand. The several types of geotextile drains on the market can be divided roughly into three groups. The first is strips of needle-punched, nonwoven fiber or filament material about five millimeters (3⁄16 inch) thick. The material is cut into strips ranging from 100 millimeters (about four inches) to 300 millimeters (about one foot) wide, which are wound onto a spool. The second type of drain material consists of a core surrounded by a filter web. The core material in these composite-type drains is made either of a profiled synthetic strip that vertically discharges water or of a number of perforated round pipes or tubes. The third type is sand-wick drains, constructed of a geotextile outer casing and stiffener over a center filled with coarse sand. Sand-wick drains, unlike sheet-type drains, are round, usually 60 millimeters (close to 2¼ inches) in diameter.

Because a narrow lance is used to penetrate the layers of soil and lead in the strips of sheet geotextile drains, surrounding water and aquifers seldom are disturbed or contaminated, as often happens with sand drains. Once the lance and drain material have reached the desired depth, the lance is removed, leaving only the drain material.

Vertical drains should not be placed randomly; their spacing should be designed carefully, taking into account the soil conditions at all levels, the weight and structure of the proposed building, and the construction time frame (see Figure 1). Most of the design parameters will be set by information gathered from the soil tests, which should focus on horizontal and vertical variations in the subsoil structure.

Depending on the variation found in the initial tests, further studies should concentrate on compression, permeability in relation to consolidation, one-dimensional compression, drained and undrained shear strength, and sensitivity to erosion.

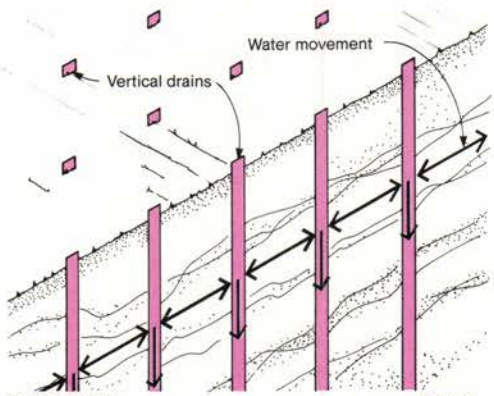
Vertical drains should have low entry resistance and high discharge capacity. How well they perform will depend on proper installation, the selection of filters, and the expected life span vis-à-vis the time it will take to drain the site.

The selection of a filter in a vertical drain is a compromise: the finer the filter the higher the hydraulic resistance, but the coarser the filter the greater the possibility of clogging the drain. Once selected, the filter should be inserted at a uniform speed to ensure an even tensile pressure along the entire length of the drain, thus preventing failure of one or more of the drain components. Speed of insertion should be increased only when moving from firm soil layers into softer layers.

Horizontal filters and drains

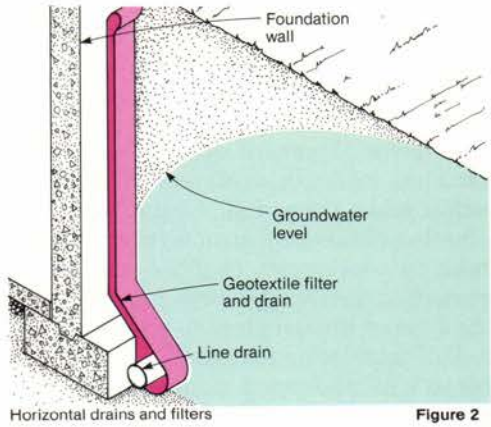
Geotextiles placed over foundation drains can act as selective filters to prevent soil particles from being carried into drain pipes (see Figure 2). Selection of the proper geotextile must be tied to the soil type and grain size; the pore size of the geotextile must be smaller than the larger grains on the side of the fabric with the largest load. As a bonus, the residual "skeleton" of larger grains building up around the textile pores begins to act like an even finer filter, further preventing seepage of finer grains of soil. The skeleton filter can be destroyed, however, if cyclic loading is imposed on the geotextile filter.

Selection of geotextiles and geotextile composites may be confusing. As a rule, woven fabrics are strong and can be used as very selective filters. On the other hand, thin, open, nonwoven fabrics usually are applied when a very permeable filter is needed. Thick, voluminous nonwoven fab-



Vertical drains

Figure 1



Horizontal drains and filters

Figure 2

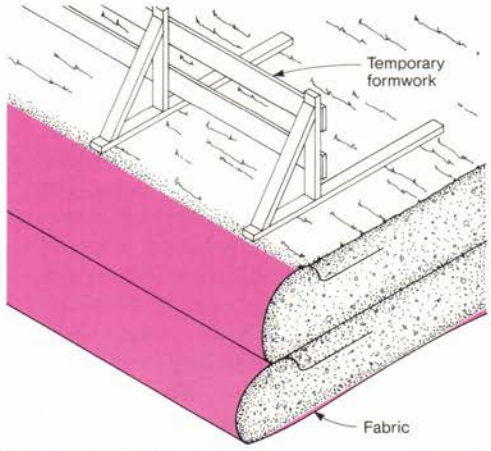
rics are best used as soil-retaining filters, while those of the thinner variety are preferred in hydrostatic loading conditions. And, while geotextiles combine both the filter and drainage functions, there also are geotextile combinations that incorporate impermeable geomembranes, special filters, or structural properties.

Any geotextile drain material must be handled carefully on the site. Its bottom edge should be anchored temporarily. A composite material in particular should be laid with overlapping seams to create joints without gaps. When the material is in place, care must be exercised during the backfill operation to ensure that the geotextile isn't damaged or simply overloaded. (Backfill that overloads a fabric reduces its effective water discharge capability.) Also, if the geotextile's outer layer is not thick enough, coarse fill material may tear it. Finally, the backfill operation should be carefully supervised to avoid overzealous compaction, which could result in large tension loads on the fabric.

Embankments

Surface erosion will affect newly graded ground that has been stripped of vegetation. Even on a 2 percent slope, light rain can cause damaging erosion. The results are a loss of soil and pollution of downstream rivers and ponds. As a consequence, all newly graded areas should be dammed at their lower edges or replanted immediately. Water coming from uphill, off-site property also can cause erosion, and provisions should be made to temporarily block or divert this runoff.

Dams, sometimes no more than large berms, will contain the runoff and allow the soil particles enough time to settle out. Then the water can be dissipated using vertical drains down into the aquifer, or it can be left to seep naturally through the dam. When planning temporary or permanent dams, berms, or embankments, the designer faces the problem of earthwork stability. The angle of repose, which varies by soil type, always is a design constraint. For instance, wet clay can maintain only a 30 percent slope, while wet sand can maintain an 80 percent slope before sliding downhill. Additionally, increasing numbers of structures are being built on poorer soils. In those cases in particular, reinforcement is necessary at the base of the structure to reduce the risk of foundation failure. The need for better soil reinforcing techniques has led to the use of geotextile sheets for drains



Embankment geotextile reinforcing **Figure 3**

because they have a higher water transport ability than the surrounding soil.

The advantages of using soil-reinforcing geotextiles are increased stability (hence, less likelihood of sliding), the ability to construct steeper slopes (thus decreasing the amount of fill material needed), and the possibility of constructing embankments over poor soils or material that normally would not be suitable.

The overall stability of reinforced-soil structures is derived from the interaction between the layers of soil and the material (see Figure 3). However, a number of factors influence the shear strength of geotextile-reinforced soil, including the stiffness of the reinforcement in relation to the surrounding soil and the orientation of the reinforcement. Friction between reinforcement and soil, creep performance during the life of the structure, and the material's resistance to deterioration also are critical.

Geotextile embankment reinforcing is subject to high forces and thus must be stiff, that is, have low elongation properties. Usually 5 percent to 6 percent elongation is considered maximum under working conditions. Higher elongation properties will result in a large amount of movement in the soil and ultimately failure of the embankment.

Traffic loads may damage the geotextile and also may reduce its overall strength. Therefore, grading where geotextiles are used should be designed to require minimal and proper machinery. Even using proper machinery, the designer can expect the geotextile material to lose 10 percent to 15 percent of its ultimate strength due to traffic. The initial design should account for this loss of strength.

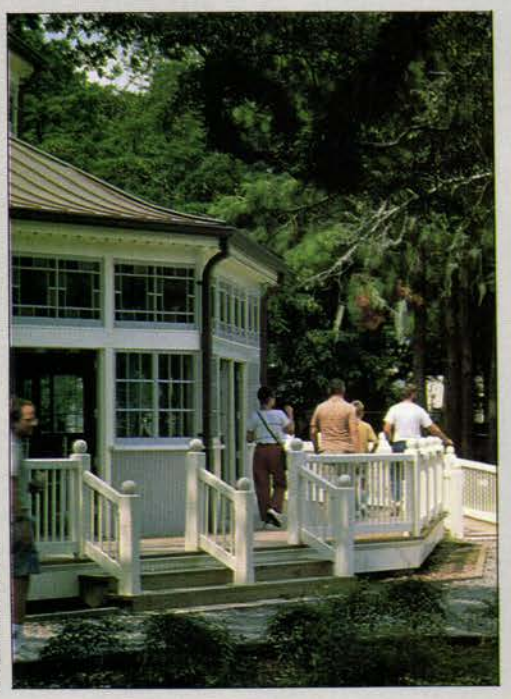
Creep causes the increase in length of the fabric when the fabric is loaded at a constant stress level over a long period of time. Because geotextiles are viscoelastic polymers containing both crystalline and amorphous elements, the individual polymers tend to arrange themselves in folds and intertwined patterns. When the geotextile is stressed over a long time, the material deforms because of the slow untangling of the folded polymer chains. During production, manufacturers of geotextiles attempt to orient the unfolding process in one direction. The manufacturer should provide the designer with reliable long-term creep tests at various stress levels. From these tests, the designer can determine whether the material is suitable as a reinforcing mat.

Normally, geotextiles are resistant to natural chemicals within soil. They are, however, susceptible to degradation from ultraviolet radiation. The most effective protection is to cover the exposed surfaces with stone. Alternatively, more permanent structures can be covered with soil that is then planted. The embankment must be inspected and maintained regularly.

The geotextile material must be able to absorb and adjust to the inevitable deformation caused by dynamic loads. For example, simple compaction can place the geotextile in tension, particularly if a wedging action of the upper layer of soil causes a lower layer of soil to slip along the fabric. Because geotextiles are able to stretch, the initial tension loads caused by bridging over the small irregularities in the bed are reduced over time. If the geotextile is not laid properly over large depressions or is expected to span large areas of uneven settlement, the initial stress will be increased when a layer of covering soil or stone is placed over it. The result can be local tears, which can be avoided by laying the geotextile in small folds. Also, even soil compaction will prevent nonuniform settlement, which can result in increased tension and strain on the textile, change in the soil tightness and permeability, and erosion.

Finally, "fabric flapping," generally a result of improper subsoil/geotextile contact, can be a problem if the subsoil grains are significantly smaller than those covering the fabric. As small individual grains become suspended in the space between the fabric and the subsoil, they are easily lost through the fabric pores, causing a certain amount of uneven settlement. To create good surface contact between the fabric material and the subsoil, as well as the covering material, an intermediate layer of soil should be applied on the fabric.

—Timothy B. McDonald



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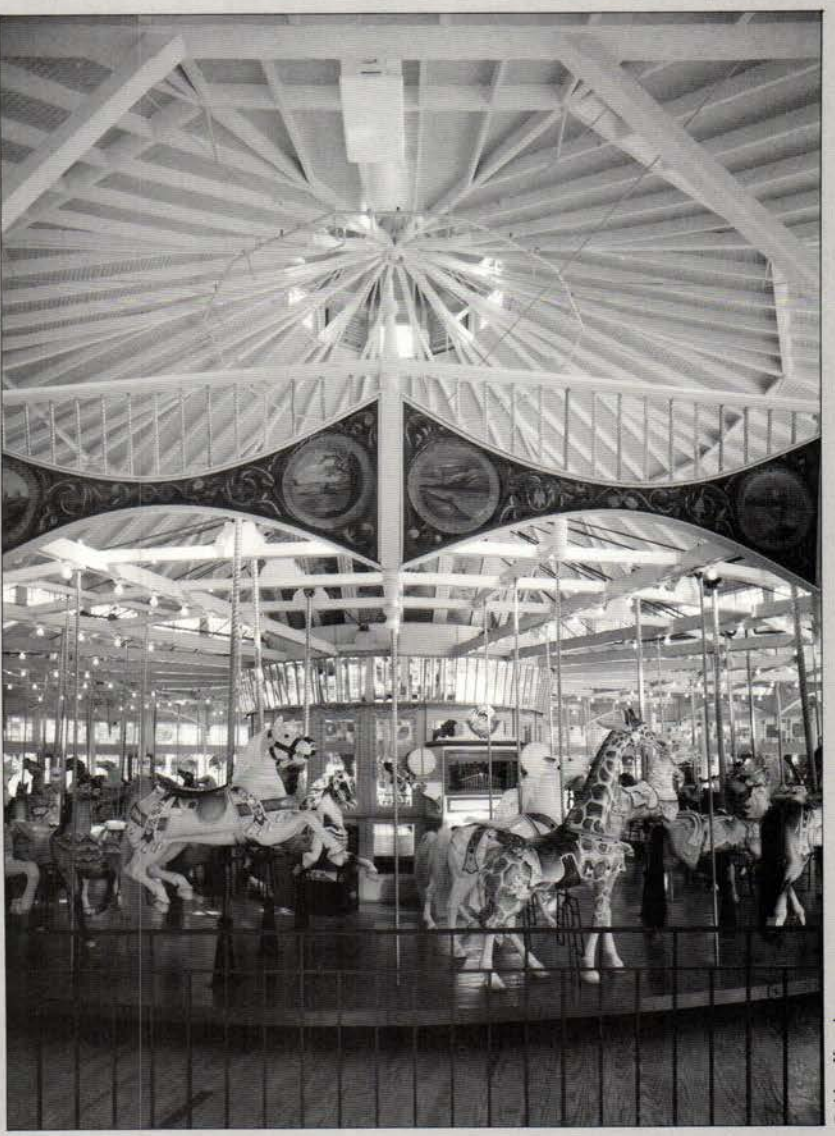

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Louisana Chapter. City Park Carousel, New Orleans (top left and right); Peter M. Trapolin & Associates Architects, New Orleans. Built in 1905 and moved to its present location in 1928, the carousel had deteriorated severely. The French doors, the operational transoms, and the louvers of the cupola were opened up and restored to allow natural ventilation. The roof structure and decking were restored and a new standing-seam copper roof installed.

North Carolina Chapter. Reynolda Village, Winston-Salem, N.C. (above); Edwin Bouldin Architect, Winston-Salem. In converting a collection of 1916 farm buildings to a commercial and retail center, the architect developed a master plan to retain the character while inserting amenities and parking. Additions to the complex have similar massings and repeat the expansive green roof, heavy columns, and stucco and stone exterior finishes.

William Mills

Christopher Lark

Virginia Society. Myers residence, Crownsville, Md. (top); The Joseph Boggs Studio, Washington, D.C. Located on a two-acre site on the Severn River, this 2,400-square-foot house for an art dealer features a large display area with indirect northern light, while the southern exposure takes advantage of river views. The architect chose a "progressive" massing to respond to the sloping lot and clad the house in board and batten cedar siding.

Georgia Association. The Mall at Lexington Green, Lexington, Ky. (above); Cooper Carry & Associates, Architects, Atlanta. An almost literal interpretation of a horse barn, this 166,400-square-foot specialty marketplace has a steel structural frame with exposed truss in the expansive food-court area and a standing-seam metal roof on exposed wood decking. Signifying the public spaces are two green-tinted skylights and three white cupolas.

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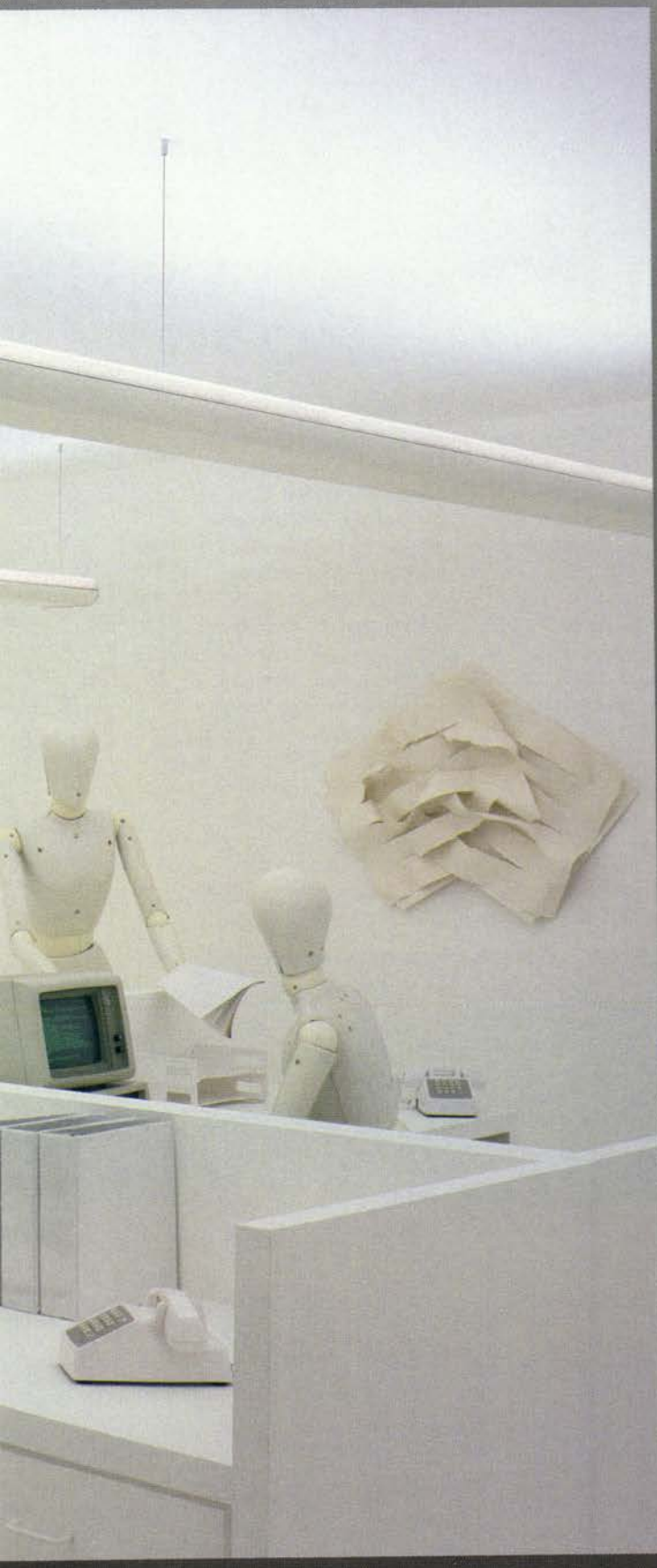
Dennis Marsico

Pittsburgh Chapter. Benedum Center for the Performing Arts, Pittsburgh (above); MacLachlan Cornelius & Filoni Architects, Pittsburgh. A 1928 movie palace was converted to a 2,800-seat performing arts center for the city's opera, ballet, and dance council, as well as for traveling productions. The Benedum Center, built in conjunction with CNG Tower (by Kohn Pedersen Fox; see page 120), was the first component in Pittsburgh's recently created Cultural District. The ornate auditorium was restored in compliance with federal standards while integrating modern systems and increasing space for support functions. A new 18-foot-deep, wood-paneled proscenium was constructed inside the arch.

Chesapeake Bay Chapter. Agriculture History Farm Park, Montgomery County, Md. (below); Colimore/Clarke Associates, Annapolis, Md. Acquired in 1971 by the Maryland National Capital Park and Planning Commission to preserve the county's link with agriculture, the 200-acre farm now houses government agricultural agencies and provides space for educational programs and conferences. Future development will include a farm museum. The architect organized the new activity center and chose materials (wood, stone, heavy timber, and metal roofs) to recall traditional farm buildings; the red "silo" contains the elevator and a circular stairway to the lower level.

Jeff Heatley

New York State Association of Architects. Gates of the Grove, East Hampton, N.Y. (above); Norman Jaffe, AIA, Bridgehampton, N.Y. Cited by the jury as a "powerful example of architecture as sculpture," this synagogue uses materials characteristic of the region in "thematic shapes drawn from the Hebrew script and the drama of repetition to build a striking yet reverent place for worship." The architect developed a plan that would be comfortable for the congregation at varying numbers in attendance, whether 40 or 250 people. **Rhode Island Chapter and the New England Regional Council.** Trinity Church rehabilitation, Newport, R.I. (left); Irving B. Haynes & Associates, Providence, R.I. The restoration balanced the needs of the church as a contemporary place of worship without adversely affecting the distinguishing qualities of the historic 1726 building by Richard Munday. Mechanical systems were upgraded, windows restored, and the structure supported.



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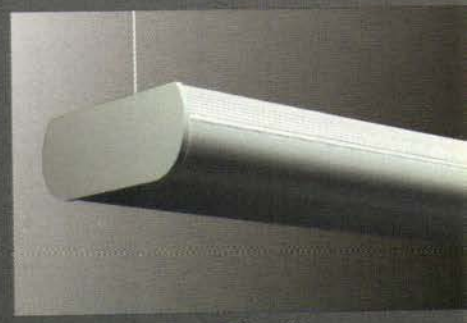

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Paul Warchol

Philadelphia Chapter. Founders Pavilion and Miller Plaza Hospital, University of Pennsylvania, Philadelphia (left); Geddes Brecher Qualls Cunningham, Philadelphia. The hospital's long-range master plan of 1973 has culminated in the construction of this 15-story wing, which houses 124 beds, ICU, surgery, and a cafeteria, as well as a new circulation and service system. All vertical mechanical systems are located in vertical shafts outside the base plan. These external shafts serve as the prominent element in the grid pattern of the west facade. Two colors of precast concrete and three colors of tile complete the grid. The south facade, which faces a new open space, uses the same materials and details but has a larger scale fronting the existing hospital buildings.

New York State Association of Architects. Dalton-on-Greenwich, New York City (right); Beyer Blinder Belle, New York City. This 84-unit condominium development combines a new 11-story building with the renovation of three adjacent loft buildings. The entire complex is served by a single lobby and a landscaped interior courtyard. The residential building was cited by the jury as a "carefully studied and successfully executed effort to create the special character of New York's cast-iron architecture . . . making this project truly unique."

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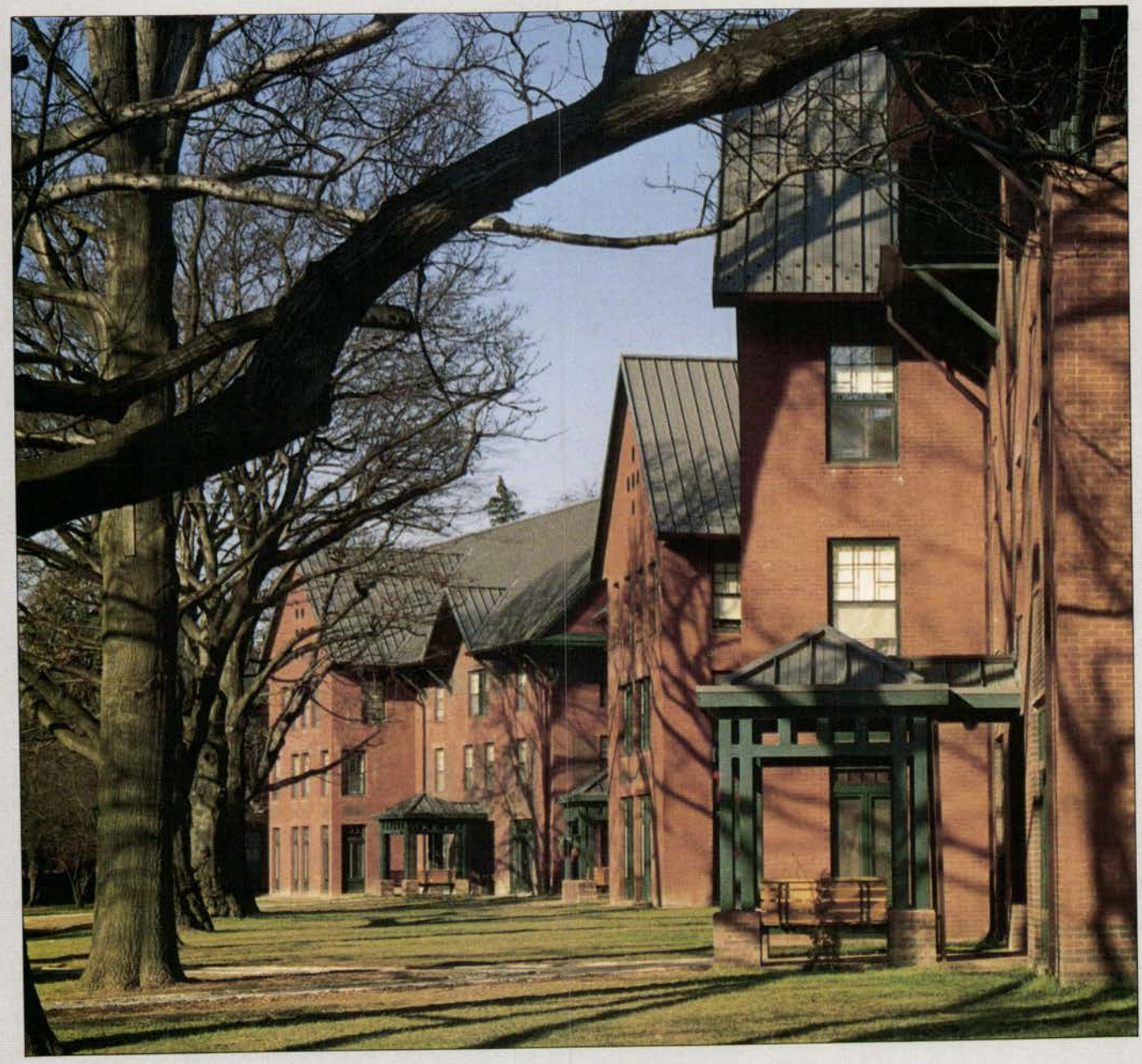
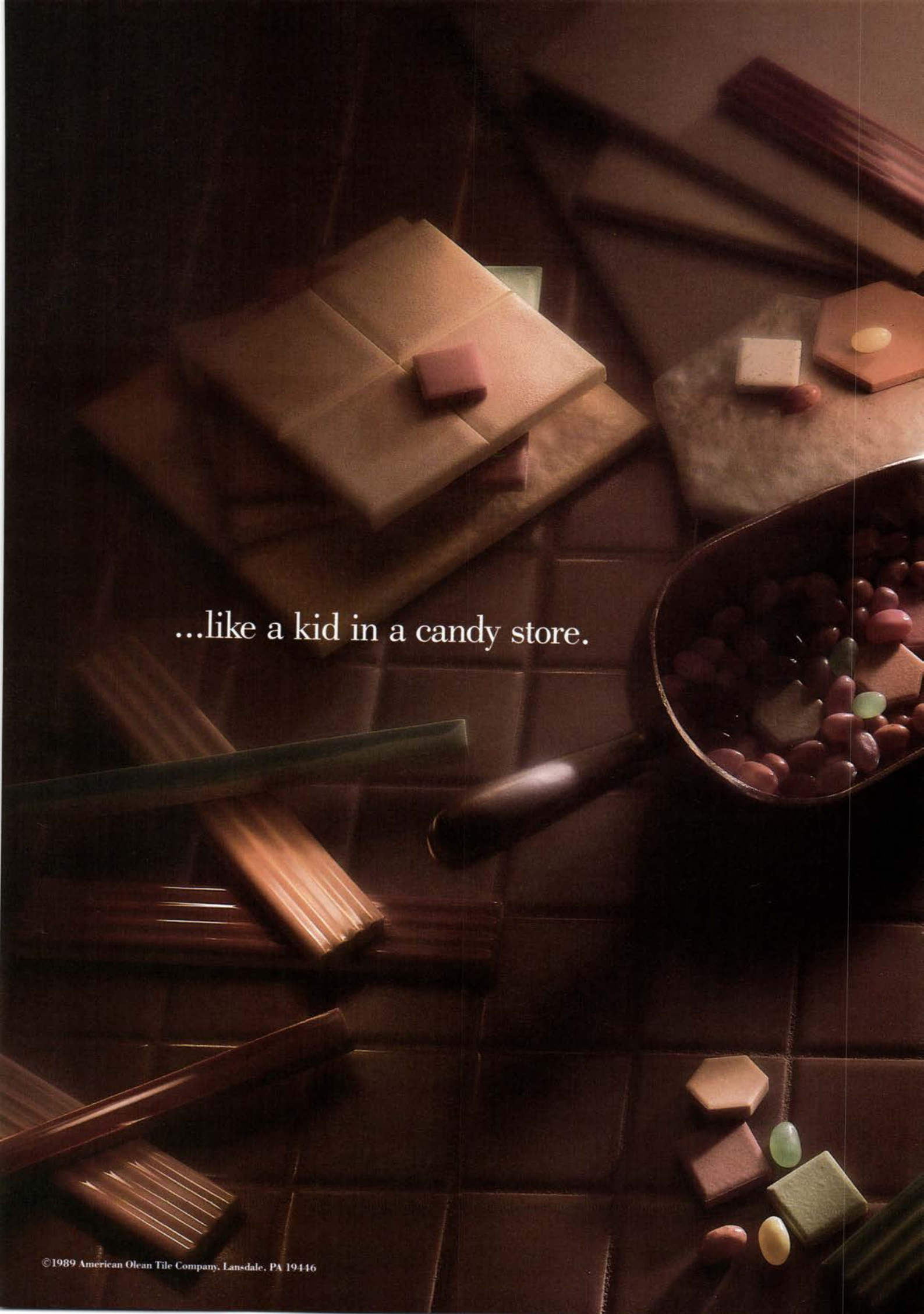


Photographs by Victor Sittig

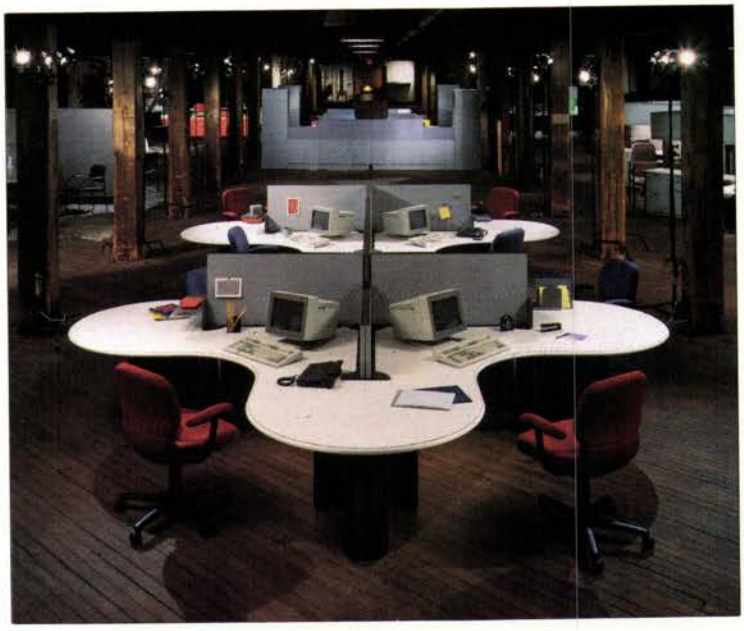
New Jersey Society of Architects. Lawrenceville School student housing, Lawrenceville, N.J. (above and left); Short & Ford Architects, Princeton, N.J. The original campus plan was designed in 1886 by Frederick Law Olmsted with architect Peabody & Stearns, but, as the school expanded, much of the geometric order of the landscape had been lost. By siting the girls' dormitories in a crescent near the original circle, the architect defined a new outdoor common and connected the recent dining and athletic facilities to the rest of the campus. Grouped behind an arc of mature oak trees, the four three-story "houses" are similar but alternately reversed in plan. The buildings are brick with the front facades detailed with bands of brick in constrasting colors and with steel brackets and windows. Large-scale gestures—two-story bays, clustered windows, and projecting eaves—also relate to the scale of the crescent.



PRODUCTS

Coach Hide Chairs
Matteo Grassi S.p.A. chairs from Milan, above, feature oval tubular frames in a highly resistant steel finish. The coach hide seat and back are available in two different height options. Legs and bent steel armrests are entirely covered in the coach hide or in all metal.
Matteo Grassi S.p.A.
Circle 402 on information card

Sculptural Floor Lamp
The Fantomas floor lamp, right, designed by architect David Baird, is named after a phantom character who appeared on French television in the 1950s. The lamp's sculptural shape allows it to change its silhouettes during the day and night against a background of light.
Ziggurat
Circle 403 on information card



Freestanding Furniture System
Context, a freestanding furniture system from Steelcase, left , is made up of independent elements, such as storage units and core units, that can be configured to meet a range of work settings and tasks. Context encourages increased interaction among workers yet offers privacy where needed through the use of boundary walls and screens. All storage is freestanding, conference units and tables of various sizes accommodate meetings and formal discussions, and each workstation handles power and cabling internally. Jacks and connectors are kept at worksurface level to help simplify office arrangements or replacement of office technology.
Steelcase Inc.
Circle 401 on information card

Products *is written by Amy Gray Light*

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Traditional Casegoods
Traditional casegoods from Gunlocke feature an ogee top, plinth base, a choice of four colors, and optional trim molding in a handrubbed cherry finish. The office group features a 42 x 84-inch desk, 20 x 92-inch credenza, and a vertical storage unit. Traditional detailing is expressed in the grill doors, trim molding, and period hardware.
The Gunlocke Company
Circle 404 on information card

Danish Low-Profile Radiators
Danex Inc.'s baseboard hot water radiator system called Vanpan is now being manufactured in America.

Danex radiators are compact, with a low-profile 1 x 5⅜-inch baseboard unit. Because of their thermodynamic design and relatively low-temperature circulating fluid, the baseboard units are able to deliver most of their heat by radiation rather than convection.

The Vanpan models are manufactured in extruded aluminum. Either copper piping or a specialized, high-temperature, cross-linked polyethylene piping may be used for supply lines.

The low-profile radiators can replace conventional wooden baseboards along the room perimeter. They extend from the wall no farther than standard baseboards.
Danex, Inc.
Circle 405 on information card

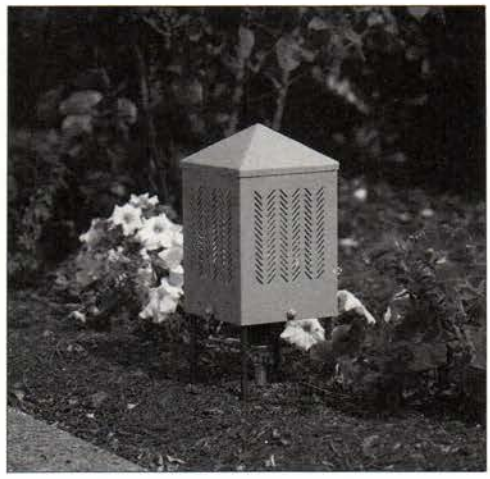
Emergency Planning Guide
"What to Do When the Sky Starts Falling" is an emergency guide geared for the construction industry on how to develop a crisis management program. The guide outlines techniques for organizing, planning, and communicating in crisis situations.
Seacant Associates Inc.
Circle 406 on information card

Elevator Phones
New elevator phones from Viking Electronics require no dialing on the part of the user. The two models offer a conventional handset or a handsfree design. The phones initiate ring-down circuits or auto-dial preprogrammed numbers when used with Viking's K-15000-4 One Number Dialer. Up to five elevator phones may be connected to one K-1500-4 Dialer. Both models can be equipped with a ringer, enabling emergency personnel to call back on the elevator phone. They are telephone line powered, designed for both new and retrofit applications replacing any existing elevator phone, and will fit standard flush or surface mount boxes. They are manufactured of heavy metal with a bright red, baked enamel finish. The handsfree model includes a two-minute timer for automatic disconnect.
Viking Electronics
Circle 407 on information card

Products continued on page 242

Custom Nylon Railing
Normbau Inc. introduces custom railing for exterior and interior applications, for commercial, institutional, or residential projects. The tubular, nylon-coated steel railings are designed to remain warm to the touch and to be easy to maintain. They are available in 12 colors, including neutrals, black, white, and gray, and coordinate with a wide range of Normbau accessories, including shelves, handles, grab bars, and locking systems. The manufacturer will provide quotes from drawings or blueprints.
Normbau Inc.
Circle 408 on information card

Outdoor Luminaires
GE Lighting Systems introduces Lighting Legends high intensity discharge luminaires, a versatile line of outdoor post-top and wall-mounted fixtures that features 13 products, some with base-down and others with base-up lamps, in a variety of globe or paneled opticals. Black pole top adapters, wall brackets, and poles in traditional styles in black housing of heavy-gauge cast or spun aluminum add to the historic ambience of the fixtures. They use energy-efficient high-pressure sodium lamps of 35 through 250 watts plus metal halide or mercury lamps of 100 and 175 watts.
General Electric Company
Circle 409 on information card



Contemporary Outdoor Lighting
Liteform Designs introduces outdoor fixtures (above) in many styles, from advanced tectonic metal shapes in distinctive finishes to sculptural redwood forms and esthetic ceramic finishes. Styles include wall sconces, pendants, garden accents, bollards, walkway lights, and post lights. The designs are UL-listed.
Liteforms
Circle 410 on information card

Lock-Set from Italy
Premi-apri lock-sets by Serrature Meroni SPA do not rotate, but rather operate by a built-in, lever-action button, so they have no moving parts and are easy to use. Two models are available, the Alia in polished solid brass, polished chrome, or satin chrome, and the Nova in a choice of six colors. Both fit a standard tubular 161 cut-out, and backsets are available in 2⅜ inches and 2¾ inches.
Iseo Locks
Circle 411 on information card

Metal Chair
The Traverse Chair from LFI has slightly splayed legs and a graceful curved sweep of a seat and backrest, and is available with or without armrests, and either a grid or a perforated metal seat panel. The chair comes in nine colors, and the electrostatically applied Pangard polyester powder-coat finish is baked on.
LFI Landscape Forms Inc.
Circle 412 on information card

Plastic Foam Backer Rod
Sof-Rod foam backer rod for concrete joint sealants is designed to eliminate the outgassing problems associated with hard, closed-cell polyethylene, while still offering moisture resistance. The backer rod, from AET, is formed from a copolymer to provide water-repellent skin and long-term resilience. Because of this resiliency, the backing material conforms to irregularities in spalled or revealed joints, and will fit a wide range of joint widths with a single diameter. The backer rod is designed to remain dust free and chemically inert, and is compatible with all

known cold applied sealants, including silicone and rubber asphalt. Sof-Rod is available in six diameters (⅜-inch to two inches) of varying continuous lengths.
Applied Extrusion Technologies Inc.
Circle 413 on information card

Flexible Lumber Board
Billee-Board flexible polyurethane lumber, manufactured by Imaginative Materials Group, has all the characteristics of traditional lumber, but can also be bent into a two-foot radius. Not only can it be cut, nailed, painted, screwed, and drilled with conventional woodworking equipment, it also is pliable enough to be bent to build curved walls, arched doorways, spiral staircases, radius windows, and other sweeping architectural designs. One of the primary uses of Billee-Board is for framing radius windows. The board is bent to the exact shape of the window and installed in the flange. A patented ridge running the length of the board allows the easy installation of tape. Using the Billee-Board eliminates drywall and arch-aids on the inside of window openings, leaving a clean reveal. Billee-Board is said to provide full insulation properties; arched windows using the board are said to provide insulation equivalent to traditionally constructed arched windows using double glazing.
Imaginative Materials Group
Circle 414 on information card

Encore Series of Fabrics
Lee Jofa has introduced an encore series of upholstery and drapery fabrics (above) inspired by rare documentary designs from the Textile Museum in Washington, D.C., following the marketing of the first collection.

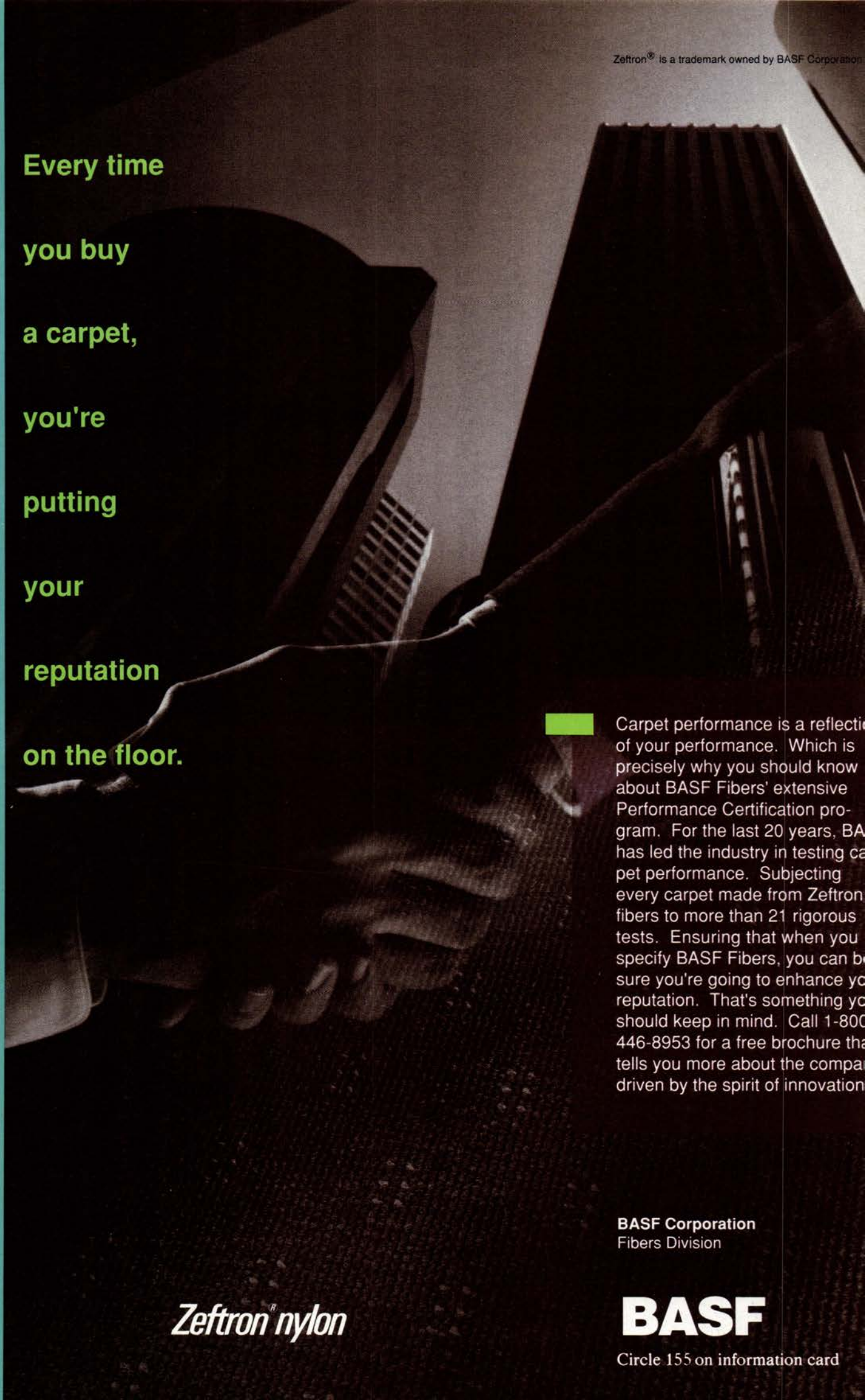
Caravans II consists of seven designs—three prints and four weaves—from such diverse cultures as Japan, the Belgian Congo, Peru, and Samoa.
Lee Jofa
Circle 415 on information card

Rug Flick
Concept Associates now offers "Consumer's Guide to Old Decorative Oriental Rugs" in videocassette. Featured are 34 categories of 160 rugs handwoven between 1880 and 1940. Oriental rug specialist Val Arbab shows each rug in full length, midrange, and closeup view, and discusses its merits. Purchasers may order the guide in Beta or VHS by mail or by calling Concept Associates' toll-free number (1-800-333-8252).
Concept Associates
Circle 416 on information card

Open-Cell Ceiling Systems
Specialty metal open-cell ceiling systems from Alcan Building Products mask but do not interfere with overhead building services such as HVAC, lighting, sprinklers, and speakers. The ceilings mask the building services, allowing users to select mechanical system components for functional and economical efficiency rather than esthetic appeal.

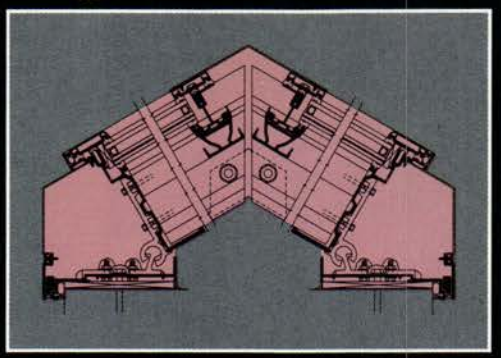
Alcan's Magnagrid, Beamgrid, and Magnabeam systems are available in a wide range of cell sizes and depths and in dozens of finishes. Simple carrier systems and the ceiling's modular, lightweight characteristics enable flat, square, angular, saw-tooth, and sweeping vaulted ceiling designs.
Alcan Building Products
Circle 417 on information card

Products continued on page 246



Circle 155 on information card

United States Aluminum's Series 3300 Slope Glazing is tops in its class . . . just ask Spring Creek College.



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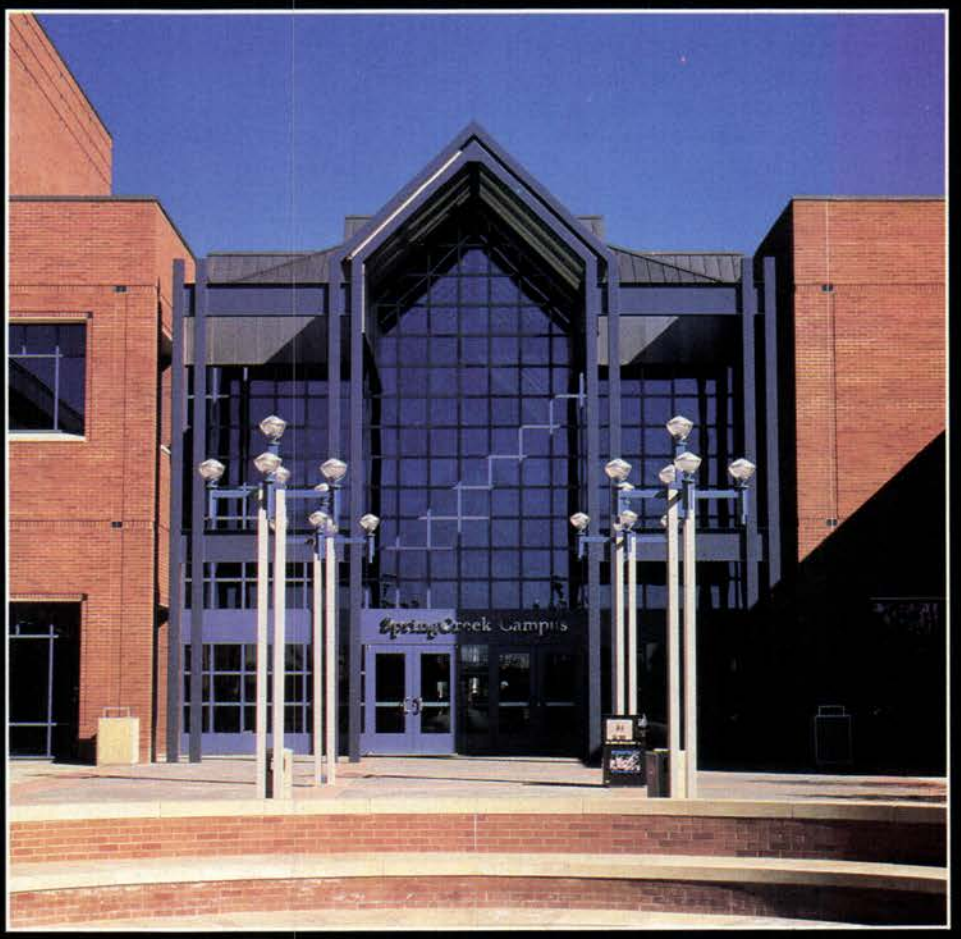

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Circle 157 on information card

New French Doors for Patio
Crestline introduces new wood French doors, in both in-swing and out-swing models, with a wide variety of design options. The 180-degree in-swing operation allows door panels to lay flush to the wall, while the full out-swing operation provides more interior space. Offered in one-, two-, and three-pane models with fixed or operating single panels, these natural wood doors are of select Western woods and are treated with a water repellent preservative. A new sill design provides a built-in water barrier that is designed to withstand rain in winds up to 34 miles per hour.
Crestline
Circle 418 on information card

Three-Quarter-Inch Blind
Carey-McFall, maker of Bali Blinds, announces the industry's first custom horizontal window blind with a ¾-inch slat. The manufacturer of the first half-inch micro blind and the Ultra Blind with an all-in-one control cord introduces the new size to allow less light to penetrate a room while creating a more uniform appearance of color. The new Midsize is available in 140 designer colors, 84 standard colors, and in groupings, all color-coordinated with the entire Bali line of horizontal and vertical blinds, pleated shades, and Bali SofTrims window treatments.
Carey-McFall Corporation
Circle 419 on information card

Circle-Head Window
Eagle Window and Door Co. introduces a circle-head window (above) in a continuous curve of wood on the interior that can be finished to match any decor. The exterior is of extruded pre-finished aluminum. An integral glazing leg gives a clean exterior line. The window is also offered in all metal, quarter-circle, and circle-head styles. Sealed insulated glass is used.
Eagle Window and Door Company, Inc.
Circle 420 on information card

Radon Gas Sealant System
A sealant system called Radon Shield protects houses from the infiltration of radon gas when used in conjunction with EPA ventilation requirements.

The system, from Radon Shield Inc., is designed to be applied during new construction, and is not intended for use with retrofit buildings. The sealant system comes as a kit. One kit per house is needed and provides the materials to seal a 1,250 square-foot basement area from radon gas. Additional sealant also is provided for closing openings around pipes, drains, and plumbing through basement floors. The kit contains five, one-quart tubes of the sealant, one quart of adhesive, and 150 feet of closed-cell foam joint filler.

Tests have shown Radon Shield does not promote flame in the event of a fire, possesses enough flexibility to accommodate normal structural movement while still remaining intact, and has enough permeability to allow a house to breathe, while keeping the structure waterproof.
Radon Shield Inc.
Circle 421 on information card

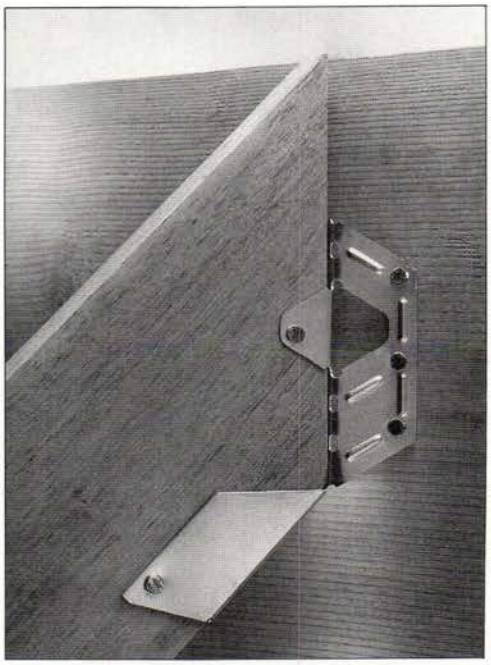
Exterior Aluminum Cladding
Marvin Window's exterior aluminum cladding for windows is available in Bahama brown and white, and in two new colors of pebble gray and bronze.

The cladding is .05 inch extruded alu-

minum, baked in a polyester finish. The interior is primed and prefinished wood. Marvin manufactures over 8,000 standard sized windows, and can make custom windows in any size and style.
Marvin Windows
Circle 422 on information card

Mirrored Pocket Door
Stanley-Acme Wardrobe Door Systems has a new mirrored pocket door, Model 4650, which is available with a mirror on both sides, or a combination of mirror and paneling, in gold-colored aluminum and in standard widths of 24, 30, or 36 inches.
Acme General Corporation
Circle 423 on information card

Versatile Sheathing Line
FibreCem Corp.'s HandiSheet are fiber cement sheathing made without asbestos. The new line is designed for excellent density and cross grain bending strength, no measurable shrinkage or expansion, and durability. Its composition of organic fibers, cement, silica, water, and other proprietary additives enable it to resist deterioration, splitting, cracking, fungal growth, and resistance to pests. The sheathing is available without texture or in a stucco or striated textured style, and the 4- x 8-foot sheets are UL Class A Fire Rated and have a 50-year warranty.
FibreCem Corporation
Circle 424 on information card

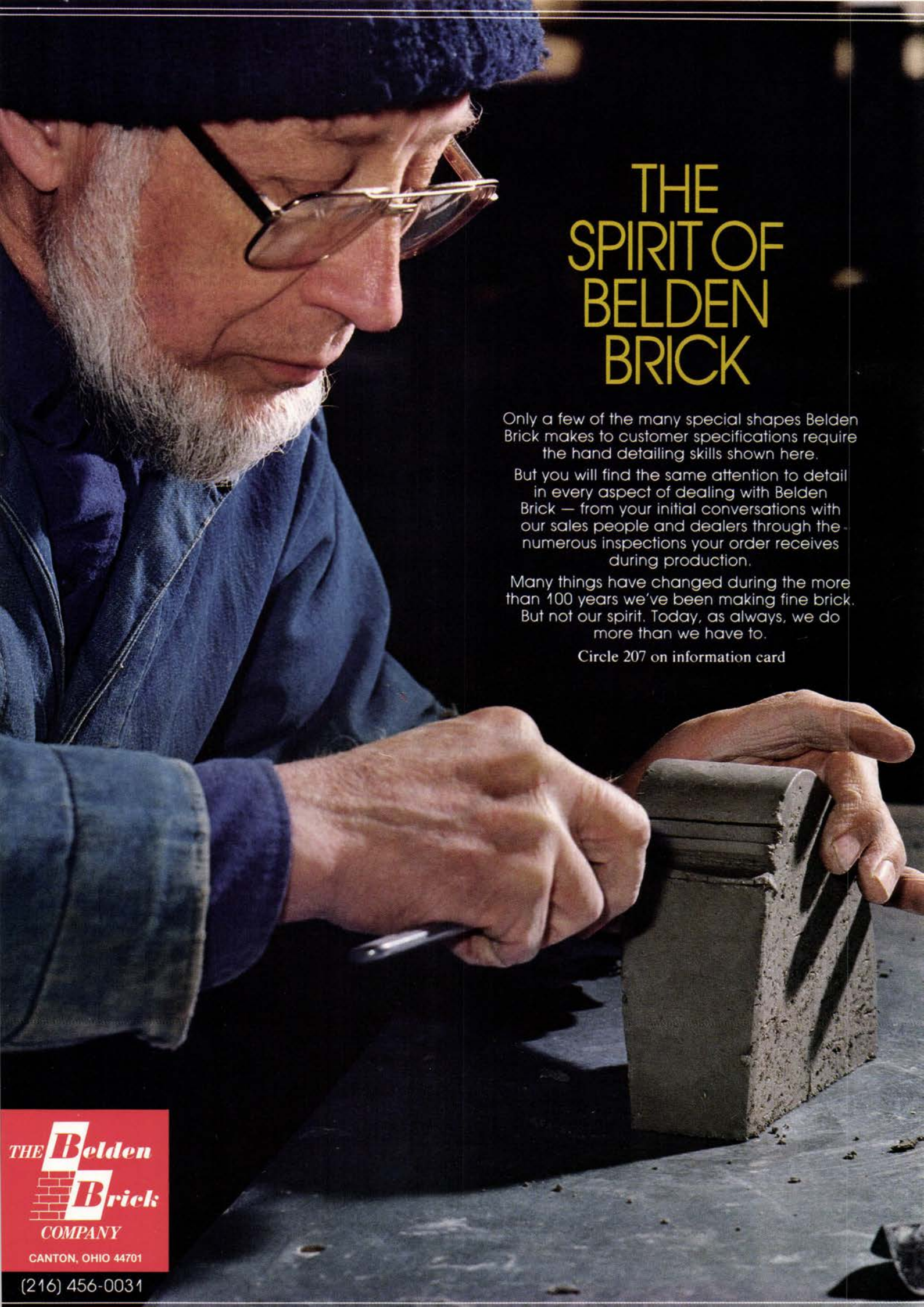


Full Adjustable Hanger
Simpson Strong-Tie Company's new LSU26 joist hanger (above) for light-load applications can be both sloped and skewed on the job site. Bendable side flanges allow the installer to skew the LSU26 into a left or right configuration from zero to 45 degrees, and an adjustable hanger seat allows the installer to slope the joist hanger up or down.
Simpson Strong-Tie Company Inc.
Circle 425 on information card

New Pastel Grout Colors
Bostick Construction Products introduces new Hydroment (sanded) joint filler/ceramic tile grout in designer colors. The new Regency series of color grouts features eight new colors, while 13 new grouts are featured in the Hydroment Designer Series. The Hydroment Standard Series has added five new colors. Hydroment grout systems feature wear and mildew resistance, a high compressive strength, non-shrinking performance, and maximum density. The Regency and Designer Series are available in 25-pound bags and 9-pound retail canisters.
Bostick Construction Products
Circle 426 on information card

Screening Systems
Construction Specialties Inc., manufacturer of sight and sunscreen systems, offers a brochure detailing all of its current profiles, along with suggested specifications and application photographs. These systems can be used for screening parking garages, mechanical equipment, and cooling towers, and for reconstruction projects. They can also be easily customized. A complete line of solar screens can reduce a building's energy demands by screening out the sun's undesirable heat and glare.
Construction Specialties Inc.
Circle 427 on information card

Products continued on page 250



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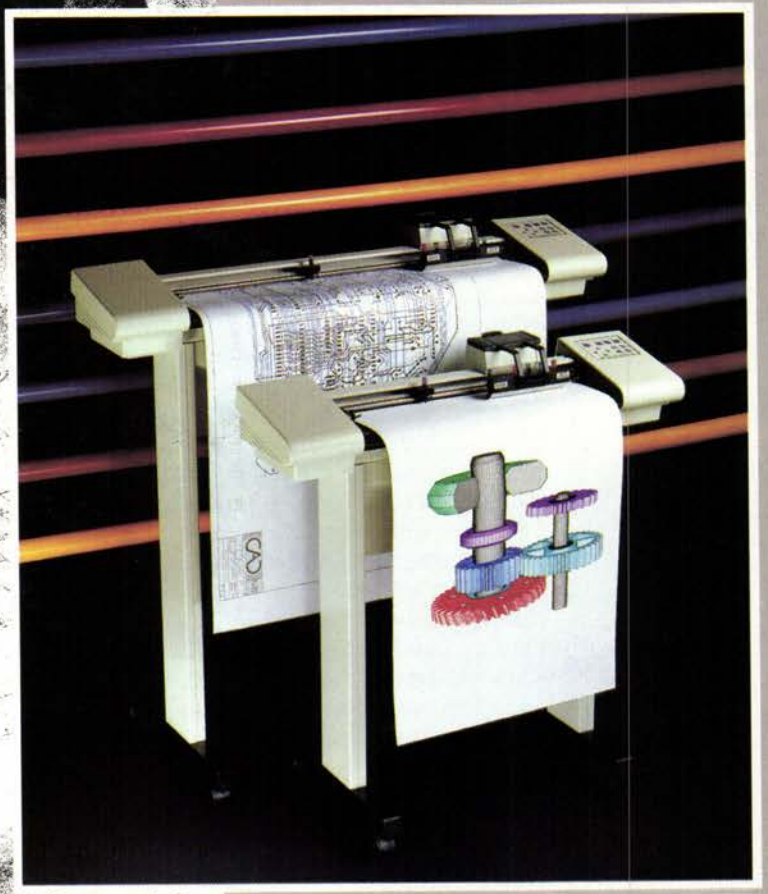

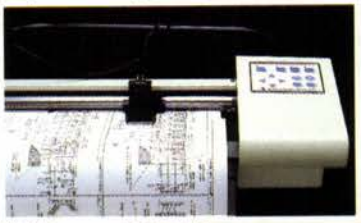

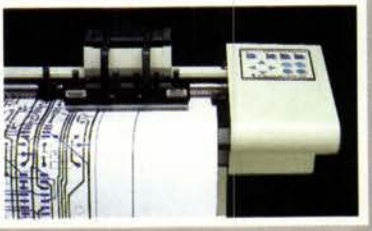

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Circle 163 on information card

High-Temperature Insulation System
Pittsburgh Corning Corp. introduces Foamglas insulation StrataFab System for industrial and commercial piping and equipment. The insulation system works on a wide range of temperature applications from 100 degrees Fahrenheit to 900 degrees Fahrenheit. StrataFab's fabrication process creates built-in expansion and contraction joints that allow the insulation to expand and contract at approximately the same rate as mild steel. The insulation may be cut into a wide variety of sizes for piping systems, and shapes for use as insulation covers for flanges, valves, and heat exchangers.
Pittsburgh Corning Corporation
Circle 428 on information card

Prefinished Siding
Olympia's prefinished siding is made of timber or hardboard siding with a stain coating that is shop-applied and cured in a controlled environment to ensure even application without the potential peeling and cracking of field-applied finishes. The manufacturer says the machine-applied prefinish also enhances the life of the siding, reduces potential delays due to weather, and eliminates lapmarks, streaking, or spattering problems.

The prefinished product is available through select, licensed operators throughout the United States and Canada. Olympia offers five- to 15-year warranties on all its products.
Olympia Homecare Products Company
Circle 429 on information card

Smart Faucets
Need to wash a pot, get a drink of water, soak your head? The faucet knows—using infrared sensors it will initiate a flow of water on any object placed in its path and will stop the flow when the object is removed. Liparus Associates's three new Contempra model faucets—a 4-inch and an 8-inch lavatory model and a kitchen model—all have rotating knobs for temperature control and a switch on the faucet for continuous water flow.

The streamlined faucets use brass components and are available in a range of finishes, including gold, brass, and chrome. They will fit any standard residential sink, and the manufacturer recommends them for commercial use, especially as a part of a barrier-free design.
Liparus Associates
Circle 430 on information card

Metal Finishes
Brass Smith's new line of architectural-quality baked-on metal finishes is specially designed to withstand heavy traffic both indoors and out. Called the Natural Finishes line, it combines rough texturing with the natural colors of sandstone, rust, black iron, and verdigris.
Brass Smith Inc.
Circle 431 on information card

Products continued on page 253

 Circle 165 on information card

Designer Rug
Edward Fields now offers the first-place winner of its 1988 annual rug design competition, held in conjunction with ASID.

The winning design by artist Mel Smilow features a textured geometric pattern that is suitable for residential or commercial applications.

The New Zealand virgin wool rug may be ordered as an area rug or as wall-to-wall carpeting in any color palette desired.
Edward Fields Inc.
Circle 432 on information card

Composite Building Panel
Reynolds Metal Company recently introduced a fire-resistant building cladding panel system composed of a solid thermoplastic core sandwiched between two sheets of aluminum.

Reynobond panels, which meet or surpass the national building codes for fire resistance, are available in a wide range of colors and sizes up to 20¼ feet wide and 5¼ feet long. The panels are suitable for new construction and renovation of building exteriors and interiors. Possible uses include curtain walls, spandrel covers, cladding, ceilings, fascia, and trim. The lightweight panels can be installed with conventional concealed methods such as route and return or continuous edge grips.

The panels will be available later this year.
Reynolds Metals Company
Circle 433 on information card

Shuttle Transit
It is not faster than a speeding bullet, but it does well at velocities of up to 25 miles per hour and will carry 187 passengers per car for a distance of just over a mile. Otis Elevator of United Technology offers the Shuttle Transit system, propelled by a wayside traction drive machine and suspended on an air film with rubber shock mounts.

The shuttle system can operate in single-lane or double-lane configurations and can run fully automated, on a schedule, or on demand. It can handle grades up to 8 percent. Two or more cars can be linked together.
United Technologies Otis Elevator
Circle 434 on information card

CREDITS

John B. Hynes Veterans Memorial Convention Center, Boston (page 92). *Architect: Kallmann, McKinnell & Wood, Boston.* Principal, design: Gerhard Kallmann, AIA, and Michael McKinnell, AIA. Principal, management: Henry A. Wood, AIA. Senior associate, design: Bruno Pfister. Project management: Kathryn B. MacKenzie, Lloyd G. Dyson Jr., Ronald Barber, Hans Huber. Design team: Charles Carlin, Ginette Castro, Martha Cuddeback, Matthew Ellsworth, Melanie Fran-

Credits continued on page 254

Credits *from page 253*
cis, Paul Frazier, Lynn Hopkins, Rayford Law, Thomas Robinson, Claudia Russell, John Salem, Vincent Synder, Anne Tansantisuk, Donald Taylor, Brooke Williams, Chuck Woods, Ronald Zeytoonian. Owner: Massachusetts Convention Center Authority.

Solana, a joint venture of Maguire Thomas Partners and IBM, Dallas (page 100). *Architect: Legorreta Arquitectos, Mexico City, and Mitchell/Giurgola Architects, New York City.* Principal (Southlake and Village Center): Ricardo Legorreta, Hon. FAIA, Principal (Westlake Complex): Romaldo Giurgola, FAIA. Landscape architect/planning: Peter Walker & Martha Schwartz. Associate architects: Leason Pomeroy Associates (Southlake and Village Center); Harwood K. Smith (Westlake Complex). Designers and planners: PHH Neville Lewis (Southlake). General contractor: HCB Contractors.

Pacific Design Center, Phase II, West Hollywood, Calif., (page 108). *Architect: Cesar Pelli & Associates, New Haven, Conn.* Principal in charge: Cesar Pelli, FAIA. Principal for landscape design: Diana Balmori. Project manager, design: Lily del C. Berrios. Project manager, construction: Jeffrey L. Paine. Designers: Mac Ball, Doug Denes, Philip Koether, Susan Papadakis, Roger Schickedantz. Executive architects: Gruen Associates. Partner in charge: Allen Rubenstein. Project architect; Robert S. Barnett. Job captain: Karl Swope. Contact room space: Jon Courtney. Structural engineers: Cygna Construction Engineers. Mechanical engineer: Flack & Kurtz. Landscape engineers: P.O.D., Inc. Civil engineering: Paller Roberts. Graphics: Sussman-Prezja & Co. Lighting: Jules Fisher & Paul Marantz.

Trinity School, Atlanta (page 112). *Architect: Lord & Sargent Inc., Atlanta.* Project team: Betsy Beaman, Allen Duncan, Michael Few, Jimmy Hawkins, Harriet Leavens, Larry Lord, AIA, Terry Sargent, AIA, Howard Wertheimer. Mechanical and electrical engineer: Jones, Nall & Davis. Structural engineer: Weems Doar Engineers Inc. Civil engineer: Harrington, George & Dunn. General contractor: VWC Inc.

CNG Tower, Pittsburgh (page 120). *Architect: Kohn Pedersen Fox, New York City.* Partner in charger: A. Eugene Kohn, FAIA. Partner in charge of design: William Pedersen, FAIA. Senior designer: Robert Evans, AIA. Project planner: Mark Strauss, AIA. Project managers: Robert Barbach and Creighton Jones. Job captains: Walter Chabla and Paul Diebert. Structural engineer: Lev Zetlin Associates. Mechanical and electrical engineer: Joseph R. Loring & Associates. General contractor: Mellon Stuart Co. Owner: Lincoln Property Co.

1201 Third Ave., Seattle (page 126). *Architect: Kohn Pedersen Fox, New York City.* Partner in charge: Robert Cioppa, AIA. Partner in charge of design: William Pedersen, FAIA. Senior designer: Sudhir Jambhekar, AIA. Job captain: Susan Davis-McCarter. Associate architects: The McKinley Architects. Principal in charge: Patrick A. Gordon, AIA. Project manager: John E. Petterson, AIA. Structural engineer: KPFF. Mechanical and electrical engineer: Bouillon Christofferson & Schairer. Contractor: Howard S. Wright. Owner: Wright Runstad & Co.

Desert View Elementary School, Sunland Park, N.M. (page 138). *Architect: Perkins & Will, Chicago, and Mimbres.* Structural engineer: Mimbres Inc. Mechanical engineer: Bridgers & Paxton. Electrical engineer: Tierra Engineering. Landscape architect: Mimbres Inc. General contractor: Wooten Construction Co. Owner: Gadsden Independent School District.

Folger Shakespeare Library, Washington, D.C. (page 138). *Architect: Hartman-Cox Architects, Washington, D.C.* Structural engineer: James Madison Cutts. Mechanical and electrical engineer: Vincent Lee Thorp. Landscape architect: Lester Collins. General contractor: Skinker & Gar-

rett Inc. Owner: Trustees of Amherst College.

Martha's Vineyard Residence, Massachusetts (page 140). *Architect: Steven Holl Architects, New York City.* Structural engineer: Robert Lawson. General contractor: Doyle Construction. Owner: Steven Berkowitz and Janet Odgis.

Hansen House, Wilmette, Ill. (page 144). *Architect: Hammond Beeby & Babka, Chicago.* Principal in charge: Thomas Beeby, FAIA. Project assistants: Tannys Langdon, AIA (now Langdon Woodward), Charles Young, and Karen Johnson, AIA (now Johnson Rogatz Wilson). Structural engineer: Getty, White & Mason. Mechanical and electrical engineers: Chicago Design Consultants. General contractor: Erik Hansen. Owner: Erik Hansen.

Reid House, Johns Island, S.C. (page 148). *Architect: Clark & Menefee Architects, Charleston.* Structural engineer: Shoolbred Engineers Inc. Mechanical and electrical engineer: Engineering Technology. Interior design: Dian Boone. General contractor: Stier Kent & Canady Inc. Owner: G. Marion & Annie Caroline Reid.

Kings Point Pool Addition, Kings Point, N.Y. (page 150). *Architect: Tod Williams, Billie Tsien & Associates, with Annie Chu, New York City.* Structural engineer: Frank Taffel & Associates. Landscape architect: Tom Pritchard & Mario Tuccinardi. General contractor: Roy Anderson Associates. Owner: Emily and Jerry Spiegel.

Meyer May House Museum, Grand Rapids, Mich. (page 152). *Restoration architect: Tilton + Lewis Associates, Chicago.* Structural engineer: Entela Inc. Mechanical and electrical engineer: Criner & Wedeven. Landscape architect: David Nederveld. General contractor: Barnes Construction Co. Owner: Steelcase Inc.

Miller Park Plaza, Chattanooga (page 156). *Architect: Derthick, Henley & Wilkerson, Chattanooga, and Koetter, Kim & Associates, Boston.* Structural engineer: Bennett & Pless Inc. Mechanical engineer: Derthick, Henley & Wilkerson. Electrical engineer: Campbell & Associates. Landscape architect: Nimrod Long & Associates. General contractor: Raines Brothers Inc. Owner: Miller Park Board.

Headquarters Library of the Clayton County Library System, Jonesboro, Ga. (page 158). *Architect: Scogin Elam & Bray, Atlanta* (commissioned as Parker & Scogin Architects Inc.). Electrical, mechanical, and structural engineer: GPWD Consulting Engineers. Landscape architect: Doug Allen. General contractor: M.G. Engineering & Construction Co. Owner: Clayton County Library System Board of Trustees.

Central Housing Office Building, University of California, Irvine (page 162). *Architect: Eric Owen Moss, AIA, Culver City, Calif.* Project associate: Jay Vanos. Structural engineer: Gordon Polon. Mechanical engineer: Paul Antieri. Electrical engineer: Paul Immerman. Landscape architect: Peter Walker. General contractor: MIAR Inc. Owner: Regents of the University of California, Office of Physical Planning, University of California, Irvine.

Seneca Lake Pier and Pavilion, Watkins Glen, N.Y. (page 165). *Architect: Chad Floyd, AIA, of Centerbrook Architects, Essex, Conn.* Structural engineer: Besier Gibble Norden. General contractor: Dalrymple Contracting. Developer: Schuyler County Industrial Development Agency.

Delaware Aqueduct, Minisink, N.Y./ Lackawaxen, Pa. (page 166). *Architect: Beyer Blinder Belle, New York City.* Partner in charge: John Belle, FAIA. Project director: Mark A. Pavliv, AIA. Project architect: Allen Swerdlow. Engineer of record: Ammann & Whitney. Partner (engineer): Edward Cohen. Project engineer: Fred Chang. Major construction contractor: Chesterfield Associates Inc. Timber contractor: Browne & Bryan Lumber Co. Cable restoration: A.G. Lichtenstein + Associates. Owner: U.S. Department of the Interior. □

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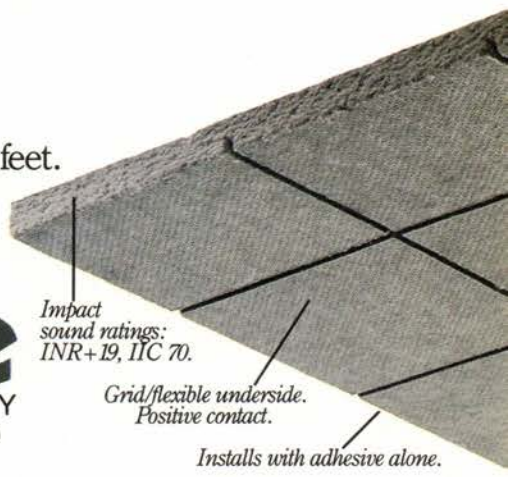

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Circle No.		Page No.
213	ABITARE	256
107	ASC Pacific	198
189	Above View	263
17	Adams Rite	17
51	Allsteel Inc.	39-45
53	Allsteel Inc.	46-47
57	Alucabond Technologies	52-53
111	American Gas Assn.	203
139	American Olean	230-231
99	American Plywood Assn.	185
191	American Stair Glide	264
145	Amoco Chemical Co.	236-237
85	Andersen Corp.	79-90
	Apple Computer	10-11
1	Armstrong	Cov. 2-1
3	Armstrong	2-3
5	Armstrong	4-5
211	Avis	258
155	BASF, Fibers	244
207	Belden Brick (E & C Reg)	248
21	Bethlehem Steel Corp.	20-21
59	Bobrick Washroom Equip.	55
137	Bradley Corp.	228
105	Brother Copier	196-197
109	CNA Insurance	202
39	C/S Group, The	36
167	Cal-Shake, Inc. (W Reg.)	251
23	California Redwood Assn.	22
149	Canada	240
69	Cedar Shake & Shingle Bureau	63
81	Celotex	74-75
95	Chicago Faucet Co.	183
73	Curries Co.	67
	Dover Elevator	188
75	DuPont-Hypalon	68-69
195	Epic Metals	Cov. 3
83	ESCO Elevators	77
37	Eternit Inc.	35
41	Eternit Inc.	37
63	Fry Reglet	58
179	Georgia-Pacific	257
197	Georgia-Pacific	Cov. 4
97	Gimeor, Inc.	184
19	Glen Raven Mills	18-19
117	Grace, W. R.	209
113	Haws Drinking Faucet Co.	204-205
201	Hewlett-Packard	176
209	Holmsten Ice Rinks, Inc.	253
203	Homasote Co.	259
163	Houston Instrument	249
119	Hurd Millwork	210-211
25	Intergraph Corp.	24-25
55	Interpane Coatings	51
67	Italian Institute for Foreign Trade	61
177	Kaiser Permanente	256
87	Kawneer Co. Inc.	168-169
89	Kawneer Co. Inc.	170-171
91	Kawneer Co. Inc.	172-173
93	Kawneer Co. Inc.	174-175
141	Koh-I-Noor	232-233
27	LCN Closures	27
43	LOF	38
129	Louisiana Pacific	220-221
101	Manville Commercial Insulation	186-187
103	Manville Commercial Insulation	195
171	Manville-Holophane	252
125	Manville Roofing Systems	217
31	Monarch Hardware	30-31
77	Monier Roof Tile	70
159	Monsanto-Saflex	246-247
131	Morton Thiokol Inc.	222
121	Mutoh America Inc.	212
193	Nixalite of America	264
143	Norco Windows, Inc.	234-235
13	Nucor Corp.	14-15
33	Overhead Door	32
147	Pearce Structures Inc.	238
133	Peerless Lighting	224-225
185	Pflow Ind.	262
215	Pitt County Memorial Hospital	256
175	Plan Hold	254-255
45	Pozzi Window Co.	34
165	Precast/Prestressed Concrete Institute	250
61	Rohm & Haas	56-57
29	SKOK	29
11	Schlage Lock Co.	12-13
205	Seal Master Corp.	263
71	Sloan Valve	65
161	So. Calif. Edison (W Reg.)	248
79	Southwall Technologies	73
217	Spacesaver Corp.	206
219	Spacesaver Corp.	206
221	Spacesaver Corp.	206
223	Spacesaver Corp.	206
225	Spacesaver Corp.	206
227	Spacesaver Corp.	206
229	Spacesaver Corp.	206
231	Spacesaver Corp.	206
7	Steelcase Inc.	8-9
35	Steel Deck Institute, Inc.	33
15	Sternberg Lanterns Inc.	16
151	Stucco Stone	241
187	Surveyors Supply Co.	263
157	U.S. Aluminum	245
127	U.S. Brick, Inc.	219
123	Uni Group U.S.A.	215
65	Velux-America	60
153	Western Wood Products Assn.	242-243
173	Wiley & Sons, Inc., John	253
135	Wilsonart	227

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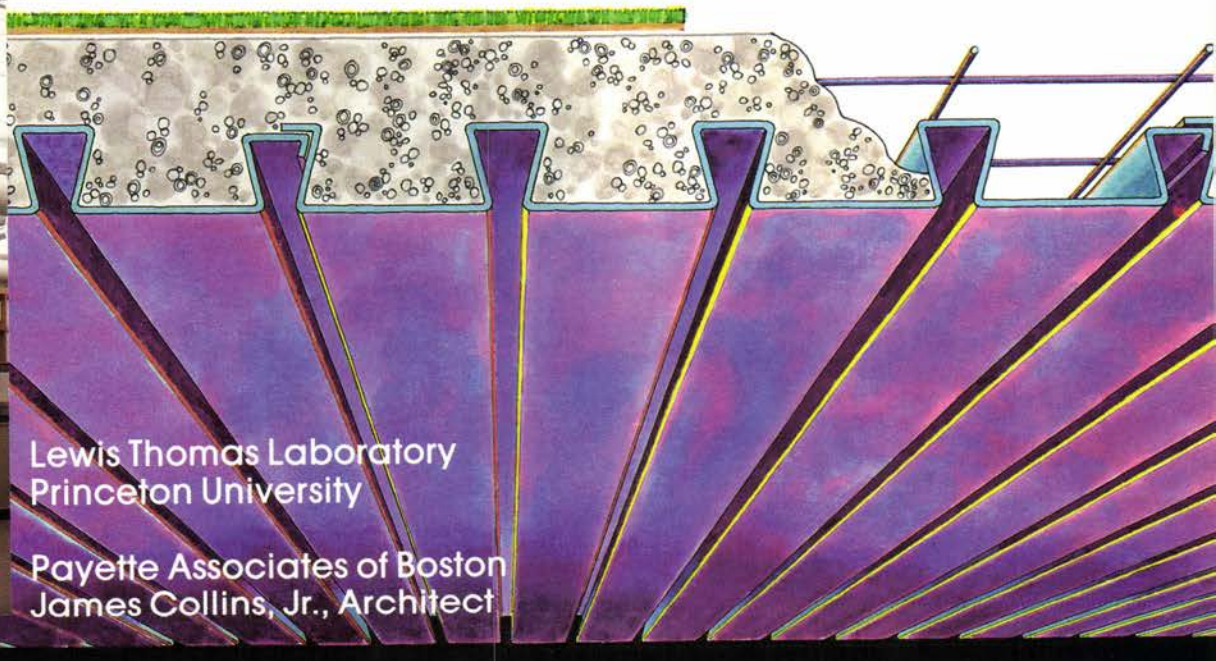

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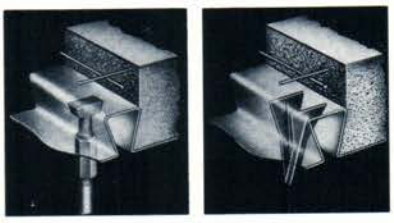

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