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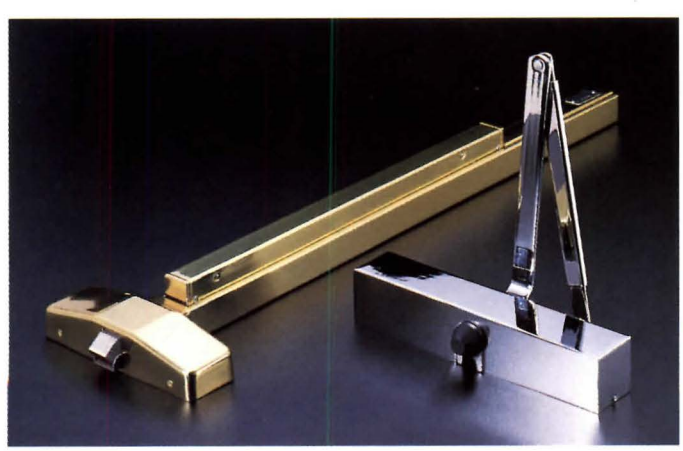

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Right, proposed Times Square Redevelopment by SOM/ New York.

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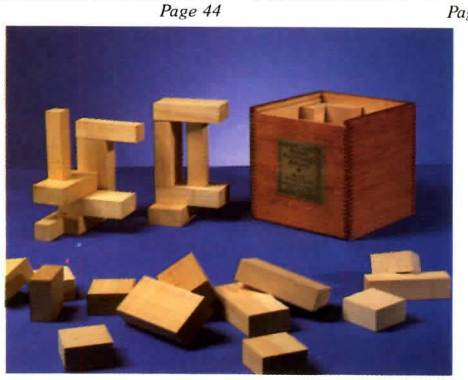
Above, Pacific Design Center addition by Cesar Pelli & Associates.

Right, bold geometrics of Froebel Blocks, circa 1895.



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Jack Hartray's drawing of Nagle/Hartray hard at work.

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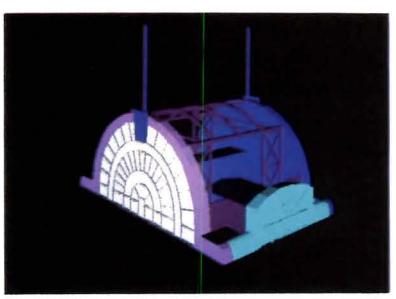
Diamond-saw-cut sculpture makes Toronto atrium.

Cover

Norwest Tower by Cesar Pelli & Associates (see page 44). Photograph © George Heinrich.

News

Technology & Practice



Chicago's City Place, by Loebl Schlossman & Hackl, modeled on CADD.

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GREAT
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EVENTS

March 1-28: Exhibition entitled "Through Amateur Eyes: The Architecture of European Modernism as Photographed by an American Abroad, 1931," Chicago. Contact: University of Illinois at Chicago, Gallery 400, 400 S. Peoria, Chicago, Ill. 60607.
March 2-4: Energy Efficient Building Association Convention, Winnipeg, Manitoba. Contact: Howard M. Faulkner, EEBA, University of Southern Maine, Technology Center, Gorham, Me. 04038.
March 6-7: "Energy Auditing '89: Improving Efficiency in Existing Facilities," Atlantic City, N.J. (repeated May 18-19, Las Vegas). Contact: Wendy Wheeler, Association of Energy Engineers, 4025 Pleasantdale Rd., Suite 420, Atlanta, Ga. 30340.
March 6-10: Conference on "Sprinkler and Other Automatic Fire Suppression Systems," Orlando. Contact: John T. Quigley, University of Wisconsin-Madison, Dept. of Engineering Professional Development. 432 N. Lake St., Madison, Wis. 53706.
March 9-10: Conference entitled "Health Care Design: Creating and Keeping the Competitive Edge," Scottsdale, Ariz. Contact: Susan Lockhart, Frank Lloyd Wright Foundation, Taliesin West, Scottsdale, Ariz. 85261.
March 14-16: Training course "Introduction to Federal Projects and Historic Preservation Law," Santa Fe, N.M. Contact: Peggy Sheelor, GSA Training Center, P.O. Box 15608, Arlington, Va. 22215.
March 17-19: "Architectural Artisanry: Preservation by Design," Symposium and exhibit North Dartmouth, Mass. Contact: AAS, Division of Continuing Studies, Southeastern Massachusetts University, North Dartmouth, Mass. 02747.
March 19-23: Associated Builders and Contractors Convention, Washington, D.C. Contact: Dick Haas, ABC, 729 15th St. N.W., Washington, D.C. 20005.
March 20-24: Short Courses on Plastics Failure Analysis and Prevention, Philadelphia. Contact: Michael R. Roop, L.J. Broutman & Associates, 3424 S. State St., Chicago, Ill. 60616.
May 5-8: AIA Annual Convention, St. Louis. Contact: Ketchie Brassel at Institute headquarters, (202) 626-7396.

LETTERS

Octagon House—The Untold Story: I was especially interested in the article about the Octagon House in the November issue [page 119] because when I was a member of the Institute's board of directors (1947-50) we considered tearing it down.

When the red brick, compatably designed administration building in the backyard became available for occupancy and the staff moved out of the Octagon House, we had to face up to the question of what to do with it. Although it had become a symbol of the Institute, it required a disproportionate amount of our income to maintain. We also realized that in the future an unimaginable amount of time and money would be required for restoration and preservation.

Some of us thought that, since it had served as a residence for President Madison, the federal government, rather than AIA, should maintain it. We asked then-AIA executive director Ned Purvis to investigate the possibility of deeding it to the government for that purpose. After contacting the proper officials, he reported that they were not interested because Madison had not lived there long enough for it to be considered as his "home."

We then had many spirited discussions about what to with it. One member suggested that, since it was well insured, what we needed most was a "nice big fire." Another said that maybe we could make some money out of it by demolishing it and selling the bricks as souvenirs to the membership at $5 each, plus packaging and delivery. Branson Gamber offered to be chairman of a committee to run it as Washington's most fashionable bordello. He proposed furnishing the rooms on the upper floors with canopied four-poster beds, dressing the girls in Dolley Madison costumes, and advertising the building as a museum and its occupants as "museum pieces." Still others wanted to try to get some philanthropic trust like Mellon or Rockefeller or Guggenheim to take it off our hands.

Richard Koch of New Orleans, who was then one of the nation's most ardent preservationists, insisted that we had to keep it under our control because the founders of the Institute would turn over in their graves if we didn't. His view eventually prevailed.

The suggestion about selling it to a trust was eventually realized, of course, 20 years later when it was sold to the AIA Foundation, a creature of the College of Fellows, thus enabling the Institute to have its cake and eat it too. Whoever dreamed up that solution should have his name and features cast in bronze and hung on the wall in the reception room.

The world moves on, but sometimes nothing seems to change. For example, after spending eons of time and tons of money, here we are, 40 years later, with a committee, five subcommittees, and an officially designated architect, all working on the next five-year restoration plan for which they don't presently have any money.

What else is new?

Kenneth C. Black, FAIA
East Lansing, Mich.

Friendly Mac: As an architect who has thoroughly integrated Macintosh-based CADD into my practice, I was concerned about inaccuracies in your users' evaluations of the CADD product we use daily [see Oct.'88, page 105]. Our office was a contractor to Graphsoft, the developer of Minicad, in preparing its manual for its earlier version 3.0 and 4.0. We receive, however, no ongoing royalties or compensation of any kind for its sale.

I agree with the reviewers regarding the sometimes laborious language of the manual—it was our first foray into technical documentation.

While many of the criticisms leveled at Minicad were legitimate (e.g., copy protection), the review (and its accompanying chart) was misleading and in places outright mistaken regarding the capabilities of Minicad. For the sake of clarification, I list below the errors I found in the review. [The editor of that review, Oliver R. Witte, solicited responses from the Minicad reviewers, which appear in brackets.]

"The available precision . . . is of little use when providing information to carpenters," the article states. Minicad provides full feet-inches parsing and reduces all fractional inches to their lowest common denominator. Entry of dimensions for objects to be drawn may be in any format (e.g., 3 feet-2 ¾ inches, 38 ¾ inches, or 155/4 inches may all be typed as an entry to specify an object or line dimension as is convenient, and Minicad will automatically display the dimension as 3 feet-2 ¾ inches, the construction standard).

"No Bezier curves," according to the article. Minicad can smooth a closed polygon, an unclosed polygon, or a freehand entered line to a Bezier spline. [Minicad, like Architrion, lacks a satisfactory Bezier curve function. Although polygons can indeed be smoothed, it requires an extra step, which is inconvenient.]

A "more precise snap feature" is needed, the article claims. Minicad allows snap to endpoints of lines, corners, or centers of graphic primitives, vertices of polygons, and intersections of lines and primitives, or between primitives. User-definable grid snaps and a construction point "snap to locus" are also available. These are all explicitly documented features. [Cleanup of Ts and Ls is not automatic; it requires use of the Join command.]

"No symbols library" is available, indicates a chart accompanying the article. Minicad supports a complete symbols library function and allows the user to create, replace, or expand symbols from the library. Minicad's very useful ability to attach text "tags" to symbols is unique among low-cost Mac CADD programs. The symbols library is also explicitly documented. This is almost certainly a typo on the chart. [Graphsoft did supply two disks of templates containing trees, cars, etc., but not what we would consider a library of architectural symbols. Such a library is available from other vendors.]

Robert F. Anderson, AIA
Austin, Tex.

"Mr. Anderson misses the main points of the review," Witte responds, "which are that the program keeps crashing, it loses track of information when zooming, and the manual is very difficult to follow."—Ed.

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Awards and Competitions

Gehry Wins Competition for L.A.'s Disney Concert Hall

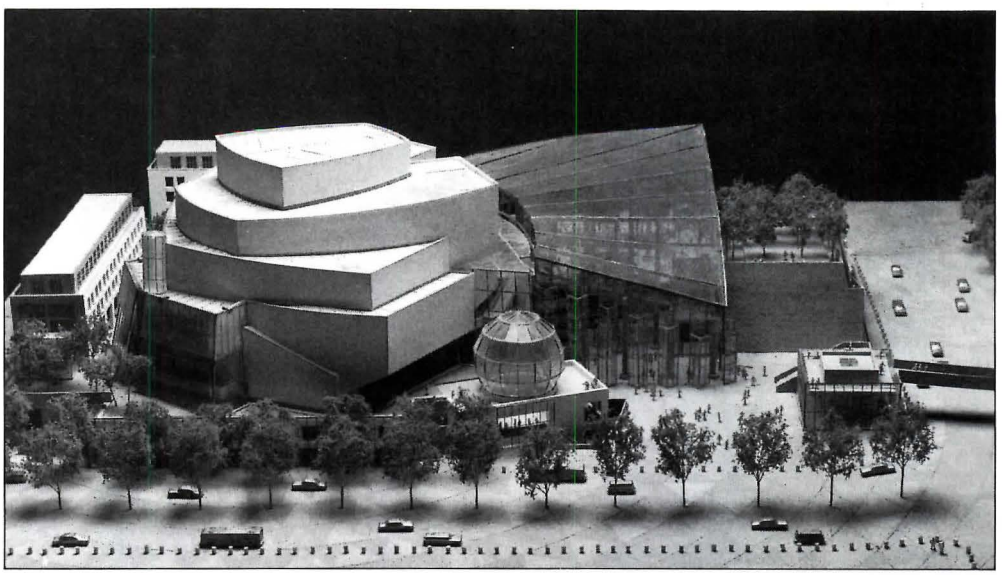
Last December, after years of frustrated hopes, Frank Gehry, FAIA, was finally named to design a major public building in his own community. The commission is for an expansion of the Music Center in downtown Los Angeles, about two blocks away from Arata Isozaki's Museum of Contemporary Art. It includes a new concert hall, offices, and garage for the Los Angeles Philharmonic Orchestra, to be paid for by several million anonymous Los Angeles county taxpayers and by the Lillian B. Disney Foundation. It will be named after Mrs. Disney's late husband Walt.

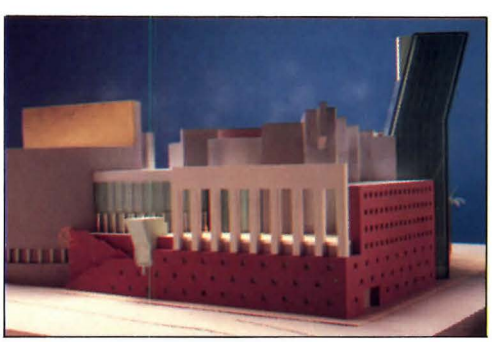
Initiated in the spring of 1987, the project got off to a rocky start when internal politics married the $50 million Disney gift to an urbanistically inferior site at the rear of and downhill from the present concert hall, the Dororthy Chandler Pavilion. This flew in the face of reason and also the advice of Barton Myers Associates, the county's urban design consultant, who recommended a site fronting an existing plaza at the center of the Music Center complex.

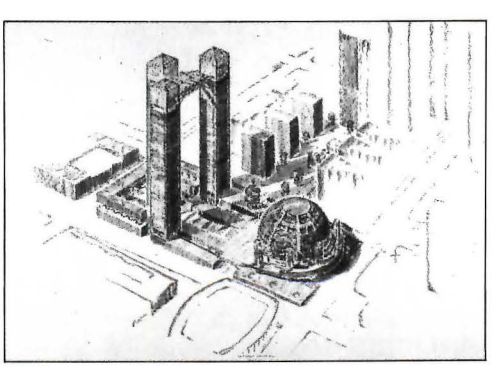
Since this inauspicious beginning, matters improved considerably. The Disney family seems committed to a first-class hall in fact as well as in name, and the Philharmonic management has set the seating capacity at 2,500, about midway between the acoustically unworkable 3,000 seat size of the present hall, and the acoustically ideal but economically unworkable 1,600-2,000 seat range.

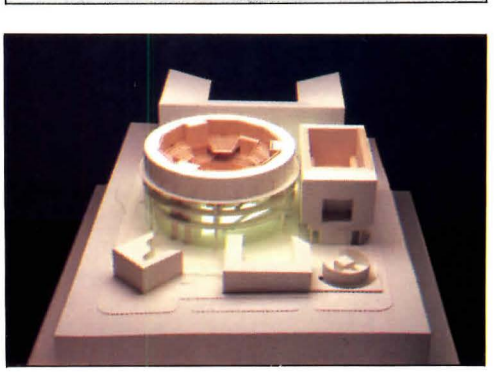
And to select their designer, the Disney Hall committee agreed to a design competition, the first ever held for a Los Angeles cultural building of any importance. As a result, the committee and the public were able to see how four international-caliber design firms—those of Gehry, Hans Hollein, Hon. FAIA, Gottfried Boehm, Hon. FAIA, and James Stirling, Hon. FAIA, & Michael Wilford—chose to solve the problem.

The programming and selection process proceeded slowly, and inspired grumbling among more than one architect who felt that the $75,000 stipend was inadequate to cover out-of-pocket presentation costs, much less design work for the two-phase process. And even to someone who didn't have to pay model makers and renderers, the requirements of two models, four perspectives, many other detailed drawings, as well as design of adjacent blocks not under the committee's jurisdiction, seemed far out of proportion to the competition fee.









Disney Hall entries were, from top, by competition winner Frank Gehry, Hans Hollein, Gottfried Boehm, and James Stirling. The competition was held to select an architect, not the final design for a 2,500-seat hall in the Music Center complex.

As is so often the case in competitions for complicated projects, the architects wound up subsidizing the sponsors. Adding to the frustration, this involved process was not aimed at selecting a final design, but only an architect.

Yet, when it came to choosing that architect, all went well in spite of some well founded fears. Gehry was of course the local design community's favorite, but even his partisans wondered whether his submission would be so avant-garde that its selection would be politically difficult. And whether one's hopes were linked to Gehry, Los Angeles is a conservative and architecturally unsophisticated community that usually gives its best architectural opportunities to second-rank talents.

The competition was not conducted along standard AIA-sanctioned lines. A competition adviser was brought into the process only after it was well underway, and selection powers did not reside in a normal jury. An architecture committee composed of three museum directors and

continued on page 18

Awards and Competitions *from page 17*
two architecture school deans worked with the designers and was empowered to recommend, but not determine, a winner. This recommendation had to gain the approval of the Disney Hall committee, which had no design profession representation.

And after that the selection was still subject to the possible veto of Mrs. Disney, someone with no prior visibility in the city's cultural life. Since the people around Mrs. Disney had earlier managed to insist on the wrong site, it seemed possible that the wrong architect could also be selected. These concerns seemed shared by the Los Angeles Philharmonic management, which arranged for a long article praising the selection process that appeared in the orchestra's program guide just prior to the only real proof of that process' validity, the choice of a designer.

But in the end, Gehry made matters easy for everyone involved in the selection process. His design was so clearly the most graceful architecturally and the most suitable urbanistically that no other choice was really possible. The scheme embodied his recent tendency to break a building program down into discrete components and compose the elements into a village-like landscape.

Its genius resided largely in its treatment of public circulation spaces, which also happens to be a major flaw of the existing Music Center grouping. Along Grand Avenue, the street that links the older buildings, the new hall, and the art museum, Gehry created an informal plaza whose paving pattern also covered the roadway, with bollards separating the vehicular and pedestrian domains. Fronting on this plaza were the main hall, a 1,000-seat chamber music hall whose implementation is still an economic question, a small bookstore, a globe-topped cafe, and an airy conservatory foyer that won everyone's heart.

This last element stems from Mrs. Disney's personal desire for an urban garden, one which could be questioned on urbanistic grounds since large open spaces already abound in this redevelopment district. Nevertheless, a garden became part of the program, and Gehry was the only finalist to actually provide one in his design.

By doing so, he gained Lillian Disney's wholehearted support, and by making it a legitimate architectural element, enclosed yet transparent, he gave his design a striking focal point that celebrated the public aspects of the program. Although this garden-lobby is glass-enclosed, Gehry hopes to be able to open it up to the plaza in good weather, and is proposing an acoustical treatment that should allow for informal musical performances in the space.

Among the unsuccessful entries, Boehm's seemed the most perplexing, consisting of an immense dome and a circular bridge element that ignored the street. This eccentric exercise in 1920s expressionism bore no easily discernible relationship to the physical and cultural context of the site or the city at large. Stirling & Wilford's offering was uncharacteristically tame, showing little of the wit and vigor of their best work. Inside, their round concert hall seemed destined to anger the easily provoked gods of acoustics.

Hollein's scheme was clearly next best to Gehry's, and, at first glance, seemed to pay homage to the local architect in its composition of jostling and highly differentiated exterior forms. In contrast to this well worked out streetscape, his asymmetrical auditorium was curiously unresolved.

Gehry's own auditorium seemed to reciprocate Hollein's compliment, for its palm-like columns recalled the Viennese architect's earlier borrowing of those botanical forms from John Nash's 19th-century Brighton Pavilion. Like the other schemes, Gehry's main hall responded to the program's implicit favoring of surround seating in that the hall fanned out to the sides and had several hundred seats behind the orchestra. Audiences benefit from such a plan in two ways: distances to the rear seats are reduced, thus promoting visual and acoustical intimacy, and the seats behind the players, although subject to instrumental imbalances, allow a wonderful view of the workings of the conductor and orchestra. The best built example of this form, both architecturally and acoustically, is Hans Scharoun's Philharmonie in Berlin. Most other postwar examples, however, are acoustically problematic, and employing the shape is something of a calculated risk. Consequently, the form of the hall is still under investigation, and the Philharmonic management may yet opt for the less interesting but safer shoebox form.

This, of course, would mean design changes, but, as stated earlier, redesign was expected all along. For all its virtues, parts of Gehry's scheme could benefit from more study. The globe atop the cafe seems somewhat trivial alongside the larger and simpler forms of the conservatory and main hall, and the office wings look crowded and uncomfortable behind the hall. Economics may dictate program cuts; so far a building budget has not been set, but the $65 million that the Disney gift will generate is widely thought to be insufficient for the present scope of the project. The publicly funded garage will add about $50 million to the project costs; that figure is based on 3,500 subterranean spaces, a figure that seems excessive, even in Los Angeles, for such a modestly sized undertaking.

Clearly, much remains to be done, both on the new project and the old one. The attention and expectations created by Disney Hall will inevitably underline the esthetic and functional shortcomings of the present Music Center, a facility that was banal and anti-urban even when it opened 25 years ago. Remedial work, inside and out, will be needed to avoid an embarrassing qualitative discrepancy between old and new.

At this point, there is good reason to hope that the new building will go well. The success of this design competition might even convince other local political and cultural powers to make architectural selection an open, merit-based process in the future.—JOHN PASTIER

Kemper Award to Carlhian; Young Citation to Spencer

Jean Paul Carlhian, FAIA, has been named recipient of the 1989 Edward C. Kemper award, and John Henri Spencer, FAIA, is to be awarded the Whitney M. Young Jr. citation. The awards will be presented at the AIA national convention in St. Louis in May.

Carlhian, an educator and principal in one of the country's oldest architecture firms, Shepley Bulfinch Richardson & Abbott, was selected to receive AIA's highest service award in recognition of his more than 20 years of service to the Institute and the architecture profession. A member of AIA's design committee since 1969, Carlhian is credited with creating AIA's 25-year award and the architectural critic medal, as well as raising the standards for design awards procedures.

Carlhian's Boston-based firm won the AIA architectural firm award in 1973 and two national honor awards. Carlhian buildings include the Smithsonian Institute's Sackler Gallery and Museum of African Art, Vassar College student center, the University of Vermont student center, and Harvard University's Mather House.

John Henri Spencer, chairman of the department of architecture at Hampton University, will receive the Young citation, an award named in honor of the late civil rights leader and head of the Urban League and conferred by the Institute's board of directors to "an architect or architecturally oriented organization in recognition of a contribution to social responsibility."

An associate with the Norfolk, Va., firm Livas Design Group, Spencer joined Hampton University in 1970 and under his leadership the curriculum was revamped and the department's student body grew from 56 students to 210 students by 1982.

In addition, Spencer has helped shape architectural programs at some of the nation's leading black colleges and universities, including Howard University, Southern University, and Tuskegee Institute. He has been actively involved with the Council of Black Architectural Schools and was instrumental in initiating the Title III grant proposal, which resulted in federal funding for the development of schools of architecture at historically black universities. *News continued on page 20*

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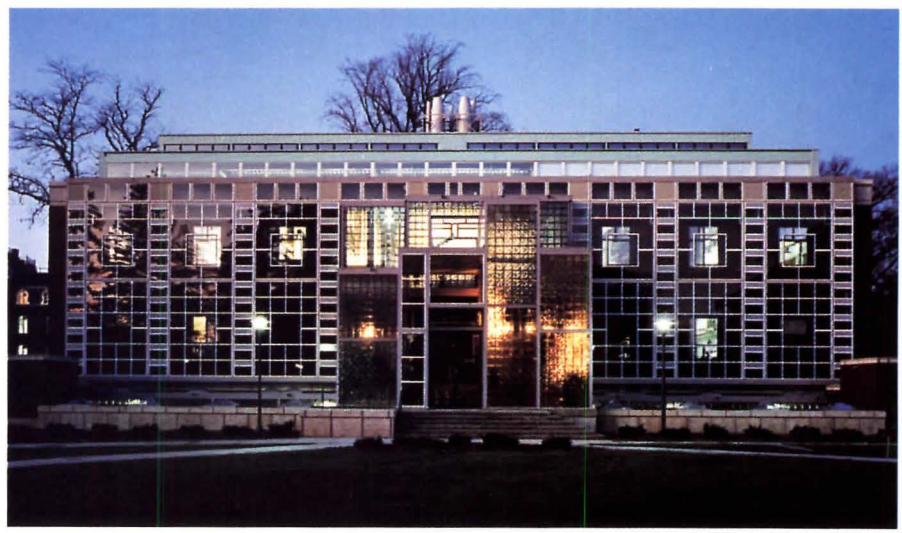

Pittsburgh Corning's first Design Competition was a spectacular success! So popular, the 1989 competition is now underway. As with the 1988 program, the purpose is to reward outstanding applications featuring PC GlassBlock® products as a central element.

1988 First Prize Winner, Completed/Existing Category: Seeley G. Mudd Chemistry Building, Vassar College. Architects: Perry, Dean, Rogers & Partners.

The Jurors

Judging will be by a panel of acclaimed professional architects—all partners or principals in leading architectural firms.

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3 Entry Fee

$75 per submission; however, there is no fee for entries submitted by schools of architecture students.

4 Entry Deadline

All entries must be received by 5 p.m. Eastern Time, Friday, April 28, 1989.

5 Categories

Existing, Planned/In-Works, Conceptual.

6 Entry Acceptance

Contingent on verification of eligibility and agreement of the entrant's client to cooperate in the competition. All clients will be contacted, and final acceptance rests with Pittsburgh Corning.

7 Awards

First and second place and up to three honorable mentions per category, at the discretion of the jurors.

8 Prize Amounts

Project Category	1st Place	2nd Place
Existing	$2,500.00	$1,500.00
Planned/ In-Works	$3,500.00	$2,500.00
Conceptual	$6,000.00	$4,000.00

9 Notification of Winners

Winners will be notified by mail or telegram no later than May 22, 1989.

First and second place winners will be honored at a banquet ceremony in Pittsburgh, Pennsylvania on June 15, 1989. For student winners, travel and hotel expenses will be paid by Pittsburgh Corning Corporation (up to 5 individuals).

10 Publishing of Winning Entries

Entrants agree that if their submission(s) wins, they release and authorize Pittsburgh Corning Corporation to use such entries in advertising, and agree to provide additional graphic materials, if needed and available.

To obtain full details, submission requirements, and official entry forms, please call the Pittsburgh Corning PC GlassBlock® Products Hotline: 800-992-5769.
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Controversies

Phoenix's Newest Urban Park: Centerpiece of Controversy

For the three long years it took to build Patriots Square, Phoenix's new downtown park, a relentless rain of maledicta fell on it. One Phoenician sourly called it "Disneyland on drugs"; another, "a nightmare out of 1001 Arabian Nights."

One columnist for the Arizona *Republic* wrote that he found the park lovely and comfortable but added that its most prominent element, a 115-foot-high spire, "will always look like the twisted remains of a fire at a lawn-furniture factory." Another *Republic* columnist, snorting at its yet-to-be-installed laser show, called instead for laser beams to be fired at the park, vaporizing it.

A small chorus did rise in its defense and seemed to crescendo last December, when the park finally opened. A columnist for the Phoenix *Gazette* reminded readers that the Eiffel Tower had suffered ridicule at first, too. And an editorial in the same paper called Patriots Square "a conversation piece destined to be a conversation place, a focus of warmth and light—a fitting fixture in the center of Phoenix."

It was easily the most disputatious and colorful design controversy in Phoenix's modern history, and the fact that it all swirled around a diminutive two-acre park reflected the community's impatience and distress over its bland, anonymous center. There's virtually no retail downtown, no inviting agora, scant public art, and not much worthwhile architecture—the one distinguished high rise is Trost & Trost's art deco Luhrs Tower. The storm over Patriots Square could be distilled to: "Yes, downtown Phoenix desperately needed a focal point—but why one so weird?"

The park had an odd history. It first appeared in 1976 as a square block of grass replacing a cluster of shabby bars that one newspaper called "the spiritual center of skid row." It was dedicated with Bicentennial fanfare and hailed as a centerpiece of downtown Phoenix's renaissance. But there was nothing to do or see in the park, no design features that might tempt anyone to use it as anything but a shortcut from one office building to another, and it quickly became a hangout for panhandlers.

In 1985, a neighboring high rise provided an opportunity to remake the park. The developer needed parking, so the city joined a $15.4 million venture for a redesigned Patriots Square with five levels of parking underground. Problems plagued construction, however, and that stirred public ire even before anyone could tell what it would look like. The garage and park were scheduled for completion in July 1987. Earlier that summer, however, city engineers found that water from the park's nine fountains was leaking into the garage. Lawsuits ensued, the fountains had to be rebuilt, and construction dragged on for another 16 months.

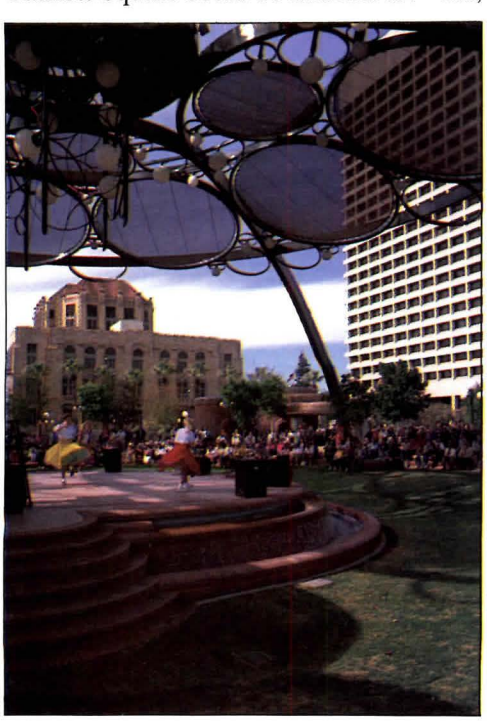
Park architect Theodore Alexander, AIA, now says he can sympathize with the public's frustration. "There was the sense of it being a very public junk pile while it was under construction," he says. "A lot of people had trouble understanding how this pile of bricks and sand and steel was going to become something warm and friendly and sensual."

A lot of people still have trouble understanding what they think was an outlandish cost for a square-block park. "I kind of like it, but compared to 15 million dollars?" ventured a businessman lunching in the park. The invisible garage cost $10 million; what people see on the surface ran about $3.4 million. The city spent another $2 million in "soft" costs.

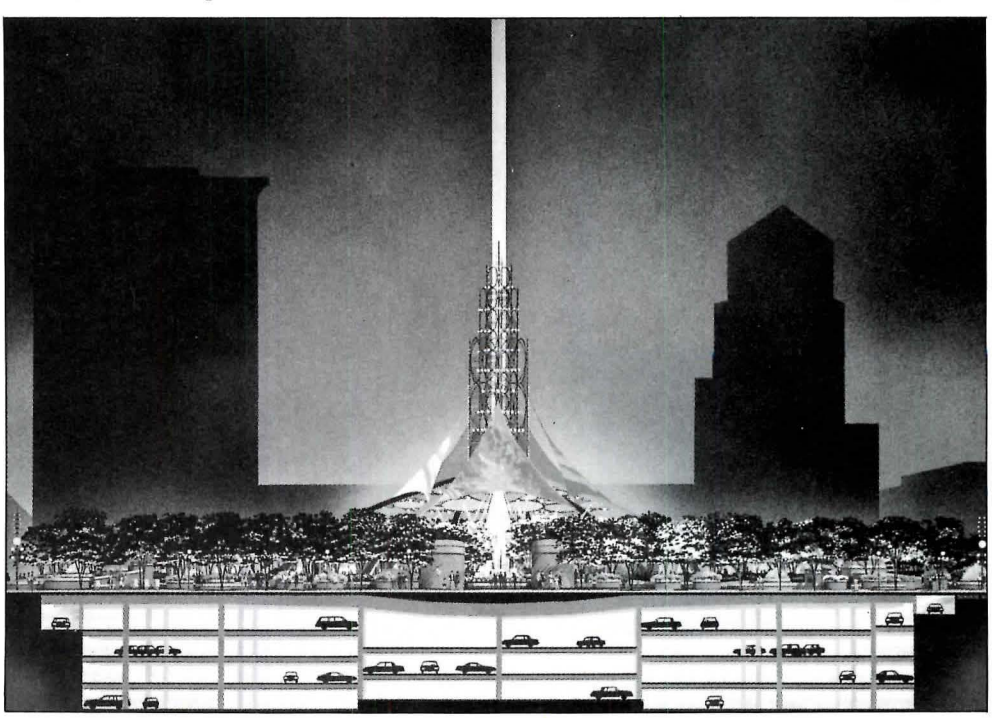
Alexander might have saved himself from becoming the eye of a furor if he had tried to do less. The city simply had asked for an inviting urban space. Alexander, a man who seldom strikes people as bashful or self-effacing, decided downtown Phoenix needed two other things: a landmark and an evening destination. Patriots Square, he concluded, was an opportunity to do it all at once.

Walk into the park today, and you're struck immediately by the way its curvilinear forms tease and upbraid the stern right angles of the buildings and streets around it. The park's theme is colliding circles. The small circles of the planters and incidental benches bite into larger circles enclosing grassy knolls, and all these forms encircle a 150-foot semicircular amphitheater. Cylinders of various sizes capped with copper roofs serve as dressing rooms, food kiosks, and elevator terminals.

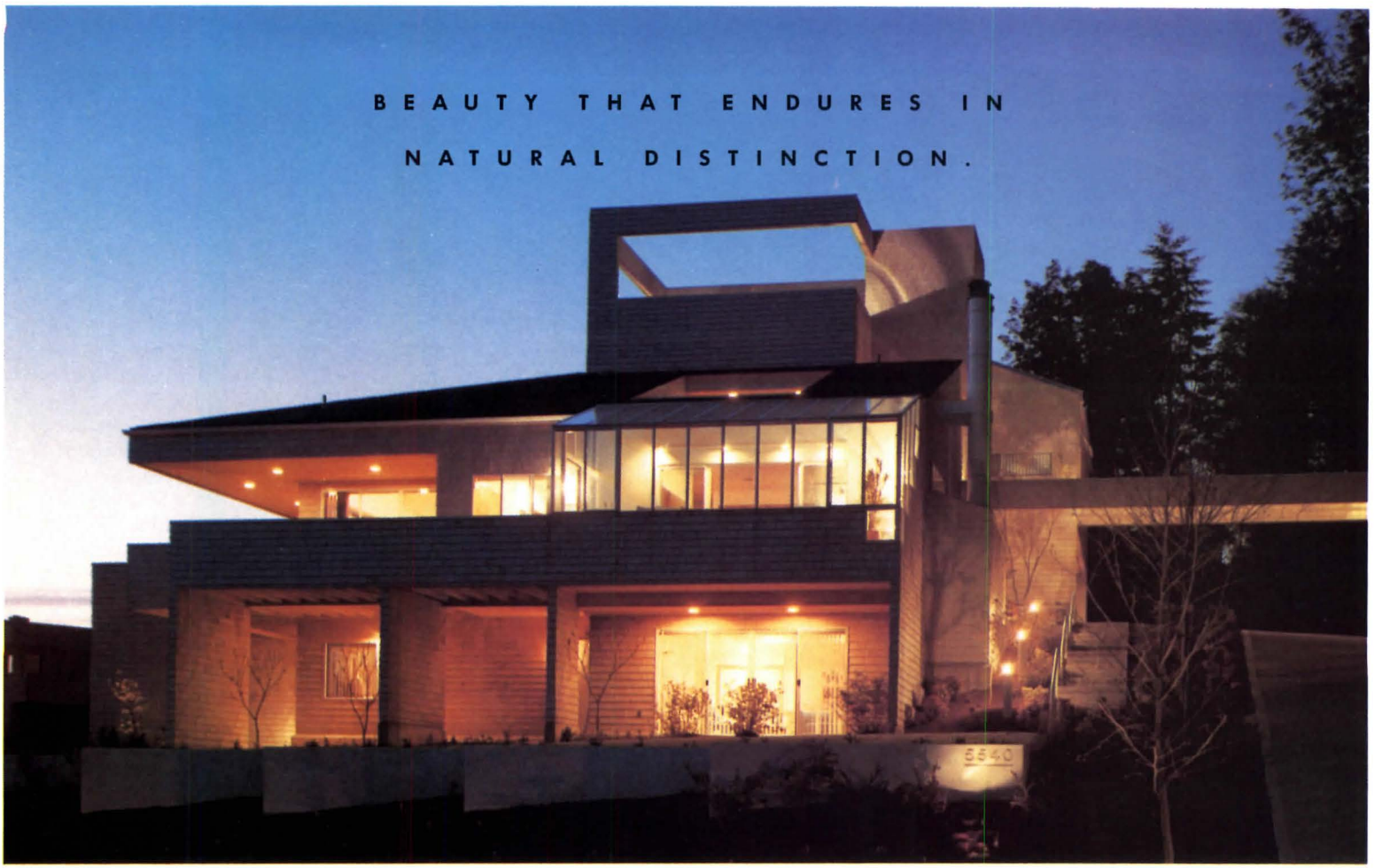
Everything is red brick, which has drawn a criticism peculiar to the Arizona desert: on a 115-degree summer day, an acre of brick paving can seem like the road to hell itself. Alexander vigorously defends the brickwork. The 162 trees in the park will provide plenty of shade, he says, and the bricks themselves form a kind of symbolic community bond, a shared past for a population in which everybody, as the local aphorism goes, came from somewhere else. *continued on page 22*



Lawrence W. Cheek. Hon. AIA



Below, Patriots Square section and view.



Martin Henry Kaplan, Architect AIA

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Controversies *from page 20*

The amphitheater is intended for formal entertainment (the city already has started a "City Sights 'n' Sounds" hour of live music every weekday noon). There also are miniplazas with small fountains at each corner of the park, and a formal plaza with a circle of glass-block cubes. Alexander intended these smaller gathering places to encourage the spontaneous urban happenings that have been so conspicuously absent in downtown Phoenix. The glass cubes, in fact, are supposed to suggest soapboxes, informal stages where harmonica players, politicians, and end-is-near street prophets can vie for audiences.

Under daylight, the "landmark" function of Patriots Square is served by its controversial spire, which erupts from a spiderlike dome over the amphitheater. The park's circle leitmotif is continued in the spire, as small circles, large circles, semicircles, and light globes leapfrog rhythmically into the sky. Some Phoenicians have termed it "modernistic," intending a compliment. Others have said sort of the same thing, intending the opposite; this critic thinks it looks like a Martian obelisk from a science-fiction film of the 1950s. Whichever, it is a decidedly busy piece of geometry, one that can occupy a parkgoer for several minutes deciphering the relationships among its elements.

Once these are scoped out, though, another question nags: what does it have to do with Phoenix? How are the city's aspirations, history, culture, or geography expressed in it?

After dark, the park turns into a light show. Twinkle lights sparkle in the trees, their canopies are sprayed with uplighting from the planters, and downlights illuminate the grass and brick paving. The light level is high to provide a sense of safety, yet it's mostly ornamental and indirect. Parkgoers aren't bathed in glare. Not yet installed—Alexander is hoping for July—is the park's most debated feature of all, the user-friendly laser.

According to the plan, fabric triangles will be stretched from the sides of the spire for one beam to play on. The other beam will fire upward through the spire, to be visible in the nighttime sky eight or 10 miles away. As Alexander conceives it, the beams will constitute the ultimate video game. For a quarter a minute, people will be able to commandeer a computer control panel and aim the beams themselves, painting images of light in the desert sky. The computer will memorize the profiles of all the nearby downtown buildings and prevent the beam from being aimed at them, and a human controller will shut it off if an aircraft strays within 1,500 feet. (FAA approval is pending.)

Alexander has defended his laser before countless skeptical politicians, civic groups, and reporters over the last several years, and his enthusiasm has been unflagging—even in the heat of criticism that has sometimes turned personal and vicious.

He still seems not to understand why some people ridicule the laser. The beam, he argues, is the perfect symbol for Phoenix, "a city of the 21st century." Like Eero Saarinen's arch in St. Louis, he believes, the beam will stamp an image of Phoenix on the world's consciousness.

That seems like an awful lot to ask of a beam of light. And that is the problem: not that the architect has tried to do too much, but that Phoenix hasn't demanded enough. Patriots Square is a friendly and engaging little urban park, its oddball spire notwithstanding, but that is still all it is: a little urban park. It isn't an Eiffel Tower, a Saarinen arch, or a great public space like Lawrence Halprin's Lovejoy Plaza in Portland, Ore. It isn't large enough or strong enough or dramatic enough to serve the nation's ninth-largest city as a centerpiece. Phoenix is not given to introspection, however, so this point hasn't made the debate.

—Lawrence W. Cheek, Hon. AIA

Mr. Cheek is a freelance writer and photographer in Tucson, Ariz., who writes architectural criticism for the Tucson Citizen. *With this issue he becomes an* Architecture *contributing editor.*

Whitney Museum Unveils Graves's Third Scheme

The Whitney Museum of American Art has unveiled a third proposal by Michael Graves, FAIA, to expand its existing museum designed by Marcel Breuer and built in 1966. This proposal comes almost four years after Graves's first expansion scheme sparked one of New York City's most emotional preservation and architectural battles. Graves's latest Whitney addition scheme is similar in its basic configuration to his earlier schemes but significantly revised in terms of esthetics and in terms of relationship and deference to Breuer's original museum.

The Whitney's first expansion plan announced in May 1985 was immediately met with criticism from the architectural community as well as from neighborhood and preservation groups. In his first scheme, Graves proposed a 10-story addition that would have been built directly above and beside the original building and on the site of five adjacent town houses owned by the Whitney. Critics argued that the addition would overwhelm nearby shops and apartment buildings and would undermine the integrity of Breuer's museum by making it merely one element of Graves's larger composition.

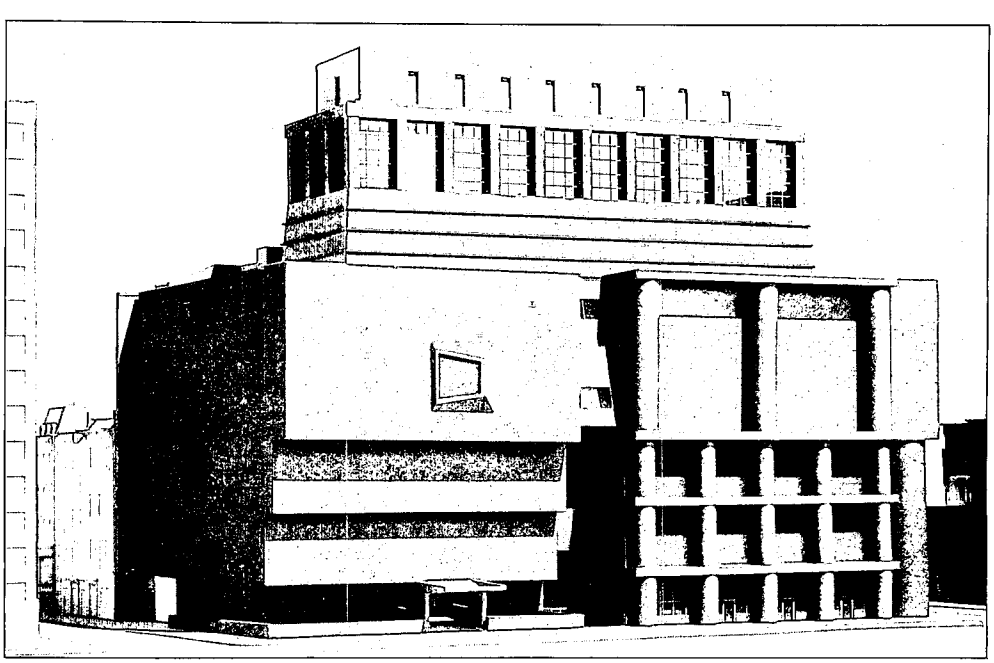
Graves's second proposal was substantially scaled down but retained his characteristic style and repeated the same basic form with similar classical and abstract details of his first scheme. This 1987 proposal seemed to fare slightly better with the public, but the design was withdrawn from the city's rigorous review process. Located on Madison Avenue between 74th and 75th streets, the Whitney is within the Upper East Side Historic District and falls under the jurisdiction of the New York City Landmarks Preservation Commission.

In his most recent scheme, Graves has diverged not only from his previous designs for the Whitney but apparently from his entire body of work. The Madison Avenue facade would feature projecting horizontal planes of gray granite contrasting with columns of red granite; a large gray granite column would anchor the corner.

There will undoubtedly be much debate over the esthetic of Graves's latest proposal, and preservation groups have vowed to continue to fight the razing of the adjacent brownstones. Perhaps the overriding question is whether it is possible to design an addition that is respectful both to Breuer's original museum and the historic character of the Upper East Side neighborhood, while meeting the ambitious expansion plans of the museum trustees.

—Lynn Nesmith

News continued on page 24



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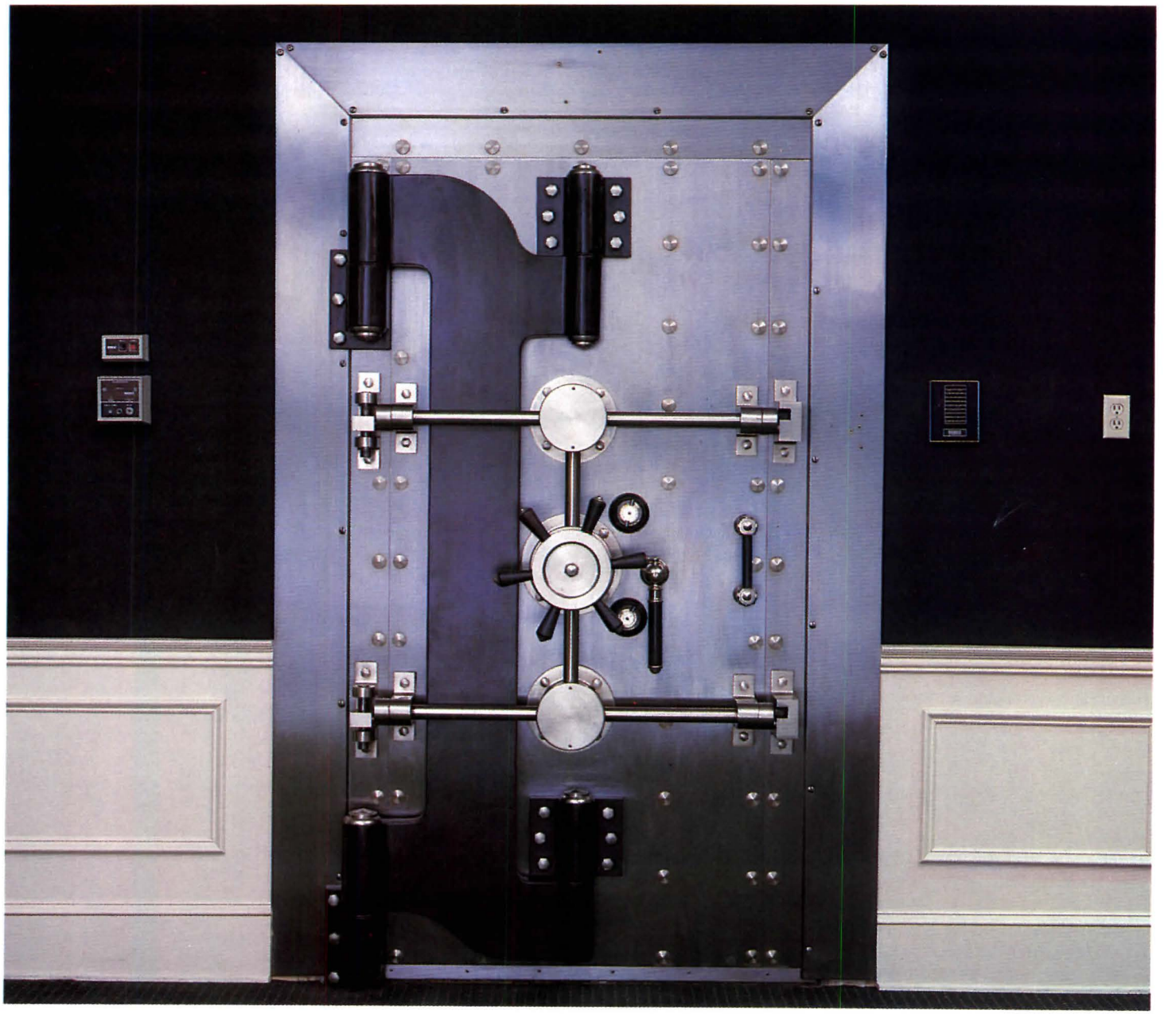

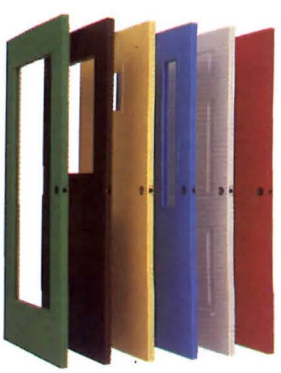

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Building Environments

Symposium Formulates Guidelines For Facility Management

What is an effective building? How can it be measured in terms of cost, management, and owner and user satisfaction? In October, the American Society for Testing and Materials (ASTM) subcommittee E6.25 met in Toronto to ponder, discuss, and formulate guidelines for a facility performance standard. The symposium, billed by its organizers as the first public forum to make this attempt, drew architects, corporate executives, academics, executives of public agencies, and a representative of the Public Service Alliance of Canada, a major white-collar union. The symposium took on international scope with participants from Japan, England, and France joining Canadian and U.S. panelists and audience.

A typical *Fortune* 500 company has a quarter of its assets tied up in buildings and land, said symposium chairman Gerald Davis. What are needed are measurements for comparing the performance, cost, and productivity of buildings of different age, type, location, and use. Standards should make it easier for architects to justify design decisions. The key word, Davis continued, is "facility." A facility may be within a building or be a whole building, its site, or a construction that is not a building.

The keynote speaker was Dennis Caplice, deputy minister of the Ontario Ministry of Government Services, who manages, he said, a "great property-owning organization." He described the work of the Canadian government in measuring, assuring, and safeguarding a productive work environment.

Prof. Francis Ventre, the first panel speaker, said that design must move beyond visual experience. Production problems have been solved. Design must contribute to human fulfillment. Karl Marx measured productivity in terms of human labor, but postmodern philosophers are also interested in consumption, thus branching out to a greater variety of human modes, Ventre concluded.

Ventre traced the history of production measurement to biblical times to establish a definition. But the modern period in measurement history that the ASTM seeks to define and make a building standard only began a century ago with Frederick Taylor's introduction of scientific management.

This was followed by Frank and Lillian Gilbreth's time and motion studies. Their calligraphy of the movement of bricklayers and hod carriers led Sigfried Giedion to suppose that the modern movement in art was inspired by modern work study measurements.

American industry established the first personnel departments before 1910, and the first psychological consulting service appeared in 1915 as an activity of an academic department at the Carnegie Institute of Technology. Psychological testing was used on a large scale by the U.S. armed forces during World War I to measure human aptitude for various tasks. Then American industries adopted the concept as "industrial psychology."

The premise of industrial psychology was that workers' capabilities, intelligence, and manual dexterity could be measured by aptitude tests. Frederick W. Taylor's scientific management sought to control the labor process. Elton Mayo's famous Hawthorne studies, conducted during the late 1920s at Western Electric, primarily measured workers' productivity as the environment was adjusted around them.

Mayo concluded that performance could not be predicted by "ability" as defined in his questionnaire. He speculated that perhaps performance bore an inverse relation to his test scores on ability. At any rate, environmental adjustment as a means of increasing productivity was questionable, at best. One conclusion was that the social forces in the workplace that are now termed "office culture" were strong motivators. Measurement studies moved from psychology to sociology.

The successors to Mayo's research and the Hawthorne studies were personnel departments, industrial psychology, and sociology. Engineers directed "work design" while practitioners of human relations, industrial psychology, and sociology measured human machinery. The contradictions that the ASTM committee seeks to standardize are deeply rooted in work itself.

Work design specifically limited contributions by individuals in the pursuit of general production uniformity. This goal has intensified in electronic work where software directs all decisions. In contrast, industrial psychology and sociology programs assured workers of their unique value to the organization. However, studies show that work design is the everyday reality in the workplace, while personnel administration is a management myth, according to the majority of workers queried.

The surveys of Orbit I and II, BOSTI, and Steelcase are small steps compared with the enormous task undertaken by ASTM committee E6.25, said behavioral scientist Arthur Rubin, of the Center for Building Technology of the National Institute for Standards and Technology. The consensus is that we need a better word for measurement than "productivity," he said. "'Productivity' is losing its meaning. We are searching for a term that does not carry the emotional baggage 'productivity' has collected.

"Personally, I do not know how to measure productivity, nor do I know anyone who does. It is extremely difficult to deal with. In terms of the history of human measurement, there are no quick solutions," Rubin concluded.

But, as Lao-tse wrote, the journey of a thousand miles begins with one step. ASTM committee E6.25 has been brave enough to set foot on the path.

—Forrest Wilson

New Study Contends Dangers Of Asbestos Are Exaggerated

A controversial Canadian study has indicated that an office worker's risk of developing cancer from exposure to materials containing asbestos is about as great as that worker's risk of being struck dead by lightning.

The study was conducted in response to concerns of workers in an office building in Edmonton, Alberta, that was undergoing renovation. A research team from the occupational health program of the University of Alberta's faculty of medicine concluded that the likelihood that a single case of cancer would develop among workers in the building from exposure to asbestos was very low, probably close to zero, according to Tee L. Guidotti, M.D., a professor of occupational medicine at the school.

In his report, published in the Canadian *Journal of Public Health,* Guidotti noted that "airborne levels of asbestos in most office buildings are quite low, several orders of magnitude below those of occupational exposure to asbestos in a typical plant situation and on the order of ambient air in a clean urban environment." In monitoring the air in buildings in Alberta and Ontario, he found asbestos levels of only 0.01 fibers per cubic centimeter for all fiber lengths and only 0.003 fibers per cubic centimeter for fibers 5 microns or longer. The longer fibers are believed to cause asbestos-related disease.

John Welch, president of the Safe Buildings Alliance, a Washington, D.C., group of former manufacturers of the material, finds the University of Alberta research to be consistent with the current body of scientific data on asbestos in buildings. "Study after study has found that asbestos in buildings poses no significant risk of public health because the levels of airborne asbestos are typically as low as outdoor air," he says.

But the whole basis of the study is flawed, says William Keane, president of EnviroDynamics, an environmental health consulting firm in Arlington, Va. He contends that the Canadian researchers did

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Building Environments *from page 24*

not understand the inherent properties of asbestos or even the acceptable levels for safety. For example, he brands as mistaken the researchers' contention that sprayed-on asbestos does not break down under wind, fire, or accidental damage.

In the Edmonton building that prompted the study, the material was being removed from the upper floors. During removal, asbestos levels on floors that were not being renovated rose as high as 0.86 fibers per cubic centimeter. Before and after renovation, baseline levels on those same floors were 0.01 fibers per cubic centimeter or below, leading the research team to recommend against total removal of asbestos from the building as being unjustified.

Keane says that, if a level as high as 0.86 fibers per cubic centimeter were found ouside the contamination area in a building in the United States, the whole building would be shut down until the problem was corrected. According to Keane, one of the major flaws in the Canadian research was the measurement technique. Guidotti's team used light electron microscopy to measure airborne levels of asbestos; but, says Keane, 85 percent of the fibers cannot be detected with that type of microscope, and therefore the U.S Environmental Protection Agency requires transmission electron microscopes to measure airborne levels of the contaminant.

In addition, Keane criticizes the research for not addressing what he says is the real exposure issue—danger to maintenance workers and building engineers. The people who change light bulbs above dropped ceilings where asbestos has been used for insulation suffer the greatest risk, and the Alberta team never even considered them, says Keane.—Elena Marcheso Moreno

Education

Conference Addresses Changes In Architectural Education

"There is a mood in America today that is important: the shift from pragmatism to the assumption of responsibility. If this trend does not catch on, a far more negative mood will transcend. It is time we look at ourselves in a *hard* way," observed former AIA President Ted Pappas, FAIA, as he launched a forum on architectural education at Drury College, Springfield, Mo.

Drury's Hammons school of architecture organized the symposium to consider the future posture of the profession of architecture, of the professional architect, and of the education of architects.

Cecil Steward, dean of the University of Nebraska college of architecture, observed that "it is time to dismiss the idea that architecture is the creation of icons" and "to relate the flow of events in our culture to the training of architects." Furthermore, Steward said, "we are on the edge of a period in time which presents to architects the greatest of opportunities to be effective." He stressed the need for a renewal of idealism, which in his view holds the brightest possible future for the architect.

In the view of Jay Garrott, director of the Drury Hammons school of architecture, architect training is a lifelong process. He said he considers idealism and philosophy important in such training and that, while an architect is prepared primarily to build buildings, his or her relationship with the building client or user must also be stressed.

Garrott advocated a holistic approach: the architect must not only create a building but also understand the artifact. "The educator must see students as individuals so they can deal with skills, cognitive factors, and become more inclusive and less exclusive," he said. "An attitudinal change is needed in the way we approach the individuals during the educational process. Mentoring the individual, not mass-producing, is the key. We need a greater integration of knowledge to develop new mechanisms for integrating liberal and interdepartmental studies."

In the forum following the panel presentations, questions were raised regarding integrity and moral values. Mike Carlie, a sociologist, said that he felt each school should ask what it is about architecture that is changeless. He then drew an analogy to the Zen Buddhist principle that one should comprehend the whole but leave the details behind.—Edgar A. Albin

Mr. Albin is professor emeritus of art at Southwestern Missouri State University.

News continued on page 28

Prospective Architects May Take Registration Exam Via Computers

Architects seeking registration now have the option of taking portions of the architect registration examination by computer. Developed by the National Council of Architectural Registration Boards, the computer-administered exam will be offered twice a year in addition to the June paper-and-pencil format.

Unlike the traditional test, the computer version allows applicants to schedule the exam at their convenience during several weeks in February and October each year. In effect, this means architects have three chances annually to pass the exam instead of waiting until the following June to retake failed portions.

The NCARB program divides questions into a series of "testlets" of equal difficulty. The computer continues to issue testlets until the exam is completed. According to NCARB, prior computer experience is not necessary to take the exam. Answers are selected from choices on the screen using only two keys, and a tutorial that precedes the examination allows for practice time.

Beginning this month it is be possible to take the following sections of the architect registration examination by computer: structural technology, general and long-span; structural technology, lateral forces; and construction documents. Other sections will continue to be added.

Convenience and frequency are not the only advantages of the computer-administered exam, according to NCARB. Scores can be issued within a few weeks of the exam. State registration boards administer the computer exams.

—Elena Marcheso Moreno

BRIEFS

National Peace Garden Competition
A national, one-stage, open design competition will be held for a National Peace Garden. Sponsored by a California-based citizen's organization and funded in part by the National Endowment for the Arts design arts program, the competition is open to all American designers—artists, landscape architects, architects, and sculptors. The proposed site is a four-acre parcel along the Potomac River in Washington, D.C., two and one-half miles south of the national mall area. The deadline for registration is May 26. For more information contact Paul D. Spreiregen, FAIA, Professional Adviser, Peace Garden Design Competition, P.O. Box 27558, Washington, D.C. 20038.

Waterfront Design Winners
Eighteen projects have won awards in the 1988 "excellence on the waterfront" competition sponsored by the Waterfront Center. The winners were chosen from 93 entries submitted from 22 states and three Canadian provinces. Entries in this year's competition were made in nine categories for current and classic (over 10 years old) designs. The jurors were Stuart O. Dawson, FASLA, chairman, Watertown, Mass.; Charles M. Davis, FAIA, San Francisco; Roy Merrens, Toronto; Ned Smyth, New York City; and David Karem, Louisville, Kentucky.

Environmental Graphic Design
The Society of Environmental Graphic Designers has awarded scholarships to three students for projects related to environmental graphic design. The scholarships are open to upper-level undergraduate or graduate students working on a degree in graphic design or a related field. The recipients are Klaus Bjerager Kristensen, Copenhagen, Denmark; Robert Kreda, Raleigh, N.C.; and Manuel Pinto, Brooklyn, N.Y. The application deadline for next year's scholarships is March 17.

Newman Student Awards
The Robert Bradford Newman award medals for "excellence in the study of acoustics and its application to architecture" have been given to seven architecture students: Lincoln Berry, Rhode Island School of Design; Mark E. Holloway, University of Florida; Vidas Juzenas, Georgia Institute of Technology; Kay Ivah Mason, Clemson University; Frank A. McClure III, Clemson University; James P. Oglesby, Boston Architectural Center; and Norliah Othman, Oklahoma State University.

SOM Traveling Fellowship Awards
The Skidmore, Owings & Merrill Foundation has announced the winners of the 1988 architectural traveling fellowships for travel and study: $25,000 to Alex Krieger, Harvard University; $9,000 to Brian Andrews, Princeton University; $9,000 to William Callahan, University of Illinois at Chicago; $12,000 to Denise Dumais, Princeton University; $8,000 to Julie Evans, University of Illinois at Chicago; $8,000 to Timothy Love, Harvard University; $8,000 to Michael Baushke, Virginia Polytechnic Institute and State University.

AIA Student Officers
The American Institute of Architecture Students has elected Matthew W. Gilbertson, a student at the University of Minnesota, and Irene Dumas Tyson, a recent graduate of Mississippi State University, as president and vice president for 1988-89.

AIA Institute Scholars Program
The AIA Institute Scholars program will fund up to three joint educator/practitioner project teams in 1989. The program, developed by the AIA architects in education committee, is open to project teams composed of an AIA member currently teaching architecture and an AIA member in practice. Project proposals should emphasize the development of new knowl-

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Briefs *from page 28*
edge useful in both teaching and practice. Prizes up to $5,000 will be awarded to each member of the winning teams. The deadline for applications is March 1. For more information contact Brenda Henderson, AIA Education Services Center at (202) 626-7345.

Making Cities Livable Conferences
The Making Cities Livable conferences will take place July 4-8 in Venice, Italy, and Oct. 24-28 in Charleston, S.C. The conferences are for urban designers, architects, planners, landscape architects, historic preservationists, and others committed to making cities livable. For further information contact Suzanne H. Crowhurst Lennard, Making Cities Livable Conference, P.O. Box 7586, Carmel, Calif. 93921.

Servicewomen's Memorial Competition
The Women in Military Service for America Memorial Foundation Inc. is sponsoring a two-stage, open competition for a memorial honoring women. The site for the memorial is the main entrance to Arlington National Cemetery in Arlington, Va., and it will include commemorative works and a visitors center. Prizes totaling $75,000 will be awarded; the registration fee is $50 and the deadline for registration is March 15. For more information contact Carla Corbin, Women in Military Service for America Memorial Foundation Inc., Dept. 560, Washington, D.C. 20042.

Architecture Exhibition
The High Museum at Georgia-Pacific will exhibit the first comprehensive examination of contemporary architecture competitions, "The Experimental Tradition: Twenty-five Years of American Architectural Competitions, 1960-1985." The exhibition, on view Feb. 6-April 15, consists of 60 projects by architects of all ranks of the profession and makes evident the major changes in architectural representaiton that have taken place over the past 25 years. The museum is open to the public from 11 a.m. to 5 p.m., Monday through Friday, and admission is free. For more information contact Pam Heisler, High Museum of Art, 133 Peachtree St. N.E., Atlanta, Ga. 30303.

IIT Seeks New Dean of Architecture
The Illinois Institute of Technology has initiated an international search for a dean of its college of architecture. Candidates should have the capacity to provide collegial leadership and the ability to work and communicate effectively with faculty, students, administration, and the professional community. Applications (with resumé and a list of references) or nominations should be sent to Professor M. Zia Hassan, Chairman, Dean of Architecture Search Committee, Stuart School of Business Administration, Illinois Institute of Technology, IIT Center, Chicago, Ill. 60616. □

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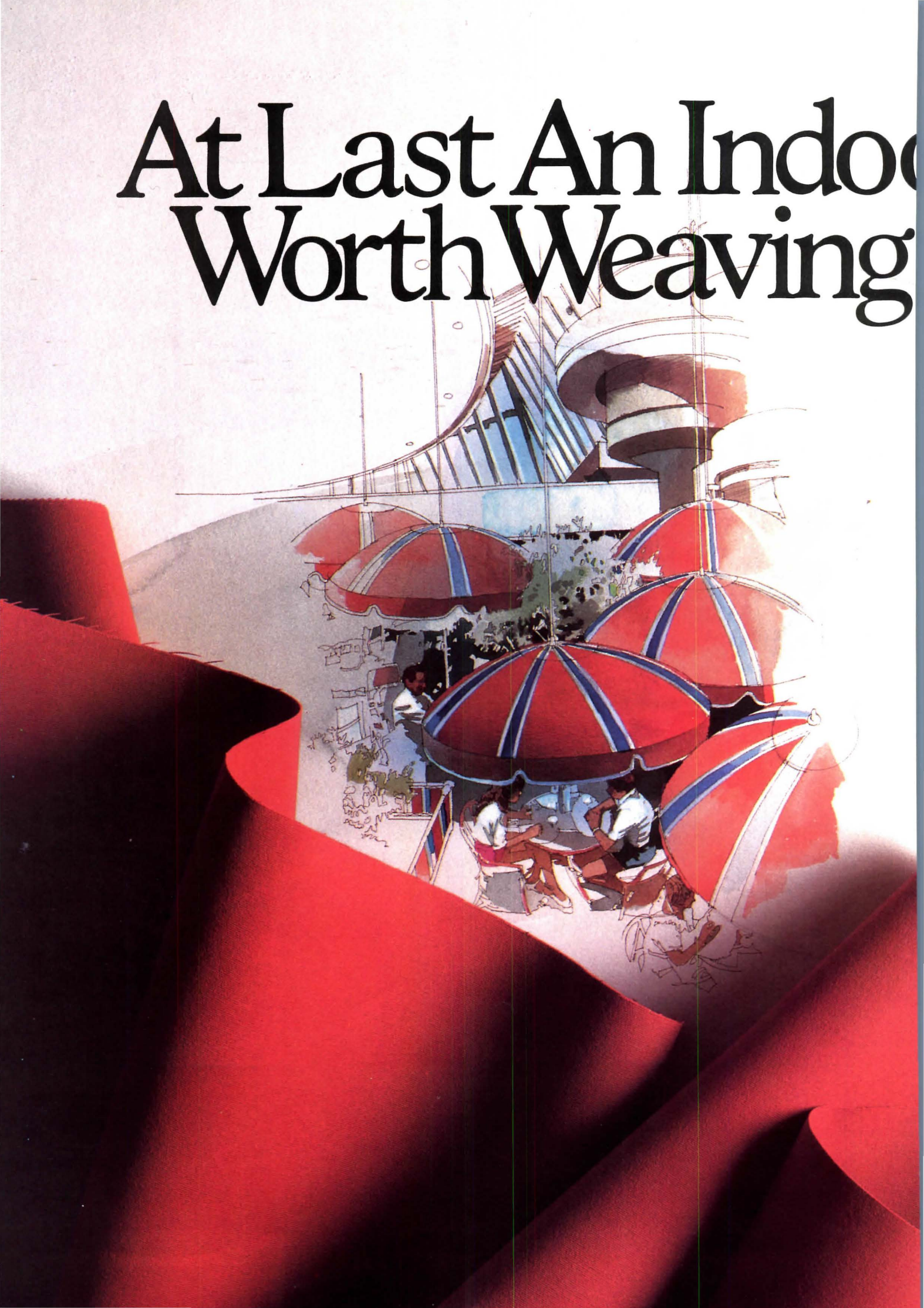

A Pair of Reviews of a Scholarly Perspective on Practice

The two reviews below constitute a kind of debate on the new book **Architectural Practice: A Critical Review** by Robert Gutman (Princeton Architectural Press, $7.95). The pro side is taken by Forrest Wilson, a senior editor of this magazine with wide experience as an editor and educator, the con by Lois Thibault, an architect and director of AIA's Vision 2000 program formerly with the Institute's education department. Which ever one agrees with, both demonstrate that the book is, whatever else, thought-provoking.

'Telling It as It Is' By Forrest Wilson

Robert Gutman, Hon. AIA, professor of sociology at Rutgers University and a visiting professor of architecture at Princeton, teaches the history of the architectural profession. Gutman is undoubtedly the leading authority on this subject. His books are forthright documents on it, and the one under review is no exception. It is not controversial, but a statement of researched fact.

Gutman's critical review of the profession is that there is expanding and changing demand for architecture and an overabundant supply of architects to meet it. The number and complexity of buildings, the professionalization of the construction industry, and the increasing sophistication of the client results in more intense competition among architects. Practice is more difficult and the public hears more about architecture and architects than ever before, and therefore expects more.

Gutman's image of the architect is a paradox. Architecture is an increasingly popular profession, entered by larger numbers than ever before. It is publicly acclaimed and the object of growing public interest. However, architects are steadily losing control over the building process, and their compensation continues to decline, according to Gutman's statistics.

Architects retain authority as designers. Their services are increasingly sought and are more and more limited to enhancing properties, creating corporate logos, and making nameless cities notable by the addition of notable buildings.

But where are the "master builders?" America has become an information society with an economy driven as surely by the incessant demand for information as by the continuing necessity of converting raw material into finished products.

There are other related statistics to be considered beyond the scope of those quoted by Gutman in his book. The majority of American workers are now white-collar. About 45 percent work in offices, and their work is being increasingly automated or computerized. Less than 3 percent of the labor force is now employed in agriculture, and the proportion of blue-collar workers is steadily declining. American industry now competes in a global economy, as do American architects, and foreign architects are often better trained technically.

Competition for world markets and domestic markets is a powerful incentive for seeking higher productivity. Yet, all statistics measuring white-collar productivity indicate a continuing decline. Architecture is not exempt from these influences, changes, and pressures.

As the successive waves of mechanization of farm and factory have changed the U.S. society and economy, so has the automation of white-collar work. The architectural office is unusually sensitive to this change, for it remains predominantly labor intensive, and labor-intensive activities are the prime target of automation or computerization.

During the shift from blue- to white-collar work there has been a steady decline in the authority and prestige of all professions. Despite the proud titles of doctor, lawyer, and architect, these professionals are judged according to the social attitudes of the time in which they practice.

Lawyer jokes are legion; patients seek two, three, or more medical opinions; and architects seem at times limited to decorating facades of buildings whose location and size have been decided by someone else.

Lack of public confidence is all too often based on fact. A good many lawyers conduct themselves shamefully, terrible things happen in hospitals, and buildings sometimes are uninhabitable or fall down. All this has happened before, but the public has never before been as sensitive to these malfunctions as it is today. The public demands accountability at a time when complexity of events is forcing a reinterpretation of the acts and responsibilities of all professionals.

Institutions are changing and are in trouble. Lawyers deflect as much blame as they can, doctors treat executive stress, and architects try to put good a face on things. As David Pye once said, if we can't make things work we can at least make them look presentable.

Gutman has told it as it is. The value of his book—and it should be read by all architects—is that the author has gathered all the information in one place and has organized it coherently to present the paradoxes of the architectural profession in transition from an industrial to an information society.

'What's the Problem?' By Lois Thibault, AIA

Robert Gutman tells us that this slim volume, whose 147 pages represent a substantial portion of the research done on practice issues (much of the rest of it is also from his pen), arose out of the desire of his students at Princeton's architecture school to gain a more accurate understanding of contemporary design and practice. They will learn little of current practice in these pages. Here are 10 of the profession's most historic myths raised to the significance of "contemporary trends," used to indict us for wishful self-delusion.

Gutman believes these 10 trends represent "a new set of conditions" acting upon architectural practice: (1) the expanding demand for architectural services; (2) changes in the structure of that demand; (3) the overabundance of entrants into the profession; (4) the increased size and complexity of buildings; (5) the consolidation and professionalization of the construction industry; (6) the greater rationality and sophistication of clients; (7) the increased competition between architecture and other professions; (8) the increase in competition within the profession; (9) the continuing economic difficulties of practice; and (10) the public's changing expectations of architecture.

Gutman's research—interviews, readings in the limited body of practice-related studies compiled over the last two decades, and analysis of pre-1982 census and professional data—is directed toward documenting current conditions of practice in

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order to demonstrate how traditional concepts inhibit the profession's ability to deal effectively with the changing context of architectural practice. Some of the research cited is embarrassingly outdated, such as "Distribution of Architects According to Work Settings in Nine Countries, circa 1960."

In the book's concluding chapter, Gutman posits five "challenges" that the profession must confront if it is to adapt to the new realities that have arisen from the trends he's identified: (1) to match the demand for practitioners to the supply of architects; (2) to develop a philosophy of practice that is consistent with but also corresponds to the expectations, requirements, and demands of the building industry; (3) to maintain a secure hold on the market for services in a period when the competition from other professions is increasing; (4) to find ways to maintain profitability when the costs of running a firm are steadily increasing; and (5) to have a competent organization exhibiting high morale and motivated to produce good work.

Those in the profession who have failed to adjust to the social, economic, and technological changes of the 1960s and '70s will recognize the litany: it's harder to get work, clients (especially developers) are calling the shots, engineers and interior designers are invading our turf, the schools are turning out too many graduates, it's impossible to make a decent salary, we're being regulated to death—in short, we're losing control.

Nevertheless, there is succor here. The good news is the trend Gutman identifies as the rising demand for architectural services, in which it is revealed that firm receipts are rising, architects are getting a higher percentage of the construction dollar, and the profession is moving into new service areas. Another trend, bigger and more complex buildings, means that we can expect more projects to require our services. We also hear about the public's increasing appetite for "designer" design.

So what's the problem? It seems that some of us persist in believing that the practice of architecture leads to a high degree of career satisfaction, that its professionals exercise power, freedom, and autonomy, and that the work of design is important to the quality of people's lives. Gutman appears to have little respect for architects and the design process that informs practice. He subtly suggests that client choices are between a building that works and one that architects like, that there is something shameful about a design/production joint venture, and that a commitment to marketing professional services (which he calls "essential" on one page and damns as "corrupting" on the next) will turn us all into trades people.

Gutman cautions architects against trying to provide comprehensive services, assuring them that most firms "whose status in the profession depends upon their reputation for design excellence eschew the model of comprehensive practice." Yet, two pages later, he reprimands the profession for allowing "construction supervision to be performed by the client, the allied architectural firm, or a construction manager."

The practice of architecture is fraught with problems, but they are not the problems Gutman lays out. What about the profession's commitment to three years' training required for admission to the licensing exam—can offices continue to support interns? How about the promise of new information technologies, whose data bases can be integrated with CADD systems to provide cradle-to-grave client services at reduced cost and time? What about the need for architects to educate the public about design values, to get out into their communities and make our language accessible to the citizenry, to demystify what we do and why it's important? What is the likely impact on our professionalism of the rapidly increasing number of architects employed in the government, corporate, and institutional sectors of the economy? Can we expect the large, comprehensive-services construction industry firms of Japan to affect our markets in the years to come? Explication of any of these issues (and this is not an inclusive list) will have a far more profound affect on the nature of architectural practice than the tired clichés of Gutman's review.

The Spirit of H.H. Richardson on the Midland Prairies. Edited by Paul Clifford Larson with Susan M. Brown. (University Art Museum, University of Minnesota, Iowa State University Press, $24.95.)

This book of essays accompanying a recent exhibition is an excellent example of a new stage in appreciating American architecture. Having exhaustively documented prominent architects such as Henry Hobson Richardson, we are taking up the process of diffusion and dispersal of their influence. From the global or national elite, we are turning now to the regional and local elite.

At one time American architecture was thought to be only a pale reflection of European models, a provincial expression deserving only invidious comparison. Then we decided that there was indeed such a thing as American architecture distinct from European sources. Leonard Eaton's book *American Architecture Comes of Age* identified American influence on Europe as one indication of our having developed an architecture even our mentors would want to imitate.

From Richardson-inspired buildings in Scandinavia, the present volume turns our attention to Richardson-inspired buildings in Waxahachie, Tex., for example. If American architecture is no longer considered provincial with respect to Europe, then we can rise above the pejorative of provincialism with reference to remoter parts of America itself.

Originally the subject of an exhibit at the University of Minnesota's art museum, the diffusion of Richardson's influence in the region identified as the Midland Prairie is documented and evaluated. As the first volume in Iowa State University Press's series on Great Plains environmental design, it is a significant start.

The essays on Chicago, Minnesota, Kansas, and Texas are by a group of younger scholars who are leading us into new architectural territory some distance removed from the traditional high points. Thomas Schlereth, Richard Longstreth, Kenneth Breisch, and Paul Larson have produced fascinating studies. The most striking essays, however, are the last two. Judith Martin and John Hudson go a long way toward placing the diffusion in a cultural and material context. Dispersal and diffusion suggest that we place less emphasis on individual buildings and more on the larger context of which they are a part. The architecture becomes an indicator of other facts rather than merely the fact itself. One could quibble that such a shift of attention does not actually produce architectural history, but, as a way of understanding a multifaceted phenomenon, it is invaluable.

One can only hope for more publications with the quality, expansion of attention, and challenge of this one. This book is not the last word, nor an attempt to finally get it right, but a shift in orientation to a subject that will continually bring out new facets that illuminate understanding.—SIDNEY K. ROBINSON, AIA

Mr. Robinson teaches architecture at the University of Illinois at Chicago.

Creativity and Contradiction: European Churches Since 1970. Randall S. Lindstrom, AIA. (AIA Press, $32.95, members $29.75.)

Randall Lindstrom's book is the result of his visits to more than 70 churches in 10 countries and of his interviews with scores of architects and clergy. Lindstrom concentrated his efforts in European countries where church building is now most prolific. In some of these countries, such as Switzerland and Germany, the governments levy on the entire population income taxes for church building, and here Lindstrom finds the most vigorous programs.

The book documents Lindstrom's travels mainly through photographs, although there are also a few plans and sections. Some of the churches shown are quite traditional and others extraordinary. The book includes an appendix listing the churches and their locations with reference maps, architects, and clergy. A foreword, with lots of exclamation points, is by evangelist Robert Schuller, former AIA public director.—MICHAEL J. CROSBIE

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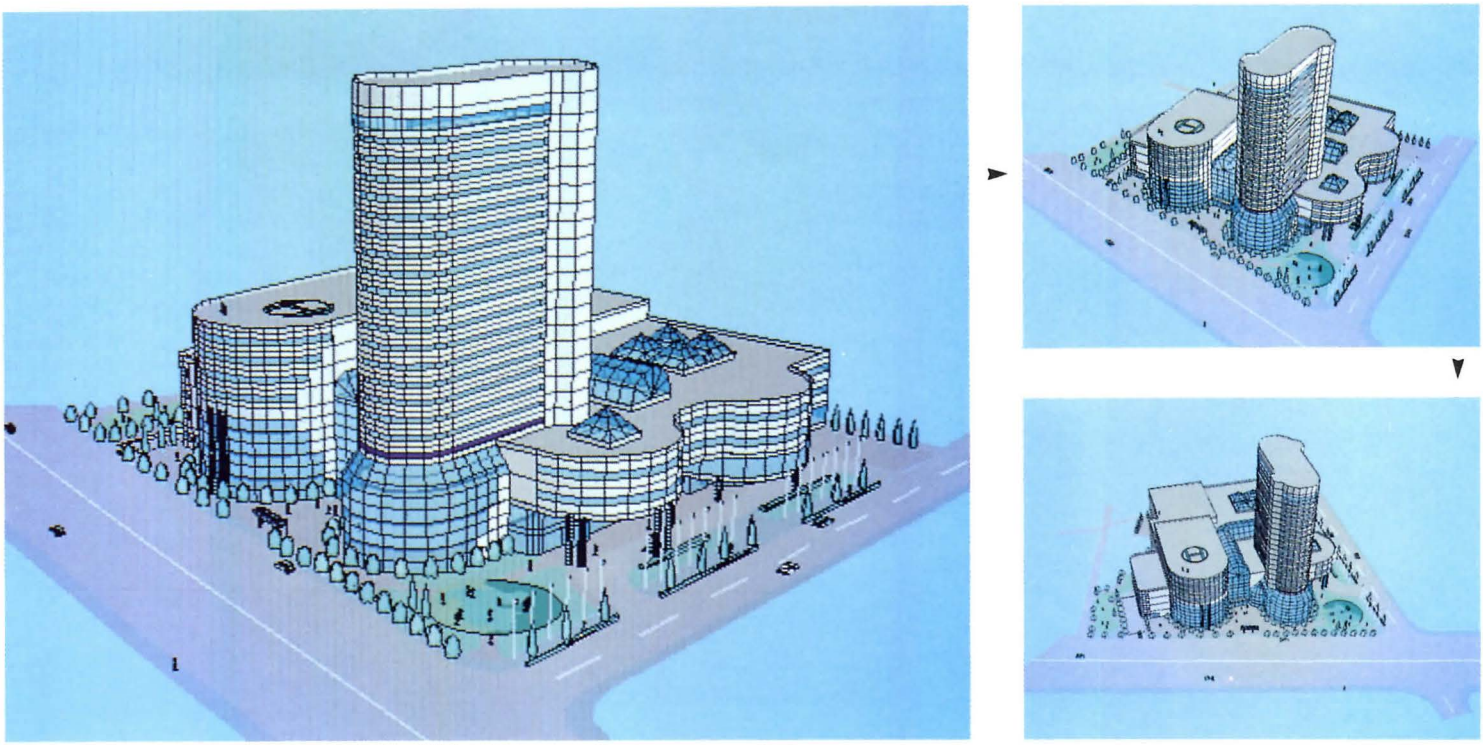

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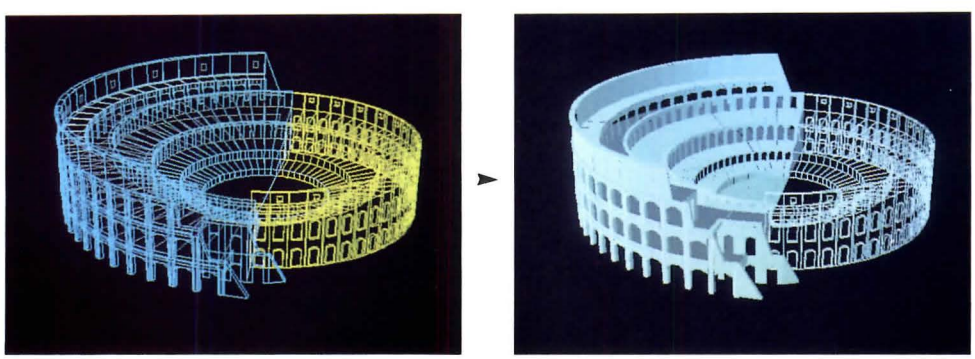

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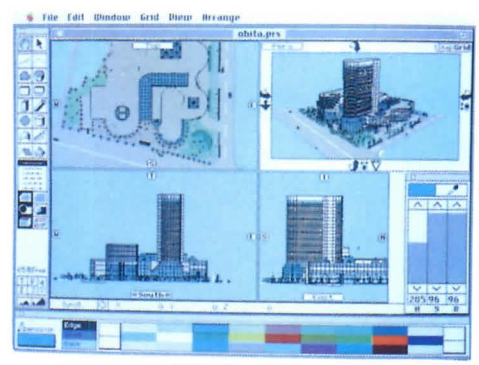

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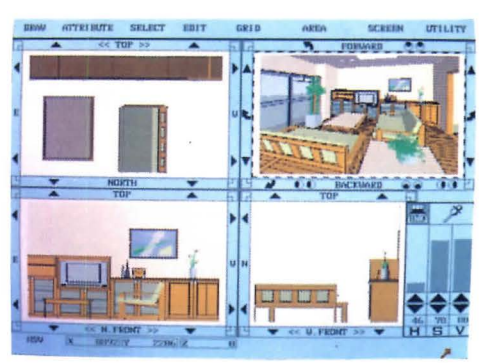

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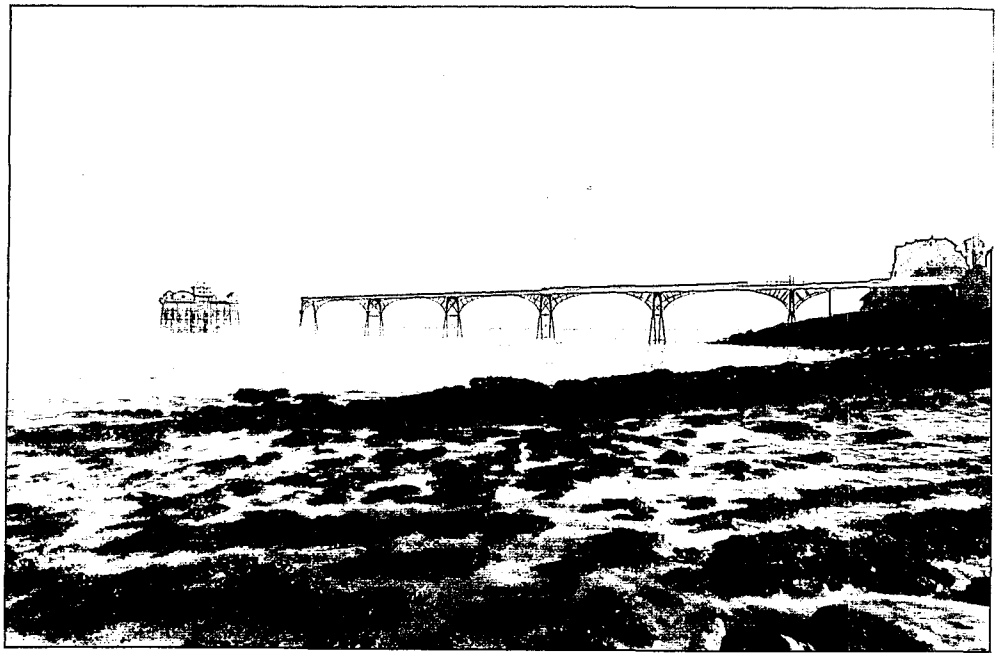


© Robert Fischer

Clevedon, opened in 1868, is scheduled for restoration. One section collapsed during a load-bearing test in 1970, and since then the end has stood as an abandoned island.

British Piers. John Walton. Photographs by Richard Fischer. (Thames & Hudson, $19.95.)

"The seaside holiday was one of the happiest inventions of the Industrial Revolution in England," writes John Walton in the introduction to this book, "and in Victorian times the seaside pleasure pier became a popular and evocative aspect of it." One of the first pleasure piers, at Margate, opened in 1823, and piers reached their boom years in the 1860s.

The piers were mainly in areas just outside concentrations of industrial production—where the rising middle class with expendable income for leisurely pursuits lived. The piers were built of cast iron or wood, often with elaborate pavilions and kiosks housing pleasant diversions. Long fingers extending out to the sea, the piers functioned most importantly as promenades where "polite, regulated social interaction, which included controlled flirtation and the operation of a marriage market, could take place."

By World War I, Great Britain's golden age of pier building was over, and, as popular taste turned against displays of Victorian ostentation, the piers fell out of favor.

Richard Fischer's photographs capture surviving piers in an eerie light of abandonment and decay—the jolly remnants of an empire in decline. His pictures are mostly unpopulated, and one can almost hear the haunting echoes of laughter and calliope music.—Michael J. Crosbie

The Nature of Frank Lloyd Wright. Edited by Carol R. Bolon, Robert S. Nelson, and Linda Seidel. (University of Chicago Press, $29.95.)

Art historian Marvin Trachtenberg noted recently in *Art Bulletin* that more has been written about Frank Lloyd Wright than any other architect, even Palladio, and that the new concern in historical methods is a "manifest search for architectural context." *The Nature of Frank Lloyd Wright* is part of that search. The essays in this collection were originally presented at a symposium organized by the University of Chicago department of art to celebrate the 75th anniversary of the Robie house.

The book has an introduction by Vincent Scully and eight essays by Joseph Connor, Neil Levine, David Van Zanten, Donald Hoffman, Gwendolyn Wright, Julia Meech-Pekarik, Thomas Beeby, and Larzer Ziff. The essays are only incidentally related to the Robie house; in fact, buildings themselves are not the issue. There is a literary thrust to this collection, the contextual issues being grounded in what Wright said and wrote. Even the book's title is a trope, "nature" being Wright's human nature as well as his relationship to the natural world.

This is an engaging group of essays. Because of the four-year gap between the symposium in 1984 and this publication, and because of the circulation of the essays among the authors, the collection has an internal coherence that is often difficult to attain in books such as this. There are similarities among the essays, including, first, a strong reliance on Wright's printed word and on the relationship between Wright's words and actions. Then there is the mythic character of the architect himself and the preoccupation with layers of abstraction—the interactions between bits of culture and nature and their transformations into architecture. Lastly, most of the discussions center on work built during the first two decades of this century.

The Robie house isn't even the building most discussed, referenced, or illustrated—Taliesin is. Spring Green, it seems, remains a most reliable environment for the working out of dualities.

Echoes of Ralph Waldo Emerson in the essays, as in Wright, give the book an inspiring tone, empowering it to fly beyond the buildings. The flight is so high that it approaches allegory: Wright, the free man, on a pilgrimage to architecture traversing cataracts of nature and culture, returns to the shining brow, the land of his people, where he lays his dwelling down. Madness and fire strike the land . . . well, you get the idea. The loftiness is part of the charm. Wright certainly is heroic here; even negotiating the sale of portions of his print collection (to meet the bills) does not diminish his stature.

But Wright is also real, out there doing architecture, engaging his world, and pushing hard against the paradigm in which he was trained. A strain of disappointment runs throughout this book, concerning Wright's having no architectural progeny—his children, grandchildren, and the Fellowship being dismissed—but, as measured by this collection of essays, the uniqueness of Wright could not be replicated. That is both myth and fact.

—Herbert Gottfried

Mr. Gottfried teaches architecture at the Iowa State University college of design.

Pleasure Grounds: Andrew Jackson Downing and Montgomery Place. Edited by Jacquetta M. Haley. (Sleepy Hollow Press, $19.95.)

Two parallel lines in the 19th century—the luminous landscape painters of the Hudson River Valley and the landscape designers who flourished in the same place and time—seemed destined never to meet. The subject of this brief but sumptuously illustrated monograph, Montgomery Place, is described as the premier Hudson River landscape estate. Its character as such, plus the drawings and paintings by the architect, Andrew Jackson Downing, advance it as the leading candidate to close this gap. Montgomery Place was a property of the Livingston family, named for the Revolutionary War hero of the battle at Quebec in 1775.

The 18-page editor's introduction is not to be taken lightly, but this monograph is essentially a gathering of every available bit of information from planting orders to landscape plans and business correspondence between designer and clients, with illustrations to match. Given that Montgomery Place is not only arguably the most important landscape estate of the Hudson Highlands but also the first to illustrate the emergence of a distinctively native style from the earlier English influence of Repton and Loudon, the significance of this work is evident. And, as landscape preservation assumes greater importance, this little book can be considered a model for many others like it.

—Frederick Gutheim, Hon. AIA

Mr. Gutheim is a Washington, D.C., author, critic, and teacher.

ARCHITECTURE

Although it is hard to convince some architects of the fact, we are not in the publicity business. We see our roles as informing, exhorting, sometimes criticizing, and, in a nonpedantic sense, educating.

We bring this up in introduction to an issue that singles out a number of individual architecture firms, not for the sake of adding to their luster, but for the sake of learning from them. There are, first of all, profiles of the most recent and first winners of AIA's increasingly coveted architectural firm award. There is also, in the Technology and Practice part of the magazine, a set of briefer profiles of somewhat less celebrated firms that nevertheless do work of consistent quality. In each case the emphasis is not so much on what the firms do as on how they organize to do it, which is where the learning comes in.

There are also an early and a new work by another firm-award winner, a look at the delightful world of architectural toys, and a Kaleidoscope suffused with a similar spirit of whimsy. And in the Technology and Practice section are some cautionary words about thin stones and a kind of superbowl of CADD software evaluations.

—D.C.

Profile: Cesar Pelli & Associates

Winner of AIA's 1989 architectural firm award. By Michael J. Crosbie

The recipient of the 1989 AIA firm award, Cesar Pelli & Associates of New Haven, Conn., is relatively young compared with the last half-dozen firm award winners, whose average age has been 26 years (leaving out Holabird & Root, honored in 1983 at age 103). That Cesar Pelli & Associates, founded in 1977, is less than half the average age gives the honor even greater luster for a firm that has managed in a dozen years to produce some of the most celebrated buildings of the past decade: expansion and renovation of the Museum of Modern Art in New York City; Herring Hall at Rice University; an addition to Pelli's 1975 Pacific Design Center in Los Angeles; and, perhaps most noteworthy, the World Financial Center and Winter Garden at Battery Park City in New York City.

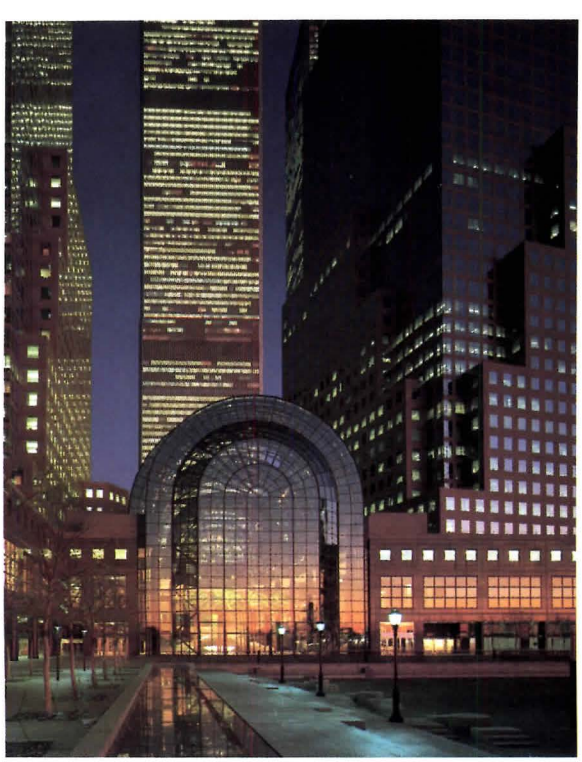
The immediate future promises another string of landmark buildings: the Norwest Center Tower, recently completed in Minneapolis; a 59-story office tower astride Carnegie Hall in New York City; and Canary Wharf, a complex comprising a 57-story tower, retail center, and railway station now under construction in London.

Like most overnight success stories, this one has been several decades in the making. Cesar Pelli, FAIA, commenced his career in the office of Eero Saarinen in 1954, following an architectural education at the Unversidad Nacional in Argentina and the University of Illinois. After a decade in Saarinen's firm, during which he was project designer for the TWA terminal at JFK Airport and for Morse and Stiles colleges at Yale, Pelli spent four years at DMJM in Los Angeles. In 1968 he moved to Gruen Associates as design partner and over the next eight years designed such buildings as the Commons and Courthouse Center in Columbus, Ind., the Pacific Design Center, the U.S. Embassy in Tokyo, and the Winter Garden in Niagara Falls, N.Y. By the time Pelli arrived in New Haven in 1977 as the new dean of Yale's school of architecture, he was a seasoned and well published architect.

Today Cesar Pelli & Associates occupies several floors in a modest office building a block and a half from Yale's Art & Architecture building. Pelli's partners, Diana Balmori and Fred Clarke, AIA, came to New Haven shortly after Pelli to help establish the new firm. With a staff of 80, the firm is literally bursting its seams, having just knocked a hole into an adjacent building to expand its work space.

Because of the previously cramped quarters, design teams on a number of projects were located in offices several blocks away from the main office, a circumstance that worked against the atmosphere of a large but close-knit studio that the partners have tried to maintain. "We function like a big, cooperative atelier," says Pelli, "with an enormous amount of loose organization, a great deal of enthusiasm and cooperation within the firm, and a great deal of competitive spirit." Physically, the office resembles a large studio, with boards side by side, study models piled high, and the usual remnants of trace and lead and glue and cardboard one finds wherever creative architects are at work.

To nurture the studio culture, projects are managed by teams whose members may remain virtually unchanged throughout the life of a project—in contrast to firms of comparable size that move work through strata of "design" personnel and then "production" personnel. According to Pelli, "when we have reviews of a project, the whole team, even if it's 20 people, gathers around to participate. The designers never enclose themselves in a conference room and leave the team out." Members of other project teams are also welcome to observe. At lunchtime each day



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Facing page and left, the recently completed Winter Garden at Battery Park City in Lower Manhattan serves as the heart of the World Financial Center. The interior is a carefully scaled and detailed communal space that makes a strong impression but does not intimidate.

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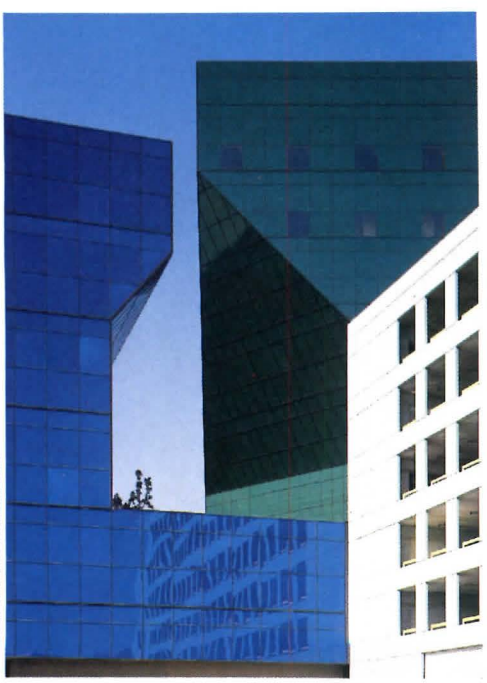

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Above, the recent addition to Pelli's 1975 Pacific Design Center in Los Angeles. 'The Blue Whale,' as the 750,000-square-foot original has been dubbed, is tightly wrapped in opaque ceramic glass. The 475,000-square-foot expansion, sheathed in green glass, connects to the Blue Whale via a blue, story-high plinth. Another phase, yet to be built, includes a wedge-shaped red building.

a huge basket of fruit, bread, and cheese appears on a table to bring the entire office together, "and that's become a great social moment," remarks Pelli.

The firm draws much of its staff from Yale—both graduates and students—but there is a sizable contingent from the Midwest, some from New York, Pennsylvania, California, and Texas, with a sprinkling of Japanese. Balmori reports that there has been "an enormous increase in applicants from Europe, Latin America, and Japan." The partners stress that the decision about whom to hire has less to do with where someone may come from than with the type of person who will thrive in the cooperative climate. "It's always the quality of being flexible that's important," says Balmori. The applicant in search of a precise job definition will probably not do well in the firm, she notes, "because they're not going to take to shifting from team to team or doing different kinds of work within a team." Adds Clarke, "We have loosely defined roles, and within those one can jump vertically from task to task. You can have a senior person making a model or a junior person meeting a client."

Over the past dozen years the firm has developed a work method that allows it to maintain the familial quality of a large atelier while undertaking colossal projects such as the World Financial Center. The firm was quite consciously designed by Pelli and his partners to associate with other architects, allowing Pelli, as the parent firm, to orchestrate a conglomeration of associated architects, engineers, and other design and building professionals with whom to collaborate. Associations of large and small firms—SOM with Frank Gehry is a perfect example—are becoming more and more commonplace, but in 1977 it was a new way to practice. Sheer necessity, however, prompted Pelli to associate on the firm's very first commission—the Museum of Modern Art expansion and renovation. Pelli received the commission just as he arrived in New Haven. "There was no office, nothing, not even a drafting table in my bedroom," remembers Pelli. Balmori and Clarke soon joined him, and a few people were hired to work on the project out of Gruen's New York City office. "We were doing design and they were doing coordination and production," says Pelli. The project was difficult yet pivotal because it taught Pelli and his partners a method by which a small firm could handle a large project—a process that the firm has now developed into a science.

Over the past dozen years the firm has had more than 40 associations and has interviewed well over 150 architecture firms. "We've probably interviewed more architects than many of our clients," observes Clarke. "We've negotiated their scopes of work, their contracts, what we do, what they do. We've become very sensitive to what makes a good associate, and by now we can within a half-hour have a good idea if the chemistry and the attitudes are right. We think of our associations as collaborations. The associate architect is not someone who disappears and resurfaces in working drawings. He's there from the beginning and he's collaborating as a technical codesigner, and we stay together until the very end."

Working in association requires that designs be fully resolved before they're sent on to the associate, that the work is checked at critical stages during the project, and that the associate is kept fully informed as changes are made. The large, integrated firm grew in the 1950s and '60s as a way of providing more complex services for more difficult jobs than a traditional firm could handle. Now, given the number of firms specializing in areas of design (hospitals and laboratories, for example), Pelli can carefully choose associates with specific projects in mind.

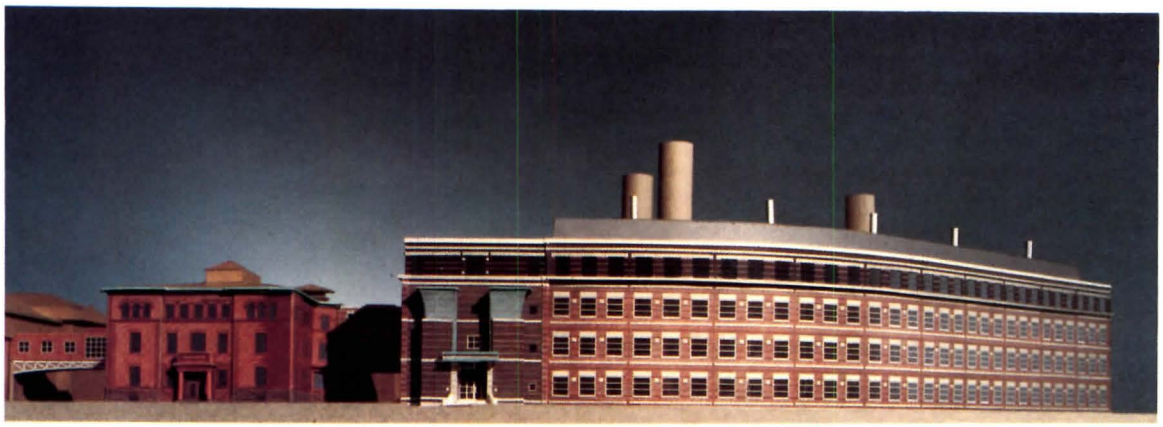
"With a large, integrated firm you have reasonably good structural and mechanical engineers, but they're not the best," says Pelli. "When we associate, we look not only for the best structural engineer, but the best for this particular building. We can set up a team that's perfect for the job. An integrated firm can't do that. At the beginning we were a tiny firm, but we were able to put together teams so that we could compete against SOM for the largest of commissions, and beat them."

A major thrust of the design work on every project (after what Pelli describes as the project's "theoretical backbone and intel-

© Brian Rose

Above, the residential tower of the Museum of Modern Art expansion and addition, the firm's first commission, is covered in a Mondrianlike pattern of glass. Below, a skin of a different sort, that of Herring Hall at Rice University, demonstrates the rich patterning in material found throughout the Houston campus.

Although Pelli is noted for large-scale projects, this lifeguard station demonstrates a small-scale sensitivity.



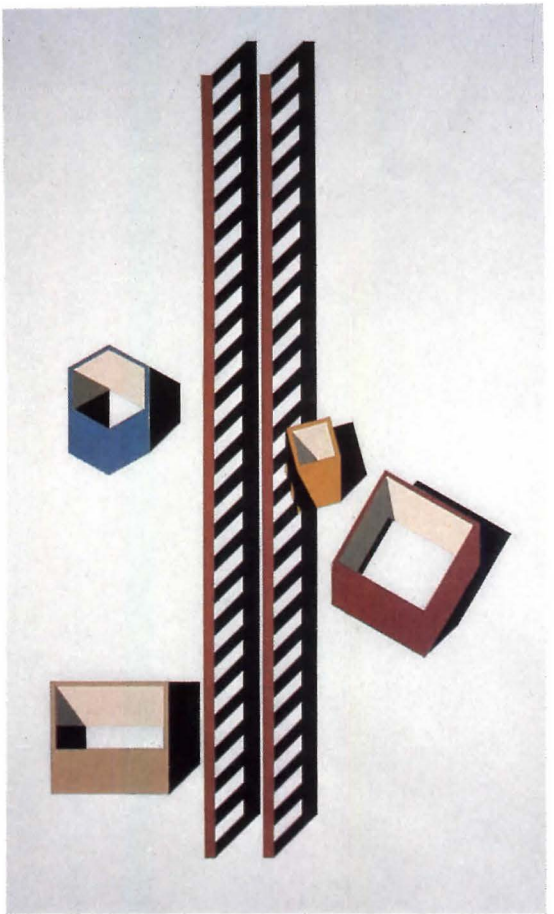
Right, model for the Yale Center for Molecular Medicine, now under construction, a low-rise 135,000-square-foot research lab of brick and limestone. Below, St. Luke's Medical Tower in Houston, shown as a superimposed model, is distinguished by twin octagonal forms that will shimmer in silvery reflective glass.

lectual framework" have been formulated and the parameters of the program analyzed) is the development of alternative schemes—forms the project might take, any of which the architects would be comfortable with. "That's a very important part of our process," says Clarke. "Every major issue, from the largest to the smallest in a project, is presented to the client in sets of alternatives. We will clearly have a preference and we'll state that, but clients never see a single solution. It surprises many of our clients who have worked with other architects who present one scheme and that's it. Some of the clients are uncomfortable, because they have to get into this more involved process. But ultimately it works much better because they feel a sense of authorship and being involved in the process."

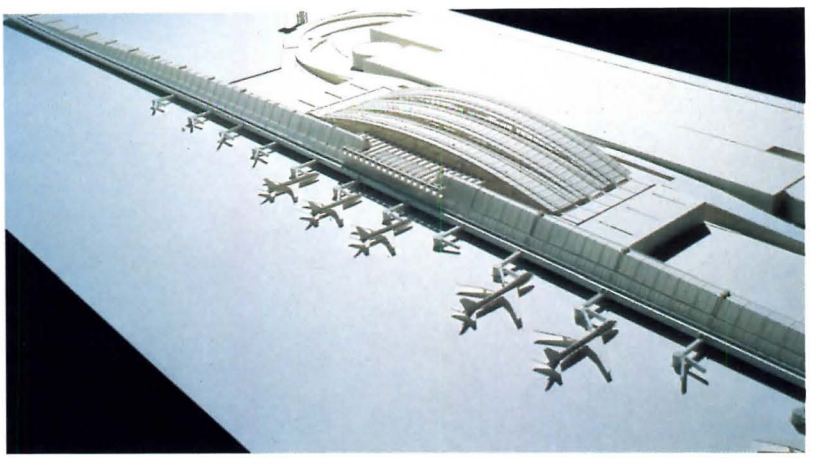
Another essential factor in the firm's design process is the reliance on study models. At a time when architectural drawings have attained the status of a cultural fetish, Pelli probes nearly all design inquiries in model form. He admits that the preference for models as a design tool was instilled by Saarinen, whose buildings often could not be practicably designed by any other means. "When we started building models it was a real revelation," says Pelli. "You figure that you have it all resolved by having it down on paper. Then you build a model to check one thing, and suddenly you realize that there are spatial relationships that you never knew were there, and some of them are horrible. We don't trust the drawings at all—we build models instantly." Pelli's office is stuffed with models; a shelf along one wall is lined with model skyscrapers, like so many hats. There are series of models, all finely crafted with materials rendered, that show the evolution of design from large-scale building form down to details such as tile flooring. Some are quite elaborate, such as a model of the Museum of Modern Art expansion that was several yards in length and had holes in its floor so that you could stick your head up into the model and look around.

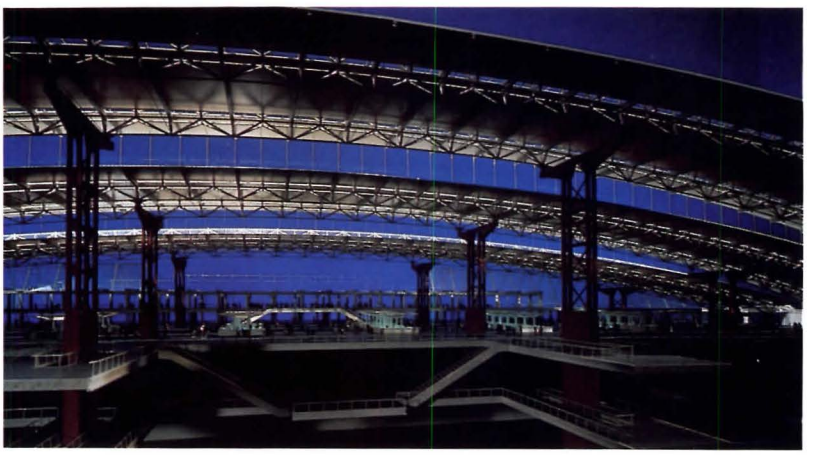
The models serve a number of purposes besides the obvious

Below, the 'Long Gallery House' for a 1980 exhibition entitled 'Houses for Sale' uses a familiar organizational device of Pelli's—the spine. A private residence recently completed in Maryland is based on this project.



Below, entry for Kansai Airport competition in Osaka, Japan, employs delicate steel members. Bottom, Yerba Buena Tower in San Francisco wears a deconstructivist crown designed by Pelli in collaboration with artist Siah Armajani.



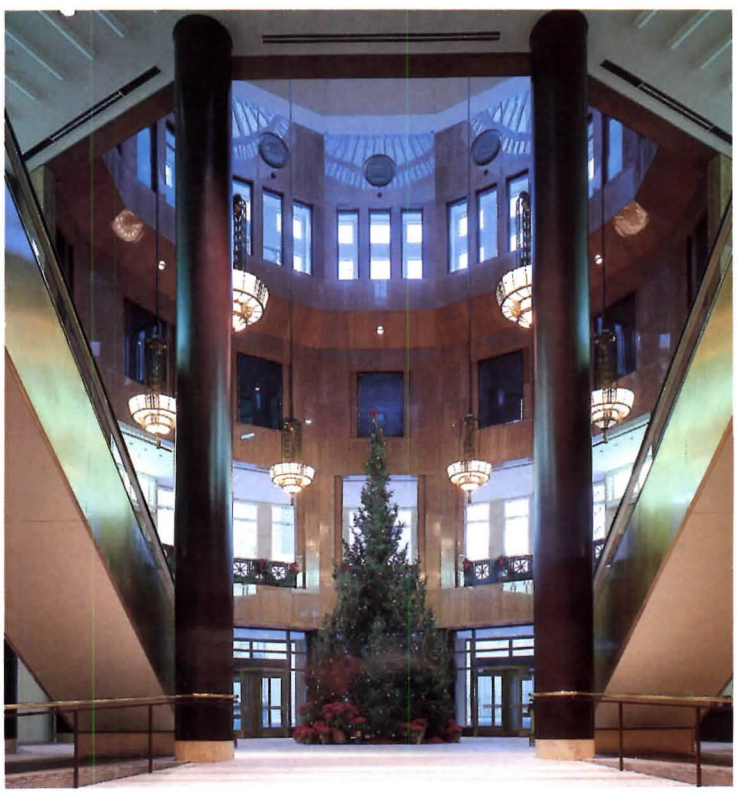


one of revealing three-dimensional relationships. They allow the design partners to make decisions quickly when appraising various schemes. "It takes more time for the team to make a model," explains Pelli, "but much less time for me or Diana or Fred. You need to make an effort to understand a drawing, to visualize it in your mind. If I see three models of three solutions, I know instantly what the issue is." Models are also important in engaging clients, who often have difficulty understanding drawings, in the design process. "That's why many of the models are more realistic than we need," says Pelli. "Once the client has a taste of this, they start asking for more and more models. Some actually figure out that, if enough models are made, they can really design their project."

With its string of accomplishments in cultural, educational, and commercial architecture, what kind of commission does the firm long for in the near future? "Eero used to say 'the American Cathedral,' " says Pelli, with a grin, "in the sense that one would like to do a great public building of obvious, universal value. We architects are attracted by projects that are guaranteed to touch everybody. There are no clean-cut projects of that nature, no single common architectural symbol where all that is good and worthwhile and advanced is gathered in one building, as a cathedral must have been." In lieu of an American cathedral, Pelli and his partners are beginning to pursue projects abroad (they are now short-listed for the Kansai Airport competition in Osaka, Japan) and projects of a nature that they have not designed before, such as the North Carolina Performing Arts Center in Charlotte, which is now being designed.

Whatever the project, the firm will likely continue its commitment to design that has been distinguished by a high resolution of detail, humanly scaled civic spaces, verve in the use of material, color, texture, and landscape, and further exploration in the realm of how contemporary methods of building construction are translated into an architecture that speaks of its time.

Above and right, Norwest Tower rises on the Minneapolis skyline as heir to the great skyscraper tradition of the 1920s and '30s. The 57-story office slab has staggered massing reminiscent of Rockefeller Center and can be viewed through skylighted lobby (below). At street level (left), the tower negotiates a change in scale that makes it comfortable to the pedestrian. □



Photographs © Nick Merrick, Hedrich-Blessing

Profile: SOM, a Legend In Transition

It was winner of the very first firm award.
By Andrea Oppenheimer Dean

In 1962, when AIA bestowed its first firm award on Skidmore, Owings & Merrill, the jury declared: "Your firm has built, in our own time, a legend—the prototype of collective practice where the team is more important than any member of it. . . . The scope and daring of your architectural design, achieved without the loss of finesse that is a frequent hazard in a large organization, is attested by the flattery of lesser men's copying and your worldwide fame." The principles upon which SOM was founded in 1936 remain intact today. The firm endures as a group practice with unparalleled capabilities; its ruling force is still design excellence.

But SOM has undergone major changes during the 1980s and at decade's end is still very much in transition. In part, the firm's recent transformations reflect the state of American architecture and its practice, as well as the U.S. economy. In part, SOM's changing face is a natural consequence of a group practice that is horizontally rather than pyramidally organized, with 40 elected general partners in several offices having equal authority (at least according to the founders' partnership agreement). For all purposes, each of SOM's 12 design partners functions like the principal of a smaller firm, building up "a clientele and practice that transcends the parent entity," as SOM/Chicago design partner Diane Legge Lohan says. Gordon Bunshaft, FAIA, likens SOM's organization to "a medical group practice or a partnership of lawyers rather than of architects." Like all SOM employees, Bunshaft of SOM/New York had to retire at age 65 to be replaced not, as in a pyramidal structure, by a second-in-command who often lacks leadership skills, but by a proven chieftain. "The fat cats can't sit around on their laurels and keep a lid on bright young people at SOM," says Charles Bassett, FAIA, who recently retired as a design partner at SOM/San Francisco.

The last several years have seen the departure of a number of key SOM designers. The firm's last living founder, Nathaniel Owings, died in 1984; structural engineering wizard Fazlur Khan died in 1982; while design partners Walter Netsch, FAIA, Myron Goldsmith, FAIA, and William Hartman, FAIA, retired from SOM/Chicago. The firm's most forceful and broadly influential presence in recent years, Bruce Graham, FAIA, also at SOM/Chicago, will reach retirement age in two years.

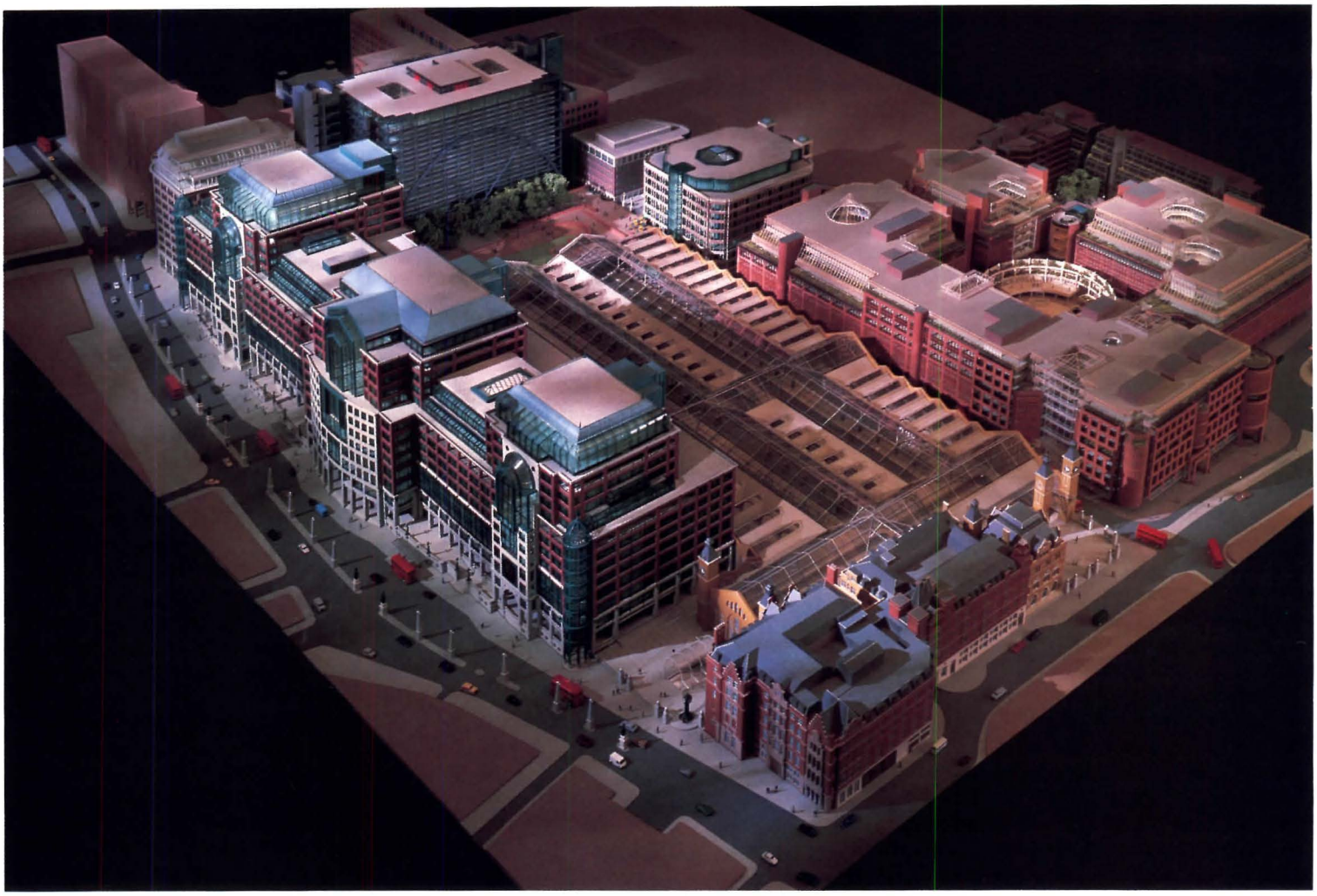
While no other architecture firm could sustain such losses without diminution and major disruption, SOM survives not only in the face of change but because of it, explains Chicago managing partner Thomas Eyerman, FAIA. He maintains that the firm renews itself every 10 to 12 years. SOM/New York design partner David Childs, FAIA, recalls, "When Nat [Owings] was around, if he saw a static situation, he would immediately do everything in his power to change it, because he loved activity and was frustrated by bureaucracy. I think he would be very proud today that we're going through violent upheavals and changes." But, as Graham says, though the individuals change, SOM's basic philosophy hasn't changed in 50 years.

Joe Gonzalez, AIA, another SOM/Chicago design partner, talks of the firm being on loan to partners for a finite period and recalls, "When I was beginning in the firm, I couldn't imagine it without the defining character of Netsch, Bassett, and Bunshaft." Today, 38-year-old Gonzalez himself is becoming influential in defining the firm's evolving character.

The average age of all SOM general partners now is 47. Of the 12 design partners, four are still in their 30s, while only three have passed their 40s—Graham, New York's Michael McCarthy, FAIA, and San Francisco's Larry Doane, FAIA, both in their early 50s. Four general partners are women; there were none before 1980.

Not everyone is delighted with the new crop of 1980s partners. Walter Netsch complains, "You don't find characters like Bunshaft and me today. And who do you find like Nat? He was the salt and leaven of architectural practice, and without that it's all properly dressed suits and proper clubs. It's just a different team today, appropriate to this time and culture. It's Reagan architecture for Reagan times."

Indeed, each of today's design partners appears eminently presentable, well organized, and businesslike. The most acerbic and



Above and opposite, Bishopsgate, designed by Bruce Graham, SOM/Chicago. The London development addresses 'the history of the place and current and future needs.'

idiosyncratic is probably Graham, and he seems to have mellowed—at least for some visitors.

Many large firms have expanded their services in the '80s, but SOM already had done so in the '70s, having added land planning, transportation, interiors, and the like; now it is renewing its emphasis on design and technology. And, while other firms are adding employees and setting up branch offices to carry out far-flung commissions, SOM has become leaner though more productive. Its construction volume has expanded to about $2.5 billion, while it has pared its employees from about 2,000 in nine U.S. offices in 1980 to 1,600 in five U.S. offices and one British office in 1989.

The closing of offices—Denver, Portland, and Boston were abandoned in '87, Houston in '88—was a direct response to the economy, as was the opening of the London office in 1987. Among the results was a musical-chairs movement of partners. Some were dispatched to existing offices, seeding them with more diverse talent and clients. Richard Keating, FAIA, a native Californian, was sent from Houston to Los Angeles to convert a languishing office into an aggressively successful operation that soon will overtake SOM/San Francisco in volume. Craig Hartman, AIA, was moved from Houston to Washington, which was, in turn, diminished by the departure of native New Yorker David Childs, FAIA, for SOM/New York and Richard Giegengack, FAIA, for the London office, which has some 250 employees and is already the firm's third-largest office, after Chicago with about 500 employees and New York with about 400.

Recent cutbacks and shifts in personnel have, somewhat surprisingly, strengthened the firm by consolidating and concentrating its forces. Bassett avers, "I was against all that expansion. It was like getting caught up in the gross national product. Every year everything has to be getting bigger—that kind of mentality, which I think is absolute nonsense." To illustrate some consequences of expansion, Keating relates how "we had an experience in Denver, for instance, where we did a bunch of buildings, none of which helped the reputation of the firm. We don't want to do that again. We're back to having offices in three regions of the country." Graham explains that the San Francisco and Los Angeles offices are seen by the parent firm as one West Coast office, New York and Washington as a single East Coast operation. The "information revolution" allows fewer architects in fewer offices to carry out commissions around the world; however, as Hartman says, "for a group practice doing large, complicated buildings, it's important to have a concentration of people in one place."

SOM's greatest concentration is in the Chicago office, known as "central." It is the administrative nerve center of the firm, providing central accounting and firmwide administration. SOM offices do not operate as separate profit centers; at the end of each year, earnings are equally divided no matter what their source. This policy gives the firm flexibility to carry for a time an office that may be suffering from a regional recession or other problems.

The question then arises, why not have the whole firm in Chicago? In partial answer, Bassett tells how "Nat and Skid's ability to get along was directly related to their physical distance from each other. Owings always felt that if two partners agreed one was superfluous. He didn't believe in collectives." Complementing the belief in group practice at SOM is a sometimes conflicting commitment to individual talent and such diversity as a number of offices with regional and personality differences bring to the firm as a whole. Says Childs, "We're constantly struggling to capture the advantages of a small practice, the personal service business, to break ourselves down but get the advantages that only large size can give." Each office can have only as many employees as can be comfortably handled by its partners. A further reason to maintain offices in different cities is that "if you want to be involved in all layers of city buildings, including more

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The Terraces at Perimeter Center, Atlanta, designed by Bruce Graham, SOM/Chicago.

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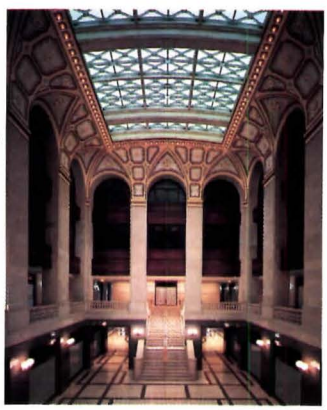

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Wacker Plaza at 222 North La Salle St. Chicago, a renovation designed by Adrian Smith, SOM/Chicago, Top photo is 'before' view.

© Timothy Hursley, The Arkansas Office

ordinary buildings and with communities and other entities responsible for the design of cities, you need to be in or near major cities," says Childs.

Another major change in SOM during the '80s has been the expansion in scope and scale of its traditionally urban, usually city-slick commercial work. A concomitant has been the firm's increased interest in cities as a whole rather than only in individual buildings. Adrian Smith, FAIA, an SOM/Chicago design partner, explains that when he came to the firm 20 years ago "a 200,000-square-foot building was considered a good-sized project. Now, that's a very small job and a 10 or 12 million-square-foot, mixed-use, master-planning and design effort is regarded as big. A million and a half square feet is moderate size." The main reason for this ballooning of projects is that private developers, for whom SOM designed single office buildings a decade ago, now are putting together vast urban packages. "Private developers are, in fact, taking over urban responsibilities," says Graham. "American governments don't care. They allow us to use up our parks and let city streets become garbage dumps. Any decent new sidewalks are by the private sector." Childs adds, "We're coming back in this historical cycle to a time of great civic projects like McKim, Mead & White's train stations, the work of the private sector." SOM got its start working on the 1939 World's Fair for captains of industry.

Though Netsch complains that "most of the business of architecture is business," Childs claims that SOM doesn't spend time trying to case out and predict the market. "We react by answering the phone," he says. There is evidence to support his contention that "we're not good promoters."

They don't have to be. SOM's considerable planning, environmental, structural, technical, administrative, and other capabilities, plus its track record, make the firm a natural choice for the huge and complex developer projects of the '80s. Moreover, the firm's large size and ample resources give it many of the advantages of a university, as London design partner Robert Turner, AIA, points out. He explains, "If we need more firepower or expertise we can usually find it in other offices—Raul D'armas's interiors group in New York, John Kriken's planning group in San Francisco, engineering in Chicago, computers firmwide." With an integrated data processing system centered in Chicago, where 60 programmers work full-time designing A/E software (marketed by IBM), SOM has been in the forefront of computer-aided design and so has been able to study far more design alternatives than ever before and make relatively effortless, rapid changes.

The expanded scale and complexity of many recent SOM projects, combined with more frequent movement by partners from one office to another, has resulted in increased collaboration among SOM offices and has diminished competition between them. Such projects as the Haj Terminal in Saudi Arabia and Canary Wharf in London have required a pooling of resources by several offices. And, as developers have spread their wings from single cities to nationwide and often worldwide work, they have tended to collaborate with different SOM partners in different cities. At the same time, as clients have become more sophisticated and have traded in an earlier look-alike esthetic for one that expresses individual personality, they have tended to develop attachments to the esthetic and personal styles of particular design partners. As a result, the Chicago office, for example, now has a major project in a Washington suburb, while the Washington office is working on a building in Chicago's Loop. Prior to the '80s, this would have been considered an unacceptable violation of turf.

When coupled with a new emphasis on visual diversity, the expanding scale of urban projects has also resulted in increased collaboration between SOM and other architecture firms. Bruce Graham worked on designs for the proposed Chicago World's Fair with Helmut Jahn, FAIA, Stanley Tigerman, FAIA, and R.A.M. Stern, FAIA, among others. Adrian Smith collaborated with Ricardo Legorreta, Hon. FAIA, on several projects, including a competition for the Chicago Public Library, won by Thomas Beeby, FAIA. Smith and Graham Gund, FAIA, recently com-

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Far left, project for 303 West Madison, Chicago, designed by Joe Gonzalez, SOM/Chicago. Left and below, model for Arlington Park International Thoroughbred Racecourse by Diane Legge Lohan, SOM/Chicago.

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Above, Chicago Public Library competition entry by Adrian Smith, SOM/Chicago, and Ricardo Legorreta, Hon. FAIA, of Mexico. Right, model for AT&T Corporate Center, Chicago, by Adrian Smith.

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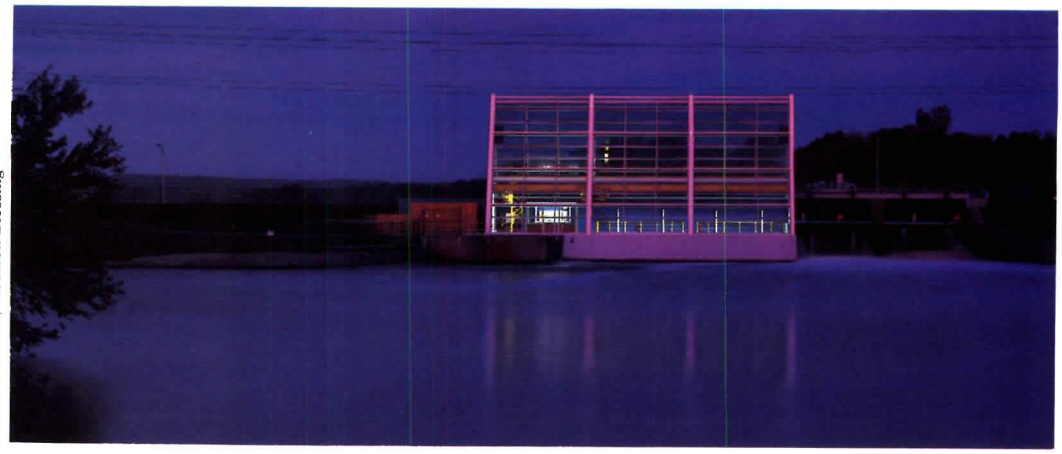

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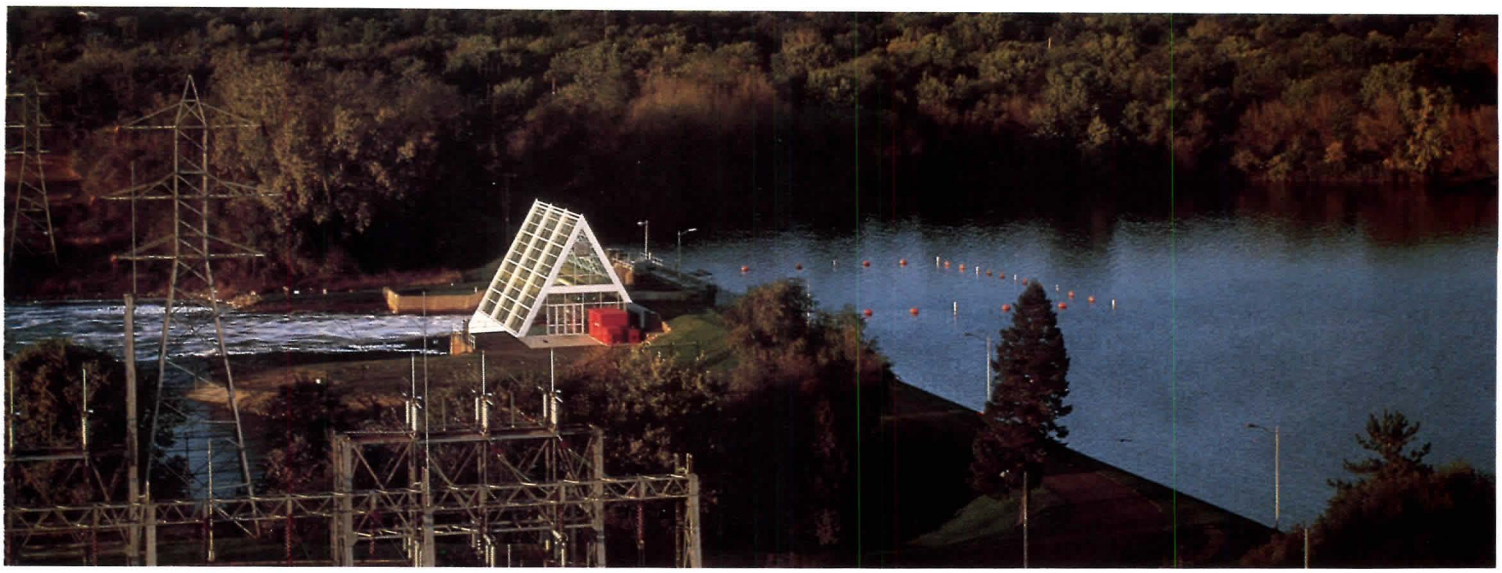

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pleted an office building at 75 State St. in Boston, a peculiar confection that betrays the hand of neither architect. In New York City, meanwhile, David Childs is now collaborating with Frank Gehry, FAIA, on a multibuilding project for Madison Square Garden.

The Childs/Gehry collaboration was mandated by developer Olympia & York. Childs believes that O&Y "wanted a building that would make the cover of every magazine, but they were probably nervous about Frank's ability to work at that scale." He recalls, "At first, I thought the idea of collaborating with Frank was ridiculous. Talk of the odd couple. Frank's paranoia, it turned out, was that his talent would be swallowed up by this great amoeba of SOM. Being younger and unknown, I was afraid of being overshadowed by Frank's ability. In the end, it turned out to be a warm, energetic, creative collaboration, and our project showed how you really build cities: it's two different buildings that play against each other. For the developer we produced something that could be phased without looking incomplete. It gave two major tenants two buildings with two different looks." Childs adds, "The project shows how two firms that are extraordinarily different in size and experience can do something together that neither could have done without the other."

Graham, who worked with Gehry on earlier projects, speaks of the Los Angeles architect as "almost a partner to us" and also talks positively of his own current collaboration with Robert Venturi, FAIA, on work for Barcelona, Spain. Says Graham, "In the time of Bunshaft and Netsch, SOM didn't work with other architects. We do it now because people like me insist that individual buildings don't make a city—you need the whole society of architects."

For that reason, Graham also spearheaded the founding a year ago of the SOM Institute for "research on architecture in urbanism," a think tank for urban architectural theory. "It's very small right now," says Graham, "but in 25 years the findings will be very useful not just to architects but to everyone involved in the building of cities."

Above photos, Morrow Dam, Kalamazoo, Mich., designed by Robert Turner while a design partner at SOM/Chicago. He is now at SOM/London. Using triangular forms and steel bents as modulators, the dam acts as a passive solar collector.

Perhaps the most significant and obvious recent change at SOM is in its esthetic approach. The firm's evolving attitudes mirror, once again, recent changes in American architecture, with its increased tolerance of diversity and heightened emphasis on regionalism, context, history, nostalgia, memory, and meaning. Smith believes the break in style to reflect the vernacular and specifics of place began with SOM's overseas work. The Banco de Ocidente in Guatemala City, which won a 1981 AIA honor award, was influenced by the regional work of Legorreta and Luis Barragán, while at the Haj Terminal in Saudi Arabia, a 1983 award winner, Fazlur Khan fashioned an Arabian theme of tentlike structures.

SOM's still more recent shift from a late modern to an eclectic approach derives also from its new urban emphasis. As Smith puts it, "We see the city as a tapestry, the buildings as stitches or bits of ornament." The first application of such principals was David Childs's early-1980s work in Washington, where height restrictions and multiple design review requirements necessitated respect for the city's trove of Beaux-Arts and other historic buildings. As Richard Giegengack says, "I think it's fair to say we were the first to do contextual buildings, to the mixed reviews of our partners at that time." Childs is now applying the broad lessons of working with external controls in Washington to the quite different conditions of New York City.

After the buzzword "context," the word most frequently used by design partners in talking about SOM's design approach is "diversity." Says Childs, "We do buildings that are very, very different from each other. Ultimately, styles don't matter—it's the quality that counts." Graham thinks that differences in approach "come from requirements and variations in the land," while Adrian Smith believes it's just a matter of "different individuals

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Above, model for Sears Franklin Center, Chicago, by Craig Hartman, SOM/Washington. Below, Islamic Cultural Center model, New York City, by Michael McCarthy, SOM/New York.

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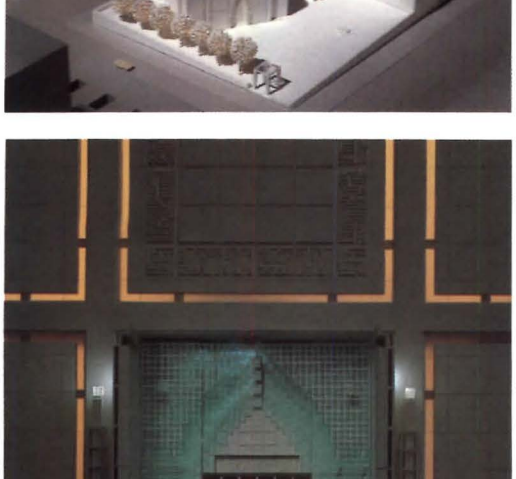

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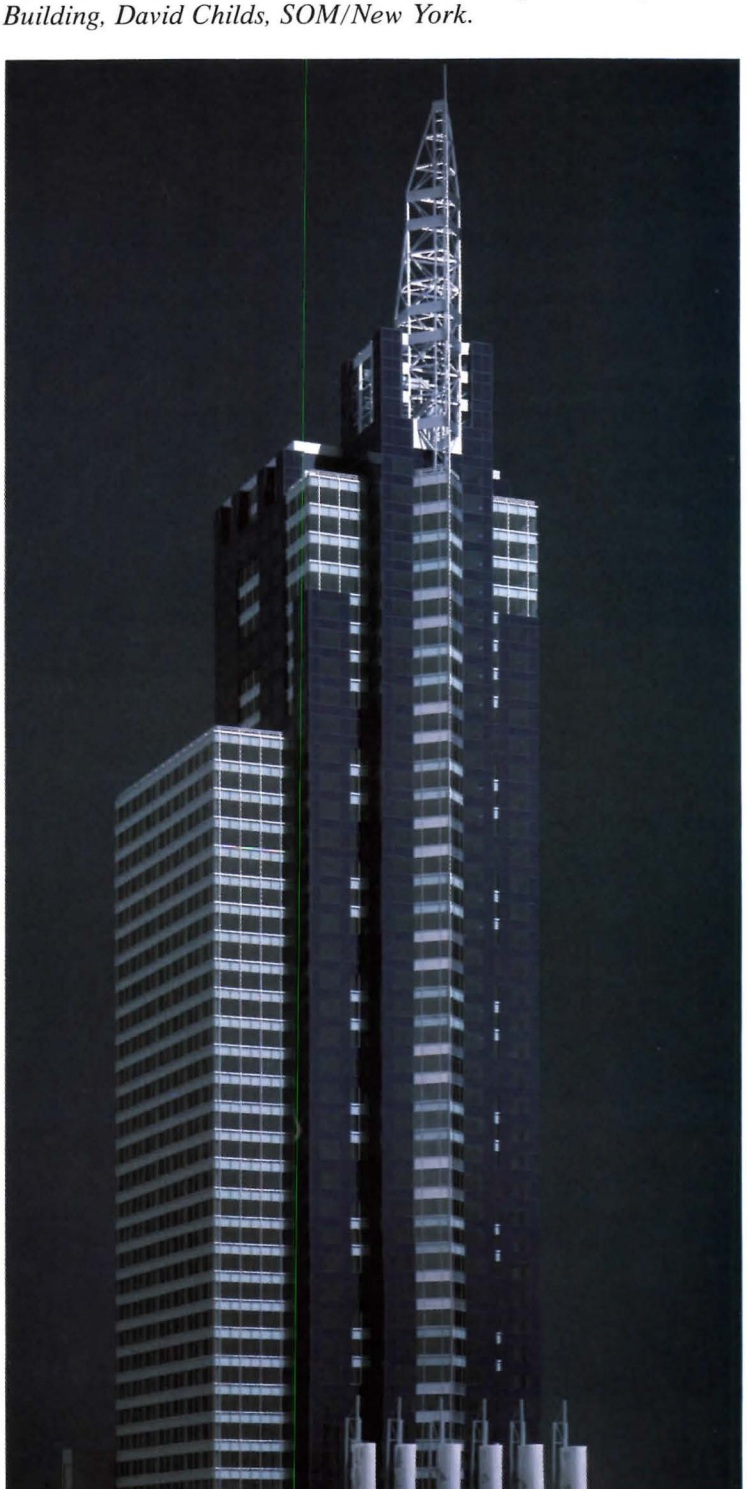
Above, Beckman Conference Center, Irvine, Calif., by Larry Doane, SOM/San Francisco. Below, model of Broadway State Building, David Childs, SOM/New York.



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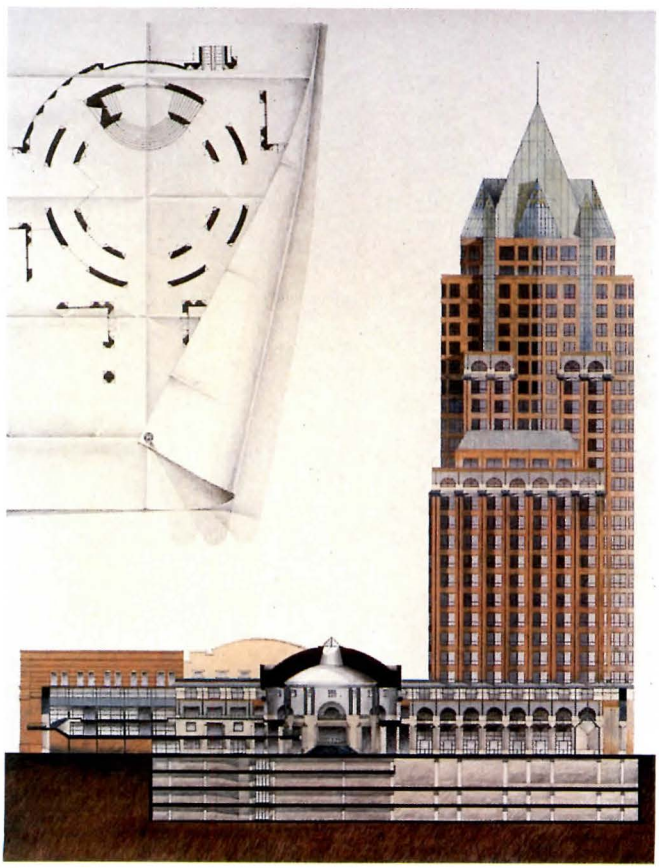
On these pages, Milwaukee Theatre District project, designed by Richard Keating, SOM/Los Angeles. A million-square-foot, mixed-use complex in downtown Milwaukee, the development will include a 30-story tower, a 220-room 'businessman's hotel,' a glass-enclosed arboretum, and a glazed galleria that will include retail space and link all the complex's components.



Photographs © Aker/Burnette

beginning to develop inherently different attitudes and esthetics."

Whatever the reasons, differences in direction among design partners are apparent. Richard Keating's tendency in Los Angeles (as it was in Houston) is toward a late modern, slick, Madison Avenue style. An often similar slickness in the buildings of Larry Doane in San Francisco is moderated by a more contextual use of materials and detailing. In Chicago, Smith combines a search for contextual appropriateness with meticulous and superb detailing; Graham is attempting to apply his longstanding structural preoccupations to a more eclectic esthetic, as at London's Bishopsgate; Diane Legge Lohan is intrigued by modern architecture and has adopted Graham's fascination with structural expression; and Joe Gonzalez's concern with context has nudged him to invent new forms that fit in with the old but are not recognizable or identifiable from existing precedents. Smith feels that Craig Hartman in Washington, who did stints in Chicago and Houston, "takes half of what Rick Keating's got and half of what we've got in Chicago and makes a blend out of it," while Michael McCarthy in New York "has always been precision oriented. He takes a building and makes an interiors project out of it."

So far, none of SOM's design partners is a "star" architect. Netsch feels the SOM of the '80s wouldn't want to absorb or encourage the sort of oddball who tends to make the deepest impression. The partners disagree, but then none of them is an oddball. As Keating says, "SOM is not known for being on the cutting edge, and that's okay by me. The important thing is that we've pushed our clients beyond where they want to go." The large scale of projects, in itself, tends to discourage the surfacing of innovative individual talent. For, as McCarthy says, "The tremendous pressure and complexity of the design process compared to the past means people have to work very closely together. It becomes difficult to accept or integrate someone too much at variance." And, as projects become increasingly massive, with multiple tenants needing to be pleased by a single design, more compromises become unavoidable.

A main reason, however, that no designer at SOM is an architectural household name is that many of its design partners are still too young to have made a significant mark. Smith, 44, made a strong start with Rowes Wharf in Boston; Childs, 47, is making his presence felt, especially in New York. As illustrated in these pages, SOM has produced some superb recent buildings and has several more on the boards or in construction. In all likelihood the reputations of Smith, Childs, and Keating will solidify, while such younger talents as Gonzalez, Legge Lohan, Turner, and Hartman, all in their 30s, will come into their own.

What of SOM's future as a firm?

Thomas Eyerman explains that SOM, like businesses everywhere, will become more global in the 1990s as developers continue to spread their wings. As developers merge, projects will become larger still. The work of SOM and other firms, Eyerman says, will become more service oriented and therefore more dependent on superior personnel, and the firm, in turn, will need to be ever more flexible and in constant transition. The increasingly complex and technical nature of the work in the '90s and beyond, he says, "will further increase the use of computer technology and will hasten the integration of architecture and engineering, which will happen faster at SOM than anywhere else."

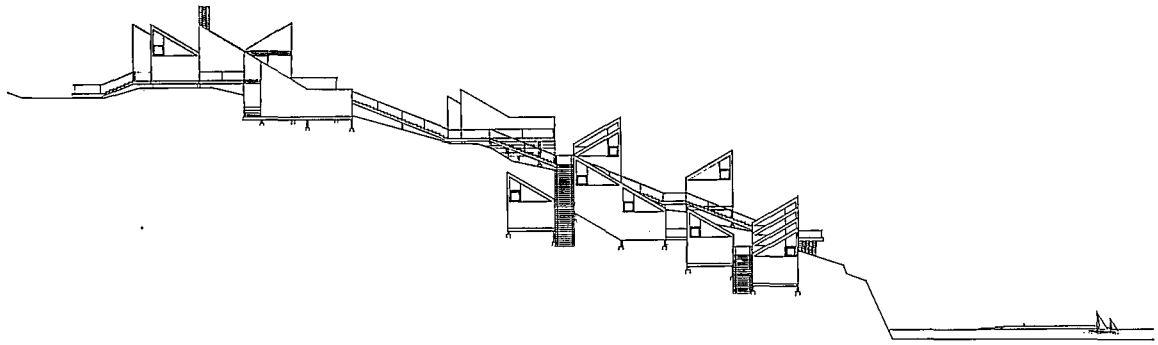
The offices that recently have grown most rapidly are, in fact, those that either have foreign business or are wooing it. The London office, only in its third year, is thriving. Located in Europe's key financial center, it will be used, SOM hopes, as a base to reach a broader European market, especially after 1992 when the European Economic Community is consolidated as a single economic entity and internal trade barriers are dismantled. SOM/Los Angeles, which is beginning to build up an Asian clientele to participate in the Pacific Rim countries' boom, has almost doubled its employees in three years. The New York office, drawing on a European heritage and building on future involvement in Europe, has in the same period jumped from about 250 to 400 employees to take advantage of the city's building boom and capture large commissions beyond its boundaries. Indicative of where the firm is going, says Childs, is SOM/New York's strong planning emphasis. "In Bunshaft's time," he says, "planning wasn't spoken here."

Despite the strong esthetic emphasis on historicism, the younger partners agree that an enriched, increasingly inclusive and tolerant re-evaluation of modernism lies ahead. The partners see more opportunity for younger architects. "Everyone seems very young," says Legge Lohan. (The average age of SOM architects and engineers is 34.) She adds, "It's not a stuffy environment. In part, that's because there is so much uncertainty in the architectural world, which allows many views to be accommodated."

Graham's impending retirement brings additional uncertainty. "The biggest worry I have is that Bruce is so goddamned smart about so many things," says Keating. "He's not an architect who all the coffee table designers might enjoy having over—he's often brutal in discussions. But his intelligence has driven the firm in ways that nobody outside SOM knows—in judgments about business and people, and making big tough decisions. There's no one around as forceful and determined."

But, then, no one at SOM is indispensable, as McCarthy reminds us. All but two design partners, Childs and Doane, were protégés of Graham and will continue his legacy. And, in many ways, says Childs, the firm has been prepared for Graham's departure. His once-mainstream emphasis on structural expression, for example, has already become a minor theme within the firm. Moreover, Bruce Graham himself has changed. "He is a very different person than he was 10 years ago," says Childs. "If he had suddenly died or resigned then, that would have been a terrible shock." More and more, Graham has let go to work with larger issues, such as the SOM Foundation, the SOM Institute, and the redesign of Barcelona.

In a similar vein, SOM/San Francisco's Larry Doane concludes that SOM's "job is to realize that we're not just preserving history but making it, and to assure that we're establishing ground rules that can serve for a long time." □

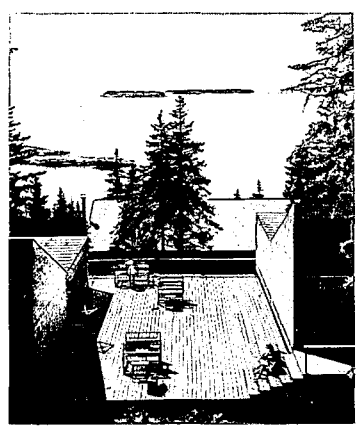


Evaluation: A Classic that Retains Its Appeal

Edward L. Barnes's Haystack Mountain School.
By Robert Campbell, AIA

Haystack Mountain School of Crafts is a building that, in its day, helped point an important new direction for American architecture. It remains, a quarter-century later, a remarkably fresh success.

Appealing to an extraordinary range of tastes, Haystack is admired—beloved, really—by its students, its faculty, its staff, and its neighbors, as well as by the normally hypercritical architectural community. As bold in conception as it is modest in execution, it has by now acquired the status of a New England classic.



© Joseph W. Molitor

Haystack is a summer craft school that serves a maximum of 80 students at any one time. The students, of all ages and levels of experience, come for two-week stints in the summer to engage in pottery, weaving, printmaking, sculpture, metalwork, woodwork, glassblowing, drawing, photography, or basketry. They live, eat, and work at the school.

Haystack's site isn't a mountain, as its name falsely suggests. The school moved in 1962 from an inland farm near Haystack Mountain to its present oceanfront site on lonely and beautiful Deer Isle in Maine. When they decided on the move, the trustees chose as their architect Edward Larrabee Barnes. Barnes still remembers his first visit to the site.

"There were thick spruces on a granite slope falling 80 feet due south to the ocean," he says. "Facing south, it's very benign. Out in the water were scattered islands to give you a sense of distance."

The slope is kept moist by frequent sea fogs. It is thickly carpeted with a ground cover of mosses and lichen that are intensely, almost electrically green. Granite boulders heave up through this cover. Exposed roots and fallen needles from the spruces enrich the texture, as do clusters of wildflowers. The effect is that of a natural Japanese garden.

"When we were first there," recalls Barnes, "the school trustees asked me whether we should build at the top of the slope, where it's level, or at the bottom, near the sea. It didn't take me any time at all to feel that we should do neither. We should build on the slope itself."

Esthetically, the problem at Haystack was to develop so beautiful a site without ruining it. Barnes solved that problem in an extraordinary manner. He conceived a village of about 20 shingled cottages connected by a system of wooden walkways. The village and its walkways hover a few feet above the ground, which seems to flow beneath them like a green sea tide. Only the supporting posts meet the earth. Haystack, thus, is like a marina. It is a network of docks and cabins, one that floats over land rather than water.

The approach to Haystack is by car. Deer Isle is thinly populated and far from cities. You drive for a long time past small villages and coves and into a spruce forest. The road grows rougher. Seeing a sign, you park. By this time, you have a sense of a place that is isolated and distant. You walk forward on a path over rocks and spruce needles and arrive at the top of the granite slope.

Here you see, for the first time, the single, powerful element that orders the entire experience of Haystack. This is a long staircase that descends, gently but absolutely straight, from the top of the slope to the ocean.

You enter the school at its top and walk down the stair due south toward the sea. The stair points like an arrow at the shore and the horizon. It keeps the seascape always in view. At its broad and frequent landing decks, walkways peel off to left and right, like ribs from a spine, toward workshops or dorms. At its bottom, their stair terminates in a small, quiet lookout for contemplating the sea.

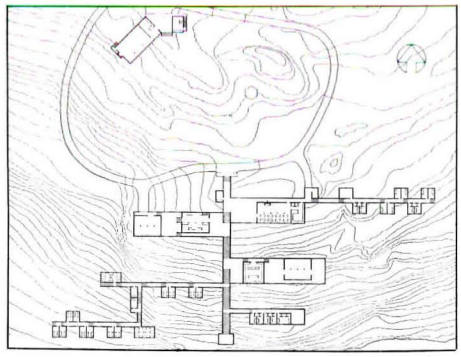
At Haystack you are continually moving or pausing along this central stair. Here you meet the other members of the community, mingle with them, and see the work they are doing. The stair and its landing decks are Haystack's agora.

The different functions are organized logically. Public places and workshops are near the top of the slope, where they can be easily serviced, and dormitory cabins are farther down, where they have more privacy. Also logical is the architecture, which is as simple as it well could be. All the buildings are built of 2x4 framing, plank sheathing, and shingles. Used only in summer, they have no heat or insulation. They cost about $5 a square foot in 1962.

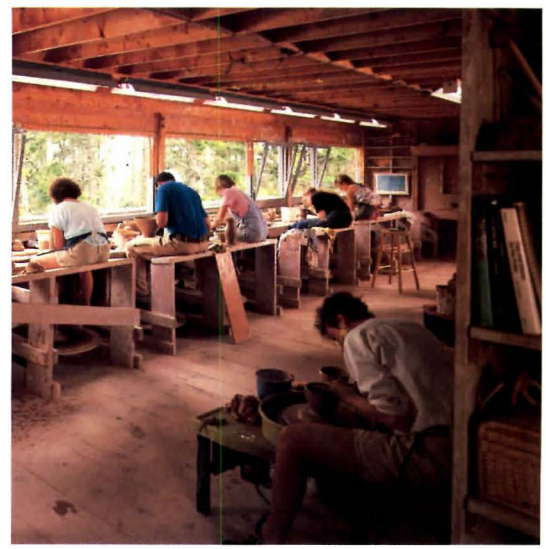
There are only two building types—the dormitory cabins and the workshops (the dining hall being conceived as a big workshop for the craft of cooking). Both types have a 45-degree shed roof. The roofs point either up the slope or down toward the ocean, never to the side. In the workshops, roofs point north, allowing big windows to flood the space with glare-free light. Ribbon windows in the low south walls allow a view of the ocean without admitting much sun. In the smaller dorm cabins, by contrast, the roofs can point either way—north or south—but the

Wooden walkways connect 20-odd shingled cottages as they meander down the granite slope to the ocean. Left, near the slope's top are the public spaces and the workshops and, above, farther down the slope are the dormitories.

© Steve Rosenthal



Below left, walkways and shingled cottages hover a few feet above the ground; below right, the naturally lighted workshop. Right, granite boulders become a natural Japanese garden for this summer crafts school, whose shingles have weathered to a granite-colored gray.



windows are high in the triangular east-west sides, preserving privacy while allowing views up into the spruce boughs. Again, horizontal ribbons open the ocean view.

Once you've seen it, this language of shapes and openings is so sensible it seems inevitable. But like most "inevitable" ideas, it took time to develop. Much of it grew from a design for an unbuilt studio that Barnes made four or five years before Haystack.

Haystack's surfaces are all shingle, now weathered gray. "It was the first time I'd had roofs and walls of the same material and achieved this blocklike volume," notes Barnes. As in so much traditional New England architecture, the roof meets the wall at a right angle, without any overhang. Because of that joint the buildings look sharp, clean-cut, man-made. Set in their rich surroundings, they embody a rare balance between the natural and the human. Their color is like that of the granite on the site, and their shapes and textures are like those of nearby fishing villages. But they don't look in the least organic or picturesque. Their architectural form and their siting are much too geometric for that. Instead, the buildings manifest the presence of a cool, rational human intelligence working in sympathy with a natural setting.

As the years have passed, it must be admitted, some of Barnes's rigor has eroded. Just as old people are said to grow to resemble their pet dogs, so Barnes's buildings are taking on some of the character of the site. They are beginning to seem themselves part of nature as their shingles grow hoary and glow softly with the moist green of mosses or lichens. Barnes professes himself delighted with the evolution.

It is possible, of course, to escape the grid of raised walkways out at the edges of the school. If you do that, you find yourself on barely defined wandering paths. One leads to a flat granite ledge at water's edge for picnicking, another to the metal- and glass-working forge, which for reasons of fire safety is off to one side. Another brings you to an improbable art-supply shop in the woods. Deep in the spruce glades, you come across mysterious sculptures that seem to have been left by some earlier civilization but are actually, of course, products of the school's programs.

Having presented Haystack, up to this point, more or less as nirvana, I should insert a couple of qualifications. The school hasn't needed a great deal of maintenance, but there have been some problems. The timber substructures that lift the cottages above the ground have often racked. They have been rather thoughtlessly stiffened with randomly angled diagonal bracing. The wastewater system also has been changed. It flows by gravity in pipes that simply lie on the ground and empty into a main beneath the central stair. Originally, the main emptied into the ocean. It has had to be revised so that the waste now flows all the way to the bottom of the stair, as before, but is then pumped all the way back up into a leaching system. Strange, but workable.

Over the years Haystack has grown a little. A few dorms and walkways have been added, indistinguishable from the originals. Other additions are a little way off in the woods. The new forge isn't shingled, but its corrugated exterior has the Haystack sense of unforced rightness. An auditorium is a little too urbane but is okay. A couple of extra tents and sheds are fine.

Haystack possesses more significance in the story of American architecture than it usually is credited with. It was designed at a moment when many leading American architects—Rudolph, Franzen, Johansen, Breuer, Saarinen, for example—were tending toward elaborate sculptural form as a means of relieving the monotony of the International Style. Haystack was a conscious reaction against that trend and an influential one.

"I felt that was a very necessary statement to make," Barnes remembers. "I felt that architecture was becoming much too busy. You have to remember the Breuer esthetic that I'd been brought up with—one wall of wood siding, another of stone, perhaps a wall painted bright blue. I thought that was very busy, especially when every architect and his brother started to do it and it was mass-produced. I've always been drawn to making things as simple as possible if you can do that without making them inhuman or dull or oppressive.

Haystack's simplicity, its natural materials, its clean-cut angular shapes, its vernacular reference, its attitude of leaving nature untouched—all those qualities exercised an influence that was immediate and strong but remains largely unrecognized. A whole generation of shed-roofed American buildings, starting with MLTW's Sea Ranch in California, belongs in some degree to a tradition begun by Ed Barnes at Haystack Mountain School of Crafts. □

Photographs © Richard Payne, AIA

Design Clarity and Urban Synthesis

The Walker Art Center sculpture garden, Minneapolis. By Barbara Koerble

If clarity has become a byword for the design approach of Edward Larrabee Barnes, FAIA, his plan for the new Minneapolis Sculpture Garden also represents a notable synthesis. Barnes's design draws the envelopes of space within the Walker Art Center outside, where modern sculpture can play against the strong classical foil of his garden plan.

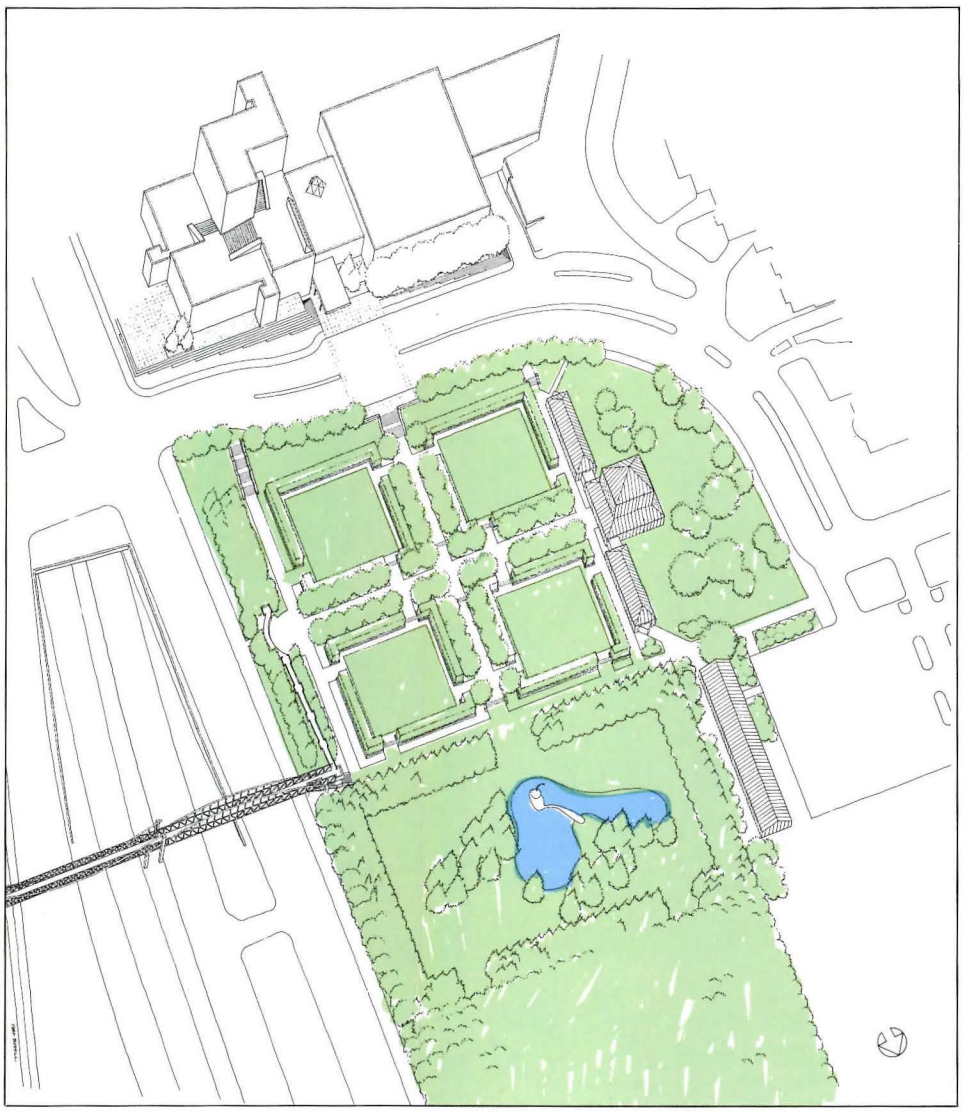
The 7.5-acre sculpture garden is one of the largest urban sculpture centers in the nation. A joint project of the Walker Art Center and the Minneapolis Park and Recreation Board, it will also feature year-round horticultural displays in the new Sage and John Cowles Conservatory, located on the grounds and designed by Barnes's partner, Alistair Bevington. The sculpture garden was designed by the Barnes firm in association with landscape architect Peter Rothschild of Quennell Rothschild Associates; the conservatory's Regis Gardens are by Barbara Stauffacher Solomon and Michael Van Valkenburgh.

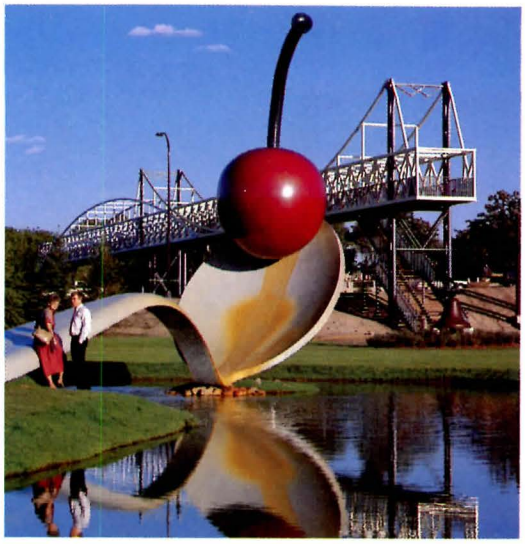
In many ways, the Walker Art Center finds itself at the vanguard. Programmatically, under the leadership of Martin Friedman, it has established a national reputation as a leading center for the study of the most avant-garde developments in contemporary art. Physically, the museum nestles comfortably against a residential backdrop to the west, sharing its site and a central lobby with the Guthrie Theater. Yet to the east it confronts 16 lanes of high-speed freeway traffic that sever it from downtown Minneapolis and the city's Loring Park.

But the Walker seems to have a knack for turning liabilities into assets. Barnes's memorable 1971 design, with its vertical progression of boxlike galleries, was necessitated by the many physical constraints of a difficult site. His plan also reflected Friedman's strong interest in contemporary sculpture. To provide more space for large works, Barnes designed the rooftops as sculpture terraces, continuing the helical procession from indoors to outdoors. His 1984 addition to the Walker extended its central helix by burrowing underground, creating more sculpture terraces around the base of the building.

Despite the Walker's special accommodation of sculpture, the underutilized park across the street irresistibly beckoned to Friedman. He and David Fisher, superintendent of the park board, saw creation of the new garden as an opportunity to repair the physical rift between the museum and Loring Park caused by Interstate 94. Rather than building yet another generic Minneapolis skybridge to join the two, the Walker commissioned artist Siah Armajani to design a pedestrian crossing. His 375-foot-long footbridge spans the yawning freeway chasm with an inverted pair of catenary arches, gaily painted pale blue and yellow. Minneapolis's necklace of parks and lakes is unparalleled as a local

Ms. Koerble is a graduate student in art history at the University of North Texas whose master's thesis deals with the museum designs of Edward Larrabee Barnes.





Facing page, the conservatory and portion of the courtyards. Above, sculptures: 'Spoonbridge and Cherry' by Claes Oldenburg and Coosje van Bruggen (top) and Richard Stankiewicz's 'Grass.'

amenity, and the Irene Hixon Whitney Bridge re-integrates the sculpture park as a link in this verdant chain.

Barnes suggests that "the big thing this design is doing is suddenly linking the Walker-Guthrie entrance in a city plan." Indeed, as one crosses over the bridge from Loring Park, the sculpture garden is seen as a grand new foreground for the Walker and Guthrie Theater complex.

The garden plan is classically simple, symmetrical, and commodious as a setting for sculpture. The central *parti* is a cross-axis that establishes four equal courts. These are balanced to the south by the blocks of the Walker and the Guthrie Theater and to the north by an open, rectangular meadow.

The axes are wide allées of compacted crushed limestone, lined with linden trees. Long, unimpeded vistas are the signature of the design, unifying the heroic scale of the site. The east-west allée is terminated on the west by the new conservatory and on the east by an apse that forms a classical sculpture niche.

Because of the block's isolation, it was obvious to Barnes that a strong site plan was needed to unite the garden with the museum and theater across the street. The formal garden plan resulted not so much from a desire for symmetry as from, as Barnes relates, the need for "something to rivet the axis of the lobby." So the strong north-south axis was drawn perpendicular to the Walker-Guthrie blocks. "Once you have a line like that, you find yourself into the whole system of axial planning. And I felt the need of a strong axis and a strong connection to cross on that line."

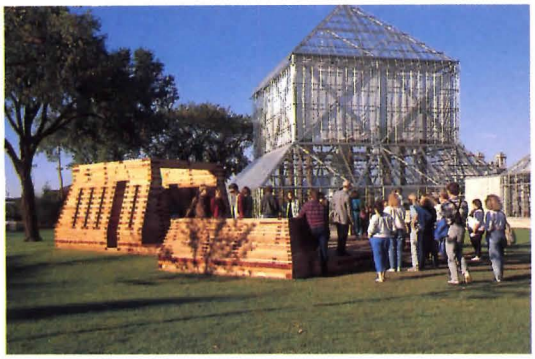
The heart of the sculpture garden plan is the four 100-foot-square grass courtyards, each framed by double-walled stone planters containing arborvitae. These plantings are still immature but in a few years' time will be clipped to resemble the crisp box hedges that outline traditional European parterre gardens.

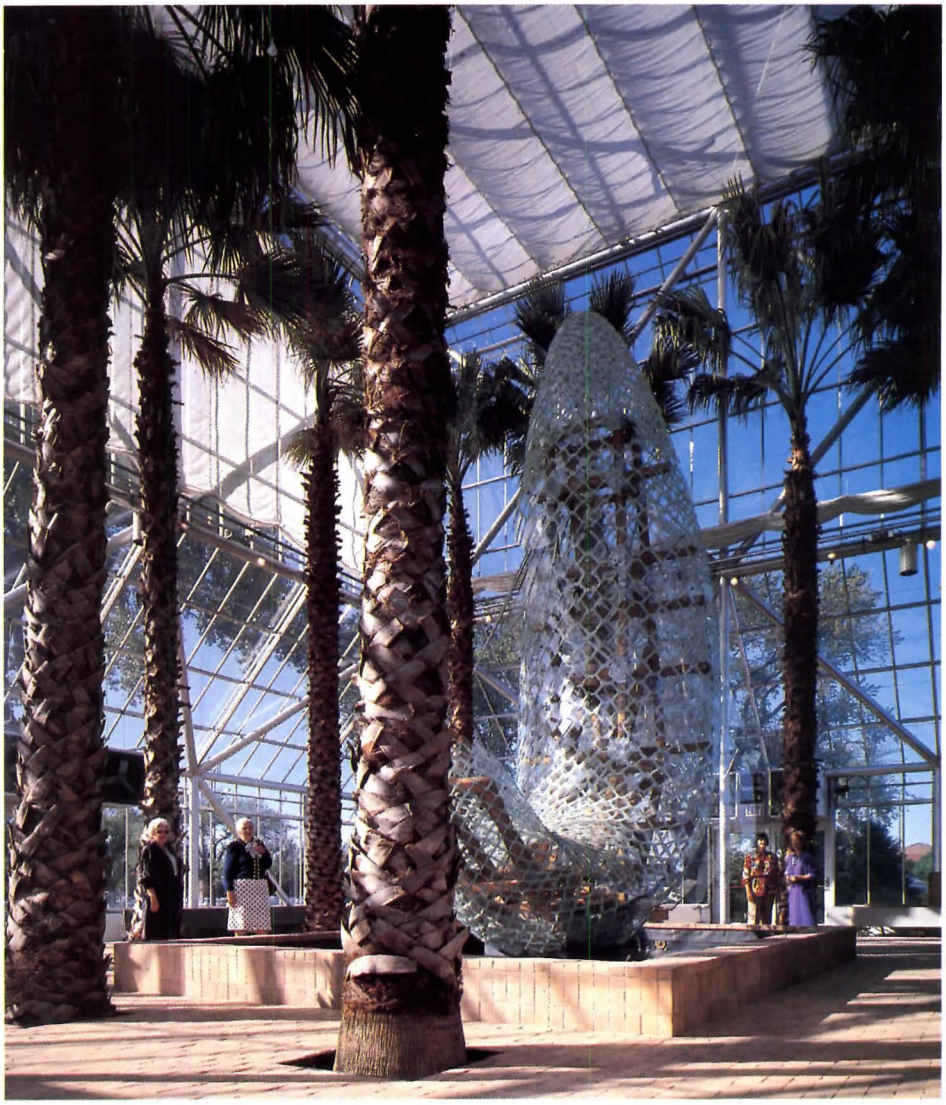
Seventeenth-century illustrations of the gardens of the Villa Medici present a striking parallel to the Walker's garden plan, particularly in its combination of box parterres with long rows of trees along the allées.

Barnes recalls that during his morning jogs through the Boboli Gardens in Florence he was struck by how "the different rooms in these gardens are completely cut off from each other by the height of the hedges. So I came back and talked to Martin about making rooms, and putting in the trees, so that in 10 years they would be really private rooms." To achieve this privacy, the arborvitae hedges surrounding the grass courts may be allowed to grow to a height of 15 feet.

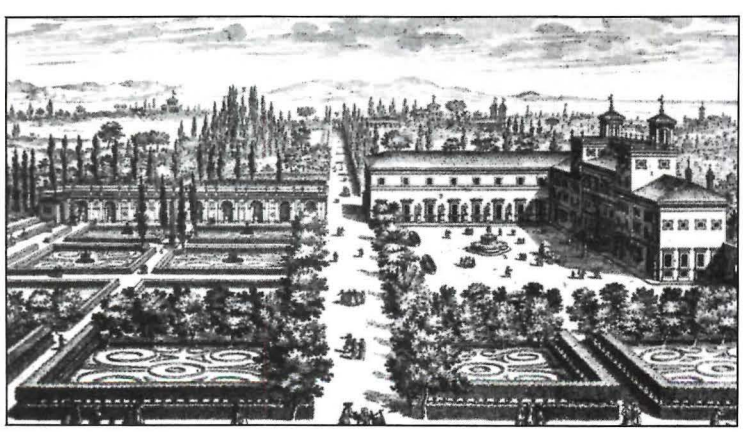
Barnes stresses that it will take time for the plantings to "settle in" and for the powerful architectural form of the foliage to be fully realized. He anticipates that the garden will, in maturity, be a mysterious place, shadowy and romantic.

European parterre gardens were often completely enclosed, containing decorative plantings and patterns to be admired from outside the garden. Barnes instead created unembellished outdoor galleries to walk through. In this way, the minimal architecture of the Walker extends itself into the garden. The analogy to the Walker design is continued in the carefully planned openings in the court's hedges to frame views of sculptures within, an effect not unlike Barnes's placement of wide doorways between the Walker's galleries to give glimpses of the next floor. Noting the deliberate break Barnes made with the Olmsted-style naturalism of other Minneapolis parks, Friedman describes their shared goal of a "museum character" for the sculpture garden:

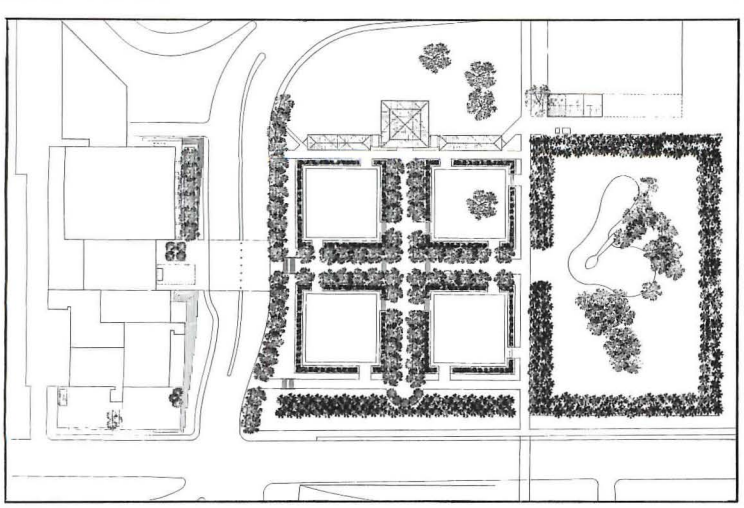




Photographs © Richard Payne, AIA



Courtesy of Hacker Art Books



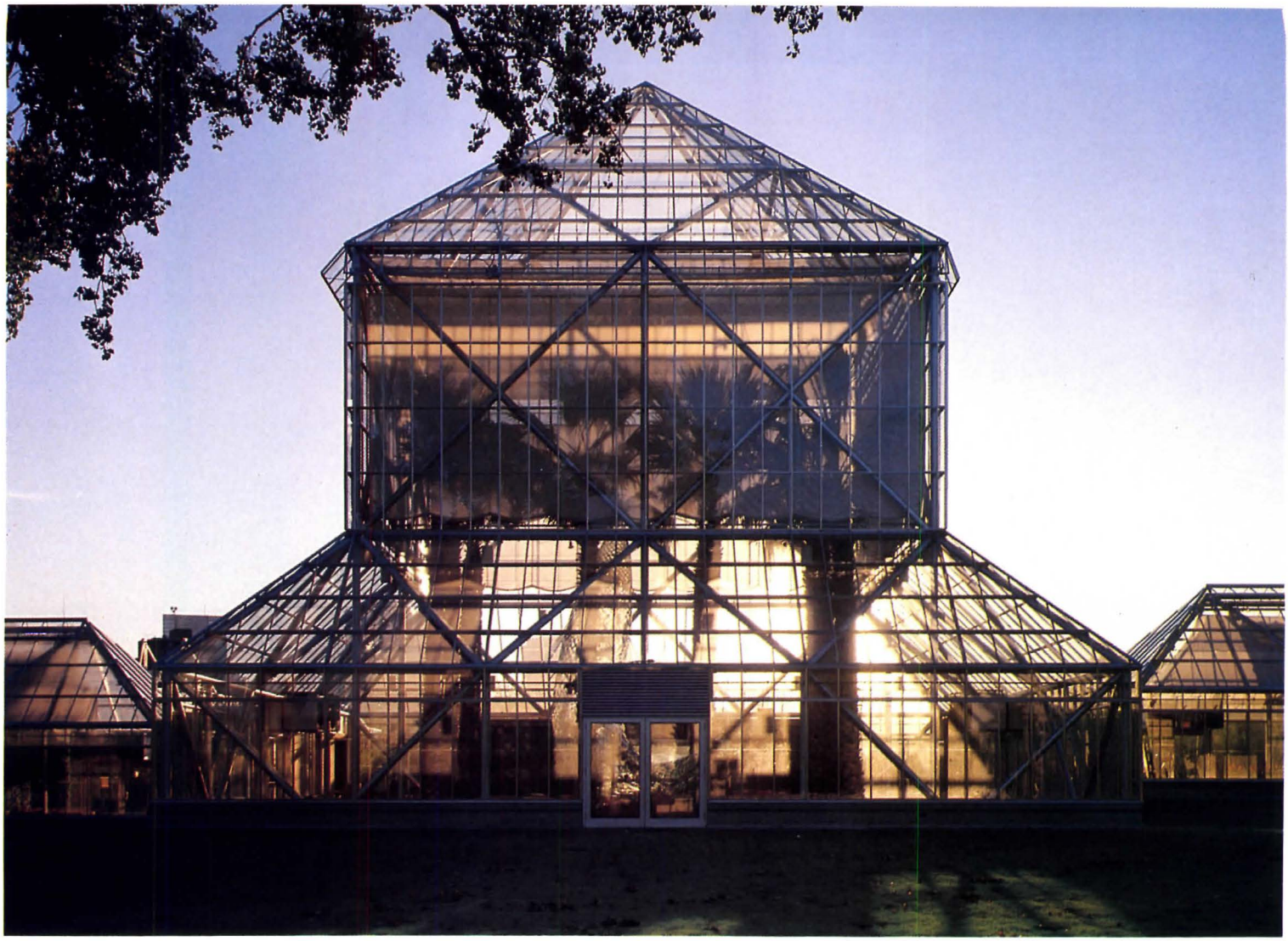
"There is an outside museum as well as an inside museum."

To provide this strong architectonic framework, Peter Rothschild selected trees such as the Glenleven Littleleaf linden, which would lend themselves to pruning. Rothschild and associate Claudia Thornton obtained no fewer than 875 arborvitae, 200 Black Hills spruce trees, and 70 linden trees. A constraint on the landscape architects was the stipulation that the garden have no floral displays, nothing to compete with the sculpture.

Extensive grading of the site was required to achieve the terracing of the courts, which step down to the north. The granite planters sharply define the grade. The same carnelian granite that paved the Walker's roof terraces is used for the garden's stairs and planter walls. In contrast to the predominantly European character of the garden, Rothschild found inspiration for the low stone walls in New England. The rustic effect of a split-faced stone appealed to him, as he explains, because "we were trying to create a marriage between what was very architectural and planned and a reality that was full of growing plants and grass and nature. The idea was to soften the effect of the walls by making them seem more like *the kind* of walls that a farmer in New England might have laid." The battered walls are self-supporting and laid with soil, not mortar, allowing for natural movement as the ground freezes and thaws.

The rectangular meadow at the garden's north end is defined

Facing page, the conservatory's facade opposite the gardens. This page, right, Gehry's fish sculpture is the centerpiece of the conservatory's main pavilion. Left, from top: Jackie Ferrara's 'Belvedere'; 'BLACKVAULTfalloffstone' by Peter Shelton; 'Prophecy of the Ancients' by Brower Hatcher. In drawings, left, Barnes's formal garden plan reflects 17th-century European designs; Medici Gardens above.



by double rows of Black Hills spruce trees. The focal point of this court is a colossal fountain sculpture, titled Spoonbridge and Cherry, by Claes Oldenburg and Coosje van Bruggen. Sited over an elongated pond, the sculpture slyly usurps the role of the traditional *isolotto* in Italian gardens. For Barnes, however, a key idea was to have water act as the terminus to the long view down the garden's central axis. "What can you put at the end of the vista any better than something that reflects the sky?" he says.

Barnes's partner Alistair Bevington's conservatory is a strong, yet exceptionally delicate, building. The most striking view of it is by night, as its softly glowing transparent volumes rise above the garden. Its spare elegance results from the strength of its cross-braced welded frame formed of six-inch-diameter structural steel tubing. Over this simple structure is laid a traditional light aluminum and clear glass greenhouse skin. The symmetry of the garden plan is reiterated in the conservatory's pair of low, 110-foot-long side wings that flank a 62-foot-high central pavilion. While the long houses are familiar greenhouse forms, the pavilion is an exercise in pure geometry, composed of elemental Barnesian prime forms.

The building's delicate appearance belies a heavy concrete foundation system with 80-foot-long piles, all necessitated by an unstable site. The land was a former lake bed, and, as the underlying layers of peat would compress under pressure, piles had to be driven down to bedrock. Bevington notes that much more of the building's weight is actually below ground than above.

The enormous expense of the foundation eclipsed earlier and more costly schemes for the greenhouse design. As it turned out, modesty is the virtue of the final plan. One early scheme featuring sheer side walls rising up into a counterpoint of shed roofs appeared too monumental, for both people outside and plantings within. The reduced upper mass of the final pavilion design and the low eaves of its side wings keep it at a comfortably human scale. Bevington says, "We used a traditional form of glazing, and that rather conditioned the kind of house we got." Small details such as the lapped horizontal joints of the greenhouse skin give the building its charm and prevent it from being merely a cold, high-tech cage. A feature appreciated in the Minneapolis winter is an interior walkway through the building that keeps visitors warm on their way from a parking area west of the garden up to the Walker-Guthrie lobby.

Regarding their design for the conservatory's Regis Gardens, Michael Van Valkenburgh recalls that he and Barbara Solomon shared the idea of "repeating an element all the way down the long houses" and treating the central court as a stopping place. These repeated planar elements flank the through-axis that continues from the north entrance to the end of the south house. In the south house, Van Valkenburgh divided the interior with a series of hanging scrims that support a delicate tracery of clinging vines. Solomon's four topiary archways in the north wing amplify the formal link to the architectural character of the outdoor garden. Within the long houses are massed beds of intensely aromatic white gardenias and brilliant orange bird-of-paradise.

The most nontraditional of the glass enclosures, the tall house is conversely the setting for what Solomon calls "the classic palm court." The tranquil pool with water lilies encircled by palms could be a scene from a 19th-century winter garden. Yet what 19th-century glass house ever boasted Frank Gehry's Standing Glass Fish as a centerpiece? The translucent sculpture shimmers within a cage of palm tree trunks and the prismatic glass house. Solomon's comment that "the division between nature and art is invisible" sums up the design not only of the conservatory but of the sculpture garden as a whole. □

Please Touch Museum

The Lasting Influence Of Architectural Toys

On a variety of architects. By Nora Richter Greer

Whether childhood play with architectural toys influences the choice of architecture for one's career is debatable, even, some would say, in the case of Frank Lloyd Wright and Froebel blocks. That architectural toys—both new and antique—can provide hours of enjoyment to both child and adult is unquestionable. Perhaps most wondrous, though, is the discovery that architectural toys reflect distinct stylistic predilections and technological advances of two centuries' worth of architecture's evolution.

"A small interior world of color and form now come within grasp of small fingers," wrote Wright in his autobiography. "Color and pattern, in the flat, in the round. Here was something for invention to seize, and use to create. These Gifts came into the gray house in drab old Weymouth and made something live there that had never lived there before." First introduced in the 1840s in Germany by Friedrich Froebel, wooden blocks called Gifts came in three basic shapes—cube, cylinder, and sphere.

Toys appear in paintings and drawings of the 1700s, but such toys belonged mainly to children of elite families. Well into the 1800s, child's play was an unacknowledged activity, since a child was considered merely a small adult. If play was allowed at all, it had to be linked to either religion or education. For instance, during the mid-1800s an acceptable toy was a set of wooden alphabet blocks, first advocated by the English philosopher John Locke as early as 1693. Locke considered play a learning process that could be educationally stimulating and pleasurable for children.

The Industrial Revolution brought far-reaching changes. Mass production meant that significantly more households could acquire less expensive toys. The kindergarten, developed in Europe in the 1840s, took root in the United States, and with it came a more positive regard for play in childhood. By the beginning of the 20th century each child received on the average two toys a year—a far cry from modern times. But this meant that toys were highly revered, particularly architectural toys that could bring hours of delight. The care given to such toys is reflected in the packaging: toys were stored in elaborate boxes in a precise order, which enabled a child to keep track of each piece.

What a child can learn from playing with architectural toys is "an intuitive sense of structure, of posts and beams, of bearing walls, of balances of forces," in the words of Robert Craycroft, AIA, a professor at Mississippi State University's school of architecture and an avid collector of architectural toys. "If some underlying reason can be found for the prevalence of building toys," Craycroft continues, "it may well be that they mirror values shared by both the parents and the manufacturers, values that are tied to a child's development as a person—namely, the sense of personal worth gained in constructing something, the human awareness and identification necessary to bring that construction to life, and the feeling of responsibility necessary to take apart and rebox the various pieces for future years."

In 1923 Le Corbusier wrote, "Architecture is the skillful, exact, and magnificent game of assembling volumes in light. Our eyes are made to see forms in light; light and shade reveal forms; the cube, cone, sphere, cylinder, and pyramid are the important primary forms which light reveals so well; it gives us a clear-cut, tangible image of them, without ambiguity. That is why they are beautiful forms, the most beautiful. Everyone agrees on that point, the child, the savage, and the metaphysician. It is the very condition of the plastic arts."

One can surmise the influence of architectural toys on modern-day architects and their buildings: for instance, the Sears Tower in Chicago as a conglomeration of rectangular wooden building blocks, or Washington Harbour in the District of Columbia as a Tinkertoy creation. The list could go on and on. Here is what a few leading architects recently acknowledged:

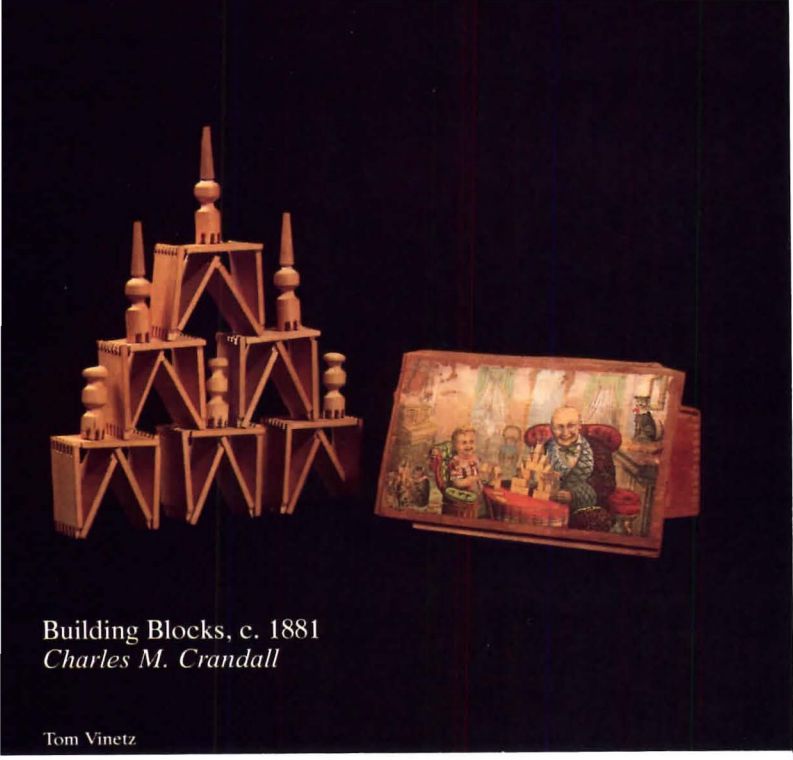
As a child, John Burgee, now principal of John Burgee Associates in New York City, played a building game with his late brother Joseph, also an architect. One would position himself in the parlor, the other on the porch, with the shade drawn over the glass door between them. Each would build with Lincoln Logs, and, when the shade was raised, the one with the best design won. (Toy collector Craycroft suggests that "the child playing with Lincoln Logs had to overcome numerous difficulties to obtain a working knowledge of balance and proportion, in much the same way as building designers overcome more complex problems in the adult world.")

David Childs, FAIA, of Skidmore, Owings & Merrill's New York office also played with Lincoln Logs, but prides himself on having had a handcrafted set that looked indigenous to the Adirondacks. Little wonder Childs plans someday to build a real log cabin on land he owns in upstate New York. But what he adored most during his childhood, he says, were his grandmother's maple blocks, which he dovetailed into arches, cylinders, and cones and which fit into a wooden box like a "Chinese puzzle."

William Grover, FAIA, turned away from store-bought toys and built complicated structures with cardboard boxes to please the household cat. "In an additive way," he says, he created megacities complete with gable-roofed houses. Another collector of toys, Charles Moore, FAIA, has been seen carrying a large ceramic model church on his lap between Mexico and the United States. Peter Bohlin, FAIA, acknowledges recently borrowing the shapes and colors of stone blocks he played with as a boy for some playground structures.

"Taken as a whole, toys become an archeology of architectural taste or architectural values," Craycroft says. His sentiment is borne out in a brief chronology of toy evolution.

Above, Scott Manufacturing Co.'s Bilt-E-Z instruction guide.



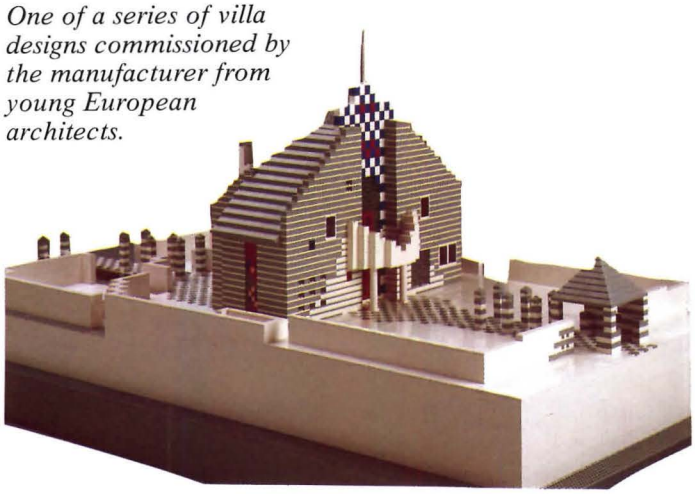
Building Blocks, c. 1881
Charles M. Crandall

Tom Vinetz

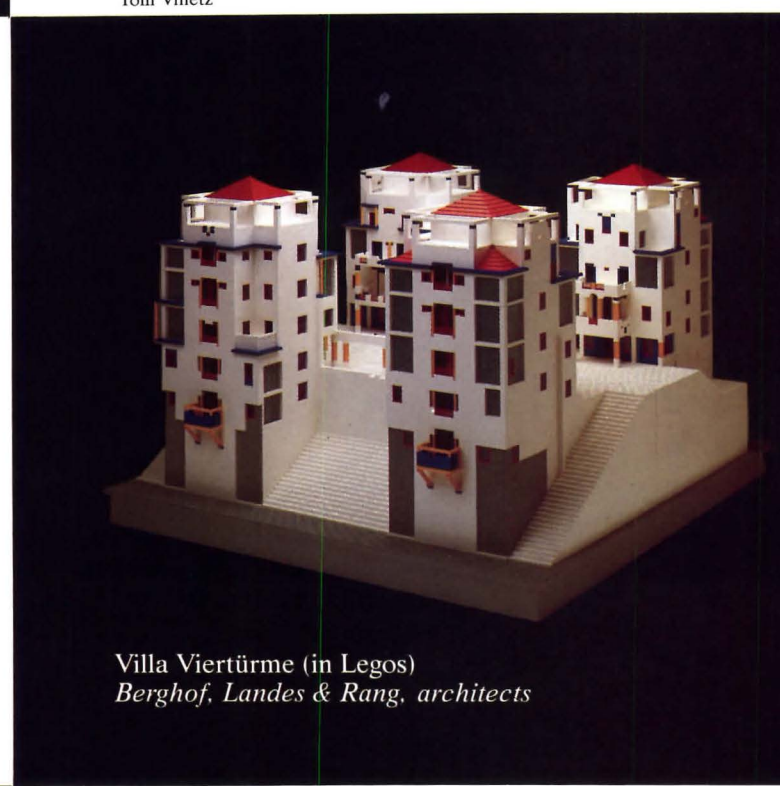
Dandanah: The Fairy Palace, c. 1925
Bruno Taut, designer

Tom Vinetz

One of a series of villa designs commissioned by the manufacturer from young European architects.



A Lego house
Reijo Niskasaari, architect

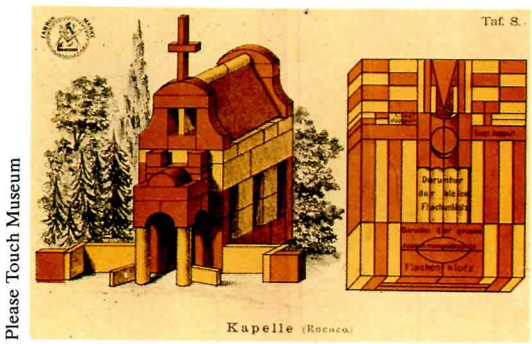


Villa Viertürme (in Legos)
Berghof, Landes & Rang, architects

In the real nowhereland (in Legos)
Jochem Jourdan, Bernhard Müller, architects

New Pretty Village, c. 1900
McLoughlin Brothers

Tom Vinetz



Please Touch Museum

Above, from Richter's Anchor Blocks instruction booklet, c. 1900.

1700s. Documentation is sketchy, but paintings, drawings, and literature offer evidence that some architectural toys exist, although they are crude.

1830s. Card houses are in vogue.

1840s. Froebel blocks.

1858. S.L. Hill's Spelling Blocks is the first architectural toy produced in significant quantities.

1865. Vermont Novelty Works' Log Cabin Playhouse, a forerunner of Lincoln Logs, introduces the first pure structural element—iron reinforcing bars that hold the logs together.

1867. Charles Crandall, a furniture manufacturer, invents tongue-and-groove croquet equipment and in the process produces short, thin pieces of wood with which his two sons build toy houses, bridges, and fences.

1881. Jesse Crandall (brother of Charles) introduces nested blocks for ease of shipping.

Late 1880s. R. Bliss Manufacturing Co.'s blocks are named Noah's Ark, Star of Bethlehem ABC Blocks, and Bible Picture and combine "the excitement over construction toys with the custom in America of allowing toys to be brought out only on Sundays," in toy collector Arlan Coffman's words.

Ceramic stone blocks developed by F.A. Richter in Germany are marketed in the United States by Milton Bradley Co. Compliance with the precise instructions in lavishly illustrated booklets leads to the creation of extraordinary Romanesque revival buildings.

1890s. Richter introduces metal pieces. It is no coincidence that the erection of the Eiffel Tower in Paris in 1889 receives worldwide attention.

1900s. New and lighter materials are gradually introduced, including tin and other metals and plastics. The Englishman Frank Hornby creates the first articulated-framework construction toy—Mechanics Made Easy, later renamed Meccano, the predecessor of Erector Sets.

1904. American Art Stone and Manufacturing Co. adds tiny "steel" beams to stone block sets to ease construction of Sullivanesque skyscrapers.

1909. A.C. Gilbert introduces Mysto-Erector, which becomes the Erector Set, the first toy with gears, pinions, and electric motor.

1914. After watching children play with sticks and spools, Charles Pajeau invents Tinkertoys.

1915. In Europe Wenebrik toys, made entirely of interlocking metal pieces, express a worker's esthetic.

1918. John Lloyd Wright (Frank's son) invents Lincoln Logs.

1920s. Scotts Manufacturing Co.'s Bilt-E-Z consists of stamped metal facades to build "proud and elegant skyscrapers." Construction is based on modular structural bays.

Bruno Taut designs "sparkling" glass blocks for his Fairy Palace set.

1945. Rig-A-Jig, the "wonder toy from Hollywood," has flat masonite pieces that resemble Tinkertoys.

1950s. The architectural toy market explodes, as plastic begins to revolutionize the industry. Legos, Bayko, Skyline Construction Sets, and Plastic Block City are just a few of the new plastic toys.

Charles Eames designs a house of cards.

Life-size building blocks are introduced.

A curtain wall building toy has turquoise wall panels that snap onto plastic frames.

1960s. Kenner Products introduces a motorized girder and plastic panel set called Build-A-Home Subdivision. Playskool Toys introduces Bristle Blocks, which stick to one another by means of bristles on each side. The Earthquake set features a motor that rattles a newly constructed skyscraper.

1970s-present. Creative Playthings' Soft Blocks are made of cloth-covered foam. Dutch Futura Construction sets borrow from the *de Stijl* esthetic; American Arkitek reflects the vision of Paul Rudolph. Bauhaus Blocks, designed in 1923, are reintroduced.

It is precisely because architectural toys foster a child's discovery of the environment and encourage creative play that they will survive. "Toys reflect our concern for the built environment," Coffman says, "and its ability to improve the quality of our lives—our belief in invention and, creatively, in the future, in ourselves." Who knows what architectural toys this postmodern era will spur? □

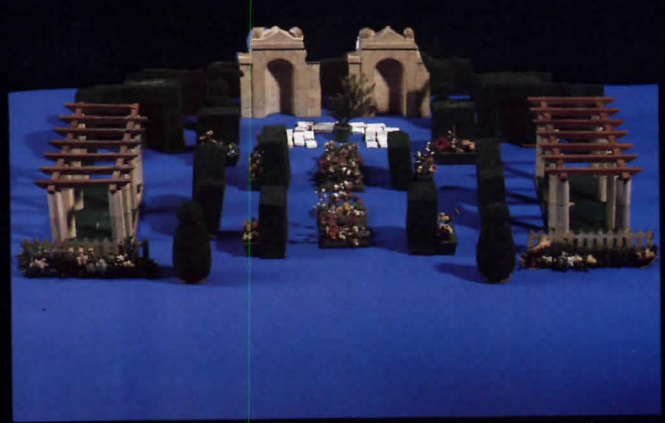
Captain Kidd's Castle, pat. 1884
Charles M. Crandall

Curtain Wall Builder
Tinkertoy, c. 1959

Card Castles
Germany, c. late 1830s

Erector Skyscraper Set
A.C. Gilbert Co., c. 1935

Lincoln Logs, combination set
John Lloyd Wright, Inc., c. 1928

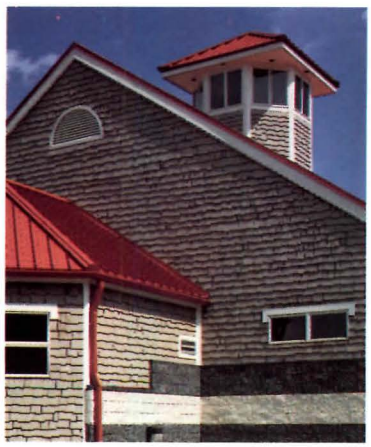


Child's version of a classical garden
Early 20th century, England

Photographs by Tom Vinetz

Kaleidoscope

© Tom Guidera



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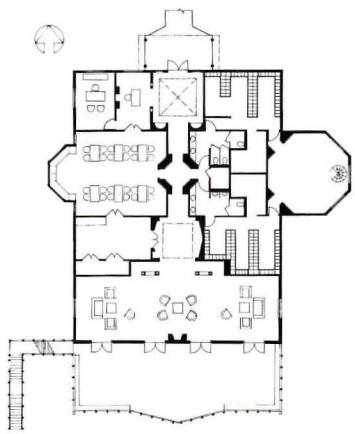
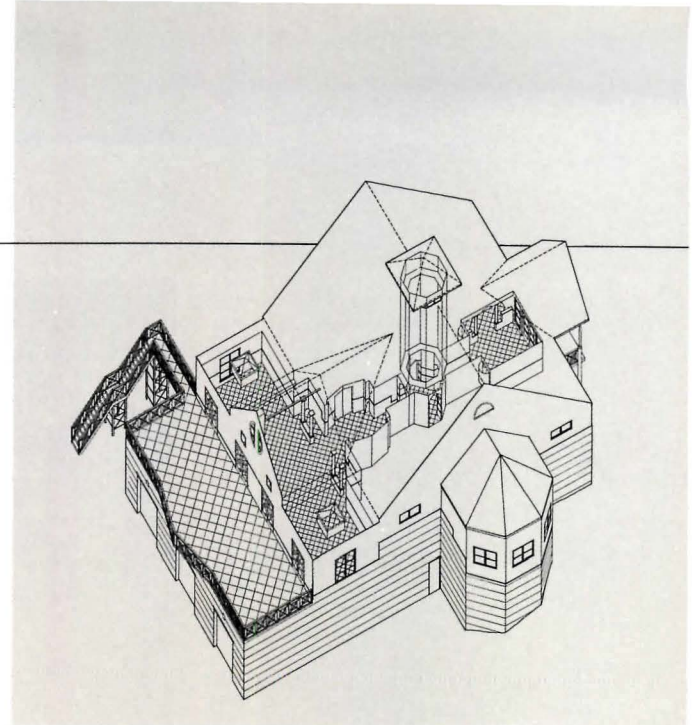


Upper level



Romantic Riverside Image For Egalitarian Boat House

This Baltimore boat house by Ayers Saint Gross is as appealing for its egalitarian accommodation of the once-elitist sport of sculling as it is for its romantic riverside image. Precedents are the picturesque, turn-of-the-century rowing clubs in Ivy League enclaves, notably Frank Furness's Undine Barge Club in a cluster of boat houses along the Schuylkill River in Philadelphia.

The Baltimore Rowing Club is similar to its Ivy League counterparts in that sculls are stored on racks on the first level and lockers and exercising rooms are above. But the Baltimore club, operated by the city parks department, also has a classroom for the Maryland Water Resource Management Organization, which studies marine life of the Chesapeake Bay and its tributaries. It is atypical, too, in the symmetry of its plan.

Though it is near working-class neighborhoods, the club is fairly isolated on the Patapsco River. The boat house with its octagonal tower (used for calling races) is set into a cleared parkland hillside rimmed by mature trees. From a distance the building has clean forms with crisp lines, but close up the surfaces are pleasingly rippled and wavy. Cladding is shaggy-edged, unpainted cedar shingles over a high-riding base of split-faced concrete block laid in bold black and white horizontal stripes. The roof is standing seam metal in a deep red.

Unexpected within such a happy little building is a dead serious, formal sequence of spaces, aligned in a spine through its center. You approach through an open, wood-framed pavilion, cross a boardwalk-bridge, and then enter the boat house itself, where open and closed spaces alternate. You move from the entry (open space) to the trophy hall with glass cases under the tower (compressed space) to a vestibule the size of the entry (open space) to a multipurpose room the full width of the building (even more open space). A fireplace in the big room punctuates the end of the spine; beyond, a deck with a slight prow provides a coda. These are the common spaces, and they have a sense of casual comfort and ease appropriate to a rowing club.

Opening from the trophy hall are the spaces particular to the rowing club and the water study center. At the far end of the rowing club side is an octagonal exercise room (the protruding bay in the axonometric above). From there rowers descend a spiral stair to the boat storage area and then down to the river.

This boat house would be a delight anywhere. It is especially wonderful to see inner-city young people use and appreciate it.—Allen Freeman

© Richard Mandelkorn

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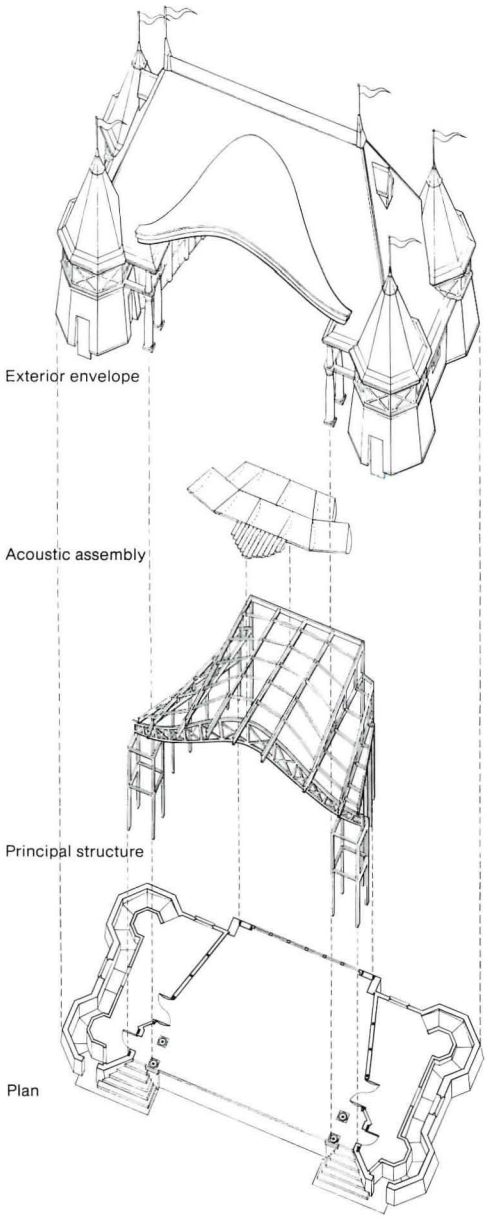
Right photos, multipurpose room; sculpture is by Shawn Fischer.

Whimsical Band Shell Pays Serious Attention to Acoustics



The romantically picturesque band pavilion on Minnesota's Lake Harriet, designed by Milo H. Thompson, FAIA, of the Minneapolis firm Frederick Bentz/Milo Thompson/Robert Rietow Inc., has a musical secret under its steeply hipped, heavy, shingled roof. In its ceiling, banana-shaped acoustic clouds, designed by the architect in close concert with acoustic engineer R. Lawrence Kirkegaard & Associates of Chicago, catch sound and project it back to the performing musicians. The clouds, coupled with an attic that functions as a reverberant chamber to help capture the music and send it over speakers, minimize two ubiquitous shortcomings of outdoor music pavilions: too much sound to the surrounding site and not enough to the performers.

The eyebrow roof, raised playfully on the audience side, also contributes to the building's acoustic acumen by housing speakers that focus sound directly to the audience. Latticework on the turrets hides additional speakers, while the turrets themselves provide storage space and a ramp for musicians' access to the stage, which seats 75 performers on its 1,500-square-foot surface. The back of the pavilion, a huge lakeside window, offers a double treat: the audience can glimpse activity on the water while boaters can enjoy concert goings-on. A dock and boardwalk are planned. —M. Stephanie Stubbs

Shopping Center's Pool Hall In the Spirit of Flash Gordon

© Greg Hursley

Eccleston Johnston Jr., AIA

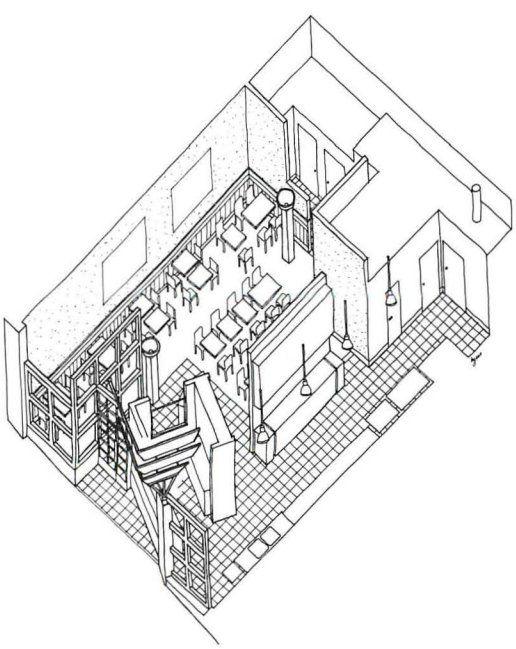
© Greg Hursley

Eccleston Johnston Jr., AIA

Eric's is an upscale pool hall/piano bar that immediately captures attention in its location within an L-shaped, strip shopping center in Austin, Tex. Its facade is the most prominent in a site that steadily narrows to a mere 30 feet at the far end of the complex. And Eric's looks like the top of an old, colorful jukebox, with a high, white, bent acrylic facade and bent acrylic red awnings, illuminated to cast a glow to the gray-tinted storefront windows below. It comes as no surprise that designer J.H. Eccleston Johnston Jr., AIA, had visions of the futuristic art deco period of the '30s and '40s, as well as the popular genre of Flash Gordon comic strips, in mind for the project. The final artful touch to the outside is a neon sign that curls across the front, melding into little symbols hinting at the delights within.

Although the piano bar immediately to the right of the entrance is complete with a baby grand and a dance area, Eric's is a serious pool hall, its tables placed within regulation distance of each other and having rails to hold beverages and prevent patrons from drifting through playing areas. Glass designer Carla Willson made the chevron-shaped light box that hangs against the mirror at the main bar. Two triangular tubes of neon in a mirrored box behind the art glass highlight the chevron's patterns and etched design.—Amy Gray Light

Traditional Thai Colors and A Distinctive Pair of Pylons

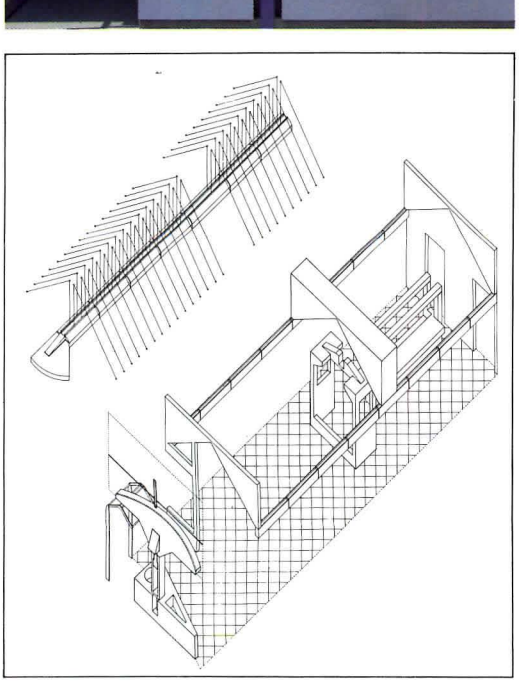


Thai Bar-Be-Que restaurant, positioned along San Francisco's developing Van Ness Avenue corridor, began as a simple interiors job but came to include major structural retrofit work when the ceiling trusses were found deficient. The ceiling structure was rebuilt and a new structural frame was installed to support the new interior surfaces and roof-mounted mechanical equipment. The design, by Glenn Robert Lym, AIA, is a straightforward interior space shaped by the mauve-painted, load-bearing steel forms and a purple, stainless steel grill house that begins at the street and proceeds inward to lime green walls warmed by oak wainscoting in the dining area. Two oak pylons topped with clear glass fixtures are positioned at either end of the room. A carpet of light purple further complements the restaurant's interior decor, which was done in traditional Thai colors.

The exterior of the restaurant features front windows of frosted glass with mullioned steel sections. The facade exposing the dining area has clear glazing. A stainless steel canopy sign of three funnels feeding into each other is adorned with the restaurant's logo in neon.

The restaurant's owner, Chureck Kirdpirote, was instrumental in the building project—he did the general contracting work himself.—Amy Gray Light

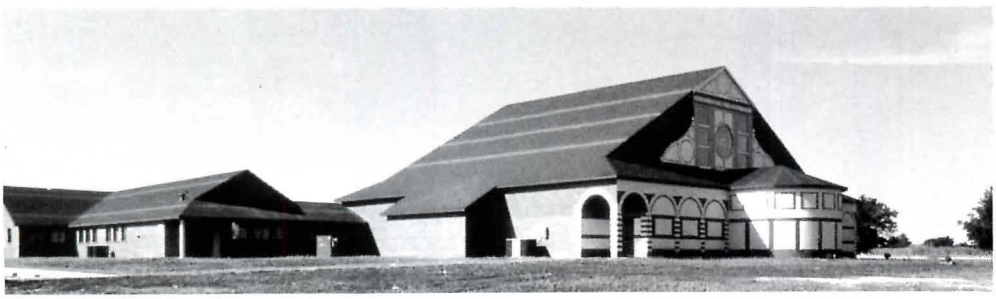
An Ingratiating Entry and A Palette of Muted Pastels



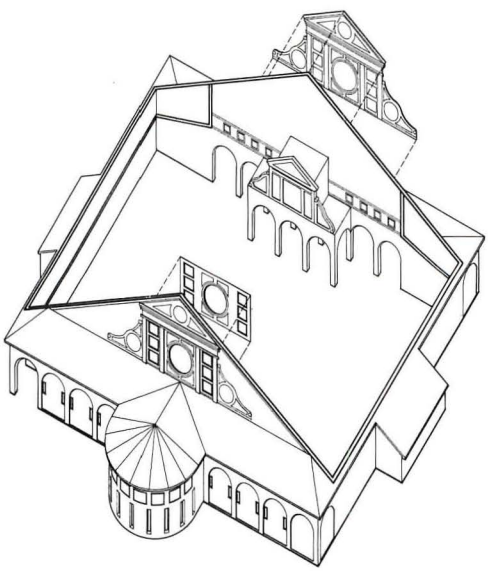
Eats Restaurant in Santa Monica, Calif., was designed by Rebecca L. Binder, AIA, to ingratiate itself gently and with chic into its site, enhancing the character of the surrounding neighborhood with a retrofit design that affords direct accessibility from constant street traffic and takes advantage of the prevailing mild climate by means of cross-ventilating operable windows that pick up coastal breezes. The cafe's facade provides shade and backs away from the hubbub of the street with a recessed portico. The muted yellow and purple pastels of the exterior are picked up inside on stuccoed walls and on the doors and trim.

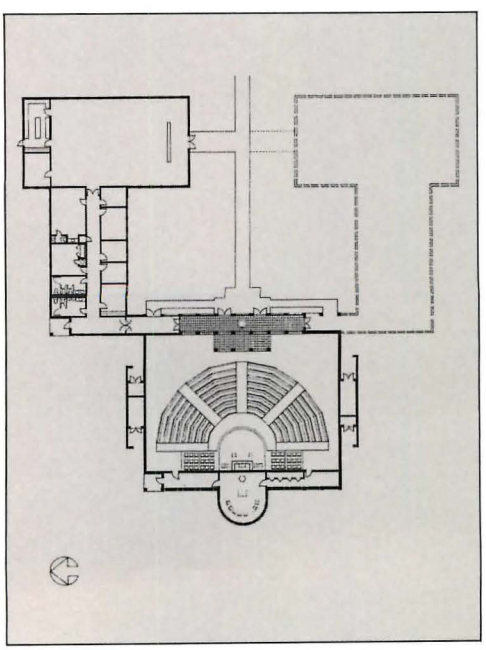
The restaurant is shoehorned into its long, narrow site—the building is 11½ feet wide by 60 feet long, with a ceiling height of 12 feet. To transform it into a generous, inviting space, the ceiling was opened up by suspending custom sheet-metal lighting troughs on either side of the walls from angled cables and by running two suspended neon strips down the center and through the length of the eatery, bathing the room in a faintly rosy light. A pale gray, cut-out pie case echoes the shape of the vaguely anthropomorphic exterior facade and shields the kitchen from the dining area, which seats about 30 customers. An abbreviated bar stands directly off to the side of the pie case just before the kitchen.—Amy Gray Light

Little Palazzo on the Prairie: An Italianate Texas Church



Inset on facing page, the Alberti facade that served as inspiration and 'icon' for St. Jerome's Florentine front and rear elevations. In the plan below note processional entry through a courtyard and foyer with baptismal font, given its own place apart from the altar as recommended by the Second Vatican Council. Interiors, facing page, are richly decorated and suffused with colored light.





This church complex is essentially a pair of wide-roofed sheds, a form not unfamiliar to the Texas landscape; they are a sanctuary and an education building, to be joined by a fellowship building completing a symmetrical composition around a courtyard. What is unusual for these parts is the decoration of the central shed. It was imported explicitly and unabashedly from Renaissance Italy and executed in multicolored brick and paint.

This is Southern Baptist country, near Waco, and St. Jerome is the first Roman Catholic church built in the area in a generation. Both architects and client had studied in Italy and felt that parishioners could use a reminder of their faith's rich architectural heritage, which had its greatest flowering in the Italian Renaissance, as Clovis Heimsath, FAIA, points out.

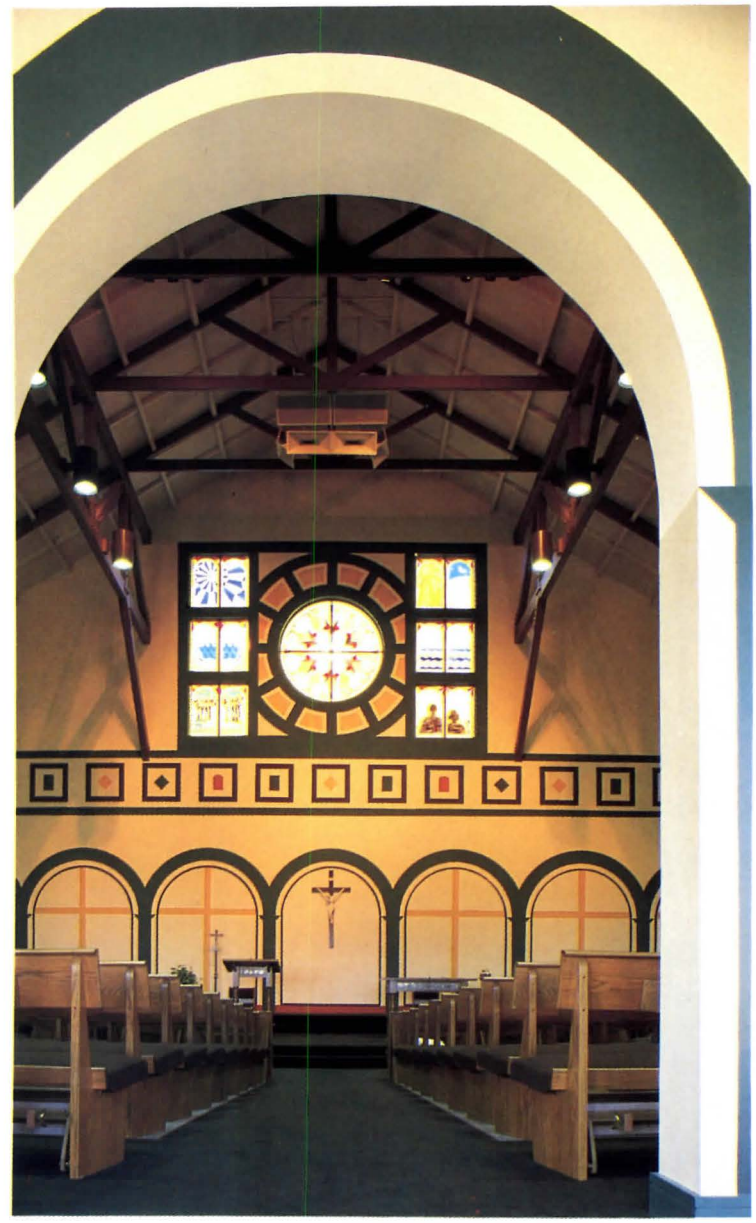
Specifically, the design uses Alberti's 15th-century facade on 13th-century Santa Maria Novella in Florence as what Heimsath calls an "icon." Its visage appears at reduced scale above a striped arcade on the entry facade and is echoed less literally in a gabled panel of brick and stained glass on the rear (actually the front of the sanctuary). The two sides are devoid of decoration, making the front and rear seem something like exotic billboards.

Inside the mood is more consistently sustained. As in much of the Heimsaths' work (Maryann Heimsath is her husband's partner), the interior is rich with applied color and light coming through a plethora of stained glass windows designed by Maryann Heimsath. Artifacts are artfully designed, and the trusswork was left exposed for reasons of both economics and esthetics.

Clovis Heimsath says that "sequential imagery" was fundamental to the church's design. He describes the entry sequence as follows: "The middle, axial doors are for ceremonial occasions only. The visitor enters from the doors to the side, into a foyer, which requires him or her to turn and turn again. The visitor is directed toward the chancel by the gable geometry and the strong rhythm of the trusses."

This is not a small church: the sanctuary accommodates 700 in a round seating pattern reflective of Vatican II. But it had a small budget to support such ambitious imagery: what has been built so far cost $84 per square foot.

—Donald Canty, Hon. AIA

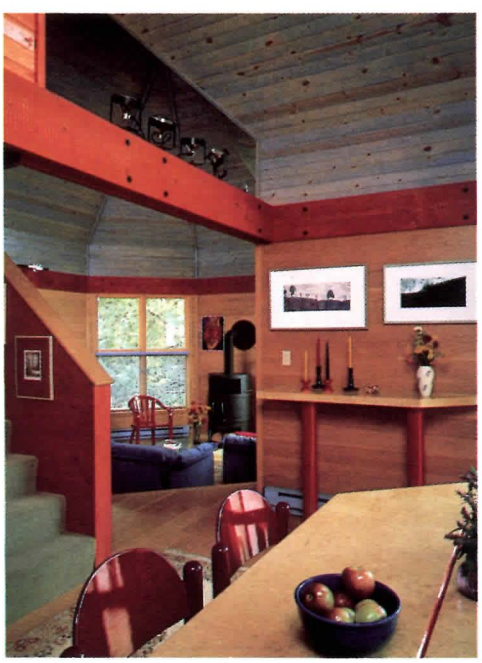


Photographs courtesy of Clovis Heimsath Architects

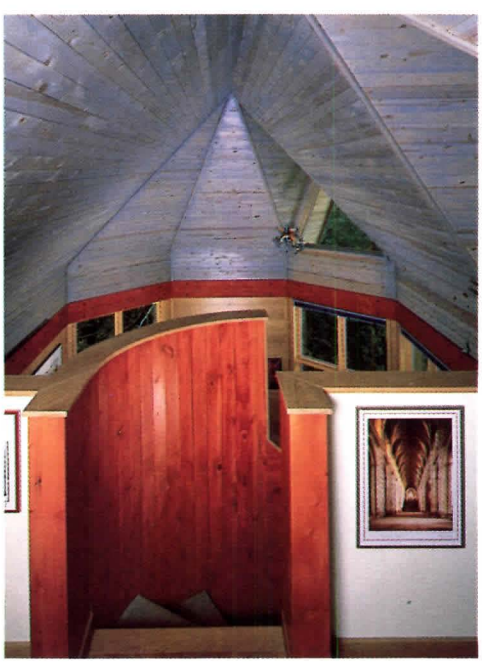
Colorful, Lighthearted Version Of an English Country Cottage

Lea Babcock

Lea Babcock



Lea Babcock



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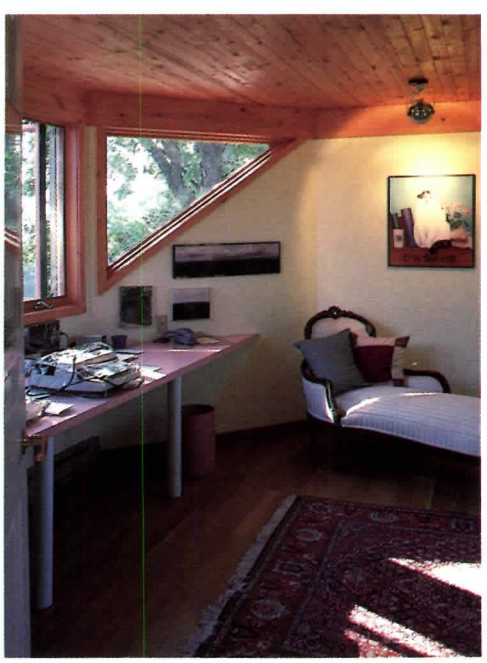
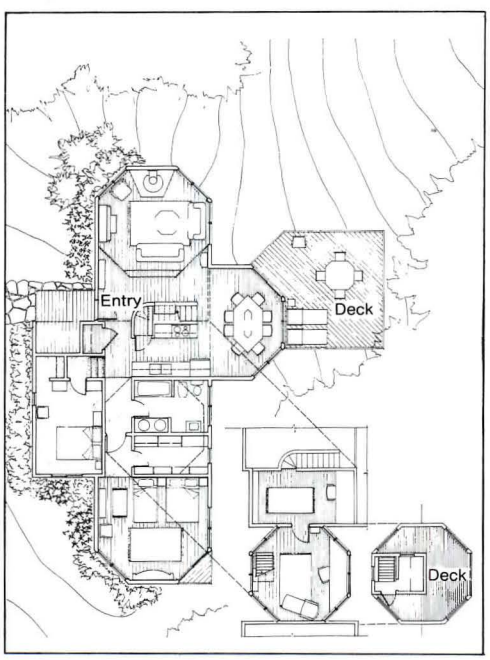


C. M. Korab

Minneapolis architect James E. Stageberg, FAIA, claims he designed this playful vacation house as a country retreat for his wife, Susan Allen Toth, a writer who had requested an escape from the hectic pace of the city. But it's Stageberg, an architect trained in the modernist tradition, who appears to have taken a well-deserved holiday from "serious architecture" with this Americanized version of an English country cottage.

Located on a densely wooded five-acre site, the house is nestled into a 400-foot bluff overlooking Lake Pepin near Stockholm, Wis., where the Mississippi River widens to two miles across. The house is oriented to take advantage of spectacular views up and down the lake, especially from a deck off the dining room and a small crow's nest reached by a simple redwood ladder through the study.

Facing page: top far left, lakefront elevation from down the bluff; left, a storage area and wood bin are tucked under the sloping roof next to the main entrance; bottom from left to right, living area, loft, and study. Right, large windows wrap the curved southern elevation.



Lea Babcock

On approach the house presents a cozy and welcoming facade. A wooden bridge and stone walkway lead from a parking area through an grassy meadow and an informal garden to the house. The sloping roof clad with cedar shingles extends to almost hug the earth with a guest bedroom tucked beneath the curved hump, accented with a small oval window. The color scheme is taken from a Scandinavian palette—all of the colors are represented in an abstract pattern on the front door.

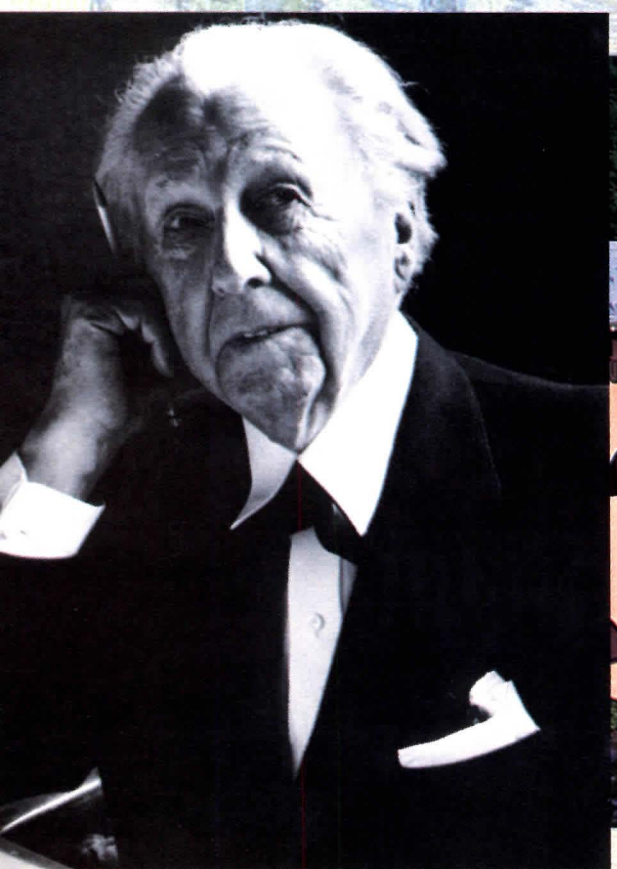
From inside, the house opens up and out with large triangular windows set in the steep gables accenting the soaring ceilings of the living areas and master bedroom. The curved stairway shields the kitchen while maintaining openness, and windows lighten every room, including the storage closet and the bathroom. The second floor study, designed as a private retreat for Toth to pursue her writing, has a built-in work station facing a bay of windows.

Interior materials are appropriately wood and oak, with natural rather than rustic finishes. Stageberg considers "natural wood in a second home second nature to a native Minnesotan." To achieve a soft but vivid color without losing the grain of the pine walls and ceilings, paint was rubbed into the wood and then wiped off, leaving a patina.

Stageberg's and his wife's domicile is a modernist house he designed eight years ago, a house he acknowledges has gradually changed character. "The vacation house is also a modern house," he says, "but it shows the freedom that recently has come into my life—on a design level as well as a personal level."

—Lynn Nesmith

THERE'S ONLY ONE FRANK LLOYD WRIGHT.



Organizing for Design Quality

By Douglas E. Gordon and M. Stephanie Stubbs

The magical commingling of the art and science of design into the reality of architecture is a very personalized act, and design approaches are as varied as architects and the buildings they produce. Interviews with representatives of seven firms chosen for their consistent design of high-quality buildings yield some striking similarities. Although the firms were selected deliberately for their disparity—in size, setting, geographic location, and longevity—the differences pale against the characteristics their people have in common. They all are optimists, and of course they love their work. They all emphasize the importance of having fun. They all believe in teamwork, whatever the form it takes in their offices. You most likely know their buildings; allow us to introduce you to their design processes and their methods for creating well-designed buildings, time after time.

Zimmer Gunsul Frasca Partnership, a 120-person firm in Portland, Ore., divides its oversight responsibility three ways: design conceptualization, technical concerns, and project management. "You have to recognize that architecture goes beyond just the execution of design, and 'there's many a slip 'twixt the cup and the lip,'" says Robert J. Frasca, FAIA. "We have three legs to our stool: a partner in charge of administrative concerns, a partner in charge of design on the project, and a technical partner. Essentially, we move along together, kind of like a cavalry charge—one doesn't get in front of the other. We have three design partners in all; sometimes they work together, and sometimes separately. The filter is always the project planning committee, which our technical partner runs.

"The management partner is the traffic cop of the whole project," Frasca continues. "We decide together how we are going to spend the design money. If we've miscalculated, the management partner has to help us decide how we re-allocate our resources so that we can put them where we can get the best design solution for the amount we have to spend. This system works well because we know each other's moves. You know where the other guy's going to be at any point in time, and vice versa. We can compensate for each other's deficiencies, and we can work off of each other's strengths."

Centerbrook Architects, a 52-person firm in Essex, Conn., takes a different approach toward principal responsibility and teamwork. "Our firm is unusual," claims William H. Grover, FAIA, "in that each of its six partners is a *design* partner who directs a project from beginning to end and has the entire responsibility for the success or failure of the design. Unlike a firm where there is an administrative partner, a technical partner, and a design partner, each of the partners here does a little of everything. We have no formal review process among the partners, but usually each of us knows what the others are doing, and we freely comment and give advice. The real design interaction takes place between the design partner and the project manager, who is either an associate or an architect/employee and handles all the arrangements for meetings, taking notes, and organizing everybody, including the partner in charge.

"Charles Moore [FAIA], the first partner in this firm, said he never designed anything alone," Grover continues. "I think that's the case with us, too. We expect architects to think about what they are doing and contribute their ideas in a collaborative way. Even though we all have to spend a lot of time writing letters and contracts, negotiating with consultants, interviewing for jobs, and other 'dishwashing' tasks, it all really is a part of design and must be done with great care."

Murata Outland Thomas Partnership of Denver is a 15-person firm headed by three autonomous principals, with the senior principal serving as arbiter of design. "Kiyoshi [Murata] does his own work and is the principal critic," Richard Thomas, AIA, explains. "The others of us will critique each other on occasion, particularly when one is stumped with some problem, but in large part it's a fairly singular kind of approach. As Kiyoshi becomes involved in larger and larger opportunities, the current goal is to pass design oversight from him to the other two principals."

The principals have the responsibility of quality-control checking as well as design oversight. "There is a budget quoted for quality control that is built right into our fee," Thomas says. "For instance, a project that might take 1,000 hours to produce would have 20 to 50 hours for the individual in charge of quality control. That time would be further broken down into areas of concern such as membrane, code compliance, and areas of greatest liability risk—those nasty little things that tend to come back."

Taft Architects, an eight-person firm in Houston, also has the three principals concentrating on design. The distinction of their approach is that all three work collaboratively on the design of every project. "Maybe it is most akin to the old Beaux-Arts atelier/workshop. Having the three partners split up the labor would be more efficient, but we're less interested in efficiency than we are in design," says Danny Samuels, AIA, one of the partners. "The three of us work at one big U-shaped desk," adds John J. Casbarian, AIA. "To talk, we just turn around and face toward the center."

Dana E. Olsen

The principals of Zimmer Gunsel Frasca bare their soles at the Portland Justice Center. Bob Frasca is seated at the lower left.

CBT/Childs Bertman Tseckares & Casendino, a Boston firm of more than 100, divides the principals among projects. "The principal is there to conceptualize and set a level of quality," says Richard J. Bertman, FAIA. "We have a principal in charge of every project, so, with 100 professionals, you could say that one partner directs the design efforts of 24 or more professionals. This way we manage to conduct the design process as though we were a smaller firm."

The method CBT uses to set a level of quality is "like a movable charrette within the firm," says Maurice F. Childs, AIA. "We call it a design review or design forum. Professionals within the firm who are not intimately involved with a project periodically review the work. Learning how to criticize our own work effectively has been a vital component of our design process."

Nagle/Hartray & Associates, a Chicago firm with a staff of 30, is run by four principals. "There are two older principals and two younger principals," says James L. Nagle, FAIA. "On each project we do, we have a partner in charge of design, a project director, and a job captain."

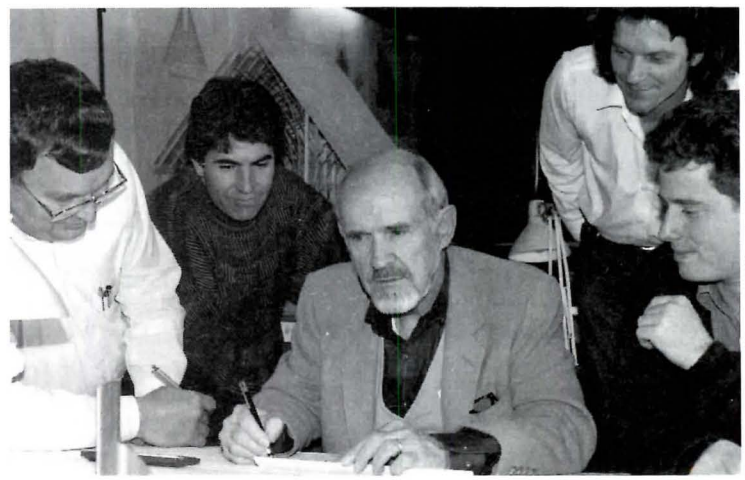
With regard to design outlook, Nagle says the firm's purpose is not to specialize in any one building type. "The new building types are always the most interesting, and usually the best building we do of a type is the first one. And from the beginning we have followed the modernist tradition." He describes the firm's work according to three basic convictions: classic Chicago, as reflected in the massing, window treatment, and base detailing; pop, which applies the logic of the local vernacular to projects the firm designs outside Chicago; and New Deal modernism, which refers to Prairie Style stripped of its Victorian origins. "If we are not too self-conscious but reinforce what we do best, we may even develop consistency without formula," Nagle says.

Fay Jones + Maurice Jennings Architects is a five-person firm in Fayetteville, Ark., developed by a college professor as a sideline to his primary job. "I've felt that I've really had the best of two worlds, but, because primarily I've been teaching at the school of architecture, my practice had to be limited," says E. Fay Jones, FAIA, who is now professor emeritus and devotes most of his time to his practice. "Usually I'm the one who speaks with the clients initially and the one who travels to the site. I'm in and out of the office a good bit, and my partner of three years, Maurice Jennings [AIA], is the one who keeps the production going and keeps up with any problems that we have.

"A high percentage of our work has been single-family housing. With everything we do, our objective is to keep making it better and better. We don't freeze the design, turn the contract documents over to a builder, and just do routine supervision. I've had so many opportunities to improvise on the job while construction is taking place, and have seen better results than what I'd first thought, that we look for opportunities to improve design all the way through construction."

Conviviality and communication

When the principals' roles are defined, teamwork extends in a logical progression to the rest of the people in the firm. For instance, the six Centerbrook partners share responsibility for the business operation of Centerbrook and each is responsible for the financial management of his own project, but involvement in decision making extends to all staff. "We have a weekly meeting of the partners, associates, comptroller, and the clerical manager," Grover says. "All business and financial decisions



Courtesy of Fay Jones + Maurice Jennings and Associates

Fay Jones at work in his Fayetteville office, surrounded by partner Maurice Jennings, far left, and the other firm members.

are made at those meetings. The vertical dimension of responsibility is very small. Partners, associates, and employees all work in the same room—we have no private offices. Our management philosophy holds that the partners should be sitting at drafting boards along with everybody else. To do good architecture, you have to be completely immersed in it, not sitting in your own office with the door closed."

"Good teamwork doesn't just happen—you adopt a style of working that allows everyone in the firm to do his or her best work," Bertman says. "For CBT, we've found that by working in teams we can effect better design solutions than we ever could by working alone or in a hierarchical manner. In fact, one of the reasons CBT has thrived is that we have refused to make a hero out of anyone—everyone shares, everyone contributes, and everyone provides internal criticism and suggestions. You have to create an atmosphere in the firm in which a high degree of self-worth is engendered."

"I should add another aspect of the delegation of responsibility at CBT," his partner Childs interjects. "Unless there is an overriding interest and commitment to a particular project, our professionals are not compelled to become involved in it. Life's too short to be unhappy in work. We want everyone who works for us to enjoy being in our office."

Staff development bears heavily on design quality, Frasca says. After Zimmer Gunsul Frasca became a partnership in 1960 with eight people, growth was slow and involved extending the partnership. "For the most part, our people have been here for a fair amount of time," Frasca says of the partners, associate partners, and associates. "When we identify someone who is really committed to the profession, and wants to do it in this place, we recognize that person as someone who will share in the ups and the downs of whatever it is we do."

"There's a real commitment to continuity in the firm," Frasca continues. "The partners will retire on a certain schedule, and the ownership will be redistributed. It's really important for us to see that there are other people who will be in positions to be able to continue the work. I want everyone in this firm, even if they're just out of school, to have the same professional motives that I have. If they want to stay for just three years, that's fine, as long as they give their very, very best for the time they are here. We're not looking for a few principals and a bunch of drones—quite the opposite."

In the end, the important result of long-term staff development is that commitment to design happens at several levels, Frasca says. "The ability to create quality design over a long period of time requires a singular guiding vision in one or two people. It doesn't happen by itself."

An example is the influence Charles Moore has had on Centerbrook. The firm began as MLTW and changed to Charles W. Moore Associates in 1970. "It became Moore Grover Harper when Chuck, Bob Harper, Jeff Riley, Glenn Arbonies, and I were the principals," Grover says. "In 1978, Mark Simon and Chad Floyd became principals. In 1984, we changed the name to Centerbrook Architects after the town in which we are located. In 1975, Chuck moved on to UCLA, and later to Austin, Texas, where he currently is the O'Neil Ford professor at the University of Texas. Each principal is now, in effect, a sole practitioner under a common roof shared by five other practitioners. A singular guiding vision, albeit influenced by Chuck's work, is thus provided by one of the principals for each of our projects. For the last five years, Chuck has been a design consultant to us, participating in one or two projects a year, such as the Hood Museum at Dartmouth. Right now he is working on Nauticus, the National Maritime Center in Norfolk, Va.

"At present, we have six associates, who are very important to our design work," Grover says, referring to Richard King, AIA, Jim Childress, AIA, Jim Coan, AIA, Leonard "Trip" Wyeth, AIA, Jim Martin, AIA, and Dennis Dowd, AIA.

A commonly cited motivator for getting and keeping creative people is the office atmosphere. Cooperation and close communication seem to be ingredients basic to an ideal architecture office; and fun, or at least enjoyment, is also high on most lists."One reason CBT has been able to continue growing is the intense communication among the principals and between the principals and the rest of the staff," says CBT partner Charles Tseckares, FAIA. "We've worked at making our partnership effective and enjoyable. Each of us is encouraged to do whatever he wants to do. We have standards about what kind of work we want to do in the office. But if something comes along that one of us wants to do, it's encouraged by all of us."

"Principals meet to discuss substantive issues every seven days," adds landscape architect Anthony B. Casendino. "When you work that closely, you get to know how each other works. We haven't had to take a vote in 21 years. We know how to disagree agreeably. And we believe in minority opinion. Many times one person has succeeded in turning the opinion of the other three."

"The important thing is that the people at Zimmer Gunsul Frasca are here by choice, and we all look at the world of design from the same point of view," Frasca says in a similar vein. "That doesn't mean we always agree, but rather that if we argue it's not *what* should be done but *how* it should be done. Architecture is a process of taking a collective set of sensibilities and coming up with a collective vision, which isn't always easy."

A benefit Fay Jones + Maurice Jennings Architects finds to being small is close communication. "There are only four or five people, with no clerical staff, and we're all right in one room together, so everyone is hearing everything that's going on," Jones explains. "I've never even had a secretary over the years. Whoever is nearest the phone answers it when it rings. So we don't have to spend a lot of time on office organization as far as getting things communicated to other people."

Jennings is a complementary talent in that firm. "He is very good at technical matters, plumbing, electrical, and structural things," Jones says. "He is very good at the production end of things. Even though we are a small office, somebody has to be in charge of that."

Jones also includes the constructors as part of the design quality control team. "We give extensive documentation to projects, sometimes with 75 to 100 sheets of drawing for a house," he says. "That can backfire with builders who are used to 10 sheets of drawings, because they see more dollar signs. More often, though, the extensive documentation reduces cost by taking away questions—keeping the contractor from guessing at things. The reactions we've gotten from builders over the years have brought us a great deal of pride, including compliments we get on the thoroughness and completeness of the drawings, builders who overachieve for us and tell us at the end of a job that it's the best thing they've done, and the feeling that constructors have accepted the challenge and improved their skills. Some of the guys have been mainly framers and doing pretty typical builder-type houses. They end up building a lot of the furniture—the dining table, chairs, coffee table, lighting fixtures, and things like that. When they're out there on the weekends showing their families what they're doing, you know they're going to give you their best."

For Nagle/Hartray, too, the collective sensibility extends beyond the design firm. "We try to work with the contractors from the outset rather than bidding the job," Nagle says. "In most of the jobs that we're doing we bring in the contractor early on, and I'm sure this applies to most other architects."

Personal involvement is important on the job site and crucial in the office. "Everyone needs an emotional piece of the action," Frasca says. "In this profession, there's not a lot else."

Casbarian speaks similarly of his experience. "I think if Taft Architects didn't work as such a close team to do architecture, I would go off and do something else," he says. "People are amazed at how we work," agrees partner Robert H. Timme, AIA. "But we've always had an understanding that we're doing this basically to have fun and to satisfy our design ambitions. If we ever stop having fun, I don't think we'd have any qualms over simply dissolving the partnership."

Creativity in a team is a personal concoction that involves putting together the right people with the right motivation and setting, in a highly communicative atmosphere where everyone knows who is responsible for what and, not incidentally, where

The trio of Taft Architects, shown from left to right: John Casbarian, Danny Samuels, and Robert Timme.

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everyone enjoys the work. Forming a partnership may be a matter of serendipity—taking advantage of the chance discovery of good interpersonal chemistry—or a matter of years of patient staff building and adjusting. An example of the former is CBT; of the latter, Fay Jones. Both firms took advantage of the rich resource pool of a university setting.

"Three of us worked in the same architecture firm years back, and we came to like and respect one another, personally and professionally," Childs says. "But the genesis of all four of us coming together came out of our teaching together at the Boston Architectural Center. When you teach, you learn, and one of the things we learned was that we got along well with one another: we have complementary and supplementary design backgrounds, the same aspirations, and we like the way we interact, so we decided to start our partnership."

Jones first met many of his employees in the classroom at the University of Arkansas. "Being connected to the school has kept me on my toes because if you preach one thing to the students and do something else they'll nail you to the cross," he says. Although he has hired people from other schools "to get a mix of philosophy," Arkansas has been his leading source of talent because, he says, in the course of teaching students he finds a few with whom he likes to work. The best example is Jennings. "He was going to follow his father into the contracting business, but got interested in architecture when he was in high school because of a house I did in his hometown. He was a student of mine at the University of Arkansas. The day he graduated he came into the office and has been here ever since."

The Taft principals also cite architecture school as a common bond. Not only do all three partners teach, they originally met while students at Rice University. After several years of working separately in different parts of the country, they found themselves back in Houston. "We really never decided to form a partnership," says Casbarian. "We'd get together for a beer in the evenings, to critique and help with the projects we were working on individually. At one point we had the opportunity to rent a space very inexpensively—we thought it would make a great clubhouse for our kind of club. As a continuation of hanging out and talking to each other, we started working together in the space. We were always coming and going—somebody would go off for a year and work for somebody else. Very slowly, we began to work more together, and at some point we just realized that we had a partnership."

Clients: Hands off or hands on?

Conjure up an image of a devil-may-care jet-setter who blithely hands the designer a blank check and says, "I'm off to Biarritz for six months. Do what you will to my building, and, of course, money is no object!" The ideal client? No way, according to these architects. Frasca insists that the client needs to understand the broader agenda of architecture. "A client has to know that it is a privilege to build buildings in the public domain," he says. "There is a certain portion of the building that has to address the public good, whether that be the city or the people who work or live in the building. The ideal client is one who has that kind of a vision, and a willingness to work for it."

Centerbrook's Grover agrees. "My ideal client cares about making a wonderful place—using the architect for some higher ideal—rather than simply making money with a project. The client and the architect have to maintain mutual respect and work hard to keep their promises throughout the job. The personal qualities I particularly like in a client are honesty, a good sense of humor, and an optimistic attitude."

Grover's partner, Chad Floyd, AIA, adds "adventuresome, thoughtful, businesslike, hard-working, warm, and decisive" to the list of ideal client attributes. "We respond better to terrific clients," he says. "Part of our philosophy is to include the client in the design process, and, in many cases, at the end of the job the client feels like he or she has designed the project, which is O.K. with us."

The best clients also have a concept of what they want, according to Thomas of Murata Outland Thomas. "Ideally, they have a really clear idea of who they are, why they're doing what they're doing, and are not willing to grant carte blanche. Really good clients ask questions that force you to get to the root of the issue," he says.

Nagle says that his firm especially likes clients who "push the architect, and come back to you and say 'this isn't good enough and I'm not satisfied.' Personally, I find that when clients come back and say they want more or want it better, that's the time we put on the afterburners, and we get a better project."

Jones agrees that it is difficult to tailor work to a "blank check" type of client. "I find that when a client has certain strong ideas and has some very definite likes and dislikes as to materials—say, stone rather than brick, cool colors or warm colors, free-flowing spaces or discretely defined spaces—the more clues they can give you, the better it is. Clients need to respect that the architect needs the freedom to put this together in some coherent way, however, so that the project is all out of the same piece of cloth, so to speak."

Most of the architects say they can tell early on whether theirs is the right firm for a particular client. Samuels of Taft Architects says, "The three of us together talk to the client initially, and this interaction goes a long way to indicate whether we want the job and if we'll get along well with the client. Because we limit the number of projects we take on, we can select those that promise to be the most interesting and the most challenging. I'd guess we turn down about 50 percent of the project proposals that come our way. Most of these simply are a bad fit between architect and client, and we pass them around to another firm. This gives us an opportunity to share work with younger, talented architects who now are in the position we were in 10 years ago."

Frasca says that it is a necessary skill to identify, early on, clients you think you can work with. "Design is a two-way street," he explains. "I tell clients that it's as important to me that they select the right architect—whether it is our firm or not—as it is to them. We have to live together for the next three years, and it has to be productive."

Of course, economics sometimes plays a part in how selective an architect can be. Nagle says his firm is getting more selective about the clients it takes on. "We try to avoid those who are 'untrainable,' if you will. We can do that because we're busy now. We have developer clients—all architects do. The best clients are the ones who know what they're doing. They go straight to the point rather than getting confused and going in circles."

How do you deal with the ideal clients, once you find them? Most of these architects include them as an integral part of the team early in the design process. Frasca says, "Design is very labor-intensive. The skilled architect can bring all the forces together in a constructive way, so that the whole is greater than the sum of the parts, rather than equal to the least common

denominator. The ideal client is willing also to be a part of this process. A client who doesn't know what he or she wants but is willing to work to get it is much better than one who has a predestined conclusion that isn't always the best."

For its larger projects, Centerbrook nearly always sets up an on-site office and holds a workshop to get clients involved during the schematic design phase. "One of the first challenges we face in every project is how to achieve good communication with the client and how to define what the client really wants," says Glenn W. Arbonies, AIA. "The workshop process achieves a fast-paced, casual, multifaceted information exchange with the client, which facilitates good design as well as client satisfaction when the building is finally built. For example, we used the workshop process for the Cedar Rapids Museum of Art, where we discussed the schematic design of the project with the building committee. During the course of design, the client saw us struggling with some of the location-specific parameters and took the position that the site should be increased. Without this dramatic action by the client, the design would not be as successful as I think it will be. I'm sure many of our clients would agree."

Grover warns, however, that projects where more than one person is the client can require special care. "Often it is more difficult to deal with a board or an institution as a client, especially if there is a large building committee of volunteers. Everyone has different ideas, and they all figure that if they're not getting paid for the work they can spend as much time as they want to on it. We always request that our final instructions for changes come from one person. We also try to cultivate long-term relationships with clients when we work with institutions."

Frasca says he has had good luck in dealing with institutional clients. "The team of public agencies for the Justice Center [in Portland, Ore.] was a really good client," he recalls. "The head of the public commission was doing the work out of the goodness of his heart. By pure happenstance, he also heads up the task force for the convention center we now have under construction. Further, the project manager for the Justice Center also is managing construction of the Oregon Convention Center. After a period of time, we got to know each other's moves, so when we started working on the convention center we already had a verbal and intellectual shorthand that we could use to get to the issues a lot more quickly."

Taft also is successful with institutional clients, who often are boards or multiple constituencies. "On the Corpus Christi redevelopment project, for example, we essentially worked with a whole city to design a building that matched their aspirations," Timme says. "We see working with institutional clients as a real opportunity to do good design."

By now it should be obvious that the client plays an integral role in creating quality design. Mark Simon, AIA, of Centerbrook says, "My clients have been everything to the quality of my design —I depend on them for the source of character in my buildings. I find it hard to invent without being able to respond to individual needs." CBT's Bertman agrees that there is no question about the client's importance. "Our clients have been crucial to pursuing and effecting good design," he says. "When you come to think about it, you realize that with few exceptions you can be no better than your clients are. Their aspirations for the appropriate design are yours—their taste in ideas, people, buildings, and the urban scene and their mark upon economic and social history all tend to buttress and support your own vision and skill."

Obstacles are opportunities for optimists

For the most part, the presumed enemies of good architecture—not enough time and not enough money—do not seem to be obstacles to good architecture for these firms. All apply the adage "constraints into opportunities," the architect's equivalent of lemons into lemonade. Frasca says, "The thing to do with obstacles is merely to acknowledge them for what they are. A project is sort of like a playing field. If you can't describe the field early on, you end up running all over the place—there's no out-of-bounds and there's no time limit. If you recognize the constraints, you can arrive at a solution that is beautiful and very efficient, a building that has a poetry of its own because it expresses its intention so clearly."

Others in the firms surveyed also welcome budget constraints. Grover of Centerbrook says, "Some of our lowest-budget projects are the most satisfying and the most interesting. When you have to figure out how to do things economically, you get the cleverest solutions."

In general, time is always a limiting force in architectural practice. Grover says, "Time constraints don't create a serious prob-

Centerbrook Architects, in front of their well-loved office.

lem because we design pretty fast, as a rule. Time constraints often cause you to go with your first instinct, which usually is better than flogging something until it gets bad. I'm much happier with a client who moves fast than one who drags things out, because the results always are better when you move along expeditiously."

Interestingly, some architects perceive the major hurdle to achieving good design as something within themselves. Grover says, "Design is making something wonderful out of a given situation. Therefore, by definition, we can't blame the situation if the design doesn't turn out well. If it comes out badly, the architect didn't understand or couldn't manage the situation. One typical obstaclelike occurrence is radical changes to the program during the design process. However, it comes down finally to the architect's ability to understand and deal with all the elements of the problem, including untimely changes. No obstacle is an excuse for bad design."

Centerbrook's Simon speaks of internal challenges: "Designing for me—and, I imagine, for everyone—is always fraught with anxiety. When you start you don't know what the outcome is going to be, and since we care about the outcome we worry about it. The important thing is to just dig in and try our best to ignore the anxiety."

Frasca sees this kind of conflict in a different light: "One of the main obstacles is being able to assess how much you can do in a particular project. In other words, it's discovering the soul of the project at the outset. If you don't understand the client's motives, there is no way you can address them, and you become frustrated and don't know which way to go. A related obstacle is anticipation—looking around corners and not discovering a problem until it's too late to do anything about it."

Thomas concurs. "The temptation is to say that clients are a barrier to good design," he says. "But that's not so—the most difficult problem is getting a handle on what the client is looking for. The hardest thing in the world to do is design on unblemished paper. You have no place to start."

Firm size and location are not barriers

Small or large or in between, size seems less influential than finding a niche that works for the firm. Jones, who has the smallest firm surveyed, says he is purposely keeping his firm to its size. "Over the years, I've probably turned down two or three jobs for every one I've taken on, just because I don't want to gear up to do that volume of work. Years ago, when I let the firm grow to 12 people, I found I was becoming more of an administrator putting out brushfires, and I just wasn't having fun anymore. Rather than fire anybody, I let natural attrition get the size down to six people, which took two or three years. Now we're all here with our desks together and we can work."

Jones started his career with Wilson Morris & Crain (the firm that designed the Houston Astrodome) when the firm had nine people. "It was obvious that the firm was going to grow, although I never imagined they would get to 200 people, as they did," he says. "I sometimes wonder what it would have been like to have been on the ground floor of a firm that grew that large. I could tell early on that I just didn't want to be part of a big firm."

Centerbrook, on the other hand, is a midsize firm getting larger. Grover says, "The partners once said that we'd never get bigger than 15 or 20 people; then we found that we couldn't hold to that rule. If a good job that requires more people comes along, either you have to turn the job down or get more people. We therefore decided that the firm would just grow slowly, to the size necessary to do the jobs that we want to do. But if we find that we're not having fun, then we'll get smaller again. Centerbrook has 52 people now, and we're still having fun. We like the day-to-day involvement. The practical limit for me is knowing that I can keep a staff of 10 or 12 people busy and still maintain an intimate involvement with each project. That means the firm's upper practical limit is about 60 people."

Bertman says of CBT, at 100-plus and growing, "You can't have quality, as we define it, without size because you can't get the specialists who can really produce quality. You need too much knowledge to have a small firm where everyone's doing everything. Also, we are able to attract good people by our insistence on seeking interesting commissions in which they are continually challenged to do their best work." His partner Casendino agrees: "There's something about not growing that seems almost un-American. We might find ourselves in the 160-plus range very soon because we don't want to turn interesting commissions away."

Like size, location does not seem to hinder quality production. These firms collectively cut broad swaths across the country. They do have a common bond in that they love the locations they've chosen and they incorporate local context into their work. For instance, the influence of the Chicago school, with its echoes of Sullivan and Wright, is apparent in the work of Nagle/Hartray. One might easily guess that Chicago would draw an architect like Nagle and offer him a solid foundation for his work. But Nagle traveled far before settling in the Midwest. "I went to Stanford, but I wasn't happy with the 'plywood' architecture—it wasn't right for me," he says. "I then went to graduate school and worked on the East Coast. I moved to Chicago because I found there the kinds of projects that interest me.

"If I open a branch office elsewhere, I'd like someone to shoot me," Nagle continues. "Our concern is that quality control would suffer. You need a critical mass to work with, and if you go beyond that you start to lose track. A key is to limit the work and maintain the quality of the jobs you take on. I don't believe the futurists who say firms will get either big or small. Midsize firms do good work and can take on big projects and small projects."

While the architectural appeal of Chicago is apparent, cynics might question what Houston, economically depressed as it is, has to offer. But Casbarian reports that not only has Taft never been busier but the firm is getting exactly the kind of work it wants. "It's great for us, because the only people who are interested in building right now are those who want to put up good buildings. The spec offices aren't being built," he says. Like Nagle in Chicago, Casbarian considers the central part of the country an ideal place for a firm that does work all over the country—Taft is only a few hours away from anyplace. Could Taft Architects play in L.A.? "Not really," says Samuels, "but we could see ourselves in the West Indies or in the south of France. I guess the place for us is not that important, but Houston is our home."

Zimmer Gunsul Frasca started and stayed in Portland, Ore., Frasca says, because it's a fertile climate for good design. "The people put value on what you do, and they are very critical because they care. In fact, a lot of the credit for the work we've been able to do belongs to the city and the state because there is a 100-year-strong tradition of doing good buildings. Although our work historically has been responsive to this more recently we've been doing work across the country."

A firm most enthusiastic about the location of its office building is Centerbrook. Grover says, "I really can't imagine working

or living anyplace else. We've got an astonishingly wonderful place to work. We have a mill pond, a nice building, no parking problems—all the things that people in New York would die for. But it's fair to say we are located in Centerbrook [near Essex], Connecticut, by chance. When Chuck [Charles Moore] was the dean of the Yale architecture school, from 1965 to 1970, our office was in New Haven. Gradually, the office got bigger than the space available, and we began searching for a place that the firm could grow into over the years. I happened to be traveling to a job site near Centerbrook and passed an 1895 factory building that was for sale. I talked Chuck into buying it, and he's probably never forgiven me because it nearly put the firm into bankruptcy later. We suffered through years of no airconditioning and drafty winters, but we've been fixing it up over the years, and it's proven to be a terrific place to work."

His partners back him up. Chad Floyd says the Connecticut shoreline is a great place to live. "If we were in a city, we'd probably be more parochially oriented to that metropolitan area. Our present location gives us a freewheeling identity but provides us with the benefits of urban contacts." Jefferson B. Riley, AIA, adds, "We have all the space we need. We sit alongside a river with swans, Canadian geese, and great blue herons. At lunchtime, we ice-skate in the winter and race model sailboats in the summer. The city comes to us."

For CBT also, the specific location of its offices plays a major part in the development of its work. Childs recalls, "Our first office was located on the waterfront back when it was deserted—it was lonely and cheap. Then we heard that the Ames Webster House, an extraordinarily beautiful 1872 building in the Back Bay, was for sale. We were motivated to move by the fact that we could save the building and become its curators. For 16 years there has been a steady stream of people who admire the building and make an association between the attractiveness of the building, the pleasure of being here to do business, and the quality of our work."

However, CBT's enormous growth curve may soon force a move, Casendino says. "The physical constraints on us are extraordinary—we need at least 25,000 square feet. In two or three years we'll probably move. Physical space is a problem, but it's still not easy to find people good enough to fill it."

What price fame?

Jones demurs at mention of the recognition his firm has received. "I really don't know about the little degree of fame I might have achieved," he says. "What there is has been gained through magazine publications and a reasonable amount of favorable response to the work. It's not a big ego thing with me. I never set out to gain fame. My goal is to try to do quality architecture that pleases the client primarily and also pleases me. Good architecture represents an architect's philosophical attitude and principles. It's definitely very personal, but one hopes there will be some recognition by a wider audience to show that the building touches more people than just the client and the architect. And if there is a broader recognition, then it's just a result rather than a goal."

Frasca considers fame a neutral element in the design process, except that it helps architects find the right kind of clients. "Fame enables you to attract clients who see your buildings and understand what your design motives are. If they share your values, you can work together to do good buildings." Recognition also can aid in attracting good employees. Grover says, "While I don't think Centerbrook is regarded as famous, I suspect that some amount of firm recognition is good for securing jobs or retaining good employees. Good people come to us partly because they know of the firm and partly because they see our work published and say, 'I want to work with those guys.'"

Kurk Stier

The four principals of CBT, from left to right: Richard Bertman, Maurice Childs, Charles Tseckares, and Anthony Casendino.

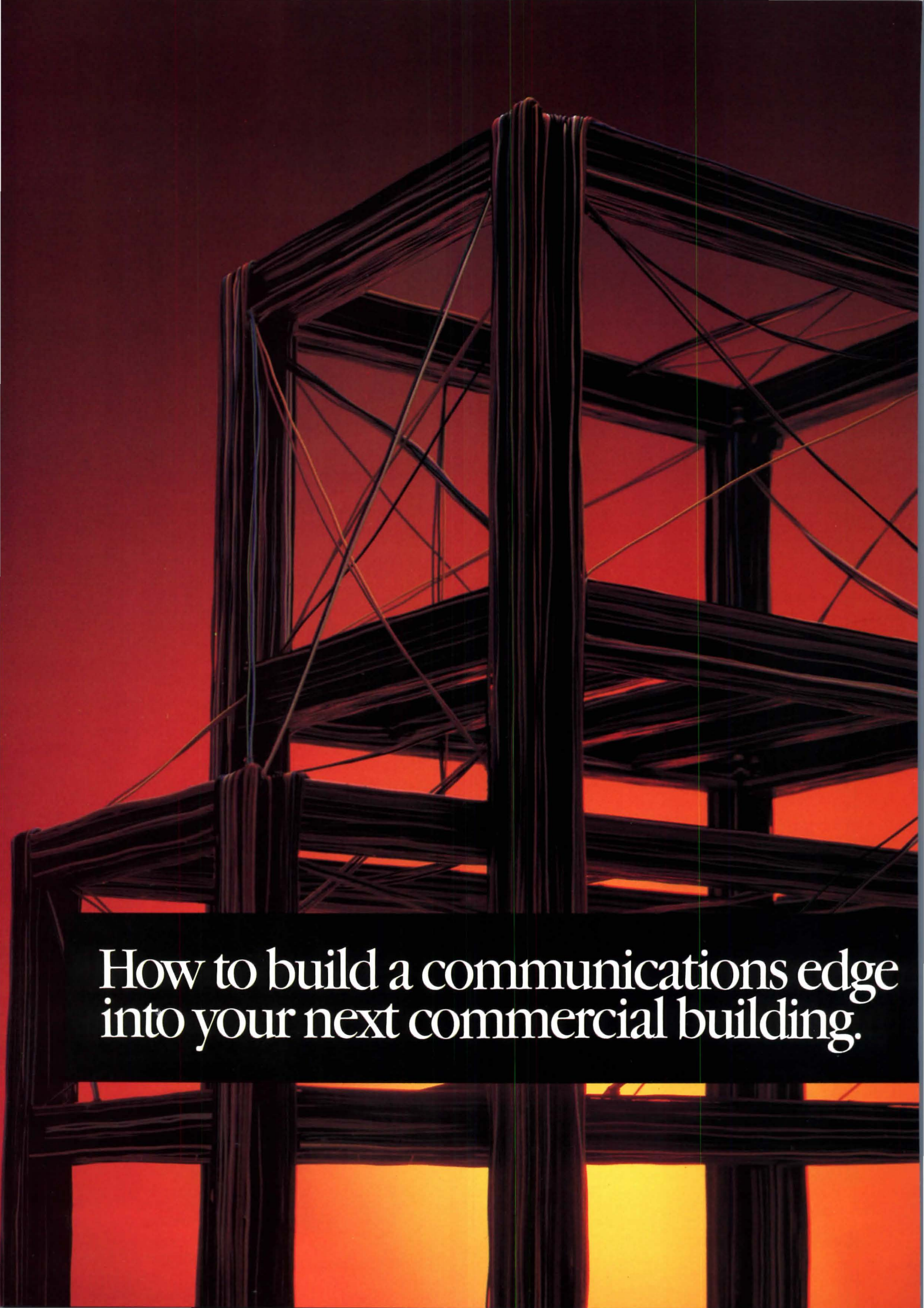
Recognition by fellow professionals seems to be a goal for all. Taft's Casbarian says, "The notion of recognition by our peers, as well as by the public, is extremely important to our firm. But we are not seeking recognition for ourselves or for the firm, but for the architecture itself."

Riley of Centerbrook puts it another way: "Although it never has more than momentary effect, fame is the applause that keeps our show running, and it always makes us try to do better. It also is recognition by your peers that you are contributing to the advancement of architecture."

Others offer warnings about the counterproductive side of fame. Frasca says, "Fame can be dangerous if it becomes a Narcissus thing, where you keep looking into the water until you fall in. It's important to keep fame in perspective. We're in a very small profession, and to one degree or another anyone with talent can gain some degree of recognition. On the other hand, we come from a profession of very heavy hitters—Michelangelo, Bernini, Wren—and I think it takes generations to become fundamentally famous. It therefore is relatively easy to stay modest, because we all have a lot to be modest about."

Nagle claims it's all a matter of balance. "First of all, recognition is a better word than fame," he says. "Too much recognition is bad and not enough is bad. Recognition is important because it gives you confidence and perhaps helps you to get more interesting work. The problem with recognition is that you begin to believe what people say about you, and you're not open to other people's ideas. I've seen that happen to a number of architects to where you can't sit down and talk with them anymore about how buildings ought to be put together."

Childs warns, "If fame arises from a particular building, like the rise of a rock star with one record that sells more than a million copies, you can start saying the same thing in every building. We don't want to copy ourselves just to keep up with our press clippings." His partner Tseckares adds, "It's good to keep in mind a thought of Sir Christopher Wren's. He wrote, 'Architecture aims at Eternity; and therefore is the only thing incapable of modes and fashions and its principles.'" □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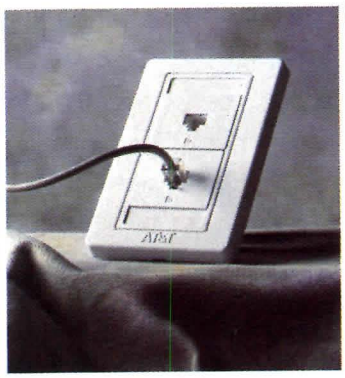

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The Perils of Using Thin Stone And Safeguards Against Them

By Forrest Wilson

Thin stone veneers of marble, granite, and travertine have been seen to dish, bow, and curl. Veneers have failed for known and unknown reasons, yet some stand without blemish, proving that stone beauty can be thin-skin deep.

The design of traditional stone walls is based on centuries of experience. Thin stone design is comparatively new and has become increasingly popular during the past two decades. As a result of the development of new sawing techniques and attendant technologies, the beauty of stone is now within the range of more modest building budgets. But certain spectacular failures appear to indicate that more is known about cutting stone than about the performance of thin-cut stone veneers on buildings.

Are we headed for another set of disasters like the terra-cotta "time bombs" that periodically exploded in major cities, killing and maiming the pedestrians below, or the crumbling of masonry facades due to chloride-containing admixtures? Should all thin stone buildings be engineered? Are some stones, cut to veneers less than two inches thick, simply the wrong material?

Stone: What you should know

Texture. Stones may have macro and micro textures, preferred orientation of crystals, and banded concentrations of minerals. They have bedding planes, imbedded fossils, and various types of voids and fissures. There may be combinations of these conditions and others in a single stone. Most stones come from rock deposits with jointing systems on a micro and macro scale. In short, stones have all the beauties and all the problems peculiar to natural materials.

The mineralogical and physical characteristics of a stone determine its performance. The orientation of minerals that have good cleavage in a direction parallel to the axis of orientation and bedding planes causes significant differences in strength and weathering and greatly influences the effectiveness of anchorage systems.

Finishes. Surface finishes affect strength and durability. Thermal finishes (flamed) as used on granite, bush hammering, and similar finishes reduce thickness and bending strength. A ⅛-inch reduction of a 1¼-inch veneer reduces bending strength by roughly 20 percent and may increase elastic deflection under wind loads by as much as 37 percent. This problem can be further affected by job-site weathering.

Thermal treatment can result in microfracturing, particularly of quartz and feldspars. Thermal shock causes fracture along cleavages, and micro cracks encourage water absorption with consequent degradation due to cyclic freezing.

Stone strengths listed in the literature are "approximate"—the stone actually may be much stronger or weaker. Stone within any given category varies widely, even among stones taken from the same quarry. Physical properties listed in tables should therefore be used only for preliminary design. Tests should be performed to establish ranges for design calculations following ASTM testing procedures (C880, "Standard Test Method for Flexural Strength of Rupture of Natural Building Stone"). Tests for accelerated weathering should be performed, and petrographic studies made.

Hysteresis. Most stones are relatively volume-stable. After expanding and contracting with thermal changes, they return to the dimension relative to the temperature at which they began. However, some marbles increase in size in small increments after thermal cycling and do not return to their original dimension. This process is called hysteresis.

Hysteresis may not affect thick marble veneers. Expansion occurs on the surface and is restrained by the unaffected portion of the veneer. But surface dimensional changes of thin marble veneers may overcome the weaker restraint of thinner material. The marble will then dish because of greater expansion across the stone's face. Moisture on the back side of the marble may cause dishing or bowing in the opposite direction.

Hysteresis increases the stone's porosity and thereby makes it more liable to attack by atmospheric acids and cyclic freezing and thawing. Some stone veneers are subject to "granulation" by natural weathering. It is recommended that all stones be tested by extended weathering techniques under controlled conditions to establish safe minimum strength requirements.

Chemical attack. Limestones, dolomites, and marbles are vulnerable to severe attack by sulfurous and sulfuric acids and to a lesser extent by carbonic acid and ammonium salts. Sulfur-based acids form gypsum, and the carbonic acid and ammonium chemicals force a dissolution of lime. These parts of the stone are then washed away. Chemical treatment of the stone surface can reduce permeability and susceptibility to atmospheric chemicals, and will prolong its service life.

The chloride ion in de-icing salts such as sodium chloride or calcium chloride does not react directly with the stone's components. Chloride causes damage from crystal growth within the body of the stone. Salts can be drawn into the stone by capillary attraction and cyclic wetting. A common example is spalling at the base of stone panels flanking sidewalks that frequently are spread with chloride de-icing salts.

Permeability. Historically, the permeability of stone veneers on buildings has not resulted in significant strength or serviceability problems and therefore has not been considered in design. But thinner veneers are liable to more penetration proportionately than thicker.

Stones with good freeze-thaw weathering properties can become frost-sensitive due to thermal cycling, which alters pore structure. Other stones are vulnerable to damage due to cyclic freezing particularly when saturated.

Water permeability tests conducted by the National Bureau of Standards indicate that, under three different pressures, sandstone was the most permeable and slate the least. These tests and observations of in-service behavior of thin stone veneers

indicate likely water penetration in greater amounts and at faster rates than normally anticipated with thicker stones.

Water, depending on the stone, can penetrate the veneer under wind-driven rain conditions, and condensation can develop on the back side of the veneer. In addition to caulking, a second line of defense such as flashings and weep holes should be provided to collect and divert water to the exterior of the building.

Dry sawing. Dry sawing and drilling of kerfs and anchor holes may cause thermal stress due to the heat generated if the stone contains materials such as feldspars. Stresses can cause microfractures in the immediate region of the drilled hole that propagate for significant distances along cleavage planes. If the stone is sufficiently thin, fractures have an important influence on bending strengths.

Blind anchorage. Blind anchorage techniques were developed for the installation of interior stone veneers and were transferred to exterior installation. But trusting to anchorages in blind grout pockets has proved risky, so specifications now normally insist on observable positive mechanical anchorage.

Movement. Properly sized expansion joints must be provided between stone panels and/or below supporting steel clip angles to allow the structure to shorten and deflect and the stone veneer to expand and contract. Unaccommodated spandrel beam deflections, building side sway, differential vertical movements between the stone veneer and the structure of the building, thermally induced horizontal movement of the structure, and vertical deflection of the supporting structure will cause distress if not accommodated.

Leveling devices placed between stone panels or below supporting clip angles and left in place can also be a cause of damage, causing the panels to crack and spall because of force concentrations due to movement.

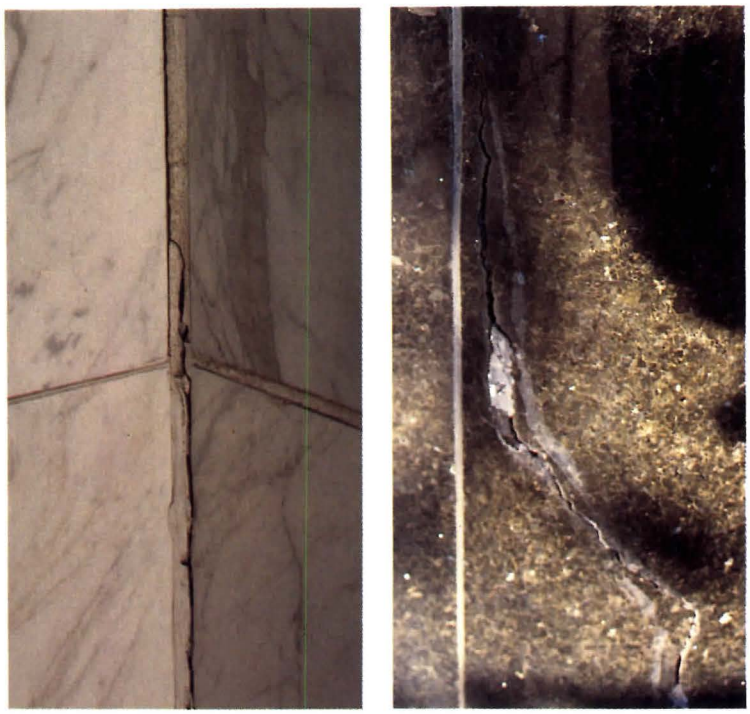
Cantilevered floor and roof slabs and beams frequently exhibit sizable elastic deformations. Stone panels resting on them move along with them. If the structure is concrete it is subject to long-term creep deflection. Thin, deep stone veneers may be forced to act as deep beams when supported by relatively shallow building-frame spandrel beams. Veneers supported on cantilever outriggers can also induce thermal twist in spandrel beams.

Vertical and horizontal expansion joints in thin stone veneers normally are caulked with sealant to prevent the penetration of moisture through the joints. To accommodate properly the anticipated movements at the joints and to ensure that the selected sealant in the joints will last for its expected life, the size of the joints normally should be two to four times the total anticipated movement.

Attachment stresses. Stones are attached using clip angles, kerfs, and pins. Angles may be continuous or intermittent, depending on design loads. Pins are either loose or held by a soft sealant in holes drilled into the veneer. Kerf stresses are complicated and are affected by the thickness of the stone after the cutting of the kerf, by kerf depth, by the inside radius of the corner of the kerf cut, and by the strength of the stone.

Handling. Since stones may be stored and transported flat, gravity loads are critical. Major stresses are induced when stones are lifted from a flat to a vertical position. Other hazards, which are impossible to anticipate, include accidental impact, jarring, and vibration during vehicular transport and force fitting on the site. The worst case therefore must be considered as a standard.

In the design of thin panels, allowable bending stress is determined by dividing the bending strength of the stone by the appropriate factor of safety. The modulus of rupture is influenced by the type of stone; variation in quality between quarries and between locations in the same quarry; size of the sample tested and arrangement of the test load; surface finish; normal statistical variation in strength of stones with nominally identical quality; orientation of the grain structure of the stone relative to the direction of the load; weathering; and moisture content.



Photographs by Forrest Wilson

Thin stone veneer failures. Corner joint chipping and panel bowing (left), and through-stone fracture (right).

Set safety factors high, and test them

Although average values for stone properties are available, variations among individual batches are such that they should be tested. Testing should be done on stone with the same finish and thickness as that used on the building.

For some stones there is a preferred orientation of the grain structure that will provide a higher bending strength. Unless the designer can ensure that the selected stone will be fabricated and installed to utilize the stronger grain orientation, the lower strength of the two grain orientations should be used in design.

The bending strength of building stone is affected by weathering on the building. Flexure tests should be conducted on stones both new and after subjection to laboratory freeze/thaw testing.

The physical properties of stone, design loads, safety factors, stress concentrations at attachment holes and kerfs, the effect of finishes on the strength of the stone, and the design of joints, connections, and flashing systems must be examined with extreme care. All these variables suggest that safety factors for thin stone veneers be greater than those commonly adopted for more predictable materials. □

This article is based largely on research done by the engineers and scientists of Wiss Jenney & Elstner of Northbrook, Ill., especially S.B. Bortz, senior consultant, and Robert Crist, vice president.

The Tools that Cut the Stone

Diamonds are among the architect's best friends. By Forrest Wilson

Photographs courtesy of GE—Super Abrasives Division

A gem on a king's finger is not worth nearly as much as a manufactured diamond in an architect's imagination. New gemstone cutting edges are being used more frequently as architects and builders explore the limits of the technology in preservation, repair, and reuse of masonry, stone, and concrete buildings.

A sophisticated technology developed to cut the hard, exotic metals, plastics, and composites used in the aerospace industry is being applied for precise cutting of stone, concrete, and fired masonry building materials that have been used for centuries. The variations of these traditional materials now can be adjusted to precise tolerances, bridging the gap between handcraft and machine manufacture.

Diamond saws and drills are appearing on building sites along with the portable drills, routers, and "skill saws" of 40 years ago. But, instead of cutting wood and plasterboard, they are sculpting the harder, more permanent building materials that formerly had to be broken or destroyed. They are converting abandoned hulks into multimillion-dollar properties. The new tools are quick, quiet, and economical.

Like earlier powered hand tools, the new cutting tools entered the building process without fanfare and quietly took over. Core boring has replaced setting sleeves in concrete slabs as a standard procedure. The cut is cleaner and more accurate, and the cost of a standby plumber or electrician has been eliminated. Underfloor metal duct systems regularly are drilled as a standard means of access for electric and data hookups.

This is the way it began a few years ago. Today, as this is being written, the entire three-foot-thick sandstone foundation of the Richardsonian Romanesque revival City and County Building, Salt Lake City, in its redesign and renovation by Burtch Beall, FAIA, is being cut through with diamond saws. That the historic building soon will rest safely on its 450 seismic isolators is made possible by the new cutting techniques (see March '87, page 66).

The technology is new. The scientists who first manufactured diamonds were seeking not gemstones but industrial diamonds, which are far more valuable. Diamonds had been used for years for cutting glass when, shortly before World War II, they were applied to cutting and machining the harder metals introduced into the automobile and airplane industries.

Diamonds used in industry and architecture are either mined or manufactured. Natural diamonds are crushed into "bort" from larger gemstones. Manufactured diamonds are grown as whole crystals that are controlled for size, surface, and strength and are engineered for specific cutting or grinding purposes. Today the use of manufactured industrial diamonds far surpasses that of natural diamonds.

Three basic machines are used for sawing, drilling, and machining concrete, stone, steel, and wood; they are powered by electricity, pneumatics, gasoline, or hydraulics.Wall saws cut door and window openings. Flat saws cut expansion joints, remove floors, and make drainage cuts and duct openings. Core drills cut sleeve openings and bore cores.

Diamond is the cutting edge but only part of the complex engineering that makes a diamond blade or drill possible. The edge is a metallic bond impregnated with diamond crystals throughout its structure. The cutting segment usually is brazed to the core. When cutting, diamond and metal must wear equally to constantly expose the diamonds, which cut as they microfracture to expose sharp edges. Manufacturers of saw blades match the wearing characteristics of diamond material and metallic bond and tailor them both to the characteristics of the material being cut and the speed of the saw. This is an exact science practiced on saw blades, some of which are more than 10 feet in diameter.

Sawing and drilling cuts are clean, material can be saved or reused, and patching is simple. In contrast, breaking tools such as jackhammers and sledgehammers make a great deal of noise, take a lot of time, and tend to destroy the bond between the concrete and rebars surrounding the work. And, despite the fact that diamond saws and drills are not cheap, savings in labor make sawing and drilling more economical than breaking holes in the building.

Man-made diamond cutting edges were introduced in the late 1950s and now are used in the major marble-producing areas of Italy, Spain, and Greece. Large, circular diamond saws with small central flanges and automatic controls are used in the primary sawing of granite. The advantages are unattended operation, increased depth, and smooth cuts, eliminating part of the grinding operation.

Steel is usually cut with boron, the second-hardest material in the world. The product Borazon is made from boron and nitrogen forming a compound with the same structure as diamond. It has a different chemistry and will cut through steel; diamond does not do that economically.

Phenolic resins, introduced in wood processing in Europe, resulted in wood machining problems because of the hard mineral filler that forms the resin. It can be cut quickly and economically with diamond-edged tools that now are used in this country for cutting resin-bonded chipboard and ordinary lumber. The tool itself is expensive, but its down time is negligible.

Contractors learn by doing. Any contractor that has been in business for any length of time probably knows the new cutting technology. There are no schools or instruction booklets, says Ed Thorn, executive director of the Concrete Sawing and Drilling Association. Diamond sawing demands skill, although flat sawing is not much more difficult than operating a skill saw, according to Thorn. But core drilling, wire sawing, and deep sawing with a large blade demand considerable talent and experience. There are no examinations; the industry weeds out incompetents. Sawyers that survive using such expensive equipment have proved themselves.

Automation of the sawing process is developing rapidly as the result of skills required to decommission the thousands of 20- to 25-year-old radioactive installations in storage areas, laboratories, and hospitals. Robotic cutting technology is advancing rapidly. □

Removing 302-ft, 30-year-old reinforced concrete stack in Zurich Switzerland the easy way, without blasting jack hammers, noise or dust (opposite). Sections cut in a single 90 minute pass with twin automatic diamond saw heads, lifted to ground (above) and carted away.

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The Pitfalls of Slander Laws

Still another area of architectural liability.
By Robert Greenstreet

Before World War II, the issue of legal liability affected the architectural profession so little that the concept of errors and omissions insurance was hardly known; in fact, only Lloyd's of London offered some form of liability coverage. Of course, since then architects have become painfully aware of the dangers they face in the prevailing litigation-oriented society and have come to regard liability as an integral part of everyday practice. Until recently, however, the legal threat was not the focus of any serious research and remained largely undefined, made all the more menacing by its vagueness. Several recent studies, including work by AIA, have helped to quantify the risks and establish a clearer understanding of negligence in the profession. The studies reveal two prominent areas of concern.

First, the decisions reached in court cases throughout the country indicate that the standard of care to which the architect is expected to conform has risen sharply in the past few decades. The standard of performance of the reasonable professional, although not yet tantamount to a warranty of perfection, is nevertheless remarkably high.

Second, the areas of practice where architects have been held responsible for their negligent actions have broadened considerably, for example, in product liability, statutes of limitation and repose, and shop drawing review. Despite recent efforts by the profession to stem the ever-increasing flow of liability claims, it is still important to keep an eye on developing case law around the country to see if any new areas of contention may soon become a commonplace threat to practitioners.

One such area that has received little attention but may bear examination is defamation—a civil law tort, or wrongful act, that incorporates both slander and libel, that is, spoken and written representations that allegedly harm the reputation of another or lead to some form of loss. It obviously is necessary for architects to voice their professional opinions throughout the design and construction processes and in the day-to-day operation of their offices. For example, they are contractually bound to "advise and consult" with their clients (AIA Document B141, 2.6.4), to provide certification based on their professional judgment with regard to payment release or termination of the contractor (AIA Document A201, 14.2.2), and to determine approval or rejection of proposed subcontractors and shop drawings. However, research indicates that construction-related defamation cases instigated over the past several years may, cumulatively, suggest some cause for concern.

Mr. Greenstreet is an architect, arbitrator, and chair of the department of architecture, University of Wisconsin-Milwaukee. He specializes in legal and professional aspects of architecture and has authored or coauthored six books.

This may appear curious at first. After all, liability for negligent acts is a well established concept, but should the principle extend to mere words, particularly in a vocation where opinions and judgments form an integral part of professional services? A review of these cases should raise some questions as to the advisability of expressing opinions orally or in writing too promptly, reveal some areas where caution should be exercised, and lead to some simple strategies for minimizing the risk of defamation suits.

Construction is a remarkably complex operation involving many different parties and activities. The potential for misunderstanding or disagreement is high and can in some instances lead to legal action for defamation. In several such cases newspaper reports or letters published in newspapers concerning design professionals, contractors, or developers have led to charges of defamation, where aggrieved parties felt they were dealt with unfairly or incorrectly.[1] However, most of these cases involved the expression of a personal, and obviously critical, opinion of a project or third party that was not actually integral to the construction process.

Other cases, involving parties closer to the construction, include the false reporting by a supplier on payments received[2] and the erroneous reporting of a contractor's bankruptcy to a credit reference company;[3] both these cases led to suits being filed by the aggrieved parties. These may seem justifiable reasons for court action, but a third case is perhaps surprising: a suit brought against an individual after he filed a mechanic's lien[4] that, it is claimed, impugned the creditworthiness of the recipient, the owner of the building in this case. The suit was dismissed, although only after a costly legal defense; the court felt that the act of placing a lien constituted normal practice and was not malicious in intent. In the same vein, the act of serving a summons and commencing legal action cannot be considered libel.

An architect, as adviser to a client, has to provide opinions that require professional judgment throughout the construction process. In fact, failure to warn a client against, for example, a contractor's incompetence could be held as a breach of contractual duty. To what degree, however, will architects be held accountable for their opinions if they reflect negatively on a third party? Certainly, there is evidence to suggest that the selection of any contractor other than the "lowest responsible bidder"[5] should be undertaken with great care. In one case, the low bidder for a government project did not receive the contract because it was discovered that he possessed a criminal record. The contractor felt that was not adequate cause to deny him the work and sued, claiming that the rejection defamed him. In another case,[6] an engineer was sued (albeit unsuccessfully) for slander after stating in hearings that he did not believe the low bidder

had sufficient experience to complete the installation of a ski lift system.

Similarly, great care should be taken in the rejection of a subcontractor by either the owner or the architect. In one such case, an architect instructed the contractor not to employ a subcontractor because of his business incompetence and lack of skill. The architect had encountered the subcontractor's firm 10 years previously and a feud had been going on ever since, culminating in this instance in a claim against the architect. The claim was dismissed, as the architect successfully demonstrated that his opinion was not malicious or rendered in bad faith.[7] Another case suggests that any advice to the client that may result in the dismissal of a contractor[8] also should be given carefully and be based solely on factual reasoning.

Professional opinions sometimes are sought by parties other than clients. References requested for individuals or companies, although they engender no contractual obligation and generate no payment, may still render the architect vulnerable to claims. The question of responsibility for one's professional opinion is perhaps best stated in an English case involving an inaccurate reference that resulted in a loss: "Where in the ordinary course of business or professional affairs a person's skill or judgment is relied upon, and that person chooses to give information or advice without clearly showing that he does not accept responsibility, that person accepts a legal duty to exercise such care as the circumstances require.... If he fails to exercise that degree of care, an action for negligence will lie if damage results."[9]

The principle was reiterated in the case of *Clay v. Crump,* in which the architect gave his opinion while on a site visit that a wall would be safe if left intact. Its subsequent collapse on top of a worker led to a successful claim against the architect for negligent misstatement.

Many architects also offer their services as expert witnesses or in the performance of postoccupancy evaluations. A recent suit[10] against an engineer for preparing a critical evaluation report on a sewerage plant worked on by another engineer suggests that caution is necessary when an opinion is expressed that negatively reflects on another party. This concern is perhaps less critical when a report is prepared for use in a lawsuit, where it is likely to be considered privileged information.[11] However, expert witnesses cannot necessarily rely on the immunity usually given to witnesses testifying in lawsuits if their testimony has been negligently prepared. In a case this year, an appellate court reversed a lower court's decision and allowed the people who hired an expert witness to sue him for the inaccurate opinion he gave on the expense of restoring lateral support for their land.[12]

Therefore, whenever a formal professional opinion is required, documented evaluations that may reflect on the work or reputation of another professional should be handled ethically in a technically correct, impartial manner. Findings should be reported in precise terminology and, if possible, should be adequately substantiated. Oral testimony should be prepared equally carefully and linked to written evidence where appropriate.

Although a surprisingly high number of defamation cases related to construction have been filed, it is nevertheless reassuring that few of them brought against architects in the carrying out of their duties have been successful. However, every lawsuit requires considerable time and money for its defense; it may therefore be useful to review several strategies suggested by the case law that could minimize claims by providing as few grounds as possible for any potential case to be based upon.

Some protection is provided in the relationship between architects and their clients. This relationship usually is recognized by the courts, which in the past have considered that a qualified privilege is necessary for architects to fulfill their duties properly. Accordingly, if opinions or statements are recorded that are given in the best interest of the client, that are believed to be true, and that are given in a factual, specific manner, any claims will have a limited chance of succeeding. However, if the plaintiff can prove that the architect's opinions were given maliciously or inaccurately, the defense of privilege may be withdrawn.

Certainly in all communication, spoken and especially written, the architect should strive to rely on facts and enlightened, well-reasoned opinions and to avoid sweeping personal statements and colorful adjectives. In particular, any perceived malice against the third party is likely to lessen the perception of an impartial professional judgment. All correspondence that involves opinions or judgments should be reviewed carefully before delivery and checked for accuracy and objectivity. Even if opinions are given ostensibly in private, the architect should consider the possibility of his or her words being passed on to a third party. For example, advice given to a client in the selection of a contractor may find its way to an unsuccessful bidder's ears.

In a litigious society where the negligent act has become a commonplace threat to practice, it probably is not surprising that the negligent word also could become a cause for concern. However, despite the abundance of cases over the past few years in the construction field, relatively few of them have been successful. This suggests that a few simple safeguards taken in speaking and writing will help minimize the possibility of such cases, particularly regarding conscious omission or any inaccurate or inadvisable contents in letters, reports, or even conversations. In the absence of malice, the threat of defamation becomes fairly remote. Thus, a certain care in offering an opinion, either spoken or written, to any party regardless of contractual relationship should minimize the chance of legal action by reducing the opportunities for aggrieved parties to build creditable cases against architects. □

Citations

1. For example, *Martin v. Wilson Publishing Co.,* 497 A.2d 322 (SupCt R.I., 1985); *Kanell v. Campbell,* 501 A.2d (N.J. App., 1985); and *Weinel v. Monken,* 481 NE 2D 776 (Ill. App., 1985).
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The 'Best' of CADD Software

By Oliver R. Witte

Since most firms will buy only one CADD program and invest a great deal of time and effort learning to use it, they feel pressure to make the right choice the first time.

So we posed a challenge to the teams of architects who have been serving as our volunteer evaluators for more than four years: "We understand that previously you had to hedge your opinions because you were not familiar with all the programs. But now, after all these years and several evaluation sessions, surely you have the answer. Tell us which one is best."

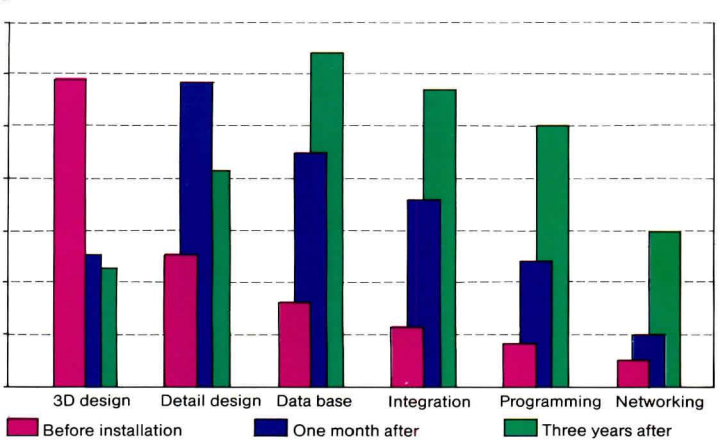
At the roundtable discussion that typically wraps up a day of presentations by each team, the mood was closer to a barroom brawl than to professional consensus. The evaluators didn't just disagree politely, they wanted to fight.

The seven programs accepted for this evaluation are Arris by Sigma Design, Autocad by Autodesk, Cadvance by Isicad, Datacad by Microtecture, Drawbase by Skok Systems, Point Line by Robi Graphiks, and Versacad Design by Versacad. They represent the *crème de la crème* of PC-based architectural CADD. They are the survivors of our five previous evaluations of programs in this class, the most recent published in February 1988 (page 103).

These seven programs run on IBM or compatible microcomputers. All are priced at $2,895 or more. As usual, each program was placed in two architecture firms clustered in the Chicago area for reasons of synergy. The firms have varying experience with computers and their CADD programs, ranging from months to years. Each evaluator agreed to use the software in his practice as the CADD program of choice.

At the evaluation meeting, presentations were made on a Compaq 386/20 computer with an Artist 10 graphics card, 19-inch Sony 1952 monitor, and 12x12-inch SummaSketch Plus digitizer. As a second monitor, the 13-inch Compaq VGA graphics board and monitor also were available. Arris and Cadvance were presented with the Image Manager 1024 graphics card by Vermont Microsystems and a NEC 20-inch multiscan monitor. Drawbase required a 12x17-inch digitizer.

Disagreement about the value of the programs ran deep. In a ranking of programs by the evaluators, each of the seven programs received at least one vote as best but none received more than three first-place votes. At the other extreme, at least one evaluator rated last-place or unacceptable every program except Datacad. With only two defections, every evaluator selected as best the CADD program he had been using.



Over time, CADD-user concerns shift, an IBM survey indicates.

If there was one overriding lesson this evaluation made obvious, it's that most vendors still cling to the fantasy that architects want to learn computing. They don't. Installing the software is as difficult in 1988 as it was in 1984. The content of the manuals has improved, but most remain wordy, inaccurate, poorly organized, poorly illustrated, and incomplete for all their bulk. And CADD is still inadequate as a drawing tool. You're supposed to draw on a horizontal surface, yet the monitor is vertical. Just try signing your name with it. In the past the evaluators were understanding, allowing for the infancy of the CADD industry. But they are becoming impatient with systems that present a hostile user environment. And that shows in the evaluations that follow.

Arris

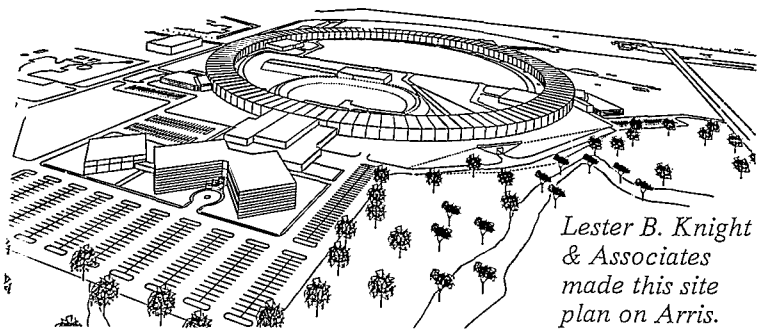
Our perceptions of the value of Arris are rather different, due in part to the extreme difference in the size of our firms. We agree that Arris is a remarkably powerful and distinctively architectural program, but its complexity affects firms that can afford a computer manager differently from firms where the principal must manage everything.

Unlike programs that began as simple PC drawing tools, Arris originally was written to run on a minicomputer. Thus, Arris is probably closer now to being what all CADD systems will be in the future than most of the other programs in this evaluation. The on-screen, pop-up menus are especially productive. They provide real-time, context-sensitive data and heads-up operation. Keyboard commands are available, although they could have been documented better, but tablet commands are not provided.

Rather than aiming at a more general market, Arris focuses on architecture and building design. An example is the "smart wall" feature. It resembles the double-line commands in other programs but can carry much more information to facilitate quick perspectives and estimating reports. Data-base attributes can be attached automatically to walls as they are drawn. Thus, wall, wainscot, and sill heights can be specified to support automatic generation of wall elevations and 3D models.

Arris has the most complete 3D capability of any program reviewed here. The program's data base is inherently 3D, and all commands work in both 2D and 3D. The only difference is how the user chooses to look at the data. Related modules include entourage items (such as cars and people) to add scale and interest to a drawing, dynamic color mixing, and the most advanced tools of any micro-based system for adding shading, shadowing, transparency, and dithering to 3D models.

Other modules provide site design and space design specifically for architects. Unlike some programs that seem better suited to big facility space planners, Space Design offers automated, graphic techniques for analyzing space requirements and affinity relationships and for developing bubble, stacking, and block-



Lester B. Knight & Associates made this site plan on Arris.

ing diagrams. Another module, Details, facilitates the preparation of detail sheets and data bases that require a mixture of more than one scale.

The big weakness with Arris is the perception that it is expensive to implement, time-consuming to learn, and difficult to use. Beginners do not come away from a two-hour demonstration with the confidence that they can run the program. Part of the complexity of Arris is in its disk operating system. Unlike the other programs evaluated here, Arris runs only on a variation of Unix called Xenix. All the other programs run on DOS. Xenix is significantly more complex than DOS and requires considerably more time to learn. (See Nov. '88, page 139.)

Arris also is criticized for the cost of its software—more than $11,000 if all modules are purchased. But Arris really is a family of programs. Not all are necessary, but users who choose to buy them can have confidence that they will work together. To get similar features with programs like Autocad requires taking the risk of buying from third-party developers. Cost, moreover, is relative. Large firms will save money with Arris. Smaller firms might find that the extra money and time make a noticeable increase in cost per workstation.

In discussion at the shoot-out, evaluators focused most of their comments on the balance between productivity, complexity, and cost. "Each computer in our office has to be able to run all our software," Hjertstedt said, "including word processing and spreadsheets. The truth is that a new operating system is going to emerge and it's not clear what it will be. The question is whether to learn Xenix/Unix or milk the more cost-effective and simpler nature of DOS until the new standard emerges." Arris's hardware lock and lack of on-line help annoyed Robicsek. Wenzler added "limited 2D production features" to the list of criticisms, while Pedersen noted the fast interaction between 2D and 3D.

—Marshall F. Hjertstedt, AIA, and James S. Lyman, AIA

Autocad

The marketplace has chosen Autocad as the preferred CADD software, and in overwhelming numbers. The vendor, Autodesk, has sold 175,000 copies of the program, which makes it the leader by far. Two out of three A/E firms that use CADD have bought Autocad, and three out of four construction industry engineers use Autocad.

This does not mean that Autocad necessarily is the fastest, the best, or the most in any single category. It does mean that Autodesk has made the long-term commitment to turn a generic CADD program into a useful tool for architects by offering architect-specific software such as Autocad AEC Architectural, Autoshade, Autoflix, Autosketch, and Autosolid; ugrading the software frequently; opening the program to third parties, who develop specialized applications no one vendor could address, and to architects who want to tailor the program even further using the built-in programming language, Autolisp; supporting almost every type of CADD-related hardware device on the market, with more possible options than any other vendor; creating DXF, a file format that many software writers are using as a universal CADD language; and developing the widest network of training centers, dealers, user groups, magazines, and newsletters of any CADD vendor.

Autocad packs a lot of power for an out-of-the-box drawing tool and has great flexibility. Its price is competitive, and it runs on almost any equipment we want or can afford at the moment. If our budget changes or we need more power or higher resolution, we have full confidence that we can upgrade without fear.

With Release 10, Autocad become a fully 3D program. All lines are now 3D and may be used with various line types. Also new is the DView command, which allows the user to create perspective viewing positions and dynamically rotate the proposed objects to select a desired view. Another major improvement is the VPorts command, which allows the user to define up to four screen areas in which to view the drawing in plan, elevation, perspective, and isometric. The views are interactive, and the user can move from one viewport to another while drawing or editing.

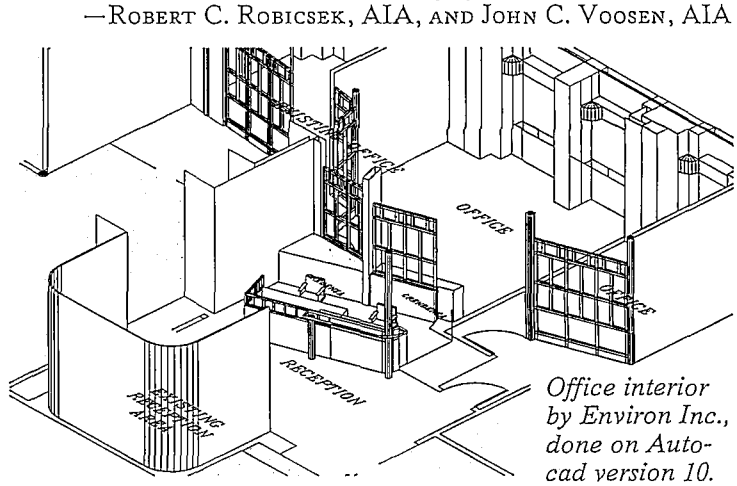
The new Convert command permits easy movement between 2D and 3D. Leaving blocks or icons in 2D until there is a need to display them in 3D speeds drawing time. The Filmroll command saves a 3D view for export to Autoshade for rendering and shading.

Fortunately, drawings created with earlier versions remain fully compatible with the latest version. Historical compatibility is important because our drawing library is large and keeps growing daily. Improvement still is needed in speed of operation and data extraction. Autodesk also needs to simplify the manual. As the software has become more complex, it has become more difficult to learn.

"Autocad offers what an architect needs to have," Wenzler said during discussion, "but does not do anything architecturally-related exceptionally well. Autocad also carries the baggage of a huge third-party offering and hence is limited in its ability to make an all-out shift in software."

"The symbols libraries need additional work to keep it from slowing production," Reginato said of the AEC template with Version 9. He also felt that the overlay system needs work.

—Robert C. Robicsek, AIA, and John C. Voosen, AIA



Office interior by Environ Inc., done on Autocad version 10.

Cadvance

Having tried most of the seven programs in this evaluation and having seen numerous demonstrations of the rest, we can say with confidence that Cadvance is the fastest, easiest to learn, easiest to use, and least expensive in cost of software, total cost per workstation, and cost of training, maintenance, and operation.

Although our firms differ significantly in size, we both believe that Cadvance represents the best value in CADD. From the initial setup through everyday use, Cadvance minimizes the time required to achieve and maintain high productivity. But the really remarkable fact is that Cadvance achieves all that with no significant sacrifice in 2D drawing power.

No other program will enable a novice to draw an L-shaped building with eight-inch walls, subdivide it with six-inch partitions, create a 3x7-foot door symbol, and insert it in three places, all without opening a manual or even using the excellent on-line help. This translates directly into dollars.

Three characteristics contribute to Cadvance's ease of use. The menu and command structure are architecturally intuitive and visible on the screen at all times, and help, if needed, is on line and provides virtually the entire manual at the click of a mouse button. Second, architectural functions, such as double-line walls with clean intersections, are available from the main menu without add-on templates. And third, the program can be set to conform to office standards with two commands that control all the system's variables.

Our approach has been to avoid having dedicated CADD operators and instead make this tool available to anyone in our offices who has the inclination. For this to work, the software must be relatively self-explanatory for occasional users and have the flexibility for us to modify it for our firm's structure. Cadvance's macro language allows us to create simple custom routines that automatically set up the system our way. New users get a brief introduction and are encouraged to practice with tutorials in the manual. Most training is individual and independent. We have never purchased training.

Our cost per workstation with Cadvance is less than it would be with any of the other programs in this evaluation. We are able to use computers with a normal amount of random-access memory, inexpensive graphics cards and monitors, and a variety of mice. We figure our savings are as much as $7,000 per workstation for hardware and up to $10,000 for software. For the cost of a high-end workstation, we can add two or more Cadvance workstations. And a firm really needs more than one station to meet project deadlines.

Cadvance also provides a powerful data-base capability. It has a two-way link with dBase III Plus, allowing us to track furnishings and other building components and produce door and finish schedules. This enables us to use data-base applications developed by our clients or others.

Speed has always been a hallmark of Cadvance, mostly because it stores its geometry in whole numbers (integers). This reduces processing time, compared with other programs that use decimal numbers (floating point). In the days of 16-bit data structure, CADD programs that used the floating point system had a theoretical advantage in accuracy and drawing size. But with today's 32-bit data structure, Cadvance is left with all the advantages and none of the disadvantages of the integer system.

Another advantage of Cadvance's integer system is that it is the only program that does not require a coprocessor—saving $795. Floating point programs, even with a coprocessor, take three to four times longer to execute commands requiring the screen to be redrawn. One typical drawing that took seven seconds to redraw with Cadvance took 30 seconds with Datacad.

If an office can afford expensive graphics cards and ultra-high-speed computers, differences in speed of the various programs are minimized. But if CADD must be done on a VGA card and monitor on a 12-megahertz computer, speed is a factor, especially considering the number of times a user must zoom in and out.

Cadvance's most obvious deficiency is 3D; it is the only program in this evaluation without it. Cadvance also does not include symbol libraries, although we do not consider this a detriment. Creating our own symbols enables us to make our CADD drawings appear similar to our conventional drawings. If premade symbols are used, our drawings will not have the same level of detail, line weights, consistency, etc.

Other weaknesses of Cadvance include a lack of associative dimensioning, a built-in text editor, grid and cursor rotatation, and a built-in plot optimizer. Associative dimensioning updates the dimension string as a wall is moved. Cadvance will import text from a word processor, but width is limited to 40 characters. A plot optimizer available at extra cost from another vendor speeds plotting time and saves wear on the plotter.

Anyone who has worked with CADD discovers that true value is realized through ease of training and system management. If most work to be done is 2D and if speed, economy, and ease of use are important, Cadvance is the price/performance leader.

The shoot-out participants generally agreed with us on the evaluation. Hjertstedt and Reginato would like to see 3D. "The lack of symbol libraries increases initial production costs until users build up their libraries," George pointed out.

—Gregory B. Cook, AIA, and James C. Jankowski, AIA

Datacad

Datacad has it all—architectural orientation, one of the best 3D functions, exceptionally easy and powerful 2D, seamless integration between 2D and 3D, a competitive data base, programming language, shading/rendering, and low cost. In each of these categories, Datacad is best or among the best, leading us to the inescapable conclusion that no other CADD program has the range of capabilities and ease of use demonstrated by Datacad.

Microtecture, the vendor of Datacad, has made an obvious

Mr. Hjertstedt, principal of a three-member Chicago firm, has examined nine CADD programs in his three years as an evaluator (half of that time with Arris). Also a structural engineer, Mr. Lyman is senior associate with Lester B. Knight & Associates, which has more than 200 employees in its Chicago office and specializes in high-tech facilities. Lyman has been using Arris for five years, on minicomputer and microcomputers.

Mr. Robicsek, an Autocad evaluator since 1983, is vice president of Environ, a 24-member Chicago firm with work in residential, office, and commercial space. Mr. Voosen, also an Autocad evaluator since 1983, heads a five-member Chicago firm doing commercial, institutional, and industrial design.

Mr. Cook, an associate of Holabird & Root in Chicago, has evaluated Cadvance for four years. With 125 employees, the firm designs offices, schools, and high-tech facilities. Also with four years of Cadvance experience, Mr. Jankowski is vice president of Ross Barney + Jankowski, a Chicago firm of 12 that designs institutional, government, and corporate buildings.

commitment to meet the needs of architects. Datacad's strongest point is its ease of use. Although the manuals are not clear and supply little insight into how some functions operate, the on-screen help menus are well organized and easy to comprehend. With the possible exceptions of Cadvance and Versacad, no other program has a menu system better organized for architecture.

In 2D with Datacad, drawing is a heads-up operation where the operator uses a mouse to select commands from the screen. Keyboard commands can be substituted for even greater efficiency. Few other programs offer the variety of built-in techniques to draw automatically elevators, stairwells, plumbing fixtures, ceiling grids, and electrical fixture layouts.

Datacad far surpasses other CADD programs compared here in the integration of 2D and 3D images. The speed and ease of model building and editing are unchallenged in its price class. Datacad's new macros make it much easier for users to organize walk-arounds and fly-throughs. The views then can be processed to remove hidden lines and linked to produce a slide show.

Images can be rendered in a separate module, called Velocity, which offers 17 light sources with varying intensities from each. Surface textures and even opacity can be specified.

In data-base capabilities, Datacad is a major contender, although the obvious leader in this category is Drawbase, and Arris also impressed us. But Datacad has made it easy to link drawings with cost estimates, specifications, and area calculations. The data base module, DataMerge, also provides aids in organizing construction bid data and job administration.

Architects are concerned about the stability of the vendor and about third-party backing. The leader in both these areas is Autocad. But we believe Datacad is here for the long run. Its programming language, DCAL, released in 1988, encourages outside companies to offer specific adaptations.

When we started this evaluation, we expected all seven CADD programs to offer roughly the same features. This proved not to be the case. And we were even more surprised at how obvious shortcomings in all the programs were presented as positives. For examples, Drawbase evaluators said they had customized their software for their uses by doing some programming of their own. Point Line evaluators said that their drawing file size was limited to a mere 64,000 bytes but that this was a plus because drawing files never became unmanageable in size or makeup. Versacad evaluators noted that it didn't matter if the 3D portion of their program didn't function very well because 2D was the important part. Cadvance evaluators said it was beneficial not to have symbols supplied with the program because then they could make their own to office standards. The Arris evaluators presented Xenix as the operating system of the future.

Perhaps we have the same blind spot. Shots were leveled at Datacad by some other evaluators for its slowness, primarily because of its 3D data base. Datacad does take longer than some programs reviewed here, but not as long as others. The same drawing, created separately in Datacad and Autocad, took 78,000 bytes of disk space in Datacad and 1.7 megabytes in Autocad. Thus the Datacad drawing took much less time to load, move, duplicate and regenerate. Loading the drawing, for example, took 2.5 minutes in Datacad and 10.5 minutes in Autocad.

For us, only two others approach Datacad's comprehensive capabilities: Autocad and Arris. Yet Datacad is more architectural than the former and easier to use than the latter. It is the only program we recommend without reservation.

—Edward W. Wenzler, AIA, and Bruce F. George

Mr. George, an associate of Charles Vincent George, Architects, Naperville, Ill., has been using Datacad for eight months. The 10-employee firm designs banks, luxury residences, offices, and retail space. Mr. Wenzler has been evaluating Datacad for four years. He is a partner in the six-member firm Edward W. Wenzler & Associates in Milwaukee.

Mr. Janssen, director of computer services for the 115-employee firm Loebl Schlossman & Hackl of Chicago, has worked with architectural CADD since 1981. The firm spent two years on Artech, a minicomputer predecessor to PC-driven Drawbase, which it has had for a year. Mr. Zinni, who has used Drawbase for three months, learned CADD on a mainframe, has worked on minicomputers, and is familiar with Autocad and Versacad. His Chicago practice concentrates on residential, hotel, and office design and space planning.

Drawbase

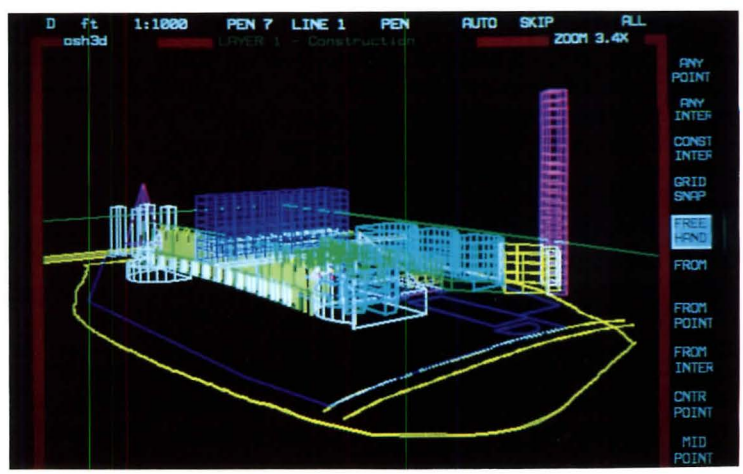
Drawbase is still the only PC-based CADD program that seamlessly integrates graphics and data-base capabilities within the same program. Some training is required to set up the data base, but it is no more difficult than integrating third-party or other add-on modules. For architecture, as well as for extended services such as facilities management, Drawbase stands alone.

Because the data-base management system is tied directly to the graphics function, changes in the drawing are updated automatically and continuously in the data base. It's as easy to view a design in drawing form, with lines and arcs, as it is to view the design as information with words and numbers. The design can be edited from the drawing or the data base, whichever is more appropriate under the circumstances.

Drawbase also is unusual for adding drawing management, word processing, user programming, and 3D viewing all in one neat program. Every aspect of the system is available to the user at all times from within the program.

Architects who are new to CADD tend to overestimate the drawing aspects (2D and 3D) of CADD and to underestimate the data management aspects. Research by IBM indicates that after the sale, however, concerns about handling the information in a drawing replace concerns about 3D and detail design as most important (see chart on page 107).

A proposed city hall by Moshe Safdie & Assocs. (Drawbase).



As the user assembles a Drawbase drawing, nongraphic descriptions on the component pieces are tallied in the data base. Up-to-date reports are available at any time from multiple drawings. Most CADD programs with data-base capabilities can obtain reports from only one drawing at a time. Drawbase makes it easy to respond to queries such as, "Find all furniture that costs more than $X and less than $Y and is made by ABC Co." Changes in the numbers of both objects and quantities, such as area and perimeters, are reflected in data-base values. Redefining and revising a data-base structure after it has been created is easier in Drawbase than in other programs reviewed here.

Value is enhanced with exchange utilities such as DXF, Lotus 1-2-3, Symphony, CSV format for dBase III, HPGL for desktop publishing, and standard ASCII. The small office gains a tremendous amount of capacity, and the large office gets much flexibility with exchange formats and networking.

Each CADD program included in this evaluation works well in the architectural environment. The implementation of CADD should be based on the needs of the firm, ranging from conceptual design to construction administration. The use of a computer in the office is an investment, not a convenience. How well the software is used relates directly to performance, which depends on the ability of the software.

Datacad, Drawbase, Point Line, and Arris have well integrated their 2D and 3D modeling functions.

Both Arris and Drawbase were developed originally to run on minicomputers or mainframes. The Arris Xenix operating system is still a mainframe system trying to fit into a PC environment, whereas Drawbase was completely rewritten for the MS-DOS operating system. Because all our other applications, such as word processing and spreadsheets, run under DOS, Arris adds hurdles to office integration. For the last five years, Xenix/Unix has been the "operating system of the future" and it is still five years away.

Datacad and Arris suffer from the overuse of parametric routines that automatically lay out items such as water closets. Solutions for clients' needs should not be limited to the parametrics of the software, and, in fact, they rarely are. Datacad is the only software that suggests that it's making decisions for the architect.

Communication is the key to productivity, particularly in a design office where many types of information, graphic and nongraphic, must be integrated. Drawbase provides a cost-effective solution to address these needs.

—Paul J. Zinni, AIA, and Terrill W. Janssen

Point Line

Point Line has changed significantly—in price, in its corporate management, in the equipment required to run it, and in its geography. We believe the new Point Line finally is ready to challenge its formidable competitors and win.

The program always has been outstanding, but it was presented so poorly that its sales were the weakest of the major CADD programs. Although the changes have vastly improved the marketability of the product, they have raised doubts about its long-term stability. We believe that the reasons for doubt have been removed and that prospects for growth have never been brighter.

Point Line has been taken over by a new company, Robi Graphiks, which is owned by a Swiss investor, Christian Bigler. He moved the U.S. headquarters from San Francisco to Madison, Wis., where the program was started and where its developers—and now its support staff and marketing department—reside. The one constant throughout the turmoil was product development, which never slowed down.

This reception area drawing by Stenbro Associates illustrates Point Line's 3D solids modeling capability.

The new team slashed the price of Point Line software to less than $4,500 for all three modules and revised the program so it could run on standard equipment, including an EGA (but not VGA) graphics card and monitor. Point Line's cost per workstation finally is competitive with other medium-cost CADD systems. For example, Point Line's 2D module costs $900 less than Cadvance—a difference more than adequate to cover the cost of a coprocessor, which is required with Point Line but not with Cadvance. A coprocessor relieves the main processor from the mathematical calculations necessary to display CADD geometry on the screen.

The greatest asset of Point Line continues to be its redraw speed and its ability to pan and zoom instantaneously. The pan feature allows the user to move the screen image to the side without redrawing the image. We use the panning feature frequently because it often eliminates the need to redraw the screen. At 15 to 30 seconds for a redraw, panning saves a lot of time. This feature makes Point Line unique among programs in its class. Don't buy a CADD system without examining Point Line's software pan and zoom.

Point Line has always been easy to use. Numerous input methods are available, including digitizing tablet, screen menus, and keyboard commands. Keyboard commands have been expanded. Several transparent commands will cause the current command to pause while a subsidiary command is executed that allows a parametric adjustment or zoom.

Point Line allows up to 40 overlay drawing files of 64,000 bytes each, and drawings of different scales are permitted on the same sheet. Individual overlays can be set to be viewed, searched, or modified, and overlay files can be shared among several drawing files.

Point Line's text editor works just like a word processor and includes a font that looks like architectural lettering. A plot spooler returns control of the computer to the user while plotting is under way.

In the 3D module, four views are displayed on the screen: three planes and the user's choice of isometric, axonometric, or any perspective. Eight colors are available for modeling. After a perspective is generated, the view can be exported to the Paint module where colors can be adjusted and other images, including video pictures, can be merged with the drawing.

Point Line's new management listens to its users. The latest release includes improvements in 2D, a two-way DXF translator, the Paint module, and a display feature that simulates a film strip for paintings. The Paint module is quite comprehensive. The software also has been opened to third-party developers, who have produced useful parametric macros.

Weaknesses of Point Line include the lack of an integrated data base, seams in its conversion between 2D and 3D, neither associative nor automatic dimensioning, no undo feature, limited bill-of-materials capability, and the necessity for two screens.

Always at or near the leading edge in development, Point Line is without a doubt an excellent overall value. We are completely satisfied with its peformance.

George was as impressed as the other evaluators by the 3D rendering, panning, and zooming capabilities of Point Line, but complained that it is severely limited in its drawing file size. Point Line's limit on design file size seems to be too restrictrive for major work, and it does not appear to be quite as well debugged as some other programs, some evaluators thought. Others said the program needs to be easier to use, learn, and manage.

—John H. Hanson, AIA, and Grant D. Reginato, AIA

Versacad

We are amazed that, after four to six years of development, some CADD programs are still so difficult to learn and use. Although neither of us would give up the gains of recent years in power and sophistication, we are not prepared at this late stage to accept deficiencies in command language, program organization, or support. We see no reason why we should be expected to sacrifice simplicity for capability, which is why we prefer Versacad. With Versacad, you can have it all.

In Versacad, the command to add a line to the drawing is "Add-Line," and a prompt tells you to locate the first endpoint and then the second endpoint. To modify the size, color, line style or other attributes of an object, choose "Modify" and you are prompted further. By contrast, Autocad's commands are less intuitive.

Even after several years of experience with CADD, we find that with Autocad we had to refer to the manual to determine how to use elementary commands. For instance, in Autocad's opening menu, what do "attdef," "dtext," "minsert," "offset" and "pline" mean and what do they do? What is the difference between "text" and "dtext" in the main menu?

Although Arris boasts more features than either Versacad or Autocad, it appeared during the evaluation meeting to be very complicated. One of the presenters, who is a CADD operator not a firm principal, had difficulty with several operations.

The bottom line is that CADD must be profitable. In small firms like ours, no one sits at the computer all day. The more complicated a program is, the more training or review is required to operate the system. On the other hand, if you expect to operate a CADD system all day every day, Versacad permits you to bypass the menu structure with user-definable digitizer commands or macros. And, if you expect to use CADD more normally, Versacad's plain English menu structure is a productive asset.

CADD power today is largely a matter of flexibility and dynamic control, by which we mean the ability to think, draw, and modify on the fly. Versacad has it; Autocad does not. We found this to be a problem when we gave our Versacad files to our structural engineer, who uses Autocad. Areas in his drawings that included a lot of detail were difficult to read because lines crossed over the top of dimensions. The text also was too big to fit into the available space. Without the ability to correct this while inserting the dimensions, you have to count on someone going back later and modifying the drawing so it reads clearly. In Autocad, you cannot change a dimension or add a word to a note without retyping an entire line. In Versacad, you can.

Versacad's flexibility in defining groups of objects is far greater than that of most other systems. Any part of any object within a defined area is included in the group. The user can add to the group or select common elements within the group for manipulation. Most other programs can't allow that. In fact, one of our CADD operators, who was trained on Integraph, prefers Versacad's group handling. Datacad is more limited in its ability to define groups. The fence must completely encompass an object, or each part of the object must be selected individually.

Versacad is unusually forgiving. You can change the color of a line after its first point is located but before the second point is set. Cadvance still limits a layer to a single color. Furthermore, a symbol in Cadvance must exist entirely on one layer, also a serious restriction. In Versacad, we have made entire patient rooms a symbol, including furniture and engineering information. By managing levels, we have been able to convert the drawing from an architectural plan to a furniture plan to an engineering plan just by selecting a position on the digitizer. This cannot be done in most other programs.

Support cannot be overlooked. We have found the Versacad technical staff available and knowledgeable in both software and hardware. Expectations of such a consistently high level of help from dealers or sales representatives are unrealistic.

No CADD program can be the best at everything. Versacad's strength is 2D, where it offers the best value in CADD today. Versacad used to have the most advanced 3D program, but it has been eclipsed by newer 3D programs such as Datacad. This temporary disadvantage does not bother us, though, because we spend vastly more hours on production work than on modeling. When Versacad makes its 3D function easier to use, the program will surpass the others for overall CADD applications.

—Charles R. Newman, AIA, and Charles G. Pedersen, AIA

Mr. Hanson is a principal of the 12-employee Stenbro Associates in Chicago, which provides facilities management and renovation services and designs commercial interiors and professional offices. The firm has four complete Point Line systems. Mr. Reginato is an associate of the 32-employee PKR Associates in Milwaukee. The firm specializes in institutional buildings and has been a Point Line evaluator for three years.

Mr. Newman has been evaluating Versacad for nearly five years. His 11-member firm in Naperville, Ill., provides design and construction management and specializes in retail, office, and public buildings. Mr. Pedersen also has worked with Versacad for about five years. His three-person Hillside, Ill., firm does educational and institutional design and roofing consulting.

For vendor information on the CADD programs evaluated here, circle the corresponding number on the information card or call: 428 for Arris (800-525-7050), 429 for Autocad (415-332-2344), 430 for Cadvance (800-634-1223), 431 for Datacad (800-722-3983), 432 for Drawbase (800-333-7565), 433 for Point Line (608-256-3025), and 434 for Versacad (714-960-7720). For information on ordering tapes made of the evaluation meeting —the "shoot-out"—circle 435 on the information card.

The Nature of Powder Coatings

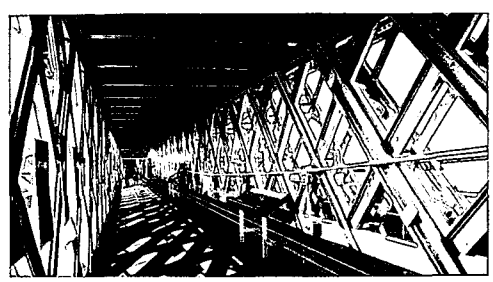
Although they are relatively new to the building industry in the United States, powder coatings have been used extensively in Europe for several years. Until recently, the use of powder coatings in this country has been limited to indoor items, such as ceiling panels and interior partitions. Now, entire buildings are being sheathed with powder-coated aluminum panels. However, for the architect considering using powder coatings, acquiring information about testing and research to meet U.S. standards may be difficult because many of the long-range research and testing sources are European.

Thermosetting powders are composed of resins and pigments that have been electrostatically charged. When sprayed on a grounded metal component—for example, an aluminum window frame—these charged particles adhere. Normally, the spraying is a single application, producing in one pass a window frame coated to the desired thickness. The hypothetical window frame then would be placed in an oven set between 300 and 400 degrees Fahrenheit. At that temperature, the pigments and resins melt and fuse to form a colored coating, which, once set, won't soften when again exposed to heat. The resulting coating is hard and resistant to impact and corrosion.

Thermosetting powder coatings are for the most part based on epoxy, polyurethane, polyester, or acrylic resin systems. In Europe during the early 1970s, some of these coating systems were formulated with a variety of curing agents/hardeners and tested to determine their suitability for architectural applications. The results varied, but at that time polyester powders combined with the curing agent/hardener tri-glycidyl di-isocyanurate (TGIC) produced the best overall results. Today in the United States, polyester/TGIC is the predominant powder coating for architectural applications.

However, Greg Boochi, executive director of the Powder Coating Institute, points out that architects should be aware that the technology is new and changing rapidly. And, as with any new technology, it is easy for the uninitiated to become confused by the industry's use of some terms. For example, TGIC is referred to variously as a binder, hardener, and/or curing agent, when in fact it is a curing agent.

Before aluminum (the metal substrate most often used) is coated, it must be carefully pretreated. The pretreatment results in a chemical conversion that replaces the surface layer of natural aluminum oxide with a new complex that is able to provide a good adhesion for the polyester film. The aluminum pretreatment process can have as many as 11 steps that include alkaline degreasing, acid pickling, and chromatization, as well as several rinsings. The number of pretreatment stages often is left up to the coating manufacturer unless otherwise specified.



Top, the extruded aluminum crosswalk of Tower Bridge, London, has a polyester powder coating. Above, the crosswalk interior.

Are all 11 pretreatment stages necessary? Matthew Osmond, market sector manager with International Paint, believes "a misunderstanding has built up that suggests that only 11-stage pretreatment is suitable for powder coatings. This is not the case. The most important thing is that the pretreatment is carried out to a high standard consistency." Fewer pretreatment steps, however, increase the likelihood of contamination. Thus, a manufacturer using a seven-step pretreatment must maintain higher levels of quality control over the process than a manufacturer using 11 steps. Also, the manufacturer must make sure that one step in the process isn't contaminated by the previous steps. The architect would do well to inquire into quality control as well as the type and number of pretreatment steps.

Once the pretreatment is complete, the actual powder coating can be applied, usually in a thickness between 40 and 80 microns. When writing specifications, the American architect should take a tip from Europeans—years of experience has taught them that film thickness is second only to pretreatment in determining the performance of the coating. In Europe, specifications for some coating contracts are written with a minimum coating thickness of 40 microns. But a specification with a nominal 60-micron (2.4 mils) thickness and an actual practical thickness of 70 to 80 microns (2.8 to 3.2 mils) is preferable. Of course, the optimum thickness of the coating depends on the type of architectural element, its location, and its application. Work closely with the manufacturer and prepare a specification that accounts for the variety of elements as well as their special coating needs.

A coating of many colors

One of the advantages powder coatings claim over other coating systems is their wide selection of colors. In Europe, architects can choose from powder coatings in more than 150 shades. Here the selection isn't quite as broad. International Paint, for instance, now has 50 shades, but the number is growing. The architect should be aware that the choice of shade is going to affect weathering characteristics such as the gloss retention, chalk rate, and color change.

Rates of weathering are governed largely by pigment, not the resin in the system. When selecting a color, the architect should be concerned foremost with durability and should choose a color with pigments that have proved durable. There is some indication that colors (excepting whites and blacks) made up of a large number of pigments (seven to 10) are more durable. The architect might do well to question the manufacturer regarding the number of pigments and their effect on the coating's durability.

Matching colors from batch to batch will be particularly important in large orders. Inquire into the manufacturer's system of color reproduction and its ability to maintain color control. Using a color computer is advantageous because it can accurately match colors and ensure reproducibility from batch to batch.

Powder coatings also come in a wide variety of finishes, from gloss to semi-gloss to mat, as well as something the manufacturers call "structure finish."

Inserts may be a concern

Architects will be interested mainly in powder coatings on metals—aluminum in particular—for such components as building panels and window frames. But nonmetallic surfaces such as glass and some thermosetting moldings also can be coated. The criteria for coating are whether the material's surface will accept the powder and whether it can withstand the "stoving" temperatures of the curing ovens.

Stoving temperatures must be taken into account when the aluminum extrusions to be coated contain plastic or rubber inserts. Until recently, if the insert couldn't withstand 300 to 400 degrees Fahrenheit, it had to be removed and installed after coating. This problem may be solved, however, with the introduction of a proprietary polyester/TGIC coating. This coating is fast-curing, has good leveling characteristics, and allows plastic inserts to be present during curing. Check test results carefully, however, before specifying this type of product, and make sure they cover durability, color retention, and everything else you would want to know about a standard powder coating. If you are satisfied with the test results, then contact the insert manufacturer and ask what the temperature range is that the insert can withstand. Finally, the cost-conscious architect should consider that it may be less expensive in some cases to mask off the insert, coat the extrusion, and have the insert installed later.

Design and specifications

On products installed indoors, powder coatings have worked well. The design parameters are narrow, so the architect should anticipate few problems. For outdoor applications, however, the performance parameters are wider. A powder coating used outdoors must resist ultraviolet radiation, temperature variations, rain, snow, and frost. The architect also should take into account special conditions in the microclimate, such as industrial pollution, salt-sea air, or blowing dust or sand. A powder coating must also resist chalking, loss of color, color change, blistering, cracking, corrosion, and loss of adhesion. The architect should inquire into all these properties during the selection process.

Today, many manufacturers supply the architect with a prepackaged specification, either in publications such as Sweets Catalog or directly upon request. In some cases, this is the only contact between the architect and the manufacturer. But, because powder coatings are such a new industry in this country, some manufacturers have not yet developed a standard specification. Moreover, organizations such as MasterSpec do not yet provide specifications for powder coatings.

The only performance standards available in the United States are the American Architectural Metals Association (AAMA) specifications 603.8 and 605.2. The AAMA 603.8 relates primarily to residential applications, which allow film thickness as thin as 0.8 mils. For applications that thin the best answer may be

polyurethane powders, capable of applications as thin as 1 mil.

For commercial architectural applications, AAMA 605.2, "Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels," is a good place to start when writing specifications. Osmond says, "At present, polyester powder coatings will meet all the film testing requirements of AAMA 605.2, excluding weathering." (The results of the five-year Florida weathering test are still pending.)

Although they are not written specifically for powder coatings but rather describe the performance capabilities of polyvinylidene difluoride (PVDF), the AAMA 605.2 specifications will help set most of the testing standards for both the supplier and the user. However, AAMA 605.2 does not specify the number of pretreatment stages.

When shopping for a powder coating supplier, the architect should ask whether the company has guidelines that users of its products must follow. If so, portions of these guidelines can be incorporated into the specification as performance parameters. The guidelines should include the following:

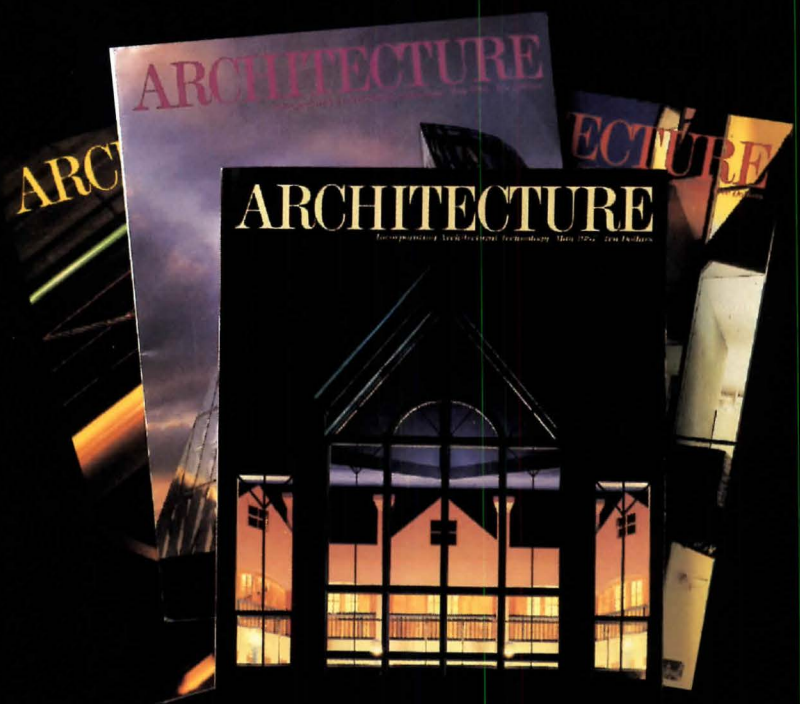
- A system of quality management and inspection not only for the coating process itself but also for the aluminum pretreatment.
- The quality and type of substrate—either aluminum alloys or galvanized steel.
- An outline of metal substrate preparation, including the recommended number of pretreatment stages.
- Application procedures, including how to apply the coating, basic reclaiming procedures, contamination control, reworking, and curing.
- Kinds of tests and standards the finished coating should meet. (If AAMA 605.2 specifications are used by the architect, the guideline standards and test section may be redundant and, if so, need not be included in the architectural specifications.)
- Standards for shipment and for repair of small damaged areas.

Cost of coatings

Powder coatings have several advantages for manufacturers. They are economical in that only 2 to 5 percent of the powder is lost during application. There are no solvents or volatile components, at least at the powder coating end of the process, that can pollute or require disposal. Few special hazardous-material precautions are necessary, and the process is easily automated. However, whether these economic advantages are passed on to the customer, and whether polyester powder coatings are indeed less expensive than other coatings, are not simple questions. The architect must shop around with various manufacturers and compare—after setting parameters for intended use, exposure, and color range. It is likely that polyester powder coatings will be less expensive than, say, liquid fluorocarbons for interior finishes such as handrails, but for outdoor applications such as building panels the reverse may prove to be true.

—Timothy B. McDonald

Architects Agree there's no Equal*



*Based on the results of the Second Annual Study of U.S. Architects conducted by Readex, Inc., an independent research company.

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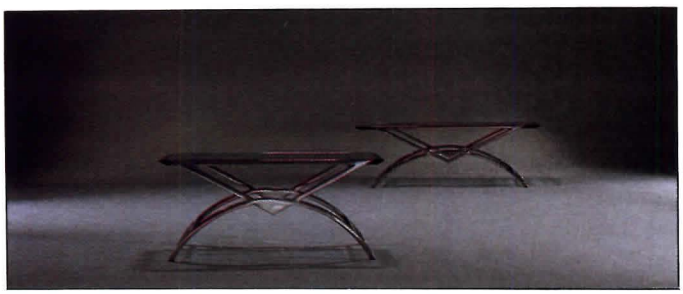
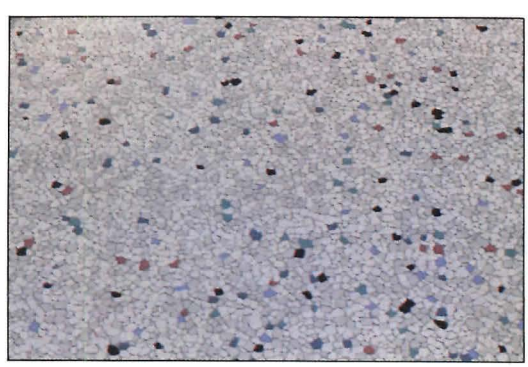


Butterfly Low Table
Stanley Jay Friedman designed the table, left, for Brueton Industries. Dual stainless steel arcs support an intersecting stainless steel "V" configuration, which holds the top frame. The intersecting "V" is offered in closed or open options. Plate glass tops are clear or bronze, ¾ inches thick, with marble tops also available. Bases are polished or satin stainless steel, or come in enameled colors.
Brueton Industries
Circle 404 on information card

Futuristic Seating
The Fiam Ghost chair, Model 1010, right, solidly stands its ground as a substantial piece of furniture, despite its transparency. The clear bent ½-inch glass chair was designed by Cini Boeri and Tomu Katayanagi for the Pace Collection, and measures 37½ x 29½ x 26¾ inches.
The Pace Collection Inc.
Circle 401 on information card

Addition to Line
Avonite's new solid white granite expands the manufacturer's line of standard Class I solid surfacing materials, right, to a palette of 13 colors. Both the standard Class I flame spread and the Class III Designer Gemstone Collection feature great translucency and depth of color. Granites in the Class III material are available through special order.
Avonite
Circle 402 on information card



Vinyl Flooring
Suffield commercial sheet vinyl flooring, above, from Armstrong World Industries, won a bronze award in the '88 Institute of Business Designers/*Contract* magazine product design competition in the hard surface flooring category. The design constitutes an overall scattering of multicolored specks that contrast the conventional background.
Armstrong World Industries
Circle 403 on information card

Products *is written by Amy Gray Light.*

Tread Saddles and Nosings
Zero International's Traction Tread saddles and nosings can be tailored to any opening or stair. Insets of specially formulated rubber fitted to profiled aluminum saddle grooves are designed to provide a smooth, even surface with good traction. They do not have raised ribbing; the rubber is flush with the aluminum surface and wears at the same rate. Since there are no open grooves to retain water and dirt, cleanup is quick and easy.
Zero International
Circle 405 on information card

Sensor System
Racon introduces the Model 18200 to its product line of detection systems. A tamper-sensitive system control unit and small, patented Microcell sensors that bolt to structural members comprise the system. The sensors are capable of detecting structural strain from unauthorized presence on fixed safety ladders, towers, roofs, floors, fire escapes, metal fence sections, or piping that crosses secured barriers. The system control unit processes the signals from the sensors and sends alarm outputs through relay contacts. The unit is not constrained by sensor location, so may be mounted anywhere. Microcell sensors are built to withstand harsh outdoor conditions and come complete with hardware, installation kit, and instructions. The control unit has a built-in display for installation adjustments, diagnostics, and easy-to-use alarm threshold settings.
Racon Incorporated
Circle 406 on information card

Snow and Ice Melting System
The Snoflow Snow and Ice Melting System by Heat Trace Inc. uses thermal and electronic technology to keep public access areas free of snow and ice.

The unilateral thermoplastic heating cable, known as the HTP Tracer, is designed to be rugged, waterproof, and resistant to chemicals and corrosive environments. It attaches in a predetermined pattern to reinforcing mesh and is embedded directly into sidewalks, ramps, stairways, roads, and driveways.
The second component of the system, called Powermatch, is a control panel that monitors the heating system in response to climatic conditions. This programmable, self-regulating controller varies the power level to the HTP Tracer in response to changes in the ambient air temperature, actual slab temperature, the presence of moisture or sleet in the atmosphere, and when snow begins to fall. A control mode allows the system to consume only the amount of energy required to meet prevailing climatic conditions. Snowflow is suggested for use in shopping malls, business complexes, hospitals, hotels, sports stadiums, winter resorts, and industrial plants.
Heat Trace Inc.
Circle 407 on information card

Contemporary Sink
The Pump sink from Watercolors Inc. consists of a white washbasin held by a tap support pole and matching towel bar. The poles are available in red, white, yellow, gray, black, and azure. The sink comes with or without a hamper/accessory basket tucked directly underneath the basin.
Watercolors Inc.
Circle 408 on information card

Conference Tables
Shaw-Walker's new Radius Conference Table line consists of 36 models that compliment the company's free-standing steel furniture line, Tempo 3 open plan system, and the Woodwind line of modular and freestanding furniture, with its wood finishes and top profiles.

Available with round, rectangular, oval, or boat-shape tops in 12 sizes, the table has four hardwood veneers and 10 finishes, and comes in 11 standard laminate colors. Table bases are in two- and four-leg models, with mirror or charcoal finishes.

A Concealed Wire Management System in the form of a 3- x 1½-inch grommet is located directly below the table base assembly and fits just underneath the surface of the table top, allowing for wiring to be concealed within the table column, exiting below the table base assembly.
Shaw-Walker Company
Circle 409 on information card

Tamper-Resistant Receptacle
New 15- and 20-amp receptacles from General Electric are designed to prevent the insertion of small objects that could become potentially hazardous. Suggested for day care centers, schools, nursing homes, and pediatric and psychiatric care areas of hospitals, the tamper-resistant receptacles meet National Electric Code requirements for health care institutions.

The receptacle features a special lockout mechanism that resists penetration by objects inserted singly in either opening. A spring-loaded slide safety mechanism will move only if the 2 receptacle blade openings are penetrated simultaneously. The UL-listed unit has a thermoplastic housing and impact-resistant nylon face. Available in 125 volt, standard duplex configurations, they come in five colors as well as in lighted face and isolated ground hospital-grade versions.
General Electric Wiring Devices
Circle 410 on information card

Framing System
Easy-Arch is a pre-formed metal arch framing system used with the manufacturer's pre-formed cornerbead to frame arched passageways, interior and exterior doors, windows, cased openings, and nooks.

The Easy-Arch is offered with either standard 90-degree cornerbead or bullnose cornerbead. Framing arches are available in opening sizes from 2 feet, 8-inches to 8 feet, and in a choice of 4 shapes: 90-degree quarter circle, 180-degree Tru Radius, Eyebrow, or Low Rise.
Clinch-On Products
Circle 411 on information card

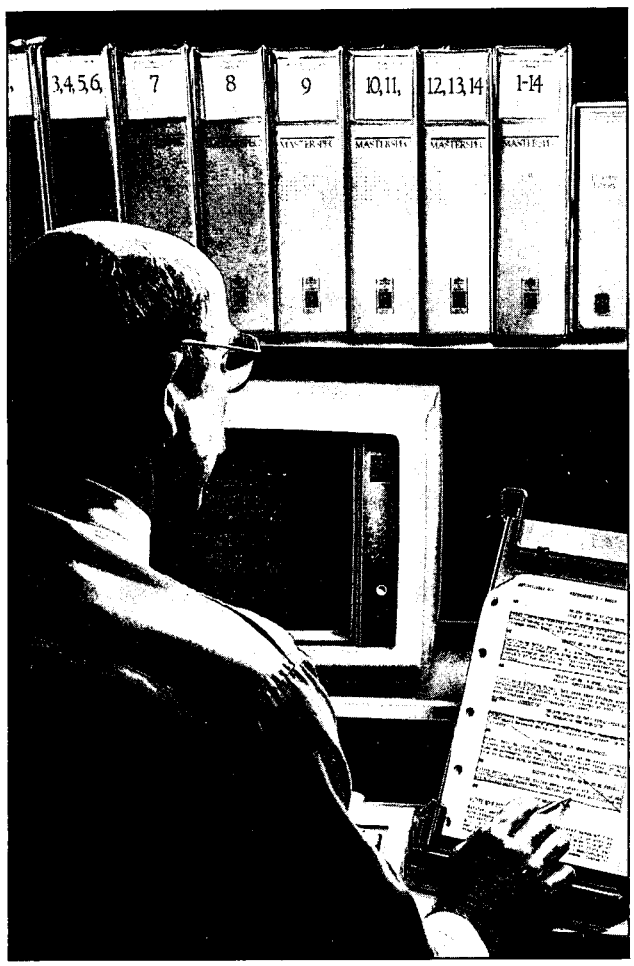
Exit Device
The Arrow S1200 series non-handed rim-type exit device features a one-piece chassis and has different trims and cylinders to meet specific needs. The chassis is designed for easy installation in stock hollow metal and wood doors, and is made of an aluminum-magnesium alloy. Because of the radial diameter of the latchbolt, the exit device has passed all UL testing without the use of a guardbolt. The rail assembly is roll-formed steel with an electrostatically applied powder coated paint finish. It is available in an aluminum or dark bronze color. The device is available with a UL fire rating for Class A doors. The chassis on the fire-rated devices is steel rather than the alloy used in the standard devices.
Arrow, Essex Industries
Circle 412 on information card

Roofing Newsletter Available
A special edition of a quarterly newsletter published by the Firestone Building Products Co. for the 1988 Midwest Roofing Contractors Association in Denver highlights Firestone's recent decision to enter the modified bitumen roofing market and reports on the introduction of the manufacturer's first modified bitumen product, an APP torch-applied membrane that will be available this winter. Copies of the newsletter are available upon request.
Firestone Building Products Company
Circle 413 on information card

Versatile Wood Wall System
Studimo Plus is an extremely flexible wood wall system from International Contract Furnishings Inc. that is designed to be either freestanding, against a wall, or a room divider in numerous standard heights, widths, and depths. Custom measurements are also available for wall-to-wall or floor-to-ceiling installations. The wall system

continued on page 126

How Good Is Your Spec System?



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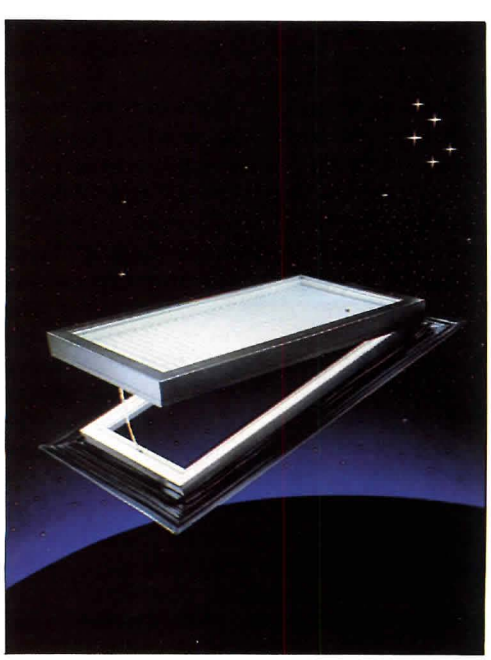
Products *from page 124*
comes in a wide variety of wood veneers, lacquers, and colors, and the user can now specify any color desired for a minimal additional charge. The system can house such diverse features as a refrigerated bar, drop-down beds, and computer equipment, file drawers, and built-in paneling and lighting.
International Contract Furnishings Inc.
Circle 414 on information card

Contemporary Bath Fixture
A new Dornbracht bath fixture collection called Edition Point, distributed by Santile International Corp., features a modern, modular design that can be mixed and matched for a customized, contemporary look. Designed by Dieter Sieger, the Edition Point fixture comes in chrome, white, smoke gray metallic, and black metallic finishes. The high-tech lever, ring, and cone are available in contrasting chrome, brass, white, black, red, yellow, and turquoise finishes.
Santile International Corporation
Circle 415 on information card

Skylight
Nominated as one of the year's most innovative products by *Popular Science* magazine, the Wasco Elite Skywindow is a clean profiled skylight with an integrated flashing system within the window itself. A primary diverter channel guides the water that runs down the roof's slope from above the skylight, then redirects it back onto the shingles below the skylight. An integral condensation gutter in the waterproof channel allows water to eventually evaporate. A continuous weatherstripping gasket seals the skylight for an airtight fit. Heat Mirror 66 glazing is available, as well as standard two-pane insulated glass. The unit comes pre-assembled with the glass included, and features a 10 year warranty.
Wasco
Circle 416 on information card



Fireproofing for Retrofit Applications
Retro-Guard RG is a new cementitious fireproofing product that is 100 percent mineral-wool-free and formulated for retrofit spray application to steel and concrete substrates.

Designed for interior use as a replacement fireproofing, Retro-Guard is factory-mixed and applied using portable spray equipment. It dries to a hard surface coating. The product is UL tested in accordance with ASTM E119 and is listed in over 40 beam, column, floor-ceiling, and roof-ceiling assemblies for fire resistance ratings.
W.R. Grace & Company
Circle 417 on information card

Non-Asbestos Roofing Shingles
FibreCem's plain and textured roofing shingles do not contain asbestos or other inorganic mineral or man-made fibers. Rectangular roofing shingles are 0.20 inches thick, and the Southern Slate shingles 0.25 inches thick. Both types are designed not to shrink or expand, and are reputed to be highly non-permeable and to have a high thermal efficiency. Their material characteristics protect them from fading, deterioration or rotting, and protect against salt water, impact damage, and acids.

The rectangular shingles come factory-coated in a variety of colors, and the Southern Slate shingles are available in standard slate colors.
FibreCem Corporation
Circle 418 on information card

Wafer-Thin Audio Speaker
The Thindy II audio speaker measures 9-x 9-inches, is only 1¾ inches deep, and weighs less than 2½ pounds. It has a maximum capacity of 60 watts and a frequency response from 65 to 20,000 hertz. The speaker is engineered to disperse sound in a full 140 degree area. The product comes with a template for cutting properly sized mounting holes in a wall or ceiling. Patented spring-loaded corner brackets secure it in place. Available in ivory or black, it can also be painted or covered with a thin cloth to match the room's decor.
OWI Incorporated
Circle 419 on information card

Waterproofing Membrane
K-Seal waterproofing membrane is described as a liquid acrylic vinyl polymer membrane that withstands weather extremities, acid rain, salt air corrosion, and has the ability to fix all types of leaks. It's primary recommended applications are to metal roofs, around the perimeter of large glass surfaces, at the tops of canopy overhangs, around HVAC equipment, or wherever tar traditionally is used to repair leaks. K-Seal comes with a 10-year guarantee.
Coast to Coast Distributors & Dealers Inc.
Circle 420 on information card

Elevator Improvements
Two products from Dover Elevator Systems offer significant improvements for elevators. A unique photo-etching process called Artifax allows custom or pre-engineered designs such as logos, art work, and custom signage to be created on the flat surfaces of elevator cab doors, swing returns, wall panels, entrances, or signal fixture panels. All Dover entrances meet ANSI/ASME Code A17.1 requirements. They have been UL tested and are certified to comply with fire test requirements for masonry or dry wall construction.

A new version of the DMC-I controller is now available for use with existing elevators. This totally integrated microprocessor control system is a flexible unit that acts as the elevators "brain," allowing for changes in over 40 different elevator functions, such as linking call allocation, door controls, speed sensing, and position indicators into a single computer network capable of instant information exchange. Its compact size enables it to be placed directly on the elevator.
Dover Elevator Systems
Circle 421 on information card

Insulated Glass Features Argon Gas
Beginning the first of January, Marvin Windows will offer Low E glass with argon gas inserted between insulating glass at no extra charge on its standard sized one-light units. Argon supposedly doubles the R value of an average air-insulated glass window.
Marvin Windows
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Longlasting, Bulbless Elevator Buttons
"Softouch" elevator buttons now available from U.S. Elevator, a subsidiary of Cubic Corp., have been four years in the making and should outlast the life of the elevator itself because they have no moving parts to malfunction. Constructed of a space-age ceramic material with piezo elec-

continued on page 128

Architects: McHale/Woods Associates

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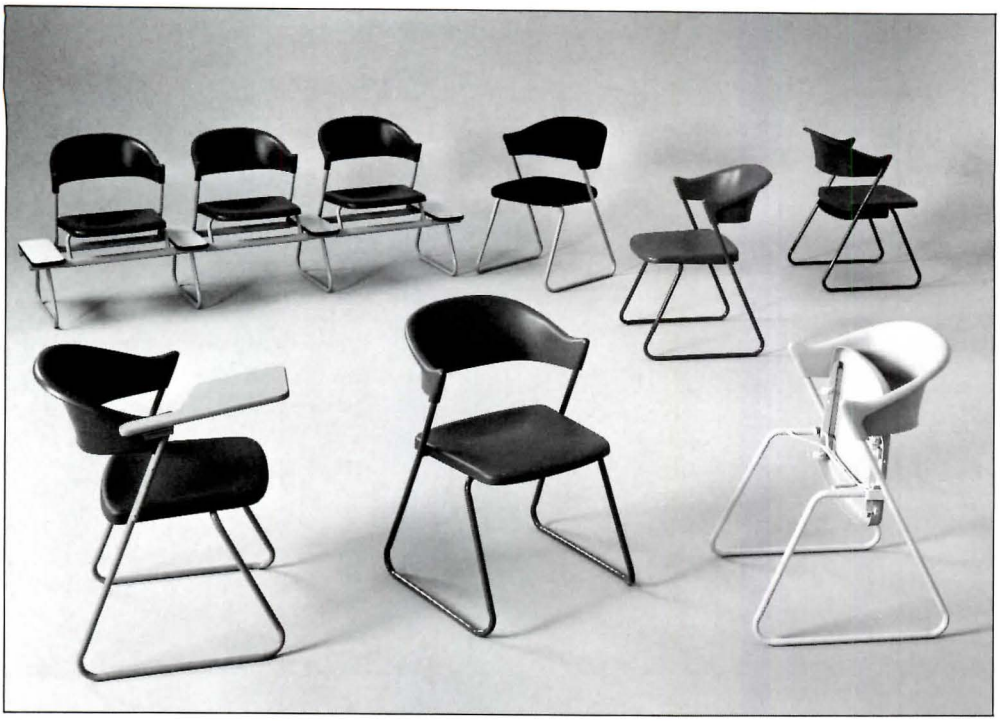


Products *from page 126*
tric properties, the buttons when touched illuminate without the use of a bulb. The Softouch buttons come in a wide variety of sizes and shapes, with customized graphics also available. Because the buttons require little or no special wiring, they can be used to replace buttons in most modern elevators.
Cubic Corporation
Circle 423 on information card

Armless Seating System
The albi multipurpose line of stack-gang armless seating, by Don Albinson, won the ASID Product '88 Design Award in Calif. this past September.

The chair, manufactured by Fixtures Furniture, features a back that wraps around to form short, upturned arm rests that support the user's arms in a natural resting position. The thermoplastic shell is available in several colors, and the frame comes in a variety of colored epoxies and in chrome. The albi comes as a full seating system complete with book rack, a fold-up seat to save aisle space in auditorium seating, and a tablet that stacks and folds out of the way.
Fixtures Furniture
Circle 425 on information card

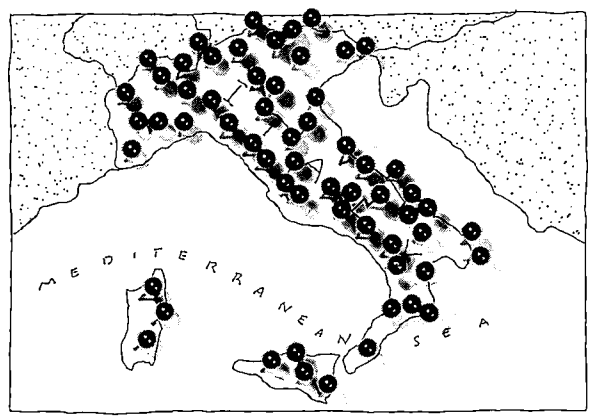
Two Additions to Chair Line Available
A Task Stool and Management High Back Chair round out Haworth Inc.'s Catalyst seating line. Designer Warren Snodgrass continued the trend of clean lines and innovative engineering that distinguish the collection's four existing models.

The Task Stool features an eight-inch seat height adjustment range (23 inches to 31 inches high) by pneumatic control. A chrome foot ring adjusts mechancially up or down within a six-inch range to accommodate the seat height. A knee-tilt/cantle mechanism lets the user recline fully without his or her feet lifting off the floor, while the cantle holds the chair firmly upright until the user is ready to recline.

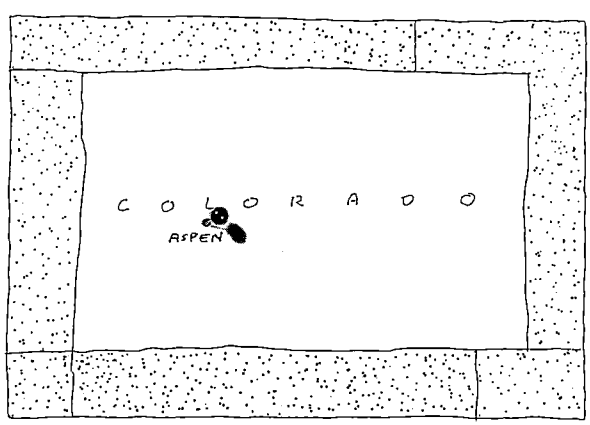
The Management High Back Chair has an even higher back height support than the Catalyst Management chair, and also features the knee-tilt/cantle mechanism and a choice of pneumatic or mechanical height controls.

Both chairs have the standard features of the other chairs in the line.
Haworth Inc.
Circle 427 on information card

The Centers of Italian Design.*



*Except June 13-18th.



For one week, the true center of Italian design will be Aspen. That's where outstanding designers, artists, architects, and writers will unite for "The Italian Manifesto: The Culture of Nine Hundred and Ninety-Nine Cities." Speakers will include architects Aldo Rossi, Renzo Piano, Joseph Rykwert and Tobia Scarpa; designers Mario Bellini, Michele de Lucchi, Achille Castiglioni, and Emilio Ambasz; fashion designers Luciano Benetton and Gianfranco Ferre; and museum director Philippe de Montebello. Italian design will never be more accessible.

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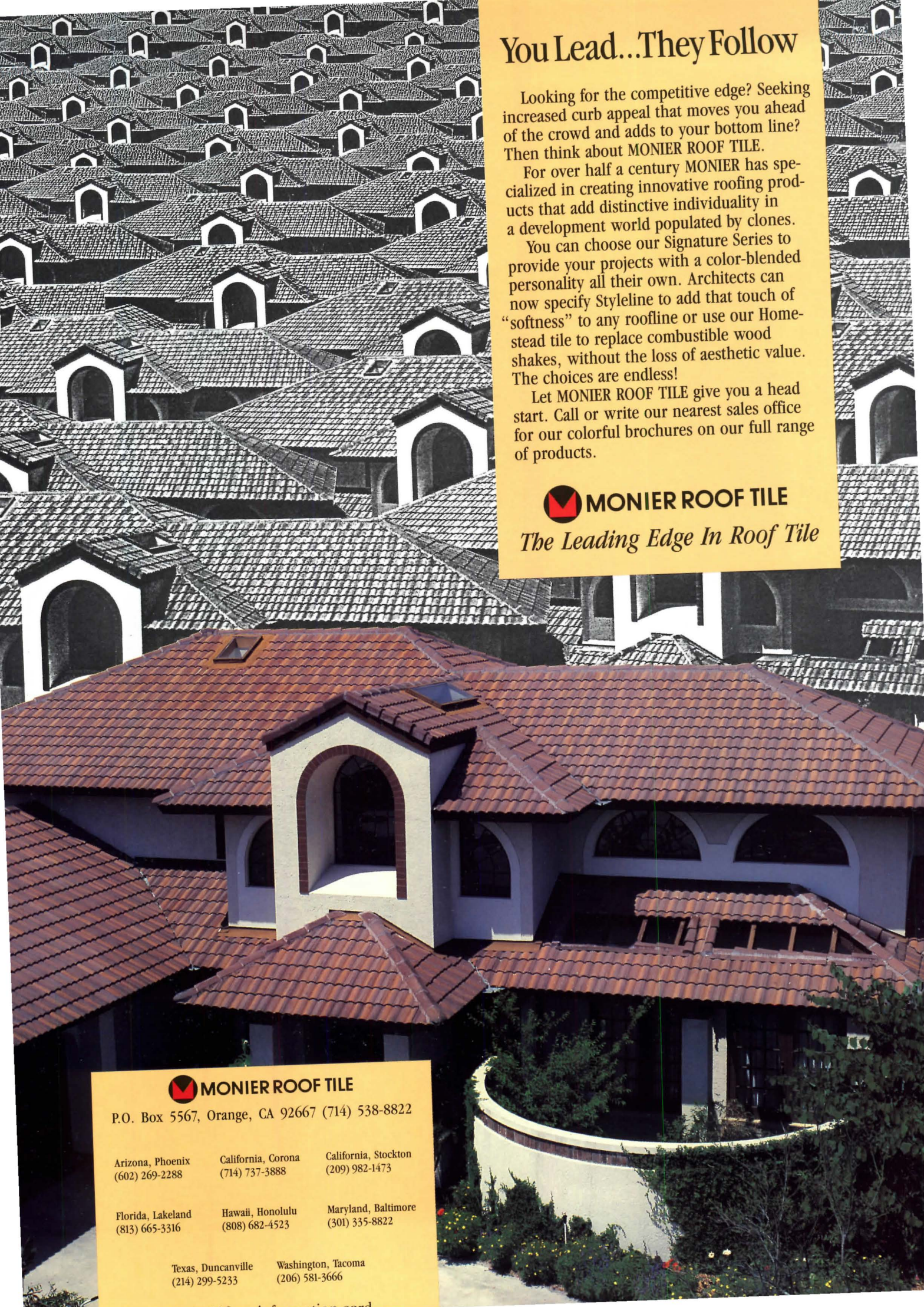

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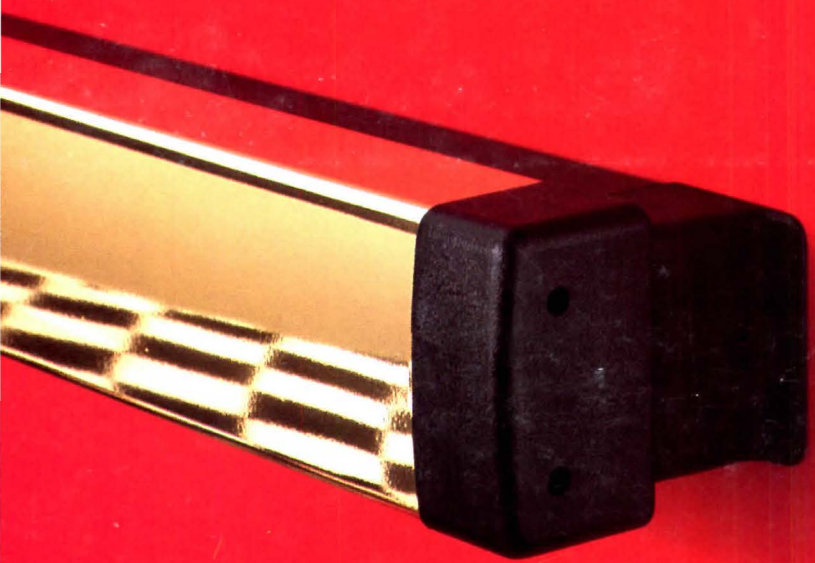

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