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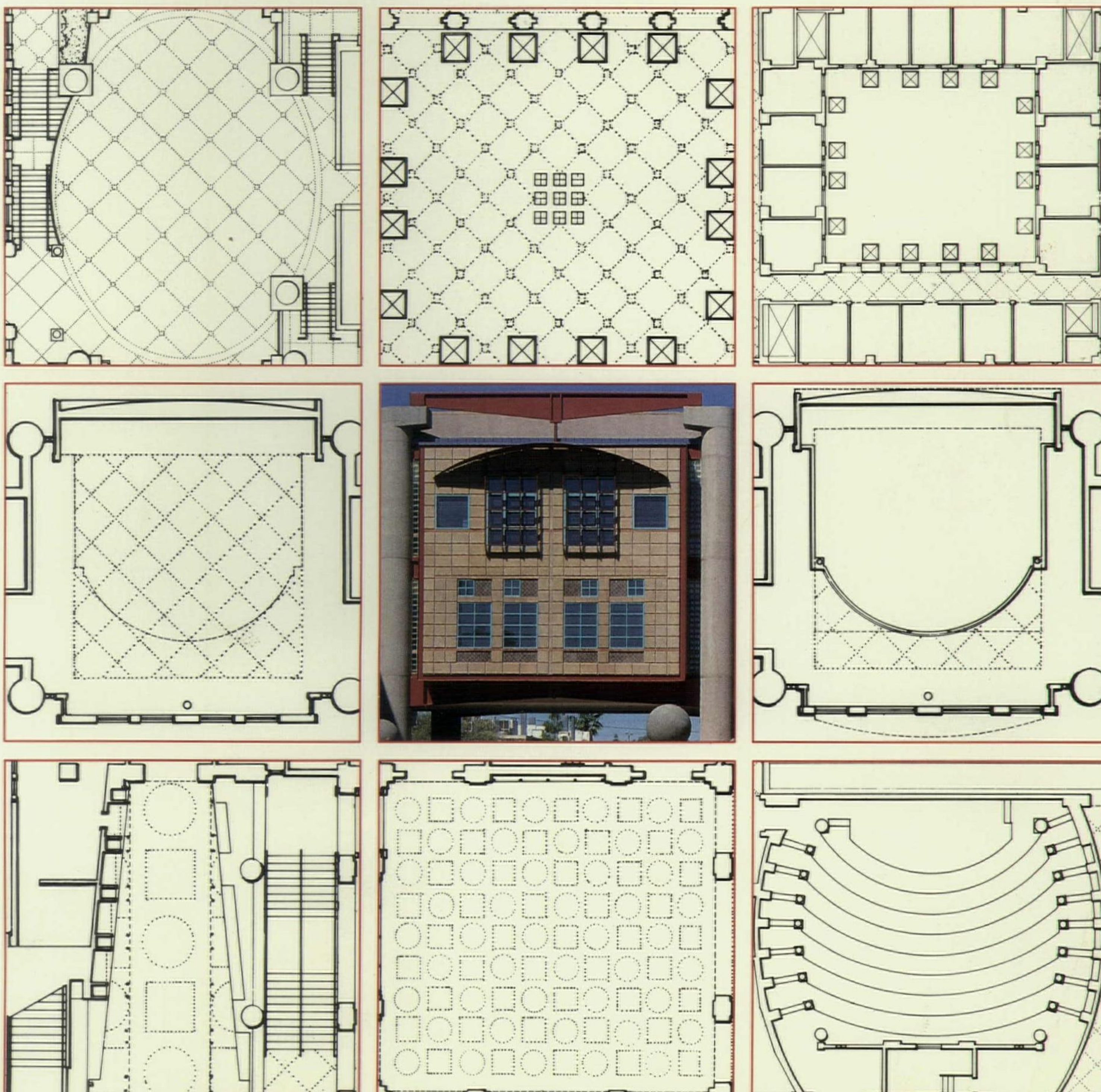


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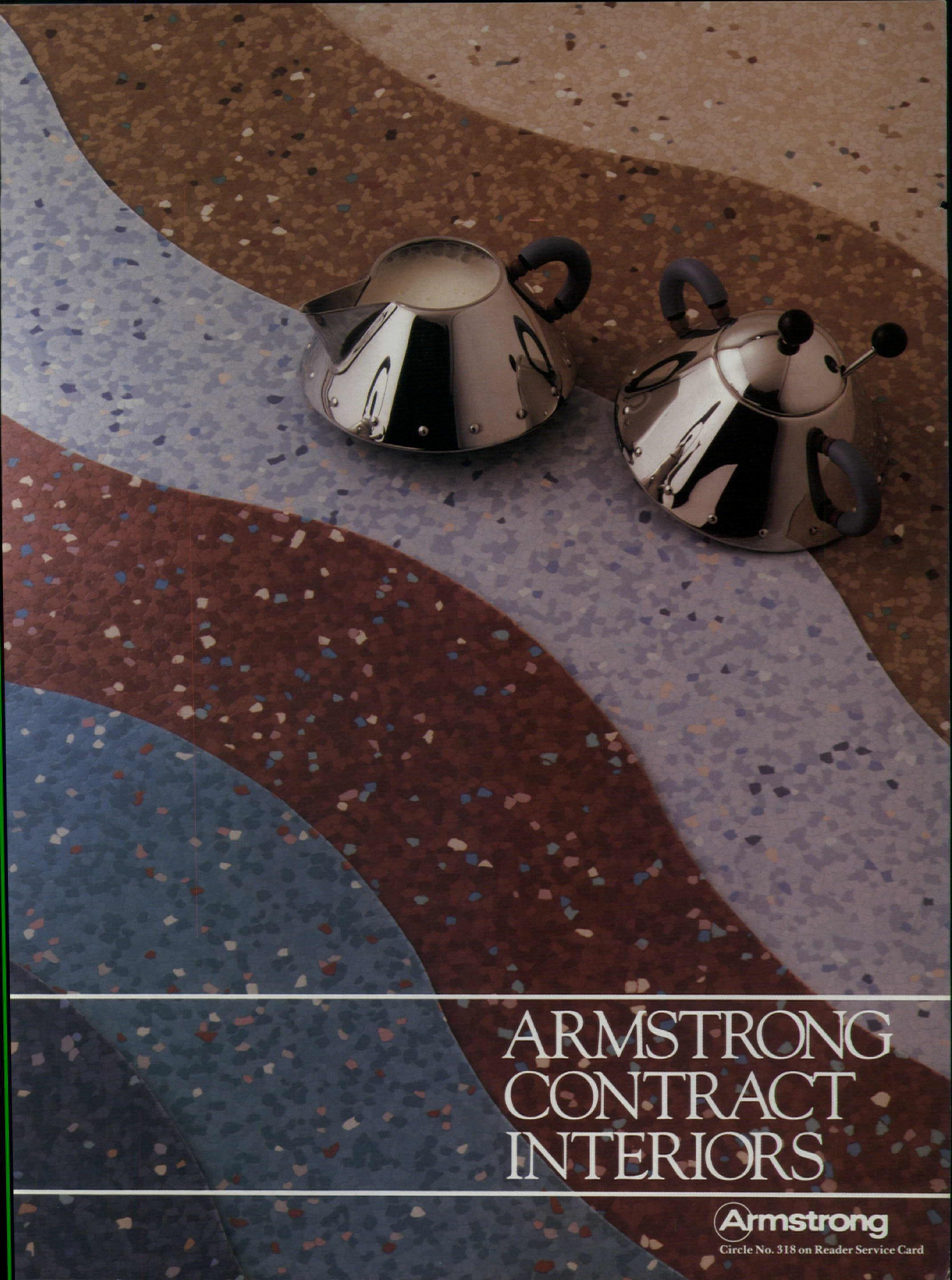
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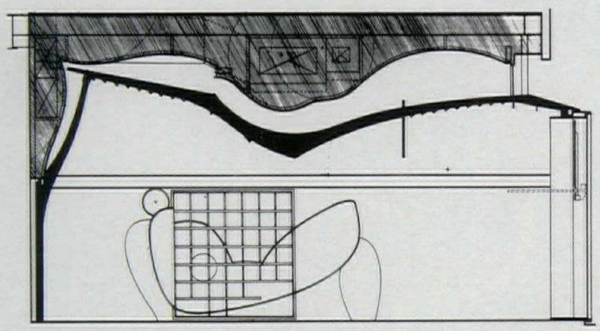

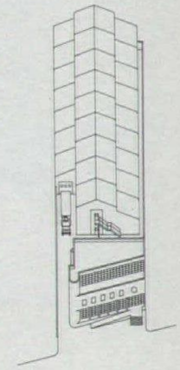

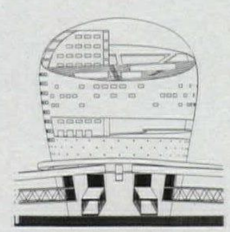

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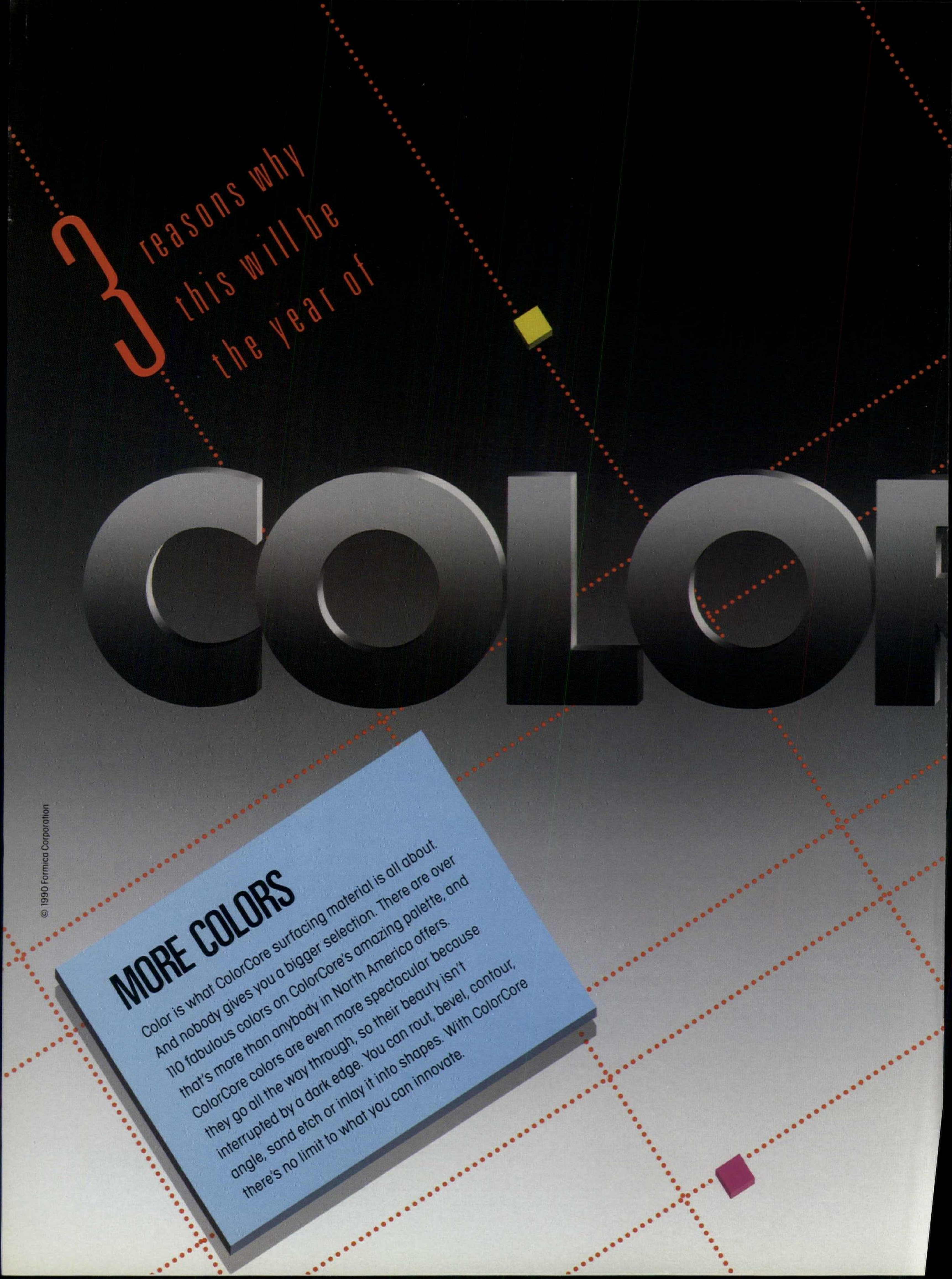
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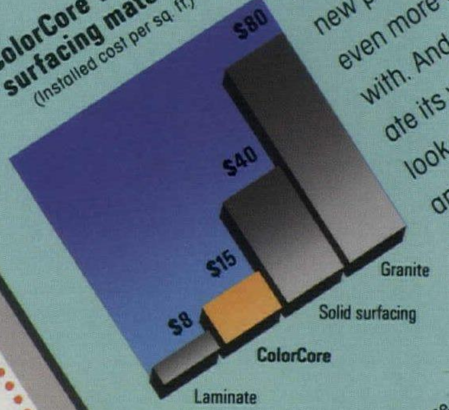

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Editorial: West is West

Despite unifying forces on a national scale, regional differences in attitudes toward architecture seem to be gaining strength.

We are used to the division between the Modernists and the Post-Modernists, and further subdivisions of these into such factions as the Deconstructivists and the serious historicists. We know that there are regionalists, who see things differently from their opposites, who might be called universalists. We have learned that there are design-oriented firms, service firms, and production firms.

It still comes as a surprise to realize that superimposed over all such distinctions, there are serious differences between architects in the West and the East. More accurately, there are strong differences between the Southwest and Northeast – between the sphere of Los Angeles, our second-ranking metropolis, and the Northeast urban agglomeration. It is easy to think of New York and L.A. as East Coast and West Coast counterparts, linked to each other by the FAX and the red-eye. Along with Chicago and a handful of other major centers, these concentrations of architectural activity seem too big and too internationally connected to nurture anything like regionalism.

But size and sophistication do not rule out West-East divisions of opinion, which were evident at the Dilemmas in Design symposium held in Washington last month (page 31). With Prince Charles's pronouncements as a catalyst, some of the Western panelists expressed a rebelliousness against both Europe and the Northeast. It may have been in part coincidental that the Northeast was represented there by Robert A.M. Stern and Hugh Newell Jacobsen, whose work shows a strong respect for historical precedents, and the Southwest by Antoine Predock and Eric Owen Moss, who asserted their freedom from such traditions. Predock talked metaphorically about the Pacific having a greater variety of sea life than the Atlantic, clearly favoring that Pacific diversity (although his two offices, in L.A. and Albuquerque, place him on both sides of the Continental Divide). Moss (a more unambiguous Californian) sees no reason why we should look to the European past – as the East Coast does – for cultural direction. Other West Coast architects on this panel, Joseph Esherick of San Francisco and Arne Bystrom of Seattle, seemed less concerned about the whole subject, as if Eastern influences were just not a big issue for them; in their cities architects can pursue their own agendas without much attention to national or international developments, while L.A. architects may understandably feel greater pressure to take on their distant colleagues.

Other indications of West-East divisions surfaced in reactions to the Arizona State School of Architecture addition featured in this issue (page 81). The building was designed by the Hillier Group of Princeton, New Jersey, which won the commission in a university-sponsored competition. To us, the most fascinating aspect of this building is the way it includes built-in object lessons on architectural volumes, plan types, façade rhythms, and so on. To some observers in Arizona, however, it represents the imposition of design precedents from the East on a regional culture. As ASU professor Jeffrey Cook explains it, the building's strict geometries and tightly enclosed spaces clash with Arizona's sense of endless vistas and casual indoor/outdoor relationships, and its historical references are alien. Architect Alan Chimacoff of the Hillier Group counters that Arizona culture is no less derived from European precedents than that of the Northeast.

While the West's independence from European and Eastern roots is probably being overstated, there are real differences that have more to do with the recent development of places like Los Angeles and Phoenix than with their location. There is simply less regard for precedent in any area of culture, whether it is dining etiquette or architecture. And as these cities begin to feel their growing economic and cultural muscle, there is likely to be increased expression of independence.

The staking out of regional attitudes in architecture is undoubtedly related to a worldwide movement to assert geographical distinctions. Every ethnic group in the Balkans is seeking recognition; republics in the hitherto-monolithic USSR are voting to secede; in America, the Federal government is trying to return authority to the states, and neighborhood groups all over America have learned how to make their interests count. Despite the vast differences in scale among these examples, they seem to grow out of the same disillusionment with big institutions and their unifying forces. Whether it is the corporate conglomerate, the city council, or the Supreme Soviet, the public no longer trusts centralized authority – or Establishment opinion. There has been speculation for years about the emergence of a new doctrine in architecture as pervasive as the International Style was a generation ago, but until the current celebration of diversity runs its course that is extremely unlikely to happen. ■

John Morris Dixon

Views

The Architect Has No Clothes

I have just read the Editorial in the December 1989 *Progressive Architecture*. The writer, Thomas Fisher, is known to me, and I am appalled by the narrow-minded and ignorant attempt he makes to dismiss Prince Charles and his message.

I think the time has come to take the gloves off, and to acknowledge publicly that the cabalistic confraternity of architects in the United States, as in England, has been perpetrating a gigantic scam on the almost unsuspecting public for about 50 years.

Few people genuinely like what architects do today or what they have done in the last decades. Yet many people go along for the ride because they are afraid of being thought to have "bad taste" or afraid to seem ignorant of the niceties of "Architecture" with a capital A. People like Mr. Fisher (and there are many of them) play on this fear. Like the sinister tailors in *The Emperor's New Clothes*, they use the ordinary person's fear of seeming ignorant as a weapon to maintain a monopoly on the profession's status quo. Above all, they use it to keep a secure hold on money.

The Executive Editor of *Progressive Architecture* tries to continue the work of the tailors in *The Emperor's New Clothes* by trying to perpetuate the unspoken esoteric knowledge, making it look like sense when it is really nonsense. For example, in his editorial he says Sandy Wilson is bad, James Stirling is good, thus trying to show that there are subtle distinctions of good and bad for those in the know, and thus stifling, or trying to stifle the thought (Oh perish the terrible thought) that there might be something so fundamentally wrong in all of Modern architecture that it is, almost all of it, flawed and misdirected. Yet in fact, from the point of view of real common sense, both works – Wilson's and Stirling's – are merely silly exercises in the same image-ridden nonsense, which we have been pretending for years makes sense.

It just does NOT make sense. Mr. Fisher's attempt to put down Prince Charles is the same tactic that architecture professors use continually in schools of architecture to subdue beginning students by creating a subtle and highly repressive atmosphere of esoteric knowledge. He tries to establish the mysterious existence of a club of those inner circle architects who are "in the know" – hoping that the vanity of others and their desire to be members of this club will quieten their common sense and muffle the criticism they feel in their hearts.

It is time to stop. It is time to declare that the architects who lay this appalling nonsense on the public are in fact just spouting nonsensical rubbish. It is time to stop the process of intimidating members of the public with architectural faddism. It is time finally to say: "LOOK; THE ARCHITECT HAS NO CLOTHES."

Christopher Alexander
Berkeley, California

Devolution of Architecture

In his essay, "Decade of Detachment" (P/A, Jan. 1990), Mr. Dixon asserts that "the only assurance we can give, however, is that as long as mankind endures architecture will evolve." Slim assurance indeed, since this is, of course, unhappily false. The long history of architecture contains numerous periods of devolution rather than evolution. The decline of architecture from the breathtakingly beautiful edifices of Imperial Rome to the crude, slapdash hovels of Dark Age Rome is only the most obvious example.

Ironically, P/A's cover photo the subsequent month (February 1990) of a window view filled entirely by a concrete wall relieved only by form marks and an expansion joint would seem enough to convince any sentient being that

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(continued from p. 11)

there are forces of architecture devolution at work this very hour. The barbarians are well past the gates – they now line our streets and have even captured our printers' presses!
Milton W. Grenfell, AIA
Charlotte, North Carolina

Preservers of New Haven

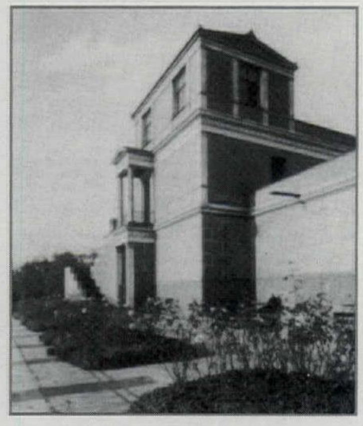
Marc Wortman's article on New Haven (P/A, Jan. 1990, pp. 39–42) rightly mentions the new roster of champions among the designers of recent buildings. He does the city a disservice, though, in focusing only on the heroic megaworks of the star designers, as if they were solely responsible for the city.

In fact, the reversal of the "urban renewal juggernaut" is due to the labors of an army of individual preservationists, homeowners, small business folk, and local architects and builders, who have protested against demolition, highways, parking lots, and highrise condominia, and have invested their life savings in the rehabilitation of the buildings and streetscapes that now form the contest for the contextual architecture of the 1980s.

New Haven has more than a dozen historic districts, the earliest dating back more than 20 years. Vincent Scully opposed the demolition of our Victorian City Hall as strenuously as he championed Louis Kahn and Robert Venturi. The renovation of our Cass Gilbert library by Hardy Holzman Pfeiffer is thanks to the citizen outcry when the building was nearly abandoned. The city is indeed a museum of architectural history because of the legacy of Ithiel Town and A.J. Davis, as well that of Saarinen, Gehry, and Pelli. It is as important to give credit to the anonymous players who have created, preserved, and enriched a city as to the big names who usually get the press.
Charlotte R. Hitchcock, AIA
New Haven, Connecticut

Krier House Inspiration

Leon Krier's final version of his house at Seaside, Florida (December 1989), seems largely indebted to Friedrich von Gartner's unusual Pompeian House, Aschaffenburg, of 1842–46 (I enclose an illustration), built for King Ludwig



From Watkin and Mellinghoff, German Architecture and the Classical Ideal, *MIT Press, 1987.*

of Bavaria. It had been inspired by the late Roman House of Castor and Pollux at Pompeii, but Gartner's Pompeian House hardly represents a coherent Neo-Classical tradition.

For Krier to complain that most American suburban houses are not really traditional, and to insist that his house at Seaside follows a truly traditional mode, is a specious argument. One might ask, why follow the "tradition" of Ludwig of Bavaria at Seaside? Despite his verbal appropriation of architectural tradition, Krier in fact has created a neologism because of his preference for historically disjunctive and regionally displaced models.
Rosemarie Haag Bletter, Professor,
City University of New York

Lautner Fan Mail

I have let my subscription to your magazine expire because, although I think it is a fine publication, its continued negligence of great architectural talent depresses me. To be specific, why do you and all other leading American architecture magazines ignore the work of John Lautner? It is bad enough that his work is published but rarely, but to see the designers

(continued on p. 15)

(continued from p. 12)

who do get published treated like deities (e.g. lead story: "Eisenman Builds!") makes me sad and only makes me wonder at the state of architectural media. It's as if it is the world of popular music, where someone decides to be a rock star and studies the proper "look" necessary in order to become a success, has a great marketing strategy, and becomes a star; the music is secondary. The "look" in this case is the polemics and theorizing; those who are not so verbal but instead simply build their visions seem to suffer, in turn, with lack of media exposure. Not that the Eisenmans and Kriers of this world aren't talented; but when I see their work next to someone like Lautner's, theirs seems to pale in comparison. Their work (and others) seems like "Talkitecture," buildings which bring with them a lot of words and intellectual baggage to prop up the designs, whereas someone like Lautner simply has the experience of the building speak for itself.

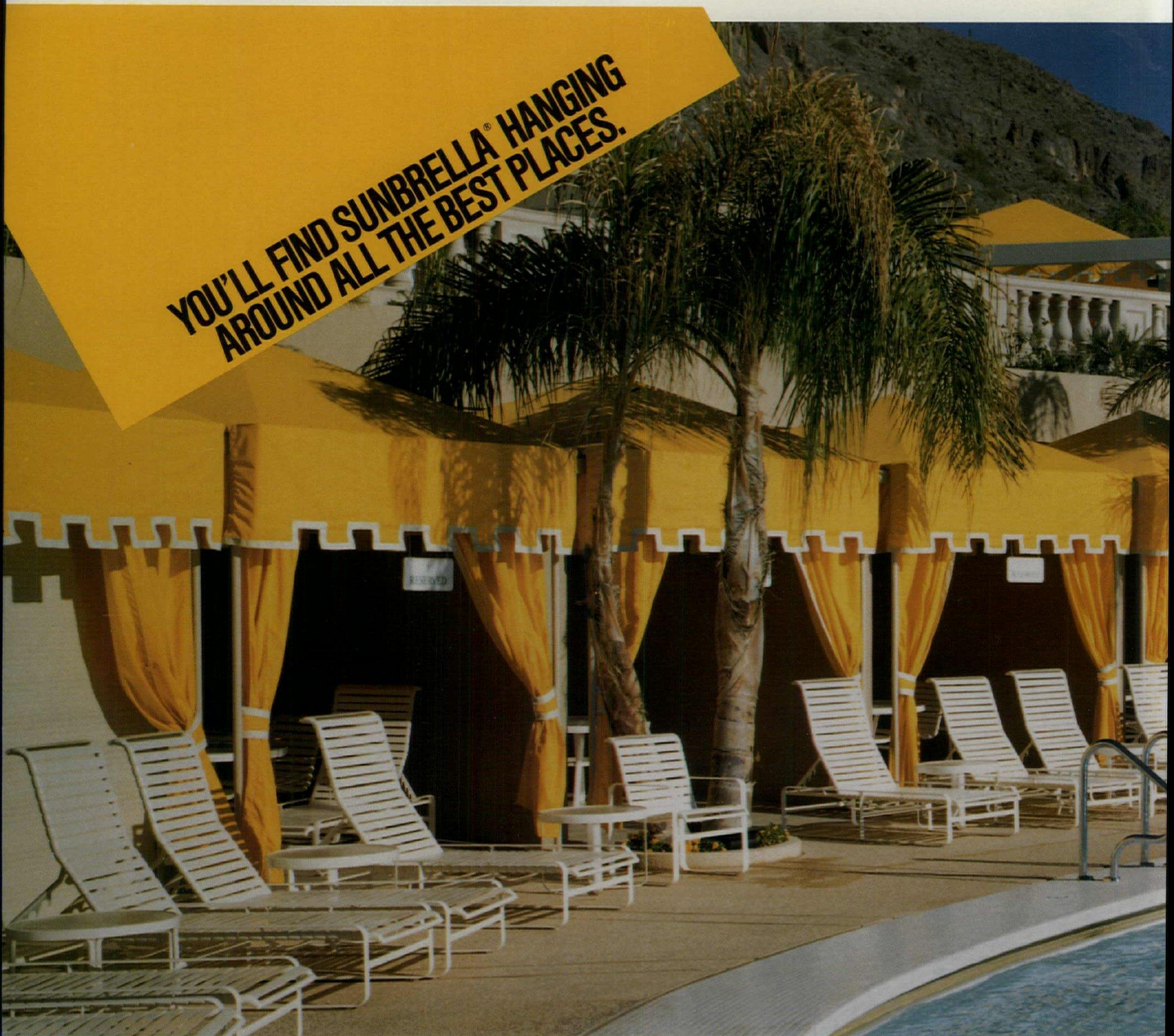
It seems so imbalanced to not show a whole other realm of architecture which exists. And not just Lautner. It was heartbreaking to me, who grew up in Mexico, to see the first Mexican house in a long time to be shown in your magazine, be a "Post-Modern" styled building which could have been anywhere. I say it is heartbreaking because in that same neighborhood are a number of homes and the studio of architect Agustin Hernandez, a major talent who I have never seen in your magazine.

I don't know. Maybe the style of Hernandez and Lautner doesn't meet some taste standards you have. And I'll be the first to admit that some of their works are monstrosities. But the thing is that once one studies them and experiences them they are marvelous monstrosities, wonders of rare imaginations, and testaments to the fine craftsmanship and the perseverance and patience and teamwork necessary to bring such ideas into such concise reality. And they are "progressive"; they start from historic traditions and head for unknown territory. Your magazine always runs fine articles on buildings by Wright, such as the great article a few years ago on the renovation of the Storer residence in Hollywood, a building constructed in the early 1920s. And yet . . . 1920s! How can you ignore a disciple of Wright who has probably continued to develop the master's ideas more than anyone else? When I look at Wright's drawings for the V.C. Morris house or the Bailares house in Acapulco, it leads directly into Lautner's marvels of soaring concrete and glass. What, after all, is "progressive" architecture?

I'm not asking you to like John Lautner's work or any architecture in a similar vein. I'm just wishing that you would give it the deserved exposure. Many years ago I came upon an old issue of P/A on Carlo Scarpa (May 1981). It was like finding a great treasure, the sort of thing that makes one exclaim, "Where were you all my life? At last we meet." I would hope it could be done while the man is still alive. I don't care if your critics hate his work, but at least let us hear why. And above all, show lots of pictures.
Charlie Knoblock
Sedona, Arizona

Mumford Correction

In our obituary of Lewis Mumford (March P/A, p. 24), Mumford's wife was identified incorrectly. Her name is Sophia.



The Phoenician Resort, Scottsdale, Arizona

Under fire, the Kimbell Museum shelves its expansion plans. See page 30.

Rossi Arch Unveiled in Galveston

Aldo Rossi visited the Texas Gulf Coast in late February to inaugurate his first completed work in the United States, the Maritime Arch in Galveston, and to open an exhibition of his work at Rice University in Houston.

The Maritime Arch is the latest of a continuing series of urban stage sets for Galveston's resurgent Mardi Gras festivities. In 1986, seven street-spanning arches designed by prominent architects (Helmut Jahn, Michael Graves, Boone Powell, Eugene Aubrey, Stanley Tigerman, Cesar Pelli, and Charles Moore) were built to herald the resumption of pre-Lenten revelries, which had died out in the late 1930s.

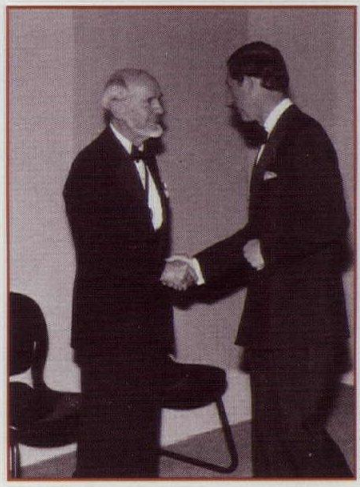
Rossi's four 35-foot-tall, red-and-white striped lighthouses (architects-of-record were Cisneros Underhill of Houston) stand at the west end of the Strand near 25th Street, bracketing the central festival zone with Michael Graves's arch several blocks away, surviving from 1986. Rossi had intended for the composition of towers and an open steel arch to be three blocks further down the Strand at 22nd, and for the truss to be behind the towers when viewed from down the Strand. Property owners rejected the preferred site, though, and the presence of a power line at the new site required reversing the elements. As a result, the truss blocks the view of the lighthouses, and the looming backdrop of the former railroad terminal, with its black and white grid of windows, dominates; the Maritime Arch is too small to have a presence. Given Rossi's otherwise astute comprehension of urban contexts, this little project, hampered by shortsighted property owners and a quarrelsome city government, is a surprising disappointment.

The exhibit at the Farish Gallery of the Rice University School of Architecture displayed drawings and models of the arch along with Rossi's two other projects in North America, the University of Miami School of Architecture (P/A, May 1988, p. 33) and the temporary lighthouse theater in Toronto (P/A, Nov. 1988, p. 23) built and demolished in 1988. These three projects share a common iconography of lighthouse forms, as each is sited near water. The red-and-white-striped lighthouses as obelisks that appear in both the Toronto and Galveston schemes are derived from Rossi's 1984 proposal for Mantua. The early sketches for Miami show the floating Teatro del Mondo (itself an amplified nautical beacon, designed in 1980 for the Venice Biennale) used as an offshore tower library. **Gerald Moorhead** ■

Gerald Moorhead

Rossi's Maritime Arch; railroad terminal looms behind.

The author, a Houston architect, recently photographed the city for the new Houston Architecture Guidebook *and writes for various professional journals.*



Walter Smalling

Gold medalist Fay Jones meets Prince Charles.

British, Arkansan Accents on Architecture

In an all-out effort to focus popular media attention on the AIA and the profession, the Institute presented a Prince, a Cinderella-story Gold Medalist, and assorted Hollywood stars at its first "Accent on Architecture" gala at Washington's National Building Museum on February 22.

The main reason for the intense media presence (and for the sellout crowd) was the address by Prince Charles, whose frequently acerbic campaign for traditional architecture in Britain was debated in a panel discussion earlier in the week (see p. 31). As it turned out, though, Charles left behind his oft-quoted jabs at specific buildings or architects and offered a somewhat flat address linking traditionalism in architecture to new-age environmental awareness. He also made a point to include short-sighted developers in his rogue's gallery saying, "It has been said that property developers are the 'Medici of the 20th Century.' Where then is our Florence?"

Also on the program at the gala was a brief presentation on the AIA's Search for Shelter program featuring Tom Selleck, Joan Rivers, and Brooke Shields; Secretary of Housing and Urban Development Jack Kemp presented a check for $65,000 to Search for Shelter, representing the proceeds from the gala. (Du Pont Antron, the Park Tower Group, and a number of associations, corporations, and firms

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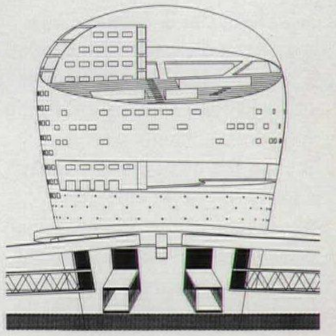
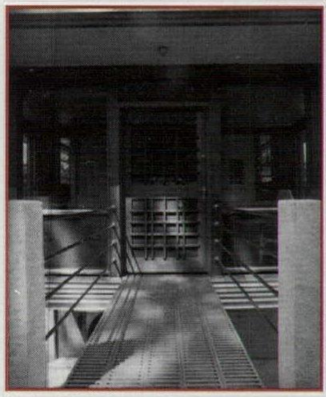


Rem Koolhaas explores the arbitrary in architectural form. See Projects, p. 123.



Alan Weintraub

Interview: Designer/Builder Steve Badanes of Jersey Devil. See Perspectives, p. 118.

Pencil Points

Charles Correa of Bombay has been awarded the 1990 International Union of Architects (UIA) Gold Medal for "outstanding career achievements and the artistic sensitivity and human qualities associated with his architecture." Correa will be honored at the UIA XVII Congress in Montréal on May 28 (see Calendar, p. 34); Skidmore, Owings & Merrill was the U.S. nominee. The UIA's 1990 Sir Patrick Abercrombie Prize, which honors an "exemplary contribution to town planning and territorial development," was awarded to Edmund D. Bacon, Philadelphia.

John Simpson & Partners has been named architect for London Bridge City in the wake of opposition to John Burgee and Philip Johnson's scheme, which echoed the design of the British Houses of Parliament. The mixed-use project in the London Docklands is to be developed by St. Martins Property Corporation and the Kuwaiti Investment Office.

Stephen Kliment has been named editor of *Architectural Record*. Kliment comes to the magazine from John Wiley & sons, where he was architecture editor. He replaces Mildred Schmertz, editor since September 1985, who resigned her position effective March 1.

Emilio Ambasz has been named designer for the Columbus Bridge Project in Columbus, Indiana. He will work with the engineering firm Butler Fairman and Seifert, Columbus, the City of Columbus, and the Indiana Department of Transportation. The bridge is scheduled to open in 1992.

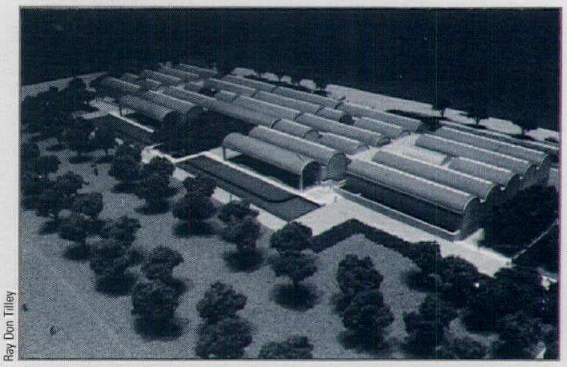
David Childs's mixed-use Worldwide Plaza, New York, is the subject of a five-part documentary series to be broadcast on public television in May. "Skyscraper" follows the building's construction from ground-breaking to completion. It will air on consecutive Mondays beginning May 7 at 8 p.m. (check local listings).

1802 view of St. Paul's by Black and Stadler, from Wren exhibit at the Octagon.

Accent *(continued from page 29)*
helped defray the costs of the festivities, as did the $250-a-plate ticket price.) In addition, the 1990 Honor Awards (P/A, March 1990, p. 26), the 25-Year Award, and the Firm Award (to Kohn Pedersen Fox, a benefactor of the Accent festivities) were presented.

Though the popular media was there to see the Prince, it seemed that the real star of the evening among the celebrants was Gold Medal winner Fay Jones of Fayetteville, Arkansas (P/A, Jan. 1990, p. 27), who, speaking after the Prince, said he felt "like a country-and-western singer following Pavarotti." Jones, who had received his medal from President Bush in a White House ceremony earlier in the day, received enthusiastic ovations when he spoke and when his work appeared on the screen during one of the slide shows that punctuated the evening.

Also featured among the week's activities was the Prince's opening of "Sir Christopher Wren and the Legacy of St. Paul's Cathedral," an unprecedented and inspiring exhibition of drawings, models, and artifacts from St. Paul's. Much of the material in the show, which is at the AIA's Octagon Museum through May 8, has not been seen publicly before, according to curator Judy Schultz. The exhibition was several years in the making, and thus predated Prince Charles's vocal interest in plans for the site surrounding the cathedral (P/A, March 1990, p. 115); as it happened, the exhibition offered fresh, objective insight on the site's importance. **Mark Alden Branch** ■



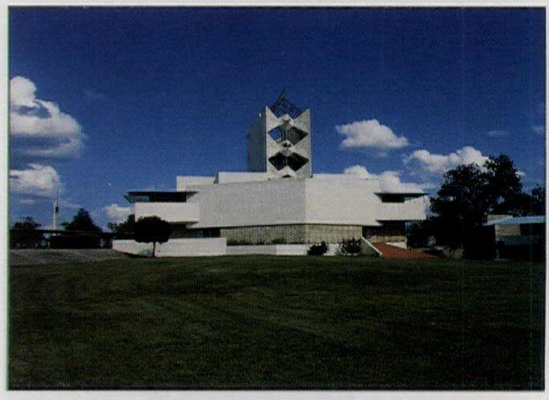
Ray Don Tilley

New wings for Kimbell were to be at far left and far right.

Kimbell Puts off Expansion "Indefinitely"

The Kimbell Museum's Board of Directors has voted to "postpone indefinitely" the controversial plans to expand its 1972 Louis I. Kahn building in Fort Worth, Texas (P/A, Oct. 1989, p. 27). In an apparent response to continued protest – much of it from members of the architectural community outside Fort Worth (P/A, March 1990, p. 23) – the museum released a statement saying it would "serve creatively the needs of its collections and the community in the existing facility for the foreseeable future." The statement gave no reason for the decision and did not allude to the fracas directly, except to say that "the public's overwhelming interest . . . has been deeply gratifying."

Announced last July, the expansion proposal by Romaldo Giurgola called for adding two new wings to Kahn's building, which consists of three sets of cycloid vaults; the new wings would have duplicated the vault structure on either side of the present composition. While the architect and the Kimbell saw the scheme as respectful to the building, a group of architects led by Philip Johnson criticized it in a letter as "mimicry of the most simple-minded character" (P/A, Jan. 1990, p. 9). Alternate suggestions such as a separate building or an underground expansion were put forth by the public, but in the Kimbell's statement director Edmund P. Pillsbury again rejected those options, saying that they "would have disrupted the organic integrity of Louis Kahn's design for a fully integrated art museum." As a result, the Kimbell now seems prepared to make do, juggling special exhibits and the permanent collection within its current space, leaving what some might consider its most valuable artwork untouched. **Mark Alden Branch** ■



Florida Southern College

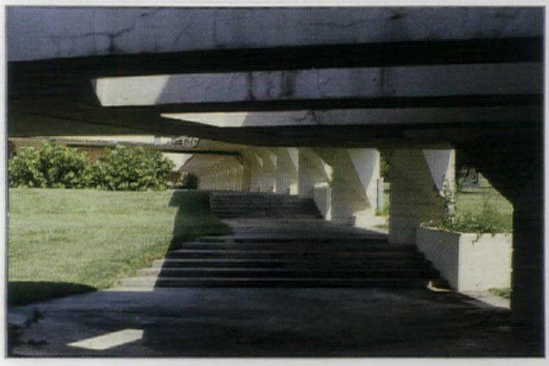
Annie Pfeiffer Chapel (1938), already restored.

Restoration for Florida Southern

The Pittsburgh/Ft. Lauderdale architectural firm of L.D. Astorino & Associates has been selected to coordinate a comprehensive restoration program at Florida Southern College, site of the world's largest collection of Frank Lloyd Wright buildings.

Situated on a 100-acre orange grove in Lakeland, Florida, midway between Orlando and Tampa, the lakefront campus is known especially for Wright's steel, sand-cast block and glass-spired Annie Pfeiffer Chapel, which has been restored in an earlier program. Wright designed and built 12 structures on the campus between 1938 and 1958. Several more buildings were designed and built by his apprentice/protege, Nils Schweizer.

In recent years, some of the buildings have fallen into disrepair. One major task will be repairing or replacing hundreds of deteriorating concrete masonry units which form the basic modules for the structures. Originally built by unskilled laborers – primarily students in the college's work-study program – the handsome pierced blocks are inlaid with pieces of colored glass. The challenge, according to Astorino, will be to mass-produce those blocks cost effectively. Plans also call for fixing leaks throughout the buildings and repairing crumbling pieces of the esplanades that connect campus buildings.


Florida Southern College

Esplanade at Florida Southern.

Astorino's 50-member firm, which recently completed a comprehensive restoration program at Wright's Fallingwater in Bear Run, Pennsylvania, will be responsible for the entire renovation program, from the initial fundraising to the development of a tourism plan after the repair work is complete. The first phase of the project, compiling a historic structures report, is expected to take about one year.

The advisory team for the project will include Wright's former colleague Edgar Tafel, Wright scholars and homeowners, restoration architects and engineers, and artisans and apprentices from Wright's Taliesin community. When the report is complete, the firm will approach cultural and historic foundations for financial support. **Judy Donohue** ■

The author is a freelance writer in McMurray, Pennsylvania.

Neal Award for Suburbs Article

The editors of *Progressive Architecture* have won an award in the 1989 Jesse H. Neal Editorial Achievement Awards of the Association of Business Publishers. The award, for best single article, was given for "Reordering the Suburbs," a survey of contemporary suburban planning that appeared in the May 1989 P/A (pp. 78–91). Former senior editor Daralice D. Boles – now an at-large correspondent for P/A – was the principal author; other writers contributing portions of the article are executive editor Thomas Fisher, senior editor Ziva Freiman, and former senior editor Vernon Mays.

The Neal Awards program, which is open to business and professional publications, attracted 656 entries this year; 15 received awards, and 15 certificates of merit. ■


Philip Bujakowski

Royal reviewers, from left: Predock, Moss, Stern, Tigerman.

American Architects Review the Prince

On February 18, a few days before the Accent on Architecture Gala, AIA members took part in a symposium entitled "Dilemmas in Design" (named, presumably, by the person who thought up "Accent on Architecture"). Co-sponsored by the Smithsonian Associates, the all-day-Sunday discussion took up the issues raised by Prince Charles, using as a text his book, *A Vision of Britain* (see review, p. 117). Under the deft direction of Stanley Tigerman, the panel included architects Robert A.M. Stern, Hugh Newell Jacobsen, Antoine Predock, Joseph Esherick, Arne Bystrom, and Eric Owen Moss.

Of this group, the only one with sympathy for the Prince's views was Stern; even Tigerman eventually stepped out of his moderator role to admit his antipathy. Predock and Moss extended their objections to his position into a broader rebellion against the cultural domination of Europe and the Eastern U.S. Jacobsen denounced the influence of uninformed observers – on review panels, in particular.

Most of the speakers thought the Prince's guidelines were naïve and too limiting. To Moss, they were "simple-minded." "His ideas may be fine in Derbyshire," observed Predock, pointing out that his advice about materials derived from the land and avoidance of gaudy signs is meaningless in places like L.A. or Tokyo. (The Prince aims his advice only at Britain, but his speaking in the U.S. implies a broader agenda.)

Moss and Stern sparred on several subjects – whether there could be a "creative Classicism" (which Stern cited in the nearby National Gallery by John Russell Pope), for instance, and whether the public could be trusted as a final arbiter. For Moss, the Prince's advocacy of an architectural "language" lacked recognition of 20th-Century language such as that of James Joyce. Stern – claiming Joyce is indecipherable – saw no reason for architecture to celebrate the disorder of society: "Architects provide an orderly framework, then life takes place."

Most of the speakers from the audience showed sympathy for the Prince's position, and they got more applause than the panelists. One person referred to the "siege mentality" evident on the panel and said that if the Prince's views "were not validated by grassroots sympathy, you wouldn't be here discussing this."

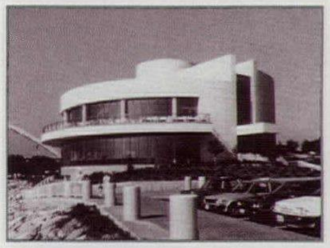
Most of the panel grudgingly agreed that the Prince's public statements were raising public interest in architecture. Said Jacobsen: "Anyone who can cause a group to be here at ten o'clock on Sunday morning is my hero." Esherick agreed that the Prince's points demanded discussion; the profession, he said, could not afford to "just can it and keep on going."
John Morris Dixon ■

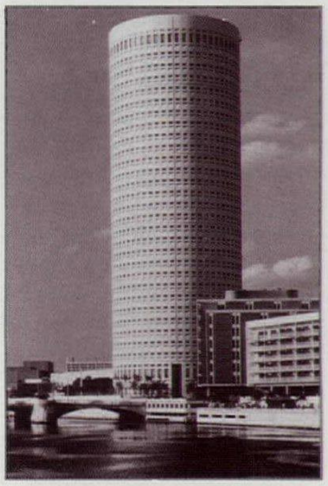
Buildings, Bridges Win PCI Awards

Eight buildings and four bridges built with precast or prestressed concrete have been recognized in the 1989 Precast/Prestressed Concrete Institute Professional Design Awards Competition. The competition attracted 130 entries this year. The winning buildings are:

- **Rowes Wharf, Boston, by Skidmore, Owings & Merrill, Chicago (P/A, Jan. 1988, p. 47);**
- **Mine Safety Appliances Company, Cranberry Township, Pennsylvania, by Williams Trebilcock Whitehead, Pittsburgh;**
- **Canterbury Green, Stamford, Connecticut, by Perkins Geddis Eastman, New York (P/A, Feb. 1990, p. 51);**
- **Woodland Hills Corporate Park, Cherry Hill, New Jersey, by F. Daniel Cathers & Associates, East Malvern, Pennsylvania;**
- **Boathouse at Sawyer Point, Cincinnati, by PDT + Co. Architects/Planners, Cincinnati;**
- **NCNB Plaza, Tampa, by Harry C. Wolf FAIA, Santa Monica, California (P/A, Feb. 1989, p. 59);**
- **Opequon Water Reclamation Facility, Frederick County, Virginia, by Camp Dresser & McKee, Annandale, Virginia;**
- **West Parking Structure, St.**

(continued on page 32)



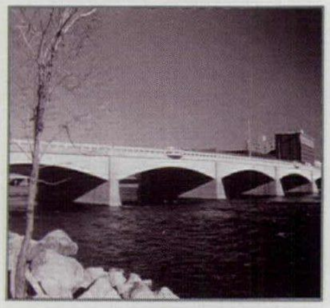


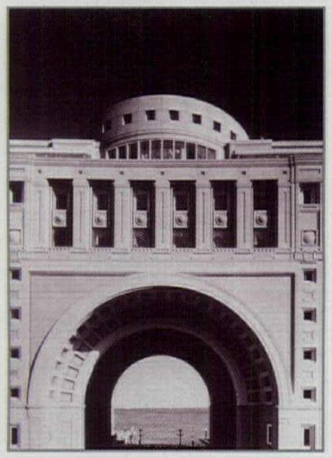
Sawyer Point Boathouse (top) and NCNB Plaza (above), PCI Award winners.

PCI Awards *(continued from page 31)*
Joseph's Hospital, Tampa, by Harvard, Jolly, Marcet & Associates, St. Petersburg, Florida.
Bridges cited in the competition were:

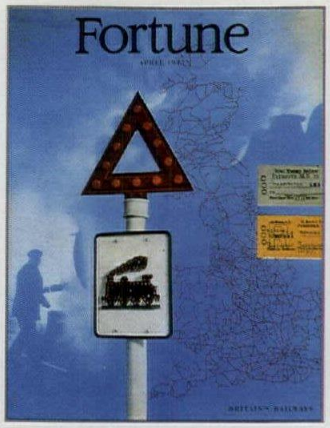
- Skybridge (ALRT Fraser River Crossing), Vancouver, by Bush, Bohlman-Reid Crowther, Vancouver;
- Bridge Street Bridge, Grand Rapids, Michigan, by Williams & Works, Grand Rapids;
- Interstate 110, US 90 to Chartres Street, Biloxi, Mississippi, by Figg & Muller Engineers, Tallahassee, Florida;
- Entrance Bridge, Pelican Bay Unit 10 Subdivision, Collier County, Florida, by Bridge Structures, Inc., Fort Myers, Florida.

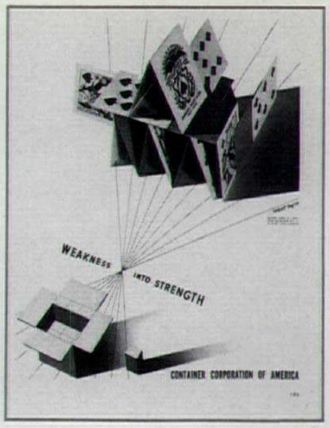
Building jurors were Esmail Baniassad, president of the Royal Architectural Institute of Canada; Richard M. Barancik of Barancik, Conte & Associates; William J. Carroll, president of the American Society of Civil Engineers; and P/A Profession and Industry Editor James A. Murphy. Judging bridge designs were Fred Conway, of the Alabama Highway Department; Stewart Gloyd, senior supervising structural engineer, Parsons, Brinkerhoff, Quade & Douglas; and Stanley W. Woods, bridge engineer, Wisconsin Department of Transportation.





PCI winners: Bridge Street Bridge (top) and Rowes Wharf (above).





From Graphic Design show: Fortune cover (1947) by Lester Beall, and advertisement (1941) by Herbert Bayer.

A Broad Look at Graphic Design

"The combination of word and image, on just about everything, just about everywhere," is Tibor Kalman's reductionist definition of graphic design, an expansive discipline that is as hard to pin down as it is ubiquitous. The exhibition "Graphic Design in America: A Visual Language History," at the IBM Gallery of Science and Art in New York through April 7, attempts for the first time to organize this vast body of variegated work, and to highlight some of the designers who have made important contributions. It is a formidable task, and the show can be faulted only for overreaching.

The exhibit, organized by the Walker Art Center and curated by Mildred Friedman, shows nearly 1200 pieces of work in the print, film, and electronic media, as well as architectural and urban signage. Grouped into genres (Design in the Environment, Design for the Mass Media, and Design for the Institutions of Commerce and Government), the work includes posters, maps, signage, magazines, newspapers, books, packaging, advertising, corporate identity, film, and television, among other things. (IBM's professional pride prevented the Macintosh-based computer graphics portion seen at the Walker from being included.)

Apart from the pleasure of seeing the work, the major strength of the exhibit is that it shows the uninitiated just how all-encompassing design is, and that for every communication one sees, someone has made deliberate decisions about content, typography, imagery, and their compositional integration. For architects, who often work with graphic designers or even do graphic design themselves, the show is particularly resonant for their own work.

The drawbacks of the exhibit are that it suffers from a poorly articulated way of viewing it at the IBM Gallery, an ironic fate considering the graphic designer's role of lending order to often complex sets of information; and, that it does not sufficiently address the work of advertising or illustrative work. The exhibit, well worth seeing, should be regarded as the first and noble attempt at surveying the visual art that, in this age of information, reaches every portion of our society. **Derek Bacchus** ■

Cloudy Skies at Technology Conference

The annual, mid-winter Association of Collegiate Schools of Architecture Technology Conference, now in its eighth year, convened under uncharacteristically overcast skies at the University of Southern California (USC) School of Architecture in Los Angeles in mid-February (Feb. 15–18, 1990).

This year's three-day symposium was a tightly scheduled marathon of nearly 100 papers, five keynote addresses, and two plenary panels devoted to the general theme of "Modernity, Technology and the City." Individual paper sessions addressed topics from "Technology and Philosophy" to "Technology and the Role of Infrastructures in the City." Selected papers from the meeting will be published by Butterworth Publishers late this year.

Responding to an energetic organizing committee under the direction of conference chairman Marc Angelil, Associate Professor at USC, the conference attracted a stimulating, if at times disjunctive, array of semioticians, neo-Marxists, deconstructivists, and technologists. While bound by a common interest in technology, participants were clearly not bound by a common definition. This was reflected in the diversity of the presentations, which ranged from the pragmatic to the polemic, with a decided emphasis on theory at the expense of practice.

As the papers continued, it started to rain. Between sessions, conferees were forced to circumnavigate Harris Hall's open-air courtyard, the center of which was flooded by a malfunctioning drain. Within sessions, the center of debate proved equally elusive as participants were often separated by independent critical language and sets of references.

Conferees were obliged to wade through pronouncements that ranged from Princeton faculty member Mark Wigley's articulate concern for the "effect of technology on the thought of architecture" to Ohio State's Jeffrey Kipnis's cryptic message, delivered in absentia by Michael Hays, that "disguise: delimit." From the audience, participants more concerned with matters of praxis, took issue with the critical stance of many of the invited plenary speakers.

But in spite of this lack of communication, or perhaps because of it, the conference clearly signaled that the relationship between technology and architecture has once again taken a central position in architectural theory and architectural discourse. It is again a subject about which architects are prepared to argue. If the exchanges were occasionally harsh and incoherent, the intensity was welcome.

With the conference drawing to a close, an exhibition of the work of Swiss architect and keynote speaker Martin Spuhler was soaked as the roof of the Helen Lindhurst Architecture Gallery leaked extravagantly under the persistent rainfall.

It was a provocative conclusion to an entertaining and perplexing technology conference that produced more heat than light and overlooked plumbing.
Donald Prowler ■

Calendar

Exhibitions

Women in Architecture
Through May 2

Tucson. This traveling show examines the work of architects from Lutah Marie Riggs and Julia Morgan to Rebecca Binder and Maya Lin. T.M. Sundt Design Gallery, College of Architecture at The University of Arizona.

Christopher Wren
Through May 8

Washington, D.C. Christopher Wren's legendary design for St. Paul's Cathedral, completed in 1711, is documented in an exhibition of rarely seen original drawings and plans, manuscripts, and artifacts. The Octagon.

Paul Nelson
Through May 11

New York. "The Filter of Reason: Work of Paul Nelson" documents the architect's projects, paintings, and drawings. The exhibition will travel to four U.S. cities, the CCA, and to Paris. Buell Hall, Columbia University.

Tod Williams/Billie Tsien
Through May 18

New York. The architects use the "Architecture Tomorrow" exhibition as a laboratory for "practical and visionary propositions regarding the utilitarian, interpretive, and constructive possibilities of the home." Full-scale building components have been assembled and public interaction encouraged. The exhibition originated at the Walker Art Center. Whitney Museum at Federal Reserve Plaza.

Charles Moore
Through May 25

Dallas. Moore's Post-Modern aesthetic is documented in a show of buildings and projects; a series of temple-like structures, designed by the architect to "illustrate allegorical qualities of architecture," supplement the exhibition. Contract Design Center.

Church Architecture
Through July 14

Portland, Oregon. "Spiritual Search in a New Land: 19th Century Churches of the Northwest" is a study of the region by Oregon photographer Barry Peril. Oregon Historical Society.

Louis Sullivan
April 8–May 20

Southampton, New York. "Louis H. Sullivan: Unison with Nature" focuses on the architect's masterful synthesis of natural elements with early tenets of 20th-Century Modernism. Original ornament in tin, wood, and iron and reproductions cast from original plaster, limestone, and terra cotta forms are supplemented by drawings and photographs. The Parrish Art Museum.

USA/USSR: Urban Projects
May 1–31

New York. "The Socially Responsible Environment, USA/USSR, 1980–1990," jointly presented by the USSR's Union of Architects and Architects/Designers/Planners for Social Responsibility in the United States, will open concurrently in Moscow and New York. Thirty of the "most innovative, socially conscious" architectural and urban planning solutions, selected by a panel of Soviet and American architects, will be on show. Knoll Gallery, 105 Wooster Street.

Competitions

Paris Prize
Registration deadline April 27

New York. "Ezekiel's Vision in Anticipation of a Messianic Age" is the ethereal topic of the 77th competition. "The creation of a place to house our longings, our aspirations . . . our international contemporary order" is the more accessible program outline. Entrants must be recipients of a first professional degree in architecture from a U.S. school between June 1987 and December 1990. Contact National Institute for Architectural Education, 30 West 22nd Street, New York 10010.

Excellence on the Waterfront
Entry deadline May 15

Washington, D.C. Any "substantially completed" project on a waterfront site may be submitted for this international competition; current and historic (pre-1980) projects are eligible. Contact Susan Kirk, Waterfront Center, 1536 44th Street, N.W., Washington, D.C. 20007 (202) 337-0356.

Montreal 1990–2000
Registration deadline May 15

Montréal. Two open idea competitions have been announced by the city of Montréal: La Cité Internationale de Montréal (a two-stage call for a down-

(continued on page 36)

Calendar *(continued from page 34)*

town gateway master plan urban design concept) and Place Jacques-Cartier (a single-stage call for a "series of public spaces, buildings, and civic art adjacent to City Hall"). Contact APAAM, 55 West, Mont-Royal Avenue, Suite 902, Montréal, Québec, Canada H2T 2S6 (514) 849-2449.

Moscow Theater Arts Center
Entry deadline May 15

Moscow. A two-stage competition for the Chamber Theater Arts Center in Moscow is open to architects, senior architecture students, and teams of architects and scenographers and/or theater technicians. Eight entrants, chosen from the first stage, will be given study tour awards and compete in the second stage, from which a design will be chosen for development and implementation. Contact Architectural Commission of the Soviet Center OISTAT, USSR Union of Architects, Schusev Street 3, Moscow 103889 USSR.

Alabama Office/Courthouse
Registration deadline May 18

Mobile. A one-stage open national competition is being held by the County of Mobile for a combined county courthouse and office building. Contact Clifton M. Lambert, Mobile County Design Competition, P.O. Box 40471, Mobile, Alabama 36640.

Yokohama Urban Design
Entry deadline May 21

Yokohama, Japan. "Revitalization of the Waterfront" is the theme of the second annual ideas competition sponsored by the city of Yokohama and other organizations. Prizes totaling 2.5 million yen will be awarded, and competition results will appear in *The Japan Architect.* Contact Yokohama International Design Exhibition, Urban Design Section, Urban Planning Bureau, the City of Yokohama, 1-1 Minato-cho, Naka-ku, Yokohama 231, Japan, tel. 45 671 20230.

Builder's Choice Awards
Registration deadline May 25,
Entry deadline June 8

Washington, D.C. New or remodeled housing or light commercial buildings completed between June 1988 and May 1990 may be submitted to the 10th Annual Builder's Choice Design & Planning Awards sponsored by *Builder* magazine. Architects, designers, builders, developers, and planners are eligible. Contact Angie Berger or Debbie Payne, *Builder*, 655 15th Street, N.W., Suite 475, Washington, D.C. 20005 (800) 622-1950.

AIA Urban Design
Entry deadline June 4

Washington, D.C. Submissions for the 1991 Citations for Excellence in Urban Design may include urban design or redevelopment projects, planning or environmental programs, or civic improvements "that contribute to the quality of the urban environment and that involve the public in the planning process." Contact Bruce Kriviskey, AIA, Design Programs, 1735 New York Avenue, N.W., Washington, D.C. 20006 (202) 626-7452.

Project Atlas
Entry deadline June 15

New York. Twelve "obsolete and abandoned" Atlas missile bases in New York State set the stage for this international competition which asks: "Are the silos monuments to a time we have left behind or will they remain precursors to an empty world?" Acceptable entries include: "any proposition and/or ideas in the form of drawings, models, text, concepts, or actions." An exhibition of proposals selected by an international jury will be on view in the fall. Contact Storefront for Art and Architecture, 97 Kenmare Street, New York, New York 10012 (212) 431-5795.

Conferences

IDCNY/IBD
April 26–27

New York. The Institute of Business Designers will hold its annual auction on April 26 at the International Design Center; and an IDCNY warehouse sale will be held on April 27. Contributions will be made to FIDER, DIFFA, IDLNY, and NCIDQ from the proceeds of both events. Contact IDCNY, 30-20 Thomson Avenue, Long Island City, New York 11101 (718) 937-7474.

Specifix^2 = WDC^3
April 26–27

Washington, D.C. The annual symposium on architecture and commercial interior design, held at the Washington Design Center, will include seminars, new product launches, speeches by Peter Eisenman, Robert A.M. Stern, and Mark Hampton, and the exhibitions "30 Under 30" and "The Wexner Center for the Visual Arts." Contact Washington Design Center, 300 D Street, N.W., Washington, D.C. 20024 (202) 479-4227.

Museum Art and Architecture
April 28–29

Des Moines. "New Museum Architecture and Contemporary Art" will examine how new museum
(continued on page 38)

Calendar *(continued from page 36)*

construction, additions, and renovations, both in the U.S. and Europe, are "planned relative to the demands of art of our time" and how "the architecture of new museums influences the nature of museum collections and exhibitions." An international group of architects, artists, museum directors, collectors, and trustees will participate. Contact Jessica Rowe, Des Moines Art Center, Edmunson Art Foundation, 4700 Grand Avenue, Des Moines, Iowa 50312-2099 (515) 277-4405.

Citybuilding
May 9–13

Montréal. A conference on 15 major American and European urban design projects; charrette sessions on nine specified sites in Montréal; and exhibitions displaying projects discussed in conferences or designed in charrette are all part of "Citybuilding: The Second Modernity." Contact APAAM, 55 West, Mont-Royal Avenue, Suite 902, Montréal, Québec, H2T 2S6 (514) 849-2449.

AIA National Convention
May 19–22

Houston. "Pushing the Limits" is the theme for this year's gathering held at the George R. Brown Convention Center; technical seminars, a new products, design, and technology exposition, and keynote speeches by James Burke, Joel Garreau, and Michael Rotondi are scheduled. Contact John Gaillard, AIA, 1735 New York Avenue, N.W., Washington, D.C. 20006 (202) 626-7397.

International Furniture Fair
May 20–23

New York. The second annual International Contemporary Furniture Fair, at the Jacob Javits Convention Center, will again focus attention on the work of small, independent furniture designers from the United States and abroad. Contact Marianne McNamara, George Little Management, 2 Park Avenue, New York, New York 10016 (212) 686-6070.

UIA XVII Congress
May 27–June 1

Montréal. "Culture and Technologies" is the theme for this meeting of the International Union of Architects. Workshops, an art and architecture film festival, book fair, computer show, and a trade exhibition are among the many events planned. Contact Congress Secretariat – UIA XVII, % Societe La Cle, 640 Saint-Paul Street West, Suite 102, Montréal, Québec, Canada H3C 1L9 (514) 393-1500.

Cities of the 21st Century
June 4–6

Glasgow, Scotland. An international conference on the future of the city will concentrate on urban economics, city design, telecommunications, energy, transportation, and lifestyles. An exhibition, June 2–10, will supplement the conference. Contact CEP Consultants, 26–28 Albany Street, Edinburgh EH1 3QH tel. 31-557 2478.

International Tile Expo
June 6–9

Anaheim, California. The International Tile Exposition will take place at the Anaheim Convention Center. Contact TSI, 1016 North Clemons Street, Suite 406, Jupiter, Florida 33477 (407) 747-9400.

A/E/C SYSTEMS® '90
June 12–15

Atlanta. Computer graphics, computer, construction, and management systems, and reprographics are among the topics to be discussed; an exhibition will be held June 13–15. The conference will be held at the Georgia World Congress Center. Contact Sharon Price, A/E/C SYSTEMS®, P.O. Box 11318, Newington, Conn. 06111 (800) 451-1196.

Context & Modernity
June 13–15

Delft, The Netherlands. A seminar on critical regionalism will be held at the Delft University of Technology. Contact STYLOS, The Delft International Working Seminar on Critical Regionalism, Context & Modernity, Berlageweg 1, 2618 CR Delft, The Netherlands tel. (0)15-783693.

Lighting World
June 14–16

Chicago. The biannual Lighting World exposition – new product launches and seminars on product, technology, and industry trends – will be held at McCormick Place North. Contact Lighting World, % National Expositions, 15 West 39th Street, New York, New York 10018 (212) 391-9111.

NOTICE

In order to provide timely Calendar information to our readers, listings information should be submitted one and one-half months prior to publication (May 15 for the July issue, for example). For possible inclusion, please send relevant information to Abby Bussel, P/A, 600 Summer Street, Stamford, Connecticut 06904 or FAX (203) 348-4023.

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NEOCON® 2
The Merchandise Mart Chicago June 12-15 1990

New store is built in 67 days with Southern Pine components.

There are about 188 Southern Pine parallel chord trusses in each Western Auto store.

Completing a 15,000 square-foot building from slab to move-in often takes three months or more. Western Auto stores in several states are going up in an average of 67 days with Southern Pine lumber components.

The cost efficiency of panelized wood roof systems means less construction time. These glued laminated girders span from 27 to 30 feet.

This faster completion helps provide additional profits for the owners, contractors, and suppliers because they can move on to the next job sooner.

The contractor reports that the panelized walls, glued laminated girders and Southern Pine roof trusses cost from 10% to 15% less than steel bar joists and concrete. According to Western Auto, the wood component system helps stores open 30 to 60 days sooner than competitive systems. It also makes the buildings more adaptable for future changes and expansions.

Parallel chord Southern Pine trusses span between 26 and 36 feet. Truss supplier Staton Douthit of Associated Systems in Mesquite, Texas, says his firm is "100% Southern Pine" because of pine's additional strength and fastener holding abilities.

Panelized lumber and plywood wall sections offer all-weather construction at lower costs than concrete tilt-up walls. They are registered under the name "Wood Tilt Walls" by Associated Systems.

For more information, contact the Southern Pine Marketing Council.

Southern Pine lumber components help Western Auto Stores open 30-60 days sooner.

Southern Pine Marketing Council

Southern Forest Products Association
P.O. Box 52468 New Orleans, LA 70152 (504) 443-4464

Southeastern Lumber Manufacturers Association
P.O. Box 1788 Forest Park, GA 30051 (404) 361-1445

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Your warm relationship with gas
is about to get cooler.
Gas-fired chillers, double-absorption, dessicant systems, gas cogeneration...today's new gas technologies give you so many more options for cooling commercial projects. And, with the additional benefit of unbeatable economy. Now, year 'round, gas is your client's best energy value.
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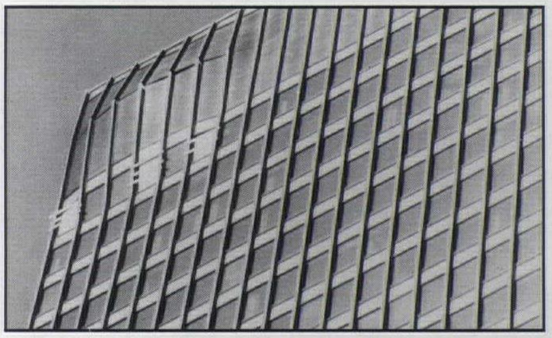
Technics Topics

Diagnostics expert **Jerry G. Stockbridge** summarizes advice learned from the mistakes of others.

Learning From Experience: Cladding Systems

With the possible exception of roofs, cladding systems tend to have more problems than any of the other elements in building structures. Since it is always much more effective and less costly to learn from other people's mistakes rather than your own, six specific areas that require special attention during the planning and design of a cladding system are briefly discussed below.



Wind damage to curtain wall.

Be Careful When Specifying Unproven Systems and Materials

There is often considerable pressure on architects to be up-to-date and use state-of-the-art systems and materials, a practice that can enhance the image of a building and its tenants as well as the reputation of the architect. To make things even more difficult, some problems in new types of construction take a long time to develop. Often a cladding system appears to perform well and as a result, it is installed in a number of buildings before the problem surfaces. An example of this was the use of mortar additives, which didn't begin to cause accelerated corrosion problems in masonry claddings for many years. To advance, we must use new materials and systems, but clients have to be involved in deciding to take the risks that go along with the aesthetic or economic rewards.

Design With Increased Care

More factors have to be considered when designing cladding systems than most other building elements. Claddings have to resist loads, exclude moisture, provide thermal resistance, control condensation, resist fire, accommodate volumetric changes, accommodate structural movements, be durable, and provide a pleasing aesthetic result. As a result, they are often complex assemblies of many components and dissimilar materials. An example of a seemingly minor detail that can cause a major problem if overlooked is when architects forget to specify drips in precast members over window openings. The runoff from the concrete can etch the window glass over time. To design with care and review details with a watchful eye, we have to price our services adequately and work under a reasonable schedule.

Make Sure That Design Responsibility is Adequately Defined

Architects design some types of cladding systems in detail, while other types are designed only schematically, relying on specified performance criteria to achieve the desired result. Making sure that design responsibility is adequately defined obviously becomes more critical when using the latter approach. Architects have to walk a fine line, providing enough detail to ensure that they adequately transmit their design intent, but not so much detail that they provide unnecessary restrictions that inhibit reasonable innovation and that unrealistically restrict qualified bidders. When in doubt, it would appear to be desirable to err on the side of providing too much detail.

Resist Value Engineering That Compromises Performance

Because cladding systems are often very complex, they normally do not lend themselves to value engineering. Cost savings that may appear possible when considering the prime performance criteria may fail miserably because seemingly minor performance criteria were overlooked. For example, the cutting of stone panels to very small thicknesses appeared to have no adverse effect on their structural performance or weathering characteristics, but it became a major problem when the panels began to curl with aging. Don't lose sight of who takes the responsibility for the revisions if they don't work.

Be Careful About Unrealistic Expectations of Construction Skills

Unfortunately, some details that look good on paper turn out to be very difficult to build and next to impossible to check in the field. The blind anchoring of stone panels, with anchors on their back sides (where it cannot be verified if they are properly engaged) is an example. Going into production without verifying buildability on a mockup is strongly discouraged.

Don't Let Scheduling Pressures Compromise Performance

There is often considerable pressure to get as much of a building as possible enclosed before winter so that the interior trades can work. Unfortunately, many of the components of cladding systems can have performance problems if they are installed in weather that is too cold or too wet. Bond failures in sealant joints that were installed on virtually invisible thin films of ice are not unusual. Attempt to convince the owner that the contractor needs a realistic schedule. **Jerry G. Stockbridge** ■

The author is a principal with Wiss, Janney, Elstner Associates, Chicago, with whom he has investigated over 750 building problems. Stockbridge is a registered architect and professional engineer.

Tech Notes

***Indoor Air '90*, the 5th (triennial) International Conference on Indoor Air Quality and Climate, returns to North America after nine years. The Canada Mortgage and Housing Corporation will host this major IAQ event at the Metro Toronto Convention Centre, July 29–August 3. CMHC (613) 748-2714.**

***Repairing and Extending Finishes, Parts 1 and 2*, and *Repairing and Extending Weather Barriers* are the first three releases in the Building Renovation and Restoration Series by H. Leslie Simmons. The titles are a bit misplaced, as they're suited to all architects who detail, specify, or inspect new or existing fieldwork. VNR (800) 926-BOOK, 300 + pp., $42.95 each.**

The Canadian Home Builders' Association *Builders' Manual* has a cartoonish look that belies its scientific approach to insulation, mechanical systems, and air, vapor, and weather barriers. It's the most sophisticated text of its kind we've seen. CHBA (613) 230-3060, 286 pp., $50 both U.S. and Canada.

***Finding and Using Environmentally Sensitive Construction Methods and Materials* is a conference to be held in Washington, D.C., May 6–8. The meeting is open to all interested in using building products that don't cause health problems and don't damage the environment. Contact Rod Waldorf (615) 297-2269.**

***Sealants in Construction* by Jerome Klosowski contains chapters on sealant types, selection, applications, specifications, testing, and structural glazing systems. It is well-illustrated, comprehensive, and direct with an extended discussion on silicone sealants. Marcel Dekker, (800) 228-1160, $85.**

Researcher **Dr. Joseph E. Minor** reviews new findings and methods for selecting glass types and designing glass cladding systems.

Architectural Glass: Strengths, Selection, Sizes

It was not too many years ago that the design of glass cladding was a relatively simple act. The required thickness of "plate" glass for a given opening area and a prescribed wind pressure was obtained from a single chart. This chart was recommended by glass manufacturers more than 25 years ago, and it is still found in building codes in slightly modified forms.

Several events have complicated glass cladding design. The energy crisis of the 1970s raised a demand for greater energy efficiency, and this led to the development of new glass products. Tinted and coated glass were marketed for energy efficiency. Since these absorb and reflect energy, they experience higher temperatures than clear glass. To enable tinted and reflective glass to resist breakage from thermally-induced stresses, heat-treated glasses were offered. And, insulating glass (IG) finally found widespread acceptance. Because IG units may consist of tinted and/or reflective glass in either or both lights, and because these may be of equal or unequal strengths, their behavior is complex and requires some understanding for design.

This article is intended to better acquaint architects with glass types and strengths, wind load resistance, breakage behavior, and other mechanical and structural issues that need to be considered when glass is used as a cladding material.

Annealed Glass

The basic type of flat glass used in architectural glazing is annealed (AN) float glass. Molten glass that has been "floated" on a bed of molten tin is cooled slowly so that it contains no residual stresses; this assures that the glass can be cut without cracking beyond the cut line. The strength of annealed glass is reported in terms of lateral pressures that can be sustained by plates of stated sizes at specified breakage rates. Annealed glass breaks in shards, so it is prohibited from use in doors, overhead glazing, and some other applications, such as transoms and sidelights.

The strength of AN glass diminishes with sustained load (this is referred to as "static fatigue"), as shown in Figure 1. From this it can be seen that the sustained load that can be withstood for a few hours is only half that that can be sustained for a few seconds. Glass also weakens in service over time. In samples removed from buildings after ten years' service from a variety of regions, laboratory tests at the Texas Tech University Glass Research and Testing Laboratory revealed reductions in strength averaging 30 percent and ranging between 20 and 40 percent. As a rough general rule, a surface imperfection (scratch, gouge) in AN glazing that is visible at arm's length reduces the strength of the glass at this point by half.

Heat Treated Glass

Annealed glass may be heat treated to produce heat strengthened (HS) and fully tempered (FT) glass. In both cases, the glass is cooled quickly in order to produce residual tensile stresses in the interior of the panel and residual compressive stresses on the surfaces and edges. Fully tempered glass retains higher compressive stresses than HS glass and is stronger. The classification requirements for heat-treated glasses are specified in ASTM Standard C 1048.

An HS glass beam in bending will fail under a load approximately twice that of the AN glass failure load, since the applied bending stress must overcome both the residual surface compression and the material strength to reach failure stress. The failure load for FT glass is approximately four times the AN glass failure load. These factors of two and four times the strength of AN glass are convenient for design and code purposes, because they allow design strength criteria for all three glass types to be read from the same set of design charts by applying a multiplier of two or four. The factors of two and four are derived from theoretical analysis, and there is no data published in the open literature on the strength and variability of actual residual surface compressions of glass delivered to the field. Tests at Texas Tech indicate these factors could be as large as 3.2 and 5.0 for HS and FT glass.

Fully tempered glass is known as "safety glass" because it crumbles into particles that are relatively harmless compared to broken AN glass. Fully tempered glass has a reputation of occasionally breaking spontaneously following installation because of impurities (commonly nickel sulfide) within the base glass. These impurities expand with temperature increases, inducing fracture within the tensile residual stress zone. While the number of installations in the field that experience this phenomenon is very small in comparison to the number of installations that have successfully used FT glass, many architects and engineers have become concerned about its use. A "heat soak" process following tempering has succeeded in reducing the potential for spontaneous breakage.

Laminated Glass

Laminated glass is made by sandwiching an interlayer of polyvinyl butyral between two (or more) plates of any combination of AN, HS, or FT glass. Laminated glass has been available for over 50 years and is used in auto windshields because the interlayer retains much of the assembly intact after breakage.

Building codes and design standards have for many years assigned to laminated glass a strength factor of 0.6, which suggests that a laminated glass plate is 0.6 times as strong as a monolithic annealed glass plate of the same nominal thickness. The source of this factor is not clear. In bending, a monolithic beam is

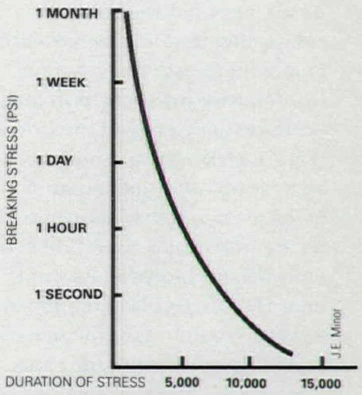
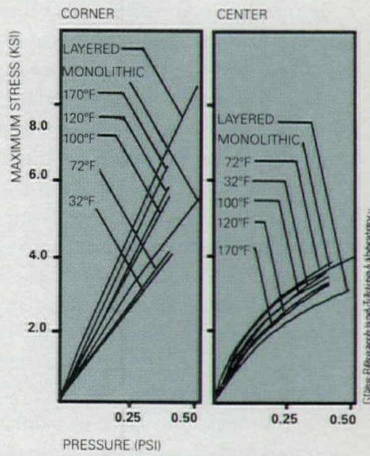


FIGURE 1. EFFECT OF LOAD DURATION ON STRENGTH OF GLASS



FIGURES 2/3. MAXIMUM PRINCIPAL STRESSES IN LAMINATED GLASS UNITS COMPARED WITH STRESSES IN MONOLITHIC AND LAYERED SYSTEMS FOR CORNER AND CENTER LOCATIONS stressed one-half as much as a two-layered beam of the same total thickness. By ignoring the interlayer, one would expect a relative strength factor of 0.5 for laminated glass.

However, recent research at Texas Tech has found that laminated glass units behave like monolithic glass plates at room temperature for short term loads representative of wind pressures (Figure 2). These data suggest that a factor of 1.0 is suitable for laminated glass under wind loads. As temperatures approach 170° F, the units behave more like layered units (Figure 3), although the interlayer continues to function to some degree in connecting the glass plates. The interlayer relaxes under long term loads at room temperature and above, but there is virtually no creep in the interlayer at freezing temperatures. This suggests that laminated glass units also behave like monolithic glass plates under long-term snow loads. Failure strength tests of laminated glass fabricated from HS and FT glass suggest that relative strength factors exceeding 2.0 and 4.0, respectively, may be appropriate for these glass types.

Insulating Glass

The sealed airspace in insulating glass (IG) assures that the two glass plates will "share" loads applied to the IG unit. Glass plates in an IG unit with relatively thin, equal thickness plates will share applied loads nearly equally. Under these symmetrical conditions (typical of vision areas), an appropriate relative strength factor would approach 2.0, i.e. two times the strength of a single plate. Relatively thick or unequal thickness glass plates in an IG unit will not share loads equally. Under these unsymmetrical conditions, relative strength factors will be closer to 1.0 if either glass plate is very stiff, since the stiff plate in the assembly will carry essentially all the load. Overhead glazing and installations requiring impact resistance and resistance to particle fallout usually require unsymmetrical IG units. The load sharing properties of IG glass for different thickness and aspect ratios are discussed in detail in a report by G. David Chou and colleagues.

Thermal Stress

Tinting and coating of glass that increases its solar absorptivity also increases its susceptibility to breakage from thermally induced stresses. The warm center of a window exposed to sunlight expands and pulls the cooler (protected) glass edges into tension. If the glass edge is marred or chipped, tensile stresses across these flaws can induce fracture at the edge. Some glass manufacturers offer guidelines and procedures to assist the designer to evaluate thermal stresses. Generally, heat treated glasses (HS, FT) are recommended by glass manufacturers if the glass is tinted or coated, although the real determinant of glass strength under thermal stress is the condition of the edges. Frames which restrain glass plates are designed with spaces around the edges of the plates so that the glass plates can expand and contract without producing glass-to-metal contact.

Breakage

Window glass breaks. It breaks for many reasons. Some causes of breakage can be controlled through design; some cannot. In certain circumstances, breakage of a few lights can be tolerated, but glass particle fallout cannot. In these situations, the designer must consider the consequences of glass breakage.

Annealed and HS glass particles tend to stay in the window opening when broken, but fully tempered glass particles do not. In windstorms, especially windstorms of long duration, it cannot be assumed that broken glass particles from any monolithic glass type (AN, HS, FT) will stay in place. In situations where particle fallout cannot be tolerated, the glass must be capable of staying in the opening following breakage, as well as during subsequent gusts.

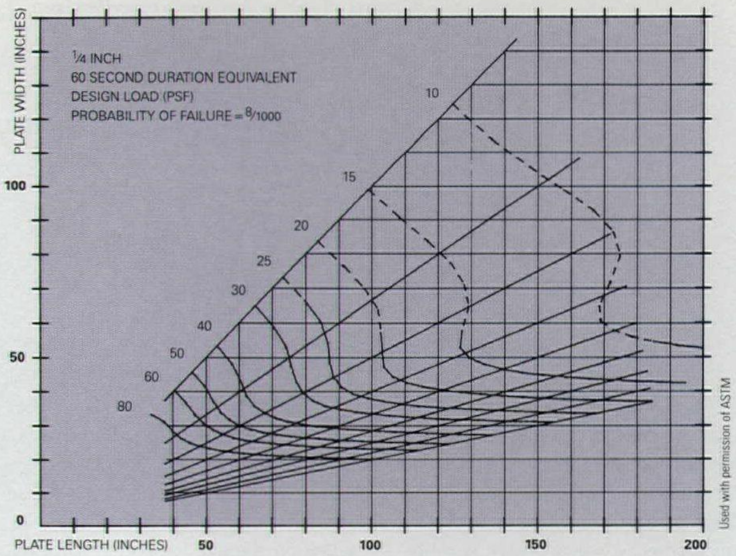


FIGURE 4. DESIGN CHART FOR ¼" ANNEALED MONOLITHIC GLASS, ONE OF A SERIES FOR DIFFERENT THICKNESSES FROM ASTM E1300-89

Laminated glass and film-coated glass resist fallout. If one layer of glass in a laminated product breaks (because of missile impact or accident, for example), the remaining layer may be able to carry wind pressures for the remainder of the storm or until the unit is replaced. A film-coated (commonly polyester) light, when broken, is more resistant to fallout than an uncoated light. However, a broken film-coated light has essentially no load carrying capacity and can be blown out of the opening by subsequent gusts. Details have been suggested wherein the film is extended beyond the edge of the glass and is connected to the window frame with a "batten." This approach might retain the broken glazing in the opening. Neither laminated glass nor film-coated glass have been fully evaluated for their ability to retain glass particles after breakage in a windstorm.

Glass in tall buildings is seldom broken by wind pressure acting alone. In hurricanes, most breakage is caused by gravel which is blown off of adjacent roofs and by falling glass particles and other "missiles" caught up in the turbulence around buildings. The resistance of different glass types to gravel missiles fired at glass samples in the laboratory is listed in Table 1. This shows that FT glass has much greater resistance than AN glass to damage from small stones. While FT glass is generally more resistant to missile impact than other glass types, when it breaks, it can contribute many new missiles to the airstream.

New Thickness Sizing Charts

Glazing materials and systems are selected to satisfy aesthetic, thermal, breakage performance, and other design objectives, but glass thicknesses are chosen to resist wind loads. The sizing procedure is an iterative one and, as has been the case for many years, uses a chart system that relates glass proportions to thickness and sustainable wind loads. In place of the single, traditional chart appearing in most building codes, ASTM has released a new Standard E1300-89 containing ten charts (for AN glass), each describing allowable wind loads and dimensions for individual thicknesses ranging from 5/32 to ¾ inches. These charts are based on a theoretical model of glass breakage behavior developed by W.G. Brown at the National Research Council of Canada and extended by Dr. W. Lynn Beason at Texas Tech (now at Texas A&M). The charts take into account loss of strength due to weathering, maintenance, and other normal in-service weakening forces. The new ASTM charts are more conservative (allow smaller wind loads) than the traditional design charts but are not too different from the design charts published by PPG Industries in 1979. Beason and H. Scott Norville attribute this to PPG's having taken in-service loss of strength into account, whereas the traditional method does not.

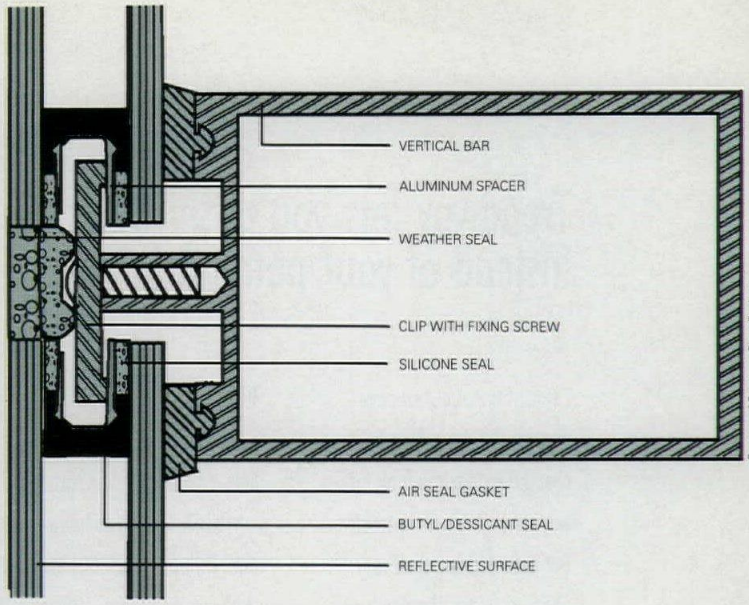
To use the system (see Figure 4), the designer (1) guesses at a

GLASS THICKNESS	ANNEALED	HEAT STRENGTHENED	FULLY TEMPERED
3/16 INCH	30 FPS	—	65 FPS
1/4 INCH	30 FPS	35 FPS	—
5/16 INCH	30 FPS	—	65 FPS
3/8 INCH	35 FPS	—	60 FPS
1/2 INCH	40 FPS	—	50 FPS
3/4 INCH	55 FPS	—	55 FPS

NOTES:
1. 6 GM SPHERICAL STONE IMPACTING NORMAL TO SURFACE
2. 1 FPS (FOOT PER SECOND) = 0.305 MPS (METERS PER SECOND)

J.E. Minor

TABLE 1. ROOF GRAVEL IMPACT VELOCITIES CAUSING BREAKAGE IN MONOLITHIC GLASS



Courtesy of Spectrum Glass Products

FIGURE 5. STRUCTURAL SPACER GLAZING SYSTEM (LICENSED TO SPECTRUM GLASS. PRODUCTS BY TREMCO, INC.)

suitable thickness of glass for a given application and goes to that chart of the ten; (2) finds the long dimension of the glass plate on the x-axis and projects a line up from it; (3) finds the short dimension of the plate on the y-axis and projects a line horizontally to intersect the projection from the previous step; (4) interpolates as necessary to find the allowable wind load (and multiplies this by any strength factors that account for heat treatment, IG load sharing, and laminated glass behavior); (5) repeats the process on charts representing thicker or thinner glass, if the allowable load is less or excessively greater than the design load, until the thickness is found that most closely carries the load. The design charts are based on a load with a duration of 60 seconds and a probability of failure of 8 lights per thousand (0.8 percent, or 1 in 125).

The repetitive nature of the procedure and the complexity introduced by compound glazing assemblies (IG and laminated units) make computer solutions desirable. Monsanto has recently begun distributing such a program on floppy disk that permits the designer to specify a glazing product (monolithic, IG, laminated) and a design wind pressure. The program delivers an assessment of product adequacy, along with pertinent data on product response. Monsanto's procedure was developed for laminated glass, since Monsanto manufactures Saflex® interlayer. However, the procedure is based on the assumption that laminated glass behaves like monolithic glass (in most design situations). As a result, the Monsanto computer program is applicable to glass design in general.

Glass Framing and Detailing

While glass thickness is sized to resist breakage, during Hurricane Gilbert in Cancun, Mexico in 1988, many lights were sucked out of their frames without breakage because the frames were too flexible or the glass and the frames were sucked out of the window opening because the frames were not anchored to the building. Since there are no code restrictions on glass deflection, the designer should be aware that this is a separate issue from breakage, and involves both the stiffness of the glass plate or IG assembly and how far the glazing extends into the frame ("bite") for conventional systems.

Structural glazing – connecting the light to the window frame solely with a silicone seal – is a proven technology that has been used principally in low-rise buildings and is employed in approximately 40 percent of new commercial construction in the U.S. Increasingly, however, structural glazing is being used in tall buildings. Four-sided structural glazing places both the structural seal and the IG unit seal in tension when outward acting (suction) pressures occur. Hence, both lights of glass in the IG unit depend on sealant adhesion (connection to the glass) and cohesion (strength of the sealant itself) to secure the glass to the building. Using load-sharing formulations discussed above and theories of thin glass plates on flexible structural supports, researchers at Texas Tech have calculated seal forces for a wide range of IG unit and structural seal geometries in structural glazing applications. In practice, engineering properties for silicone sealants are difficult to find. Structural seal and IG unit seal designs currently employ a working stress of 20 psi. Tensile strengths of products in adhesion vary, but manufacturers report values of 80–160 psi.

Geoff Francis of Vision Engineering and Design, a consulting firm specializing in curtain walls, has offered an innovation that introduces redundancy to the structural glazing concept (Figure 5). The inner light is captured mechanically by connecting the IG unit to the frame through the spacer. The outer light is still connected to the spacer only by a silicone seal and a butyl/desiccant seal. Should the silicone seal fail, the less stiff butyl/desiccant seal will allow the outer light to move outward, reducing the air pressure in the airspace, thus transferring load to the inner light. Hence, the outer light is protected by a mechanism that effectively unloads it if the silicone seal fails. Tests by Francis confirm this behavior.

Conclusion

As glass cladding products and design issues and procedures increase in complexity, a new subdiscipline of architects and engineers who specialize in curtain wall design, fabrication, installation, and maintenance has emerged. The appearance of new, even more sophisticated products suggests that the future will require even more specialization and detailed attention to exterior cladding. Whether they choose to develop the required expertise themselves, or to make use of the services of consultants, architects can no longer rely on building codes and glass manufacturers to keep them current with evolving technology and design requirements.

Joseph E. Minor ■

The author is the Thomas Reese professor and chairman of the department of civil engineering, University of Missouri-Rolla. From 1969 to 1988, he was director of the Institute for Disaster Research at Texas Tech University. *P/A acknowledges the help of Prof. W. Lynn Beason of Texas A&M University and Sherry Smith of Texas Tech's Glass Research and Testing Laboratory.*

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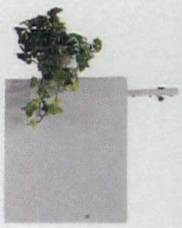

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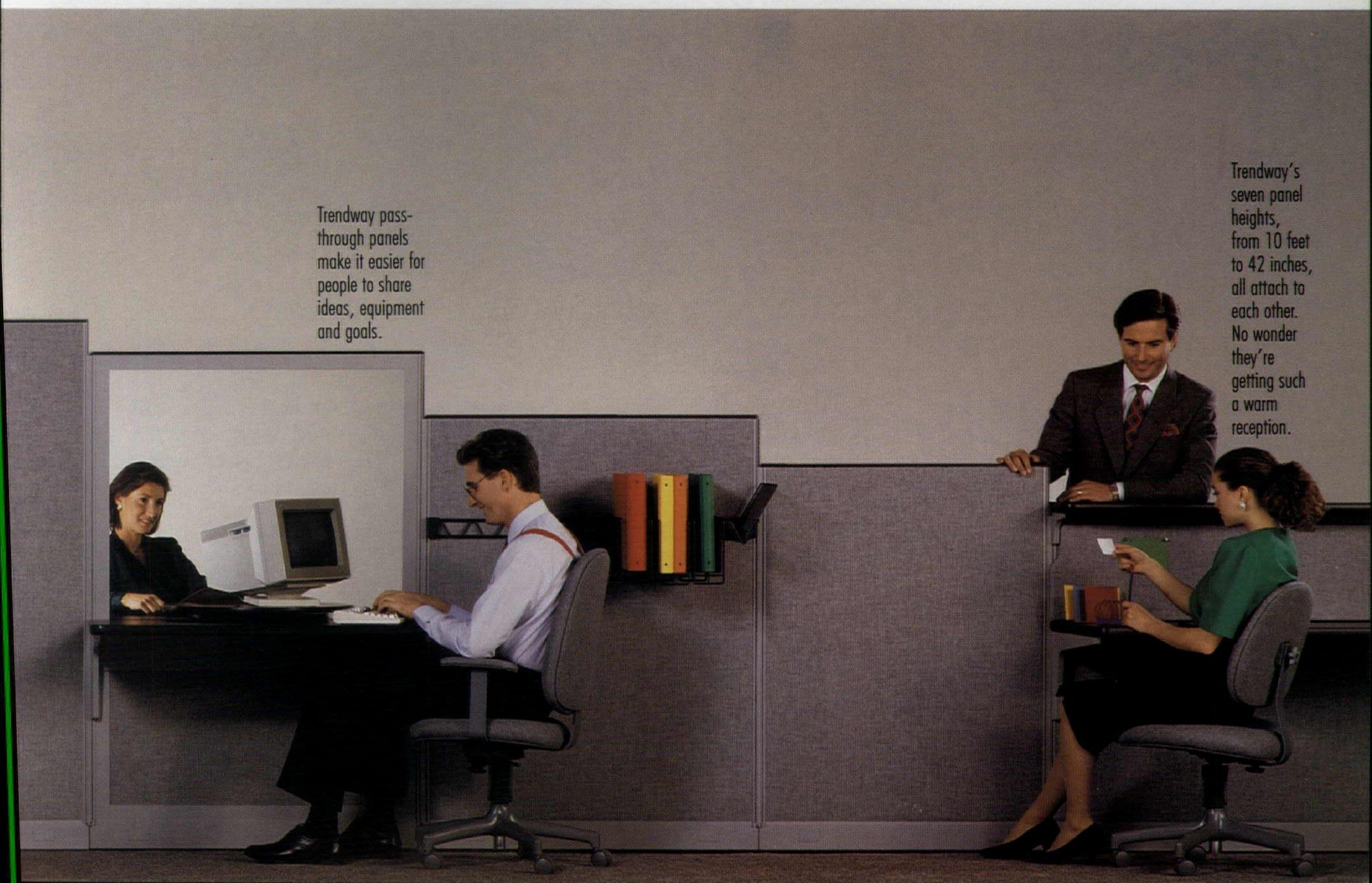
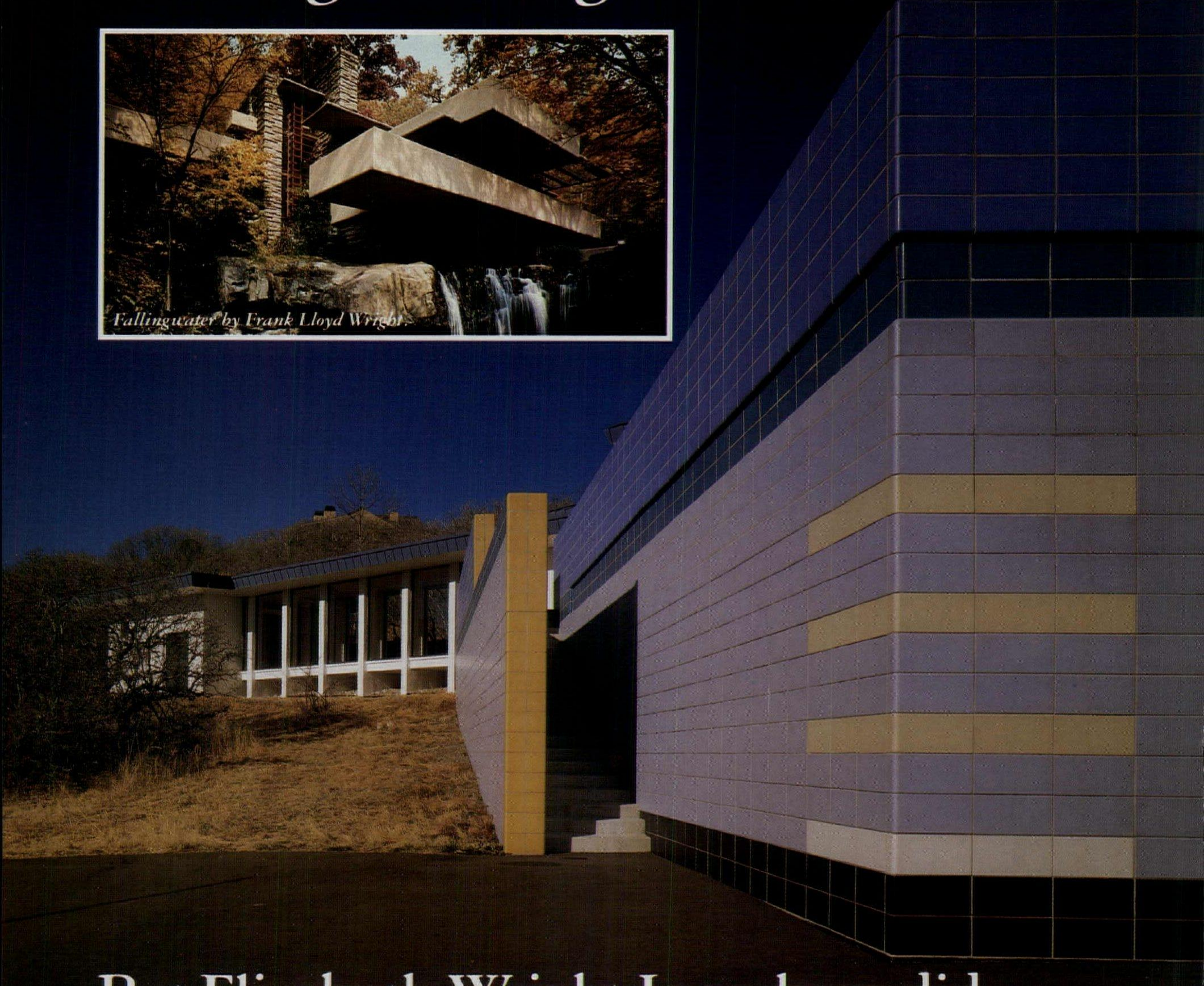


Mr. Wright never got to know us.



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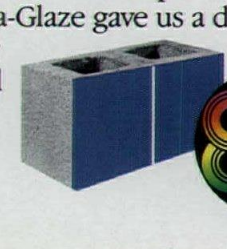

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Technics: Curtain Walls – Options and Issues

Exterior walls consultants **Gordon Smith** and **William Slack** review systems and considerations for cladding high-rise buildings.

One Skyline Tower, Bailey's Crossroads, Virginia. Architect: The Weihe Partnership, Washington, D.C.

Bruce Engineering

When facing blank paper at the start of the building design process, the architect appears to have available endless possibilities, limited only by the imagination. Similarly, an endless variety of exterior wall materials, systems, and subsystems appears to have been made available by current technology and manufacturing capacity. However, most buildings of today are shaped by many factors other than aesthetic ones, and this is especially true of the exterior cladding of high-rise buildings.

Structural System

Some of the wall design parameters introduced by the structural design are:

- Interstory movement due to spandrel beam deflections and column shortening;
- Location and accessibility of exterior wall connections as determined by size and location of structural members;
- The size and proportions of vision openings, which are also determined by size and location of structural members.

Wind loading is as critical to the selection and detailing of the exterior wall system as it is to the structural system. Building sway may produce considerable lateral or racking movement in the plane of the exterior wall, as well as interstory differential movement. And, earthquake movement and frequency are factors that must be considered.

Temperature changes, while directly and quickly resulting in exterior wall movement, may less directly and less quickly cause movement in the structural frame. Even if structural movement is slight, it is the difference in movements between the wall and structural frame that is most critical. While the structural system must influence the exterior wall design, the wall design must also influence the structural system. For example, wall design objectives may require that spandrel beam deflections be limited to a lesser dimension than might otherwise be acceptable.

Cladding Materials

The materials most commonly used in cladding high-rise buildings are metals, glass, stone, concrete, and brick. Aluminum predominates among metals, but stainless steel and painted steel are used on a more limited basis. We have recently been asked to consider solid bronze windows for a major project. Aluminum may be used in extruded shapes, flat plate, bent or formed sheet, or laminated to core materials. Stainless steel may be flat or formed sheet, either as elements in themselves, or as cladding over other materials. Similarly, mild steel may be flat, brakeshape, or rollformed. Any of these metals may be employed as complete wall cladding components, as framing for other materials, as in-fill panels, or all of the above. Each may be employed in one or more of a wide variety of integral finishes, paints, and coatings, in a seemingly infinite variety of colors.

Glass is available clear, or tinted gray, bronze, green, and blue. It may be uncoated or coated with uniform colored, metallic, or patterned coatings on interior or exterior surfaces. It may be monolithic, insulating, or laminated, using annealed, heat-strengthened, or tempered lights.

Glass traditionally has been used as an in-fill panel framed by other materials, such as aluminum or steel. More recently, however, structural silicone glazing technology has offered the possibility of the "all glass" cladding, without any other framing material visible from the exterior.

Stone is available in granite, marble, limestone, sandstone, slate, and other types in an infinite variety of colors and grain or veining characteristics. Sometimes the greatest challenge – even greater than that of design and selection – is to find, reach, and communicate with the quarry. Even the "same" stone variety may change considerably in color, from light to dark and in grain or veining from one portion of the quarry to another.

The already huge number of choices among stone types and varieties can be multiplied by the number of possible finishes – polished, honed, sand, thermal, or otherwise textured – in a range of depths. This variety of finishes can drastically alter the effective strength and durability, as well as the appearance of the stone. Recent advances in cutting technology and techniques and more adventurous engineering theories are producing stone cladding panels that are getting thinner and thinner.

Concrete, if properly specified and detailed, may be a logical choice for cladding material. Various cements, fine and coarse aggregate exposures, as well as the multitude of possibilities for casting or molding,

The curtain wall of the Wells Fargo Building in Los Angeles (facing page, far right) by Albert C. Martin and Associates, Los Angeles, is made of 5' x 12' prefabricated panels. The panels (facing page, left) have a composite portion – .042-inch stainless steel bonded to a phenolic-resin-filled honeycomb core and backed with a 20-gauge galvanized iron sheet – on the top and are glazed with insulating glass on the bottom. The prefabricated assemblies were hoisted (above right) and fastened to anchor clips set in concrete and welded to the floor slabs.

present a seemingly endless variety of colors, textures, and shapes. Thin stone facings, such as granite and marble, further expand the possibilities, and there is also fiber-reinforced concrete. Normally, when we think in terms of cladding materials, we think of precast units. However, cast-in-place concrete – although perhaps not technically a "cladding" – may satisfy aesthetic and technological criteria for some projects.

Masonry. The common brick has been joined by Norman, Norwegian, Queen, King, Jumbo, Economy, Utility, and Engineer, as well as Jumbo Norman, Engineer Norman, and Engineer King Size, just to name a few. These various "standard" sizes may be extruded or molded, together with a wide variety of special purpose shapes in many colors and textures. They may be laid up in running Flemish-, English- or stack bond, with Rowlock, header and soldier courses, or in various combinations. To this list can be added terra cotta units, glazed and unglazed, with the potential for simple or elaborate patterns, textures, and sculptured surfaces, as well as various concrete masonry units with glazed, textured, split face or ground surfaces.

Cladding Systems

We see far too many cladding designs that have apparently been approached by first selecting the cladding materials, then later figuring out how to hang them on the structure. The ideal approach – really the only approach to a successful design – is to consider the wall in total, as an integration of materials and systems, all compatible with the structural system and appropriate to the fabrication, assembly, transportation, hoisting, and installation methods to be employed for each specific project. Just as there are many basic materials that might be considered, there are many basic systems available. These are usually categorized as stick systems, unitized systems, truss systems, stud systems, and conventional masonry systems.

Stick Systems consist of components fabricated and finished off-site and delivered, hoisted and stored in bundles or packages. They are assembled and sealed on the building. These systems are often perceived as the least expensive because of lower costs of shipping, shop fabrication, handling, and storage. The proportionately higher on-site labor costs may more than offset the lower cost of getting the cladding to the site. Vigilence during assembly and sealing is critical to performance of the wall, and this must be carefully considered. The skill of available labor in the area at the time of installation requires full and thorough evaluation.

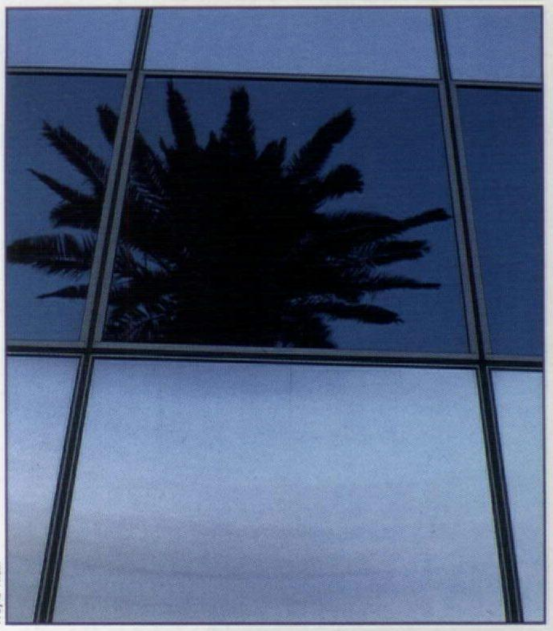
Lower material costs for framing members, as well as potentially narrower sightlines may be additional advantages of the stick system. However, in order to accommodate thermal expansion and contraction, and interstory differential movement, "split" members, inherent to the unitized system, may be necessary. Aluminum, stainless steel, or steel may be used as the "sticks" to frame and support the metal, glass, or thin stone infill panels. The details of the construction must be suitable for field assembly.

Unitized Systems are fabricated, finished, assembled, and often glazed and sealed in a factory and then transported to and installed in one piece on the building. They have become more common in recent years. The greater cost and more difficult logistics of transportation, hoisting, and storage are offset by the lower costs of factory assembly and sealing, as well as by the lower cost and skill required of factory labor. The controlled environment and the feasibility of using special tools and assembly frames or jigs assure better quality control than can be obtained in the field.

Unit systems may be fabricated with aluminum, stainless steel, or steel members that frame and support metal, glass, or thin stone panels, singly or in combination. Factory installation allows many methods for installing panels within the framing units, but some thought must be given to the inevitability of replacement in the field, either during or after installation. The clever and efficient stone installation procedures that work so well in the factory may be extremely difficult or impossible to duplicate on-site.

Size and weight, particularly when stone is incorporated, are important in handling, shipping, hoisting, and installation. The stiffness and integrity of metal-to-metal joinery and seals between materials or components is critical even before installation. The most perfectly assembled and sealed unit is of no value unless it can survive the trip to its anchorage on the building. The unit system may be faster and more readily inspected in the field than the stick system.

Steel trusses are increasingly being used to support



Wayne Thom

stone veneer and other large or heavy cladding units. Some trusses are designed with stressed skin components that double as air and water barriers and provide additional stiffness. Truss units may incorporate extruded or formed perimeter sections that mate with adjoining units. These perimeter sections may create either a temporary or final water seal.

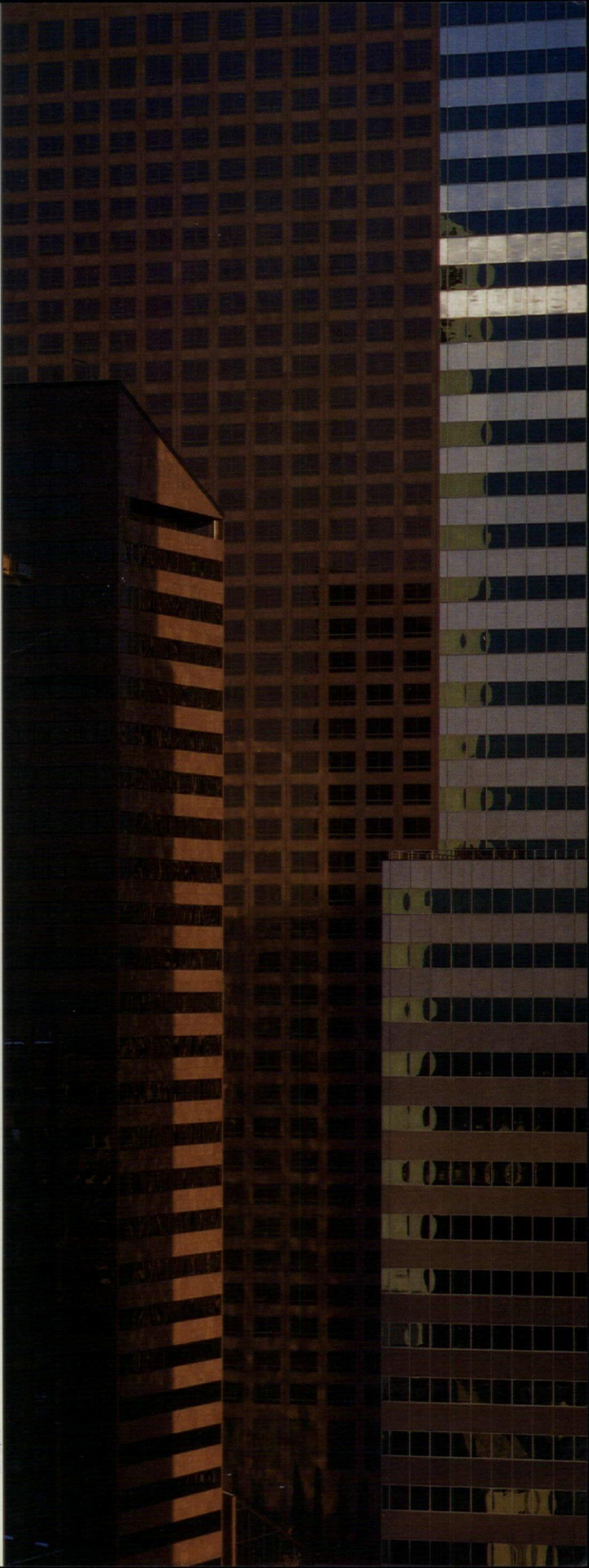
In many cases, the truss unit is set back from the stone and serves only as a "strongback" support with a weatherseal being required between the stone edges. Accessibility to joints between units is necessary in order to temporarily seal the cladding. Caulkers will not work below stone-setting, so the wall usually must be "topped out" before it can be permanently sealed. Also, one must consider how to complete the thermal insulation and vapor barrier between units, particularly if joints between units occur at columns.

Although truss systems have many advantages, they require close coordination of the various components and building trades early on in the design and bidding stages.

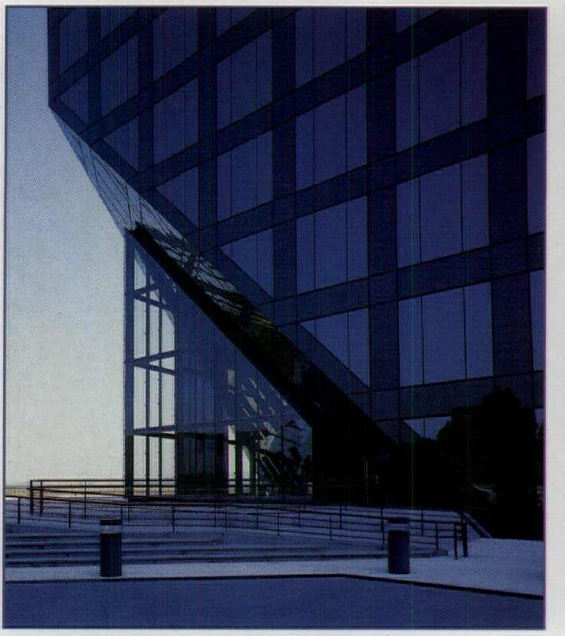
Stud Support Systems for Stone or Masonry Veneers. Just as there are advantages to stick over unitized systems on individual projects, there may be advantages to attaching individual pieces of stone directly to anchors on the building structure. These systems can be quite "forgiving" by allowing adjustments between an out-of-tolerance structure and the desired within-tolerance cladding. They may also better accommodate special conditions throughout the building.

As with all systems, however, the logistics of installing the individual components, as well as sealing between them, must be considered under the anticipated local weather conditions. Setting individual stone panels on a windy winter day in Chicago is not an easy task. But neither is hoisting and setting a 30-foot-long truss unit on a windy day.

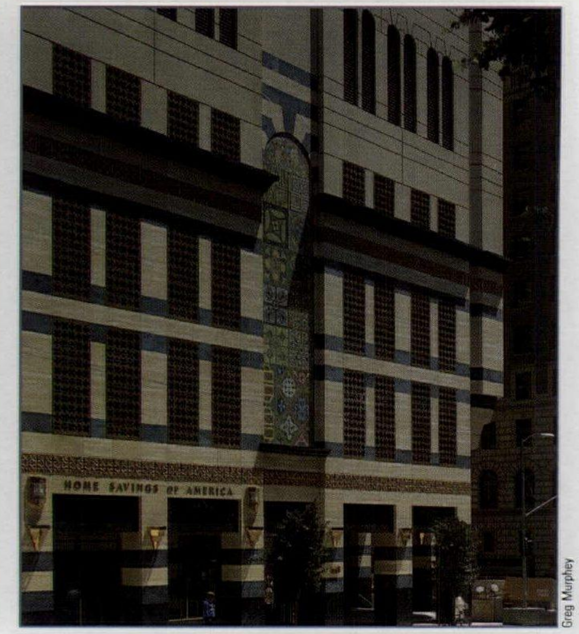
Conventionally-Set Masonry Supported Stone. Although the general trend has been toward off-site fabrication, conventionally-set stone veneer anchored to masonry back-up can be a viable solution to cladding. It is especially well suited to intricate stone designs and for cladding at lower floor levels. The inherent incompatibility between the normally rigid, unyielding, conventional masonry back-up construction and the relatively "limber" high-rise building structure must be acknowledged. The designs must



John Gaylord



Michael Arden



Greg Murphey

Two buildings by Albert C. Martin and Associates, Los Angeles, combine stone and another material in their curtain walls and are engineered to resist earthquakes. Brinderson Plaza (above right), in Irvine, California, was built in two parts, so they could move separately during seismic events. The large cubic volume has a curtain wall of thin granite slabs and glazing, which uses a strongback truss system anchored to the floors. The system is designed to resist seismic racking. The Home Savings of America building (above, far right) is clad with units of marble and travertine individually clipped to a metal stud backup system on the lower floors and precast concrete welded to anchors embedded in the structural system on the upper floors (above 60 feet). The precast system was designed to resist earthquakes without brittle failure; its units were initially set and aligned into final position with bolted connections before welding. Texas Commerce Tower (facing page, far right) in Dallas, designed by Skidmore, Owings & Merrill, Houston (now in Los Angeles), not only used a combination of materials, but also a combination of curtain-wall systems. The majority of the building is a unitized system, in which the windows and frames were prefabricated, glazed on site, and dropped into place. Trusses were clad with Salamandra granite in the factory and hoisted into place. At the base of the hole, four-sided silicone glazing was secured to trusses spanning the skylobby. In the rounded portions of the building and its curved crown, the glazing is held by mullions hung from the top of the building and secured at the bottom. (Facing page, left, shows the project while the glass was being installed.) The custom systems were designed by Olden & Company, Mesquite, Texas.

accommodate building movement and the difference between material stiffnesses. Complete uniformity of facing joints may not be possible – particularly if they are ¼ inch or less in width – because of the need for relieving angles and expansion and contraction joints.

Conventionally Laid Up Masonry. It may be difficult to understand how setting of hundreds of thousands of small masonry units, hundreds of feet above the ground, can be the least expensive way to clad a high-rise building, but our contractor and construction management friends tell us it often is. In any case, conventionally laid up unit masonry may be the appropriate cladding for certain high-rise buildings.

The cautions here are essentially the same as for conventionally-set stone veneer with masonry backup. Relative building movement – both lateral and vertical – must be recognized and accommodated. Intermittent gravity support, relief joints, and vertical expansion joints are essential. "Monolithic" brick walls must be interrupted by joints. This must be recognized and incorporated into the initial design.

Flashing. We have seen far too many masonry and conventionally set stone walls (as well as many other wall systems) that have been meticulously designed and detailed with respect to bonding patterns, jointing, projections and reveals, and even watersheds and drips, where barely any thought has been given to flashing. Too often, flashing is left up to the flasher to figure out in the field. This usually has disastrous results. While architects seem to be willing to acknowledge the inevitability of water penetration through joints between impervious materials such as aluminum and glass, they too often overlook water penetration through masonry, where it is often more likely. Flashing is much too important to be left to the flasher to work out on the job.

Subsystems

These are the basic wall cladding systems in use today. Some are known under different names, some buildings have incorporated variations, hybrids, or combinations of them. Each has its advantages and disadvantages – both in general and as related to a specific building design – which must be carefully evaluated early in the design process. Within the basic systems, there are several subsystems:

Conventional vs. Structural Silicone Glazing. Aesthetic considerations normally dictate which is selected, although thermal stress at exposed glass edges in flush structural glazing systems may be a factor. Assembly and labor considerations may favor a unitized system over a stick system, or vice versa. Some manufacturers have developed technology that may make structural silicone systems less expensive to produce.

Special care in design and detailing is essential for structural silicone systems: The design and sizes of the silicone "joints" – the adhesive that holds the cladding onto the building – depend on anticipated wind load, building movement, and related factors. The mullion-free exterior does not necessarily provide the narrowest sightlines from the interior.

Structural silicone glazing systems also require extreme care in specification – and enforcement – of quality assurance programs and techniques. We recommend that structural silicone systems be glazed in the shop under controlled conditions and under constant inspection.

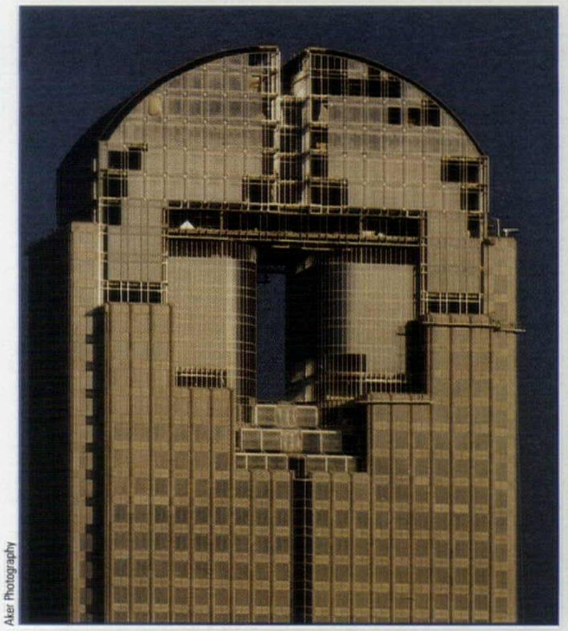
Homogeneous vs. Composite Panels. Panel flatness, weight, heat transfer, and other considerations often favor composite panels over homogeneous materials. Differential expansion and contraction of the various components, resistance to delamination, combustibility or release of toxic fumes, and other characteristics of composite panels must, however, be thoroughly investigated and evaluated.

Various Stone Support and Anchorage Systems. Many different methods of anchoring stone cladding can be used, including continuous or intermittent kerf engagement, bent pins, "stressless" anchors, expansion anchors, and threaded dowels. Each has specific advantages and disadvantages relating to stone fabrication, installation, and adjustment. The suitability of each depends on rigidity or flexibility of framing and support members, magnitude of wind loads, and stone type, strength, consistency, thickness, and panel size, among other factors.

Programmatic Considerations

Here are some important considerations that, in our experience, are frequently overlooked or subordinated in the total design, detailing, and specification of building claddings. Performance criteria should be established for each early in the wall design process:

Air infiltration. Design pressure may significantly



Aker Photography

Recommended Reading

Exterior Claddings on High Rise Buildings, conference proceedings, Chicago Committee on High Rise Buildings, % John Zils, Skidmore, Owings & Merrill (312) 641-5959; available in June 1990.

Exterior Walls: Understanding the Problems, Building Science Forum '82, NRCC 21203, National Research Council Canada, Ottawa (613) 993-2463, 1983.

Science and Technology of Glazing Systems, STP 1054, ASTM, Philadelphia (215) 299-5585, 1990.

American Architectural Manufacturers Association, Des Plaines, Illinois (708) 699-7310, publishes over a dozen booklets on curtain wall design and installation.

Curtain Walls, Bibliography P362, AIA Library (202) 626-7493; free to members, $15 to nonmembers.

affect choice of operating versus fixed sash, overall approaches to water penetration and drainage, and, perhaps, system selection.

Water penetration may be the single most important consideration in determining the height of horizontal framing members, particularly at window sill level. Fifteen pounds of static pressure will support almost three inches of water; a system that depends on interior gutter drainage with two-inch-high sill members, for example, will probably overflow at this pressure.

Wind loading. The depth of cladding support members is critical to avoid excessive deflections. Whether determined by minimum code requirements, ANSI standards, or wind tunnel testing, analysis indicates that four-inch-deep, full-story height mullions, for example, will not withstand 100 psf loading.

Building movement. Joint size and overlap of members must be engineered to accommodate wind-induced building sway. It may be simple to limit spandrel beam deflections in order to achieve a desired horizontal joint width – if planned for during design of the structural framework.

Condensation criteria. Working and non-working hours, design temperatures, and design humidities must be considered in selecting, sizing, and detailing thickness of insulation, wall thickness, thermally broken or unbroken framing members, vapor retarders, and glazing systems. Design decisions sometimes are based on incomplete or distorted criteria. If one or two floors are to be designed for a kitchen, pool, or computer operation, for example, those areas might be "cocooned" within the interior, so that the entire wall does not have to be designed for a localized condition.

Single source responsibility. If there are a number of different sub-contractors, each with responsibility for design and execution of relatively limited areas, who is responsible for overall performance? We strongly recommend a single source of responsibility for the cladding.

Correlation of cladding anchorage with building structure. If a number of small, relatively narrow units are to be supported at points along a spandrel beam, both the "worst case" center span vertical movement and the differential movements varying from column to center span must be accommodated. Stone truss systems minimize the relative vertical movement when the truss units are anchored near columns. But if the stone jointing pattern is such that joints fall at a distance from column centers, the opportunity may be lost.

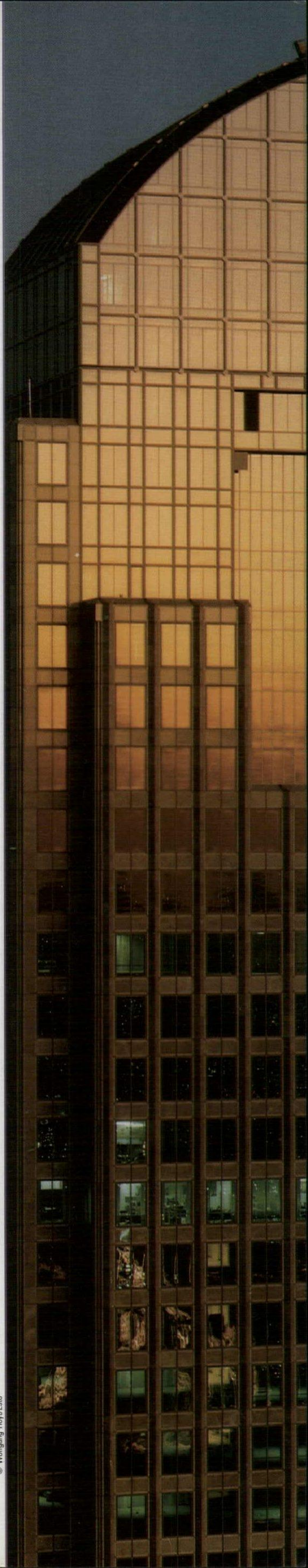
Repairs. No one likes to think about scratched metal or coatings and chipped or broken stones and glass during the design process. But damage does occur during and after construction, and provisions must be made for repair or replacement of damaged components. Repair procedures or provision for testing and evaluation of procedures proposed by contractors should be specified. We recommend that all proposals include descriptions – and drawings, if appropriate – of glass and stone replacement procedures.

Maintenance considerations. Maintenance must be considered early on in design, even though it is the last activity to occur. Will the building shape and configuration permit the development of a reasonable building maintenance and window cleaning system? Building maintenance scaffolds must be restrained, or "tied-back" to the cladding in order to perform safely. Are continuous, vertical tracks feasible within the design parameters? Will intermittent stabilization, by means of buttons or sockets, be employed? A completely flush, structural silicone-glazed wall is inherently incompatible with intermittent stabilization devices.

We have attempted to summarize briefly the various materials, systems, and subsystems most commonly available for consideration when designing the exterior cladding of buildings. Surely, the architect will be presented with other options, hybrids, or variations. Full knowledge and thorough consideration of the surrounding factors and limitations, at the earliest design stages, will be most critical in the development of the satisfying and trouble-free building we all desire. **Gordon H. Smith and William J. Slack** ■

Gordon H. Smith, P.E., is president and CEO of the Gordon H. Smith Corporation, exterior walls consultants, New York. He has served as president and director, respectively, of the National Association of Architectural Metal Manufacturers and the Architectural Aluminum Manufacturers Association. William Slack, R.A., is a senior consultant with the Smith Corporation.

See page 67 for a discussion by William Lohmann of curtain wall specifications.



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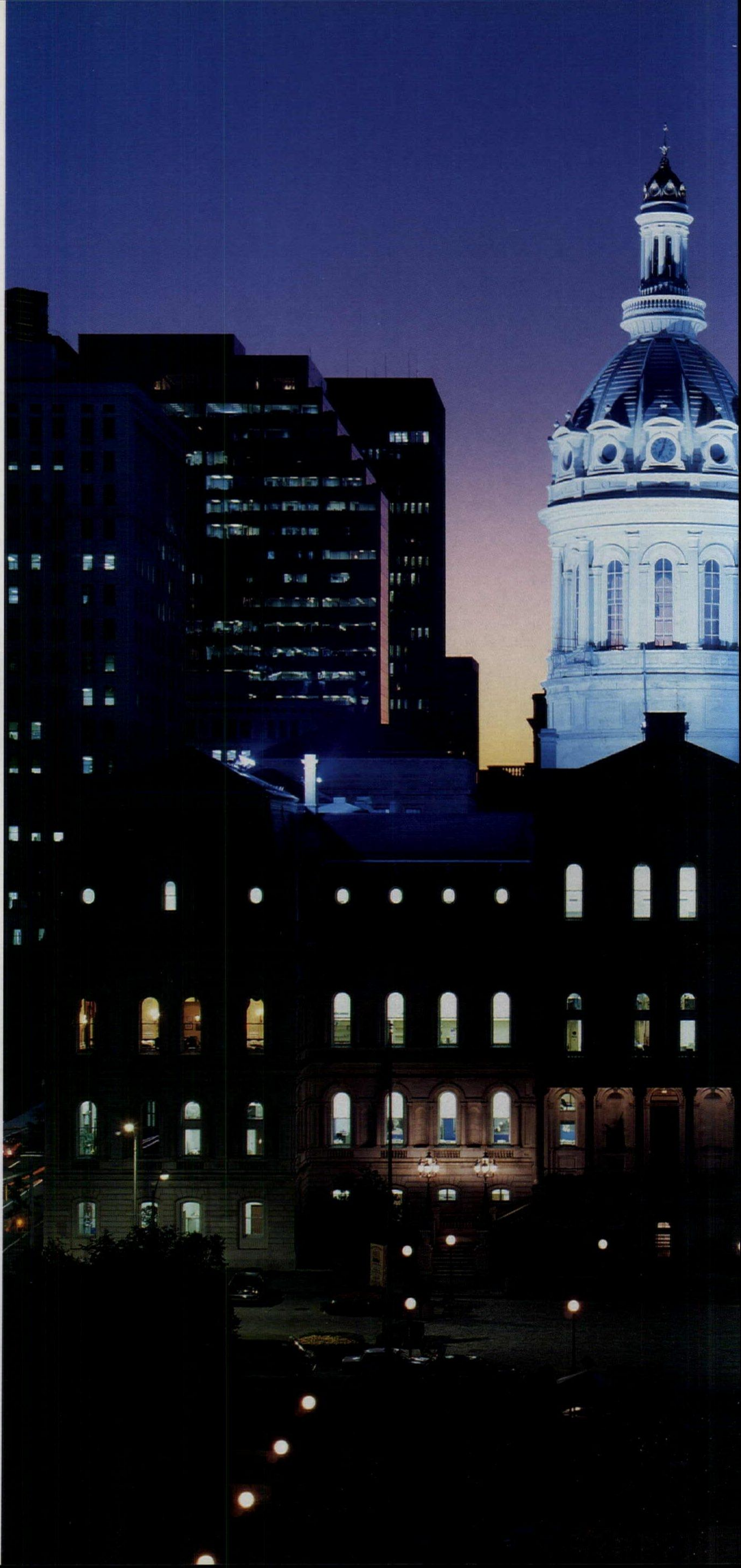

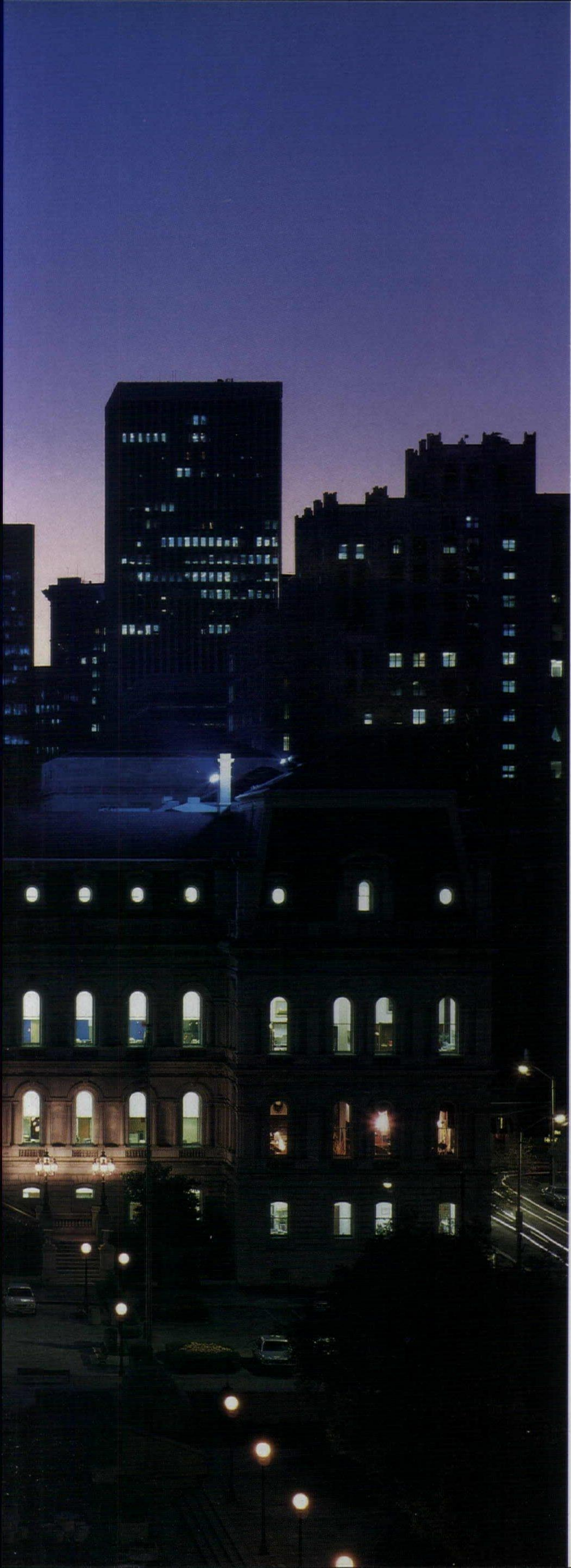

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Gary Gerlach outlines options in signing and sealing drawings.

Computers: Sealing CADD Drawings

How do you sign and seal a CADD drawing? When are the pin graphics layers made official? How and when is the demand for an "embossed seal over the approved signature" satisfied? These are complex questions, with myriad nuances and alternatives that can create potential legal pitfalls.

Registered architects and engineers are licensed by their State to practice their profession, which is acknowledged on each contract document drawing by the use of a registration seal bearing the name of the state, the professional's name, the registration or license number, and the words "Registered Architect" or "Registered Engineer." This seal is typically applied to the drawings in the form of an inked rubber stamp or by using a cast metal embossing tool. Some professionals have a clean, clear copy of their registration seal imprinted onto the drawings along with the title block and border format, relying upon their later appended signature to assure control. Others maintain a very strict control by only adding their seal and signature after the drawings are complete and approved.

In the case of electronic drawings, some professionals recreate the image of their seal, using a scanning/editing procedure, manual digitization, or by actually drafting the seal electronically onto their CADD title block layer so that it is plotted with each finished drawing. Others place this registration seal on its own layer so that it is not plotted with each checkplot, but only as selected for the finished drawings. For each discipline networked onto the CADD system for a specific project, there usually is a separate seal for that discipline on its own layer, called up only when the final plotting is begun.

Those firms who use pin registered overlay drafting have distinctly different approaches to sealing and signing drawings. Some leave a space on the title block, with or without the seal, in which to sign and date the drawing. All subsequent overlays are then pin registered to this signed background using unbordered sheets. Special care should be taken to create a different background for each discipline so that the various seals and firm names appear only on their drawings. After the "final" composites are created, checked, and approved, signatures for each discipline are then added to their official contract documents.

Other professionals prefer to have the top pin registered layer or overlay, rather than the background layer, be the one with the printed title block so that notes, dimensions, and, most important, signatures are on the same (and only) layer that has their firm name and logo. This method allows for the printing of different formats for each discipline, useful for detail sheets, schematics, elevations, schedules, and other non-overlay drawings. This procedure also avoids having some disciplines "signing" a blank, nonbordered layer, which might be mistakenly composited later on.

Sign and Seal After Approval

Once completed, manual drawings are ready for review within an office. But physically layered overlays and electronically layered CADD drawings must first have their layers grouped as a composite for printing and plotting prior to final review. Very close control over the data on numerous layers would have to be exercised if one is to approve only the layers without reviewing the composite.

The final review of the assembled drawings, composites, and plots by the architects or engineers of record occasionally uncovers a few additional changes that must be made before the documents can be finally approved, signed, dated, and released for printing and distribution.

If the seal is not printed or plotted as a part of the drawings, but rather is applied during the final "signing party," the seal must be consistent with the media of the drawings and with the subsequent printing methods. A simple rubber stamp of the registration seal using permanent ink may be sufficient for most bond papers (plots) and vellums (diazo-coated composites and standard vellum plots). For polyester matte films and clear films (diazo sepia intermediates and "silver slicks"), these applied stamps must use a nonsmear ink that is usually an acetate-based ink to adhere fully to the non absorbent polyester films. The embossing stamp, which raises and indents the surface, must be avoided on polyester film. While the embossed image on bond papers and vellums may print, photo-composites or diazo sepias and subsequent blueline prints made from embossed polyesters will not be fully legible.

The Embossed Print

Some cities demand that all submittals to their plan checker be blueline or blackline diazo prints with a raised embossing seal over the A/E's signature. This tracks the drawings after their final review. While the bulk of the contract documents might be signed and sealed in the normal fashion, this side track requires that the first issue (often labeled "Issued For Approval," which may only constitute 2 to 5 sets) would have the signatures only in their appropriate seal-block locations. Then a few sets of approval prints are made for physical embossing, with registration stamp over the signatures, and are issued to the local authorities for code approvals. Another "signing party" might then be formed to sign, seal, and date the approved plans (after any appropriate revisions have been made). Finally, the set of contract documents can be fully reproduced for bids, tenders, and subsequently for construction and fabrication. **Gary Gerlach** ■

The author is an architect and repro-systems consultant in Connecticut.

Practice Points

With more babies born in the U.S. in 1988 than at any time since 1969, schools will be one of the hottest construction markets in the 1990s. According to ENR, increasing enrollment and outdated facilities are expected to cause a 5 percent increase in education contracts this year.

Currently, twice as many non-architects as architects operate CADD systems in firms with 10 or more staff members. According to the *AIA 1989 Firm Survey Report*, this reflects the attitude of most principals that CADD is a quick, accurate drafting machine rather than a design tool.

Despite the talk of expanding economic opportunities in Europe, the growth in construction contracts there is slowing down. A survey of 13 countries conducted by Euro-Construct reported that growth is expected at only 1.7 percent through 1995, compared to a peak of 6 percent growth in 1988.

How dynamic are the office tenant leasing markets? The Building Owners and Managers Association surveyed 400 randomly selected office tenant organizations in North America to learn why they move, where they go, and what features they desire in offices. For further information contact BOMA International at (202) 408-2662.

Carefully kept project records may minimize your liability in the case of a lawsuit. The Professional Design Practices Business Newsletter suggests recording all project-related telephone calls, confirming all key decisions with the client with a memo or letter, and voiding all outdated specification drafts and records. For more information contact Olden/Associates at (813) 573-0908.

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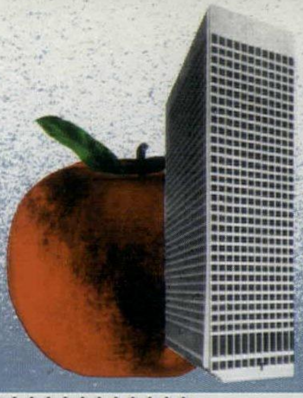


Illustration: Kristin L. Reid

Nina Hartung discusses the need for continuing education in offices.

Personnel: Continuing Education in the Office

Some of the greatest challenges design firms face in the coming decade will focus on staffing issues. Recruiting, training, and retaining skilled staff members has become increasingly difficult in recent years – and we expect the trend to continue. This is why continuing education, the training and professional development of practicing architects is a topic of growing interest among firms today.

To explore the organizational changes that are occurring within architectural firms, The Coxe Group, in collaboration with Robert Gutman, sociologist and professor at Princeton University and Rutgers University, recently conducted a research study. We wanted to understand the reasons why professional development and continuing training are becoming important themes in practice, to determine what firms are actually doing in this area, and to develop proposals for improved educational and training efforts.

In the research study, we interviewed principals and staff members from nine architectural firms: Anderson DeBartolo, Pan; CHK Architects & Planners; Haines Lundberg Waehler; Hellmuth Obata & Kassabaum; Jung/Brannen Associates; Perkins & Will Architects; RTKL Associates; Russell Gibson vonDohlen, and Swanke/Hayden/Connell. We also talked with experts in the field of continuing professional education and with consultants and professional staff responsible for professional development and in-house training programs in several major American corporations, for the American Bar Association, and in several law and accounting firms.

One major factor contributing to this trend is the difficulty many firms have in recruiting experienced architects. This has been particularly difficult during the last few years because top-flight personnel have been reluctant to make moves when they are immersed in meaningful projects. The problem is especially true for firms not in the large urban areas that are the centers for architectural culture. Faced with a shortage of experienced staff, firms must find ways to upgrade their existing staffs. Creating in-house training programs improves staff experience, and also helps firms recruit entry level architects, especially in states that require participation in an IDP (Intern Development Program) as a prerequisite for registration.

Another factor is the changing skill levels that are demanded in today's marketplace. The demand for architectural services is undergoing rapid and frequent shifts. Several factors contribute to this, including the emergence of new building projects, greater client interest in innovation and good design, higher standards of building function and use, and the involvement of more sophisticated and more technically proficient staff on the client side.

Many architectural firms find it increasingly difficult to keep up with the demands and know-how of their clients. Recruiting expertise is a basic strategy that many firms have adopted to deal with this problem, but there is a cost to this approach. To bring in personnel constantly from the outside to fill responsible positions undermines the morale of the existing staff. Mobility within the firm is an important incentive for most young architects today. If firms do not provide these opportunities for growth, their talented and skilled staff members will go elsewhere. Another strategy firms frequently use is to hire consultants to deal with complex problems. Again, this presents a potentially destructive situation in giving the desirable, challenging projects to outsiders. The final strategy is for firms to retrain and to educate their own staffs, which is why professional development now plays such an important role.

The third factor encouraging education is the need to respond to the new careerism. Employers generally agree that most young architects today have much higher standards for job and career satisfaction than their predecessors. They are much wiser and more astute about the kinds of firms within the profession, the advantages of working for one type or another, and the effect experience in different kinds of jobs and types of offices has on their development. When they interview for jobs, many prospective employees now ask specific questions about the kind of work assignments they will receive, their promotion prospects within the firm, and the benefit packages available.

Sponsoring training opportunities is one way firms can respond to the new staff demands. Of course, in order to be effective, professional development programs must receive more than lip service. Employees soon find out if a firm offers courses in, say, project management or communication skills, but then fails to give the people who have gone through the programs the opportunity to utilize their new skills.

Fourth is the internal pressure to manage projects effectively within the firm. Over the last 20 years, architects have witnessed a nearly 30 percent increase in the fixed costs or overhead associated with running their practices. Spiraling costs for professional liability insurance, health care insurance, marketing, and capital expenditures for computers have forced architects to become very aware of the staff and time spent on projects.

Firms need to quickly transmit their standards to new employees in order to make them productive in the shortest amount of time possible. The need for this type of training is especially keen for entry level professionals whose academic work may not be well grounded in the technicalities of practice.

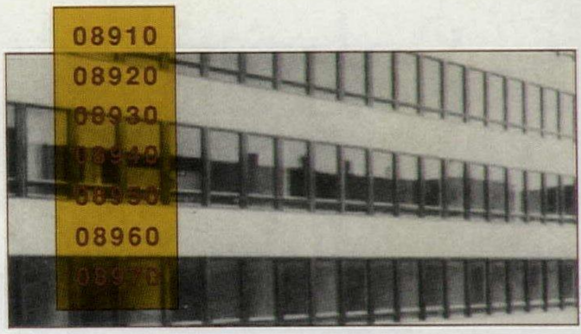
Finally, there is the need for a new generation of managers and leaders to carry on the firm. One of the major concerns that underlies the growing interest in professional development is the anxiety of principals about finding future leaders. Many large firms, especially firms that have grown rapidly in recent years, have excellent and successful practices, full of staff with considerable technical and design competence, who run projects that are managed well and expertly. The problem for these firms is at the top. For one reason or another, many principals, as they look down into the organization, are very dubious as to whether the existing staff has the entrepreneurial, design, management, and marketing abilities to maintain and develop the firm. Principals can try to bring in this leadership from the outside, but increasingly they recognize that the development of the next generation of leaders is an internal responsibility of the organization.

Firms must find new methods to develop and enhance employees' skills at all levels. Historically, architectural firms have relied on the apprentice model for teaching new employees about firm standards and practice techniques. Although the apprentice system has worked well, the forces cited above are simultaneously converging on architectural firms, causing principals to re-evaluate the tried and true method of bringing along new personnel.

In the end, every architect is responsible for his or her own professional development. The essence of being a professional, after all, implies that the individual is engaged in life-long learning. However, the architectural firm must become a continuous learning system – an incubator for the professional development of its members. The firms that act now and that thoughtfully plan for professional development will be prepared for the challenges that lie ahead, and they will emerge as stronger practices in the next decade. **Nina Hartung** ■

Nina Hartung is a consultant with the Coxe Group, an organization specializing in the management of design firms.

William Lohmann offers suggestions for specifying curtain walls.



L.M. Mangano

Specifications: Custom Curtain Wall

When considering the numerous materials and many trades that are involved in even the simplest curtain wall system, the first impulse is to combine all specification requirements into a single section. Lump together the metal components, glass, and sealants, and call it "Curtain Wall" or use the Construction Specifications Institute's broadscope number and title "Section 08900 Glazed Curtain Walls." Indeed, a single section may be used effectively for relatively standard systems and small buildings. A specified model or series number, material and finish information, shop drawings and samples, and the manufacturer's certified test data are often sufficient for a reliable installation.

On larger projects and especially for custom curtain wall systems for high-rise buildings, however, such a section would be enormous and lead to confusion in bidding and building. There is a better way. With the CSI 16-division Masterformat now widely accepted, each component (or trade) should be specified in its recommended location in the project manual. Thus a number of interwoven mediumscope sections reflect the basic material groups and trades.

Curtain wall requirements originate in the curtain wall section. Typically, they include design conditions, performance and testing requirements, submittal requirements, visual and test mockups, material and finish specifications for metal components, and fabrication and installation tolerances. Masterformat offers the following options:

08910 Glazed Steel Curtain Walls
08920 Glazed Aluminum Curtain Walls
08930 Glazed Stainless Steel Curtain Walls
08940 Glazed Bronze Curtain Walls
08950 Translucent Wall and Skylight Systems
08960 Sloped Glazing Systems
08970 Structural Glass Curtain Walls

The curtain wall section (Section 08920 has been selected for the following example) also includes cross-references to other related sections, such as stone, glass and glazing, sealants, and louvers. The table of contents begins to look like the following:

04400 Stone
07900 Joint Sealers
08800 Glazing
08920 Glazed Aluminum Curtain Walls
10210 Metal Wall Louvers

Requirements specific to each subject are described in the related work sections. Section 04400 includes stone materials, sample submittals, design criteria, fabrication tolerances, and shop quality control procedures. Materials, adhesion and compatibility tests, and application conditions for sealants are described in Section 07900. Glass types, glazing materials, safety standards, glass and glazing submittals, extended warranties, and the like are specified in Section 08800. Louver materials, finishes, and fabrication requirements appear in Section 10210. Related work could also include other curtain wall sections, such as Section 08960 Sloped Glazing Systems.

Because the related work must be coordinated with the other curtain wall components, each section also refers back to the curtain wall section for common design criteria, combined mockups, performance and testing standards, and other requirements that are common to more than one element of the exterior walls. The curtain wall section also includes requirements for coordination of the entire curtain wall work, concurrent submittal of samples and shop drawings, and an overall warranty.

Greater coordination and control of the curtain wall work is further achieved by requiring consolidation of all involved trades in a single subcontract. (See P/A, June 1988, p. 63.) The single subcontract requirement is specified in Section 01010 Summary of Work and cross-referenced in each of the applicable sections. The table of contents now looks like this:

01010 Summary of Work
04400 Stone
07900 Joint Sealers
08800 Glazing
08920 Glazed Aluminum Curtain Walls
10210 Metal Wall Louvers

While it is possible to specify all work for a given trade in a single section, it is sometimes expedient to break it into two or more sections. Glazing work is an example. The curtain wall portion is often awarded as a separate subcontract and, in fact, is frequently bid earlier than interior and other glazing. The same may be true of other related work sections. By adding digits to the section number and modifying the standard title (such as Section 08801 Glazing – General and Section 08802 Glazing – Curtain Walls), a series of sections can be created with only a minor compromise of Masterformat. Direct conflicts with Masterformat numbers are infrequent.

The stone specifications may involve a more radical departure from the Masterformat system. Exterior stone walls are usually specified in two main forms – (1) stone panels (and other fabricated shapes) to be installed as part of a curtain wall system and (2) stone components on a self-supporting strong-back or masonry wall system, which is independent of a curtain wall system. Both types often occur on a large project. For clarity and flexible bidding, each should be specified separately. The curtain wall stone section should be tied to the section on the curtain wall system and rely on the performance and testing requirements described there. For instance, the stone panels are tested as a part of the curtain wall mockup. The self-supporting stone section, however, must duplicate the performance and testing requirements to the extent that they apply to that work. It must stand on its own in the event that the work may be awarded as a separate subcontract.

Masterformat does not accommodate such a breakdown in its numbering system with grace. Under the broadscope heading of Section 04400 Stone, the mediumscope sections are based on type of stone, not means of support. At Murphy/Jahn, the stone specifications are further divided into exterior and interior applications. New numbers and titles are created, producing the following table of contents:

01010 Summary of Work
04411 Exterior Stone – Curtain Walls
04412 Exterior Stone – Self-Supported Walls
07900 Joint Sealers
08800 Glazing
08920 Glazed Aluminum Curtain Walls
10210 Metal Wall Louvers

Another departure from Masterformat, which is still under consideration at Murphy/Jahn, utilizes a Section 08990 Exterior Wall Performance Requirements. By specifying design and performance criteria in a single section, this approach avoids duplication when the criteria also apply to custom skylight systems, entrances and storefront work, and other exterior construction. Testing programs, inspections, and submittals to verify compliance are detailed in the individual sections.

William Lohmann ■

The author is Vice President Specifications for Murphy/Jahn in Chicago.

See the Technics article (p. 53) for information on curtain wall design and detailing.

Solving the problem.

Street & Lundgren, an Aberdeen, Washington architectural firm, was hired to design a fire station for a nearby town. The project was completed, there was a grand opening celebration, and Street & Lundgren received the "keys to the city."

Almost six years later, the town filed a suit against Street & Lundgren. There was water leakage into the fire house and some hairline cracking of exterior masonry. The town was afraid the building might not be structurally sound.

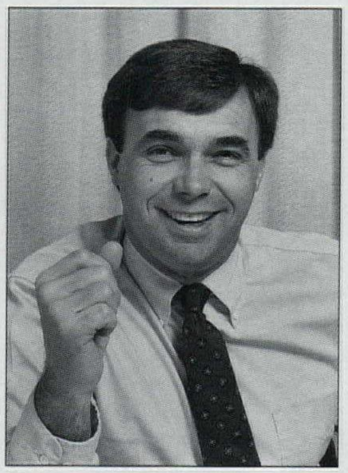
Roy Lundgren called Dale Currie, DPIC's regional claims manager in San Francisco, and described the situation. The leakage appeared to be due to the town's failure to waterproof the structure on a regular basis. The cracking was almost certainly cosmetic, due to expansion during freezing.

Dale believed the problem was solvable.

He made two trips to Washington during the next few months; first, to meet with the town and hear its grievances and second, to conduct a roundtable discussion to mediate the dispute. It was a delicate situation. The town's building inspector was convinced the structure had serious problems. Street & Lundgren and the project's structural engineer were confident the building had been well-designed.

Dale managed to keep the dialogue open. Ultimately, the town hired a consulting structural engineer to assess the situation. This engineer's opinion fully supported Street & Lundgren, and convinced the town its fire station *was* structurally sound. Now, all that was left to be done was help the town resolve the existing problems. In the conciliatory environment established by Dale, Street & Lundgren provided maintenance guidelines for the fire station as well as advice on how to repair the cracked masonry.

Dale continued to work with the town's attorney. A year and a half after the initial action, the town agreed to a *dismissal with prejudice*, meaning it was satisfied no further litigation was necessary.



Richard Dale Currie is an assistant vice president and manager of DPIC's regional claims office in San Francisco. He is a graduate of the University of California at Berkeley and the John F. Kennedy University School of Law and a member of the California bar. He has over a dozen years of experience in construction-related claims management.

R. Dale Currie

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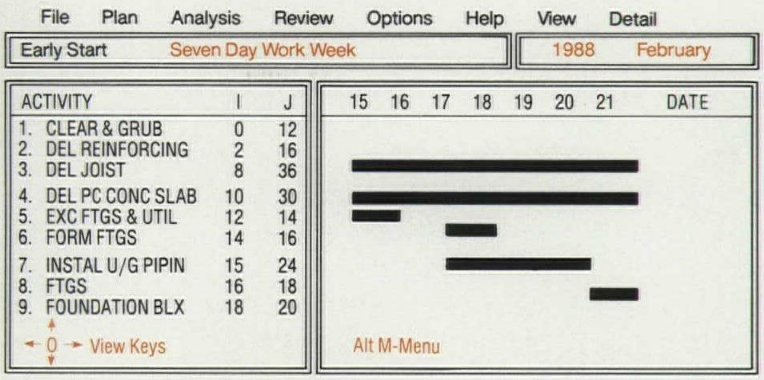

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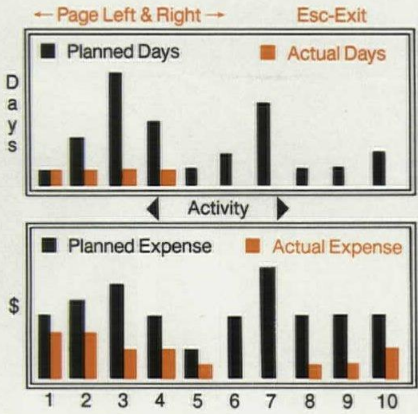

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9	6	0
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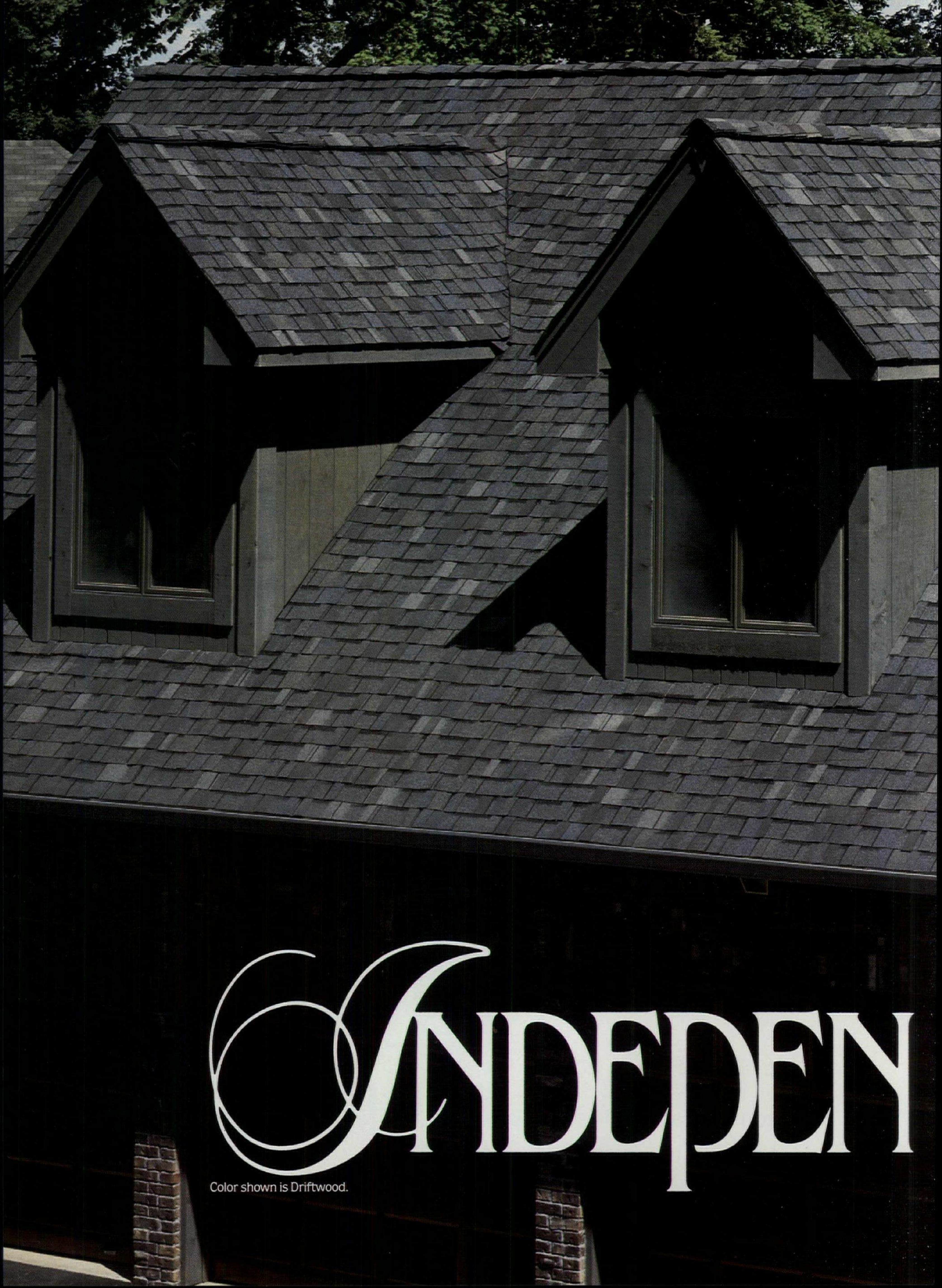
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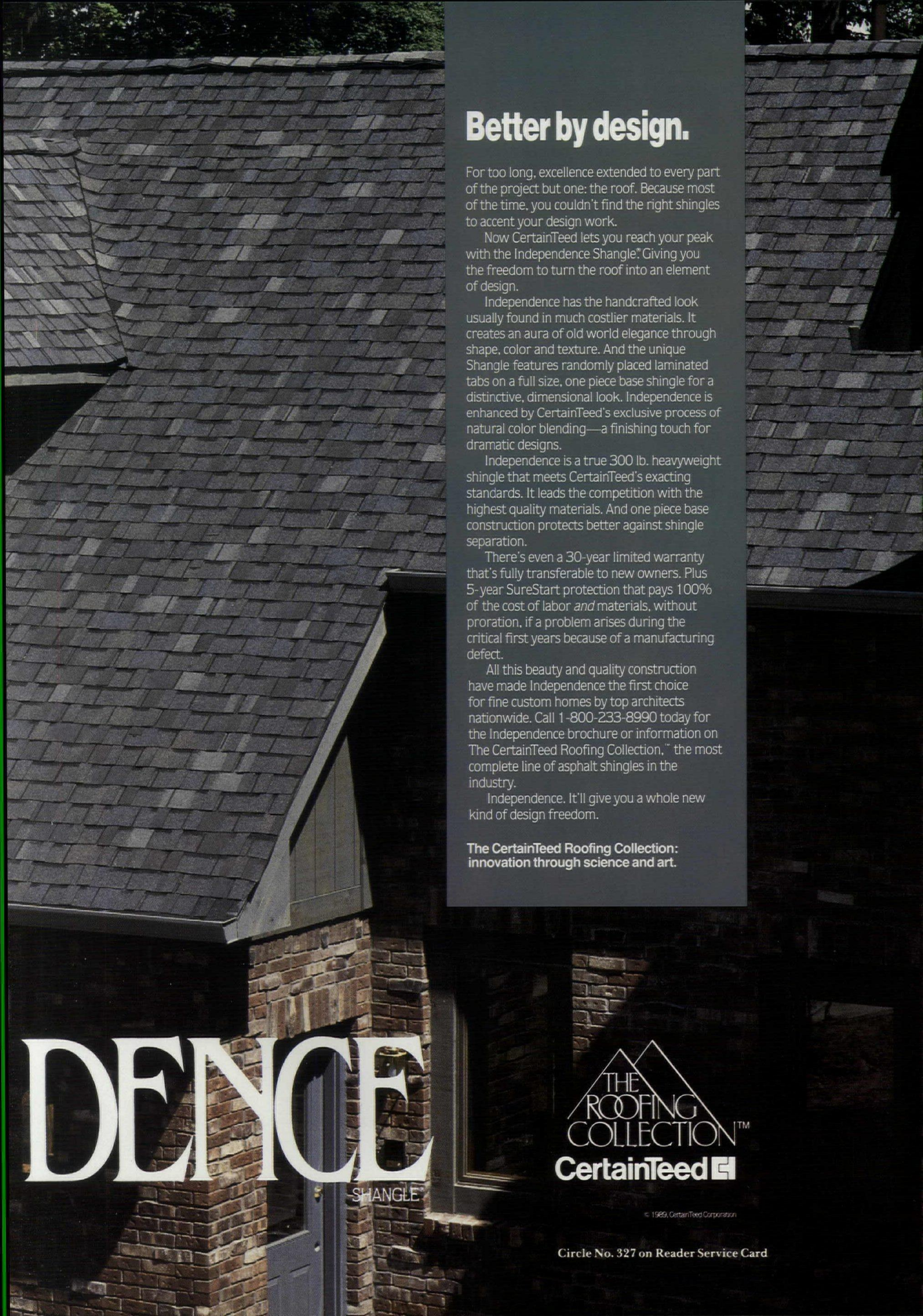
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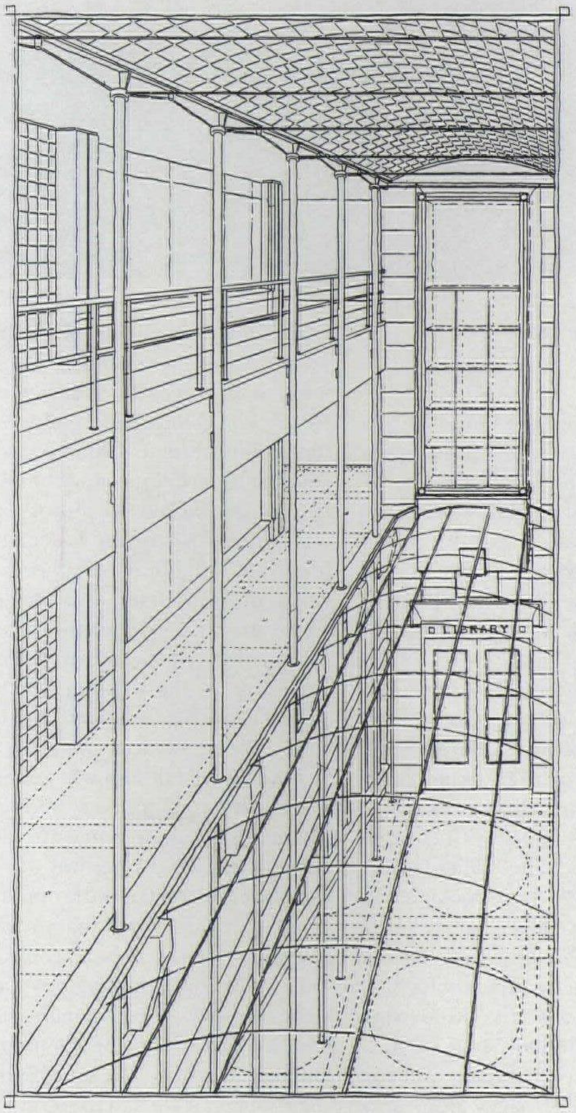


Perspective of a three-story space in the Arizona State University, College of Architecture and Environmental Design by the Hillier Group and Architecture One Ltd.

The design of architecture schools

and the urban design of campuses

are among the highlights of

the following features.

P/A Awards Update: East Meets West

Cited in the 1988 P/A Awards program, Alan Chimacoff's design for an addition to Arizona State's architecture school is itself a teaching tool. An essay on architecture school design follows this article.

Arizona State University, College of Architecture and Environmental Design, Tempe

The new architecture building, when viewed over the rooftops of Tempe, Arizona (above), reveals the many clerestory structures that let in daylight (too little, say some faculty members, because of the small size of the glass block fenestration) to the top floor studios. Behind these clerestories stand the two mechanical penthouses that dump exhaust air into the faculty court, cooling it in summer. From a distance, the building reads as a monumentally scaled block. Yet its dusty color, with red and turquoise trim, is very much in keeping with the colors of surrounding structures. Close up (facing page), the building offers a much finer scale, created by the grid of concrete masonry units and metal sunshades, and by accessories such as the custom outdoor lighting fixtures. The sunshades effectively shield the windows during some parts of the day, although they would have been more effective had their depth varied with their orientation, as Chimacoff intended.

Background: The Building's Selection and Development

Architecture schools are among the most difficult commissions, for they have the most informed users. And the new addition to Arizona State's College of Architecture and Environmental Design was no exception. A complicated program, a cost-conscious client, and a user group with strong and not always favorable opinions were just some of the hurdles over which The Hillier Group and the associated firm, Architecture One Ltd., managed to climb.

The selection of the architects was a two-stage process. The university first put out a request for qualifications, to which 26 firms responded. Three firms were then chosen on the basis of their experience: Hammond, Beeby & Babka from Chicago; Coover Saemish Anderson from Mesa, Arizona, with Hoover Berg Desmond from Denver; and The Hillier Group from Princeton, New Jersey. "We were looking for firms," says faculty member Tim McGinty, "who had done dumb box buildings, who had done them on low budgets, and who had done public buildings before."

During the second phase, each of the three firms was paid $20,000 to submit a design based upon a program prepared by a committee of faculty and administrators. The program was 66 pages long, with detailed descriptions of the function of each space, its relationship to other spaces, and any special requirements. "We tried to second-guess the architects with the program," says McGinty. "We didn't ask users of the buildings what they wanted or needed, but what was the best they had ever seen of a particular type of space." Still, the size and complexity of the program was daunting. "When I first saw the program," says Alan Chimacoff of The Hillier Group, "I was scared."

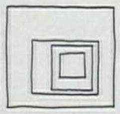
Scared or not, Chimacoff's design was the one selected by the jury, which was headed by Joseph Esherick and included faculty and representatives of the administration. Chimacoff's scheme called for a roughly square, four-story building centered around two courts stacked on top of each other. He placed the lecture halls in the basement, administrative offices, and the library on the first floor, and studios along the perimeter and faculty offices facing the courtyard on the upper two floors. In a symbolic gesture, he located the research facilities in a bridgelike connector to the existing school. The exterior was stuccoed, with syncopated rhythms of windows and with trellised terraces along the south façade.

Chimacoff's design was generally well received by the faculty and students, although there were some dissenting opinions. Some questioned whether a competition was the proper way of selecting such a building, since it offered so little opportunity for user input. Chimacoff agrees that that initial lack of communication with a client can be a problem, although he thinks that, in this case, the staging of a competition was the right decision. "With so many strong opinions in the administration, in the community, and especially among the faculty," he says, "we could not have solved the problem if we had to start from scratch. The competition allowed us to establish the basic arrangement of spaces before everyone started to suggest changes."

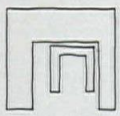
And suggest changes they did. The stucco cladding, although common in the Phoenix area, was seen by many as not substantial enough for such a major public building; an exposed-aggregate concrete masonry unit, recommended by the construction

(continued on page 86)

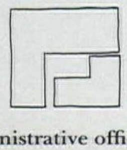
Plan Analysis



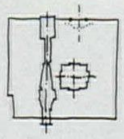
The faculty offices on the top floor create a palazzo form within the palazzo of the studios.



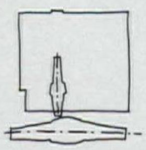
A variation of this occurs on the second floor where the offices and studios open up to the terrace. The resulting shape is a U within a U.



The administrative offices and the library form interlocking L's on the first floor.



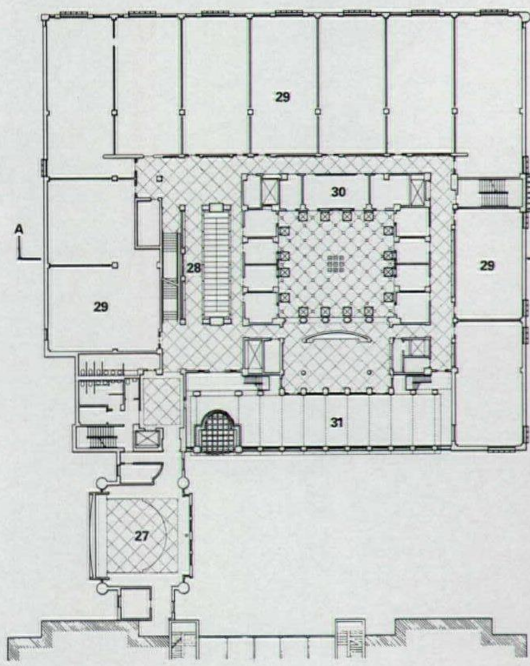
The entry sequence is arranged along an axis. The library and the lobby court create other centerlines.



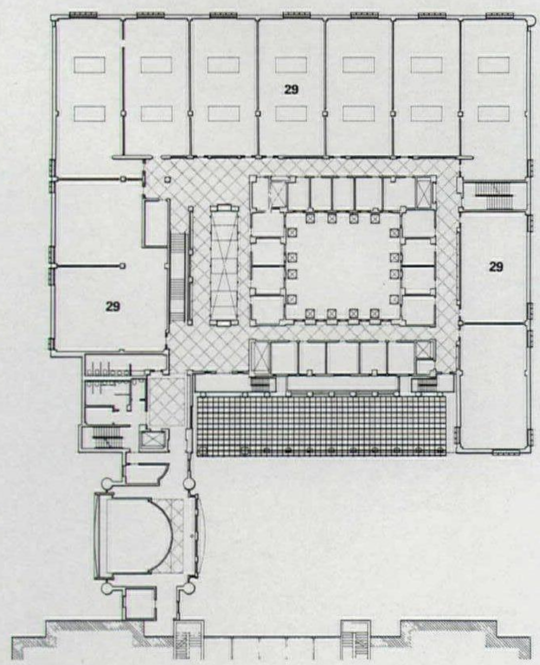
Repeating shapes, such as the Campidoglio form of the entry plaza and entry hall, are among many layers of complexity in the building.

SECTION A-A

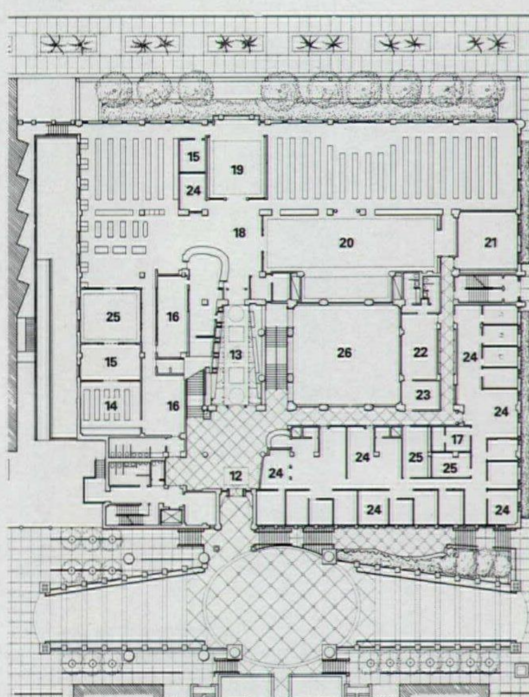
20'/6m



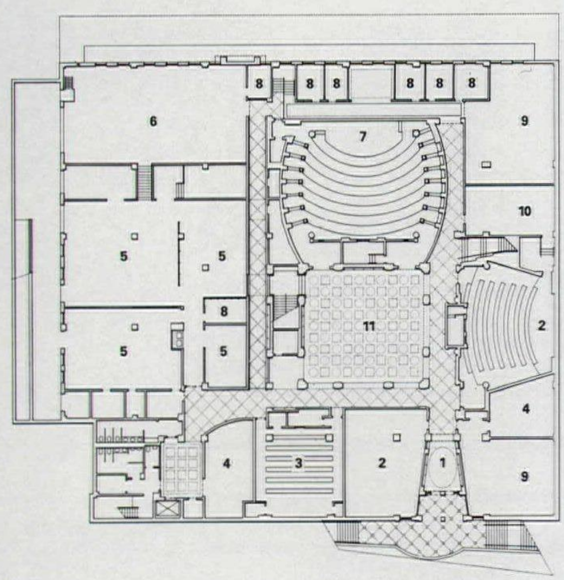
SECOND FLOOR PLAN



THIRD FLOOR PLAN



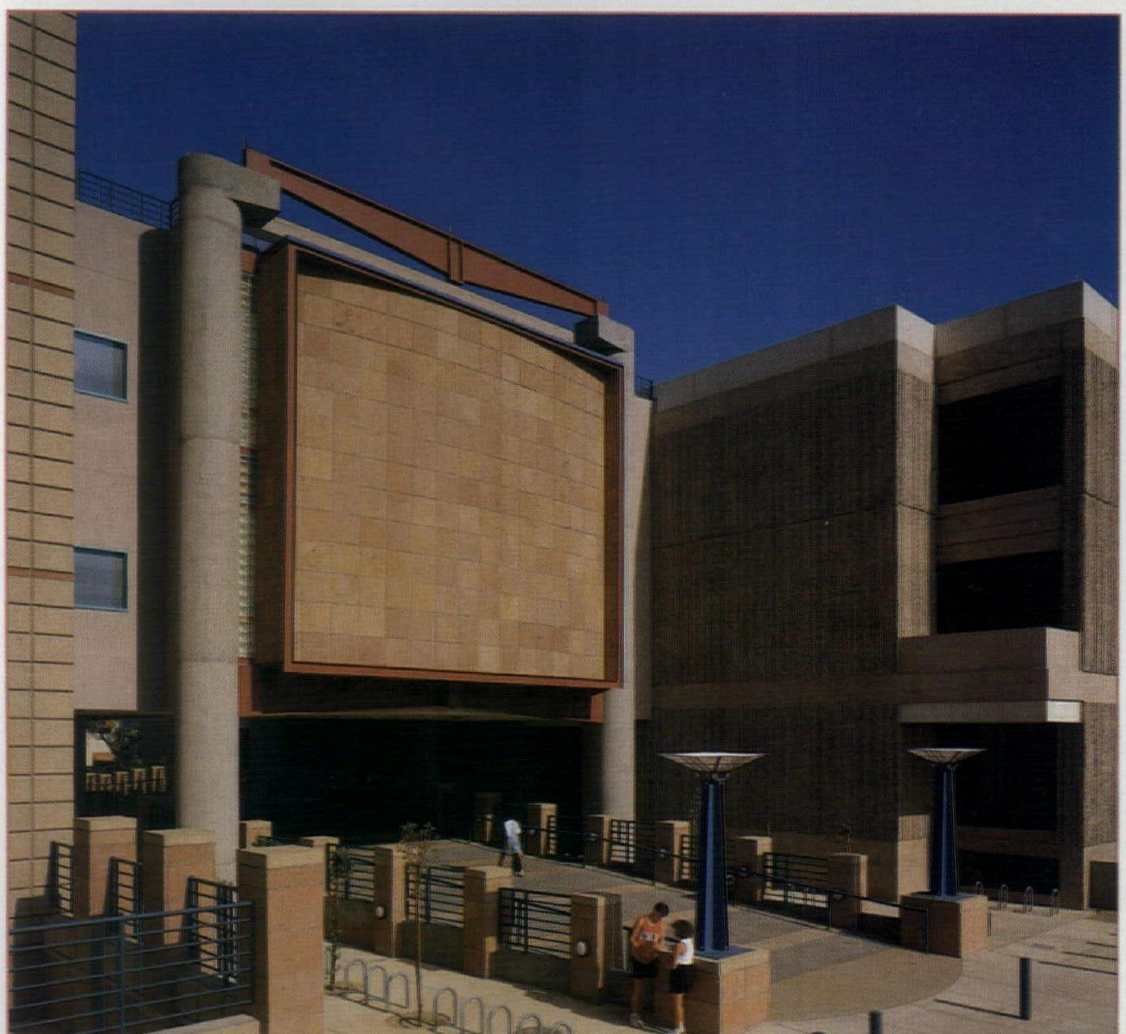
FIRST FLOOR PLAN



BASEMENT PLAN

N 40'/12m

1 ENTRY
2 CENTER FOR THE BUILT ENVIRONMENT
3 LECTURE
4 MECHANICAL
5 SHOP ZONE
6 HIGH BAY RESEARCH
7 AUDITORIUM
8 FACULTY OFFICES
9 SPECIALIZED LABORATORY
10 TEACHING AIDS
11 LOBBY COURT
12 ENTRY LOBBY
13 LIBRARY ENTRY DISPLAY
14 SPECIAL COLLECTIONS
15 STUDY
16 MICROFILM AND ALTERNATIVE FORMATS AREA
17 STAFF WORK AREA
18 CIRCULATION LOBBY
19 PERIODICAL
20 GENERAL READING
21 SPECIAL PROJECTS
22 MAIL ROOM
23 REPROGRAPHICS
24 ADMINISTRATIVE OFFICE
25 CONFERENCE
26 OPEN TO LOBBY COURT BELOW
27 COMMONS
28 GALLERY
29 STUDIO
30 SEMINAR
31 TERRACE



A new plaza stands between the new building and the existing architecture school (above). The splayed sides of the ramp and the oval shape of the plaza recall the form of the Campidoglio in Rome, a configuration that is repeated at the entry inside the building. The connector between the two buildings, which contains a two-story jury room, recalls, with its bridgelike form and curved brow, Graves's Fargo-Moorehead Cultural Center Bridge (P/A, Jan. 1979, pp. 76–77). The back of the jury room (left) brings to mind Le Corbusier's Villa Schwob (P/A, March 1988, pp. 102–107), with its blank central panel. The suspended structure of the bridge is just one of several structural conditions exposed in the building for students to observe.

Excerpt: Schematic Design

Chimacoff described the image of the school, conjured up by the program, as a "rambling two-story structure surrounding various kinds of courts." Yet, the accommodation of both a large bicycle storage court and outdoor work court on the ground level would have taken up most of the site area. The team's first step, then, was to test the volume according to some tentative goals:

- To maintain the existing building's three-story height.
- To bridge the addition over the street.
- To carve out the two smallest courts possible.

The team used a computerized stacking program to determine how much of the program area would fit into a volume defined by these parameters. The answer surprised them: The entire program took up only 2.5 stories.

The shell had to be built for $76 per square foot. Chimacoff comments, "even in Arizona you couldn't afford to build a complex building at that price. So we decided to build the simplest form possible. If your basic design is simple and pragmatic, you'll have much more money left for embellishment and details. . . ." This approach disciplined the designer's thought processes. "We chose to explore surface and what we could do spatially within the box."

A preliminary sketch in the architect's notebook contained the kernel of the design concept – "stacked donuts." Two interior courts organized the building spatially. Chimacoff quotes an adage of Colin Rowe: "Free plan, paralyzed section; free section, paralyzed plan," comparing the tradeoff between the open-plan quality of a loft-type space and the particular nature of a more Classical design.

Chimacoff proposed a three-and-a-half-story structure that would take up most of the site and create a plaza out of the street between the two buildings. A tower housing research activities would bridge the mall and symbolically link the old and new. Because the existing building is symmetrical, the architects thought of having two bridges for balance. This idea was soon abandoned.

From: *The Design Process*, © 1989 by Ellen Shoshkes, published by Watson-Guptill Publications, 1515 Broadway, New York, N.Y. (pp. 130–131).

(continued from page 82)

manager Ward Simpson of 3D/International, was selected in its stead. Also the location of research facilities in the connecting tower was seen as functionally inappropriate; these were moved to the basement and the tower became, at that point in the design, a student commons. Finally, the winning design was 10 percent too large and did not have enough circulation and queuing space. The toilet and stair core, the bridge, and the faculty offices (to the regret of many faculty members) were all made smaller as a result.

Other proposed changes Chimacoff and his team successfully resisted. For example, the university wanted to use a steel frame because of its lower first cost. But Chimacoff argued against it on the grounds that the steel would have to be fully encased, which he saw as "irresponsible in a building that gets such hard use." Also the concrete frame with waffle slabs offered him "the most reasonable column spacing with the least height."

Yet, even after the project was well into working drawings, changes to the design were made. These were instigated by the new Dean, John Meunier. He suggested that a breezeway on the second floor terrace be enclosed for use as a student lounge, that the space in the bridge be converted into a jury room, and that the large studio windows on the upper floors be centered in each bay, reducing the implied movement and multiple centers of Chimacoff's earlier elevation.

Architecture schools are tempting projects for they are a building type familiar to every firm. But they are full of pitfalls. That this building retained its original idea and coherence is a testament to the architects and, says Chimacoff, "to the ability of simple courtyard buildings to accommodate change."

Critique: The Design's Dilemma

The new architecture school, says Tim McGinty, "looks like Charles Rennie Mackintosh and Sir John Soane having lunch at the Arizona Biltmore." He has a point. Not only does the building recall the work of Mackintosh, Soane, and Wright, among others, but it sets up a dialogue – a kind of lunchtime conversation – among opposites: plan versus section, utility versus ornament, hierarchy versus equality, stasis versus mobility. "If architecture can be said to be a contemplative art," says Dean John Meunier, "then this building is very good architecture indeed."

The building is often described in Phoenix as an "Eastern" design. While this East versus West distinction is not very useful, it does offer a kind of shorthand for two opposing views of architecture that are defined, not by geography, but by two very different sensibilities: the Classical and the Modern.

What is extraordinary about Chimacoff's design is not that it values one over the other, but that it manages to embrace both positions, holding them in tension. For example, the building's plan, with its center courts, invokes both the Classical tradition of the palazzo and the Western vernacular of the courtyard building. Indeed, during the evaluation of the building in the 1988 P/A Awards program, Rob Quigley asked, "What has Classicism to do with Arizona State?" to which Charles Gwathmey replied that "this is a Southwest building type, the courtyard building."

Chimacoff creates a similar tension between the plan and section. Colin Rowe's dictum of "free plan, paralyzed section; free section, paralyzed plan" applies here. Classical buildings generally have fixed plans and free or spatially dynamic sections, while

The school forms a wall along University Avenue, a major artery at the north side of the Arizona State campus (left). Although the first floor of the building here is visually open to the street, the university did not want an entrance on this side for reasons of security. As one moves down the street, the superimposed grids of the red metal sunshades and the turquoise window frames (above) lend a flickering quality to the façade. (Although, as some in the community have noted, the metal frames also have the unfortunate connotation of prison grates.) The building was inexpensively built, with a concrete frame, waffle slabs, and concrete block exterior walls. Yet the cladding – the sandstone at the building's base, the granite blocks along the first floor, and the exposed aggregate concrete masonry units over the rest of the building – provides a richness and sense of permanence (facing page). The grid of masonry units, along with details such as the glazed corners of the projecting library reading room, make a clear reference to the Arizona Biltmore (debatably attributed to Frank Lloyd Wright) in nearby Phoenix.

The architects stretched the tight budget by putting money in the places where it shows, such as the major entry and public spaces. One of these is the three-story space above the library entrance (facing page). Ringed on the upper floors by corridors, with glass display cases at either end, this space has a vault-shaped laylight and a series of finely detailed steel columns. Another successful space is the lobby court giving access to the lecture halls on the lower level (above). A floating vault, in deference to John Soane, caps the space. At the center and around the perimeter of the vault, daylight is admitted from the outdoor court above. This is the main indoor space in the building, serving as queuing space for students between classes, as a display area for drawings, and as a meeting place visible from the main entrance, the library, and the faculty and administrative areas.

Modern buildings are more likely to have free plans with little vertical interpenetration of space. These appear to be mutually exclusive, but Chimacoff manages here to embody both. The building's perimeter is essentially a free plan, with nonbearing partitions in a regular grid of columns. At the building's center, however, a free section prevails, with staggered multilevel spaces and dynamic interpenetrating vistas.

A related dichotomy is between what Chimacoff calls "utility and ornament." Ornament is characteristic of Classical buildings and a crime in the Modern utilitarian view. What Chimacoff has done here is highlight the ornamental aspects of the building's utilitarian elements. In the library reading room, for example, he has applied strapping to the underside of the concrete waffle slab, bringing to mind a Classical coffered ceiling while also suggesting the slab's grid of reinforcing.

The Classical emphasis on static hierarchies versus the Modern preference for equality and mobility are two other pairs of opposites embodied in the building. The hierarchical aspect of the building emerges in the many axial alignments or centers in the plan and in the symmetries among groups of windows on the façades. Yet Chimacoff has laid a grid of columns over the plan and a relentless grid of masonry joints and window framing over the façades, countering these Classical hierarchies.

Stasis and mobility also are expressed on the facades. Along the building's north face, for example, the upper studio windows are centered in their bays. Small flanking windows reinforce this static composition. The arrangement of windows along the first floor, however, is anything but Classical. These view windows and transoms run in rapid, syncopated rhythms within fairly regular bays, expressing the movement and activity of the people inside.

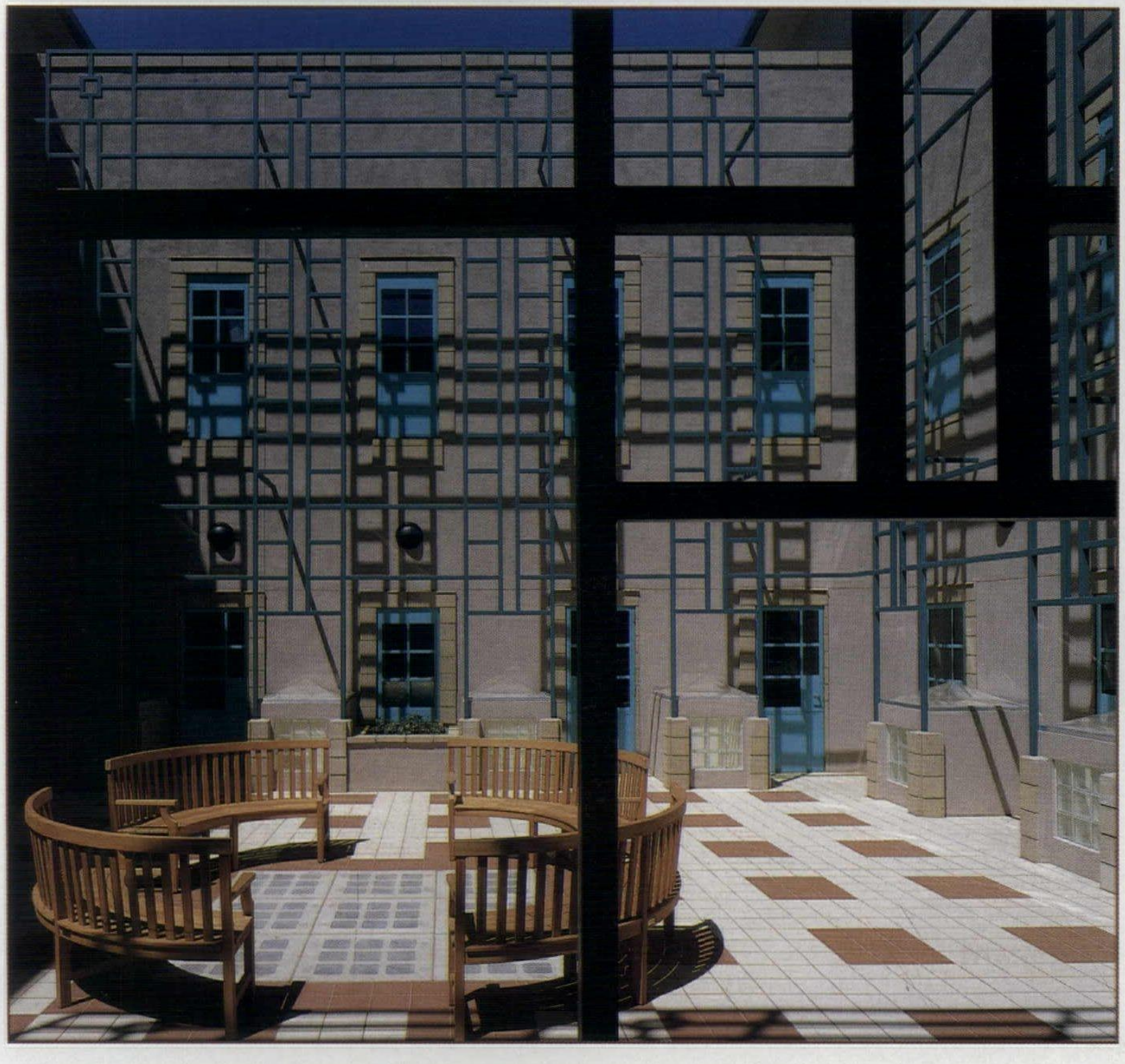
This constant play between the Classical and the Modern stems not from sheer willfulness on Chimacoff's part. It speaks, instead, to one of our deepest dilemmas. "The Classical consensus," notes Chimacoff, "is lost to us, but a Modern consensus has yet to be found." The memory of Classicism informs every part of this building, from its overall palazzo form to its sequence of grand spaces. Yet Chimacoff never takes that final false step of creating an overtly Classical building, realizing that we cannot resurrect a consensus by mimicking its forms.

Yet Modernism also hovers over this building, unconsummated. "Modernism," notes Chimacoff, "threw Classicism out as a means of expression and introduced the need for architects to adopt distinct personal styles." Chimacoff makes reference to some of architecture's strongest personalities, from Michelangelo in the building's Campidoglio entry plaza to John Soane in the lobby court's floating arch, to Mackintosh in the two-story studio windows, to Wright in the cladding's textile block configuration, to Graves in the façade of the bridge connector. But few of these references cohere into a whole. They can't, for no personal style is ever compelling enough or broad enough to become the basis of a new consensus, at least not for any length of time.

So we are caught, like this building, between two worlds, the Classical and the Modern, or as some think, the East and the West, unable to revive the old unity or find a new one in which everyone can believe. For the architecture students at Arizona State, the embodiment of that dilemma in their building may be one of their most important lessons. **Thomas Fisher** ■

The library (above) has stacks running along the front of the building, with seating areas at points where the exterior wall is more fully glazed. The studios (right) are unusual in being divided into rooms for about 14 to 16 students; this was done to ensure that class sizes would not get too large, but it does alter the dynamics of the typical loft drafting room. The structure and the mechanical system (which apparently is very noisy) are exposed, reducing costs and letting the students see the workings of the building. Students developed the design of the workstations. One of the most popular places in the building is the two-story jury room in the bridge connecting the new and old buildings (facing page, top). It is open to heavily trafficked corridors and encourages the involvement of students in the various juries. No less popular is the upper court surrounded by faculty offices and adjacent to the student lounge (facing page, bottom). With the growth of the vines planned for its trellises, the court should become less austere.

Pam Singleton



Project: *College of Architecture and Environmental Design, Arizona State University, Tempe, Arizona.*
Architects: *The Hillier Group, Princeton, New Jersey (Alan Chimacoff, project designer; Gerald F.X. Geier, project manager; Douglas Harvey, project coordinator; Eric Baker, Keat Tan, designers, Joel Spaeth, principal-in-charge).*
Associated architects: *Architecture One Ltd., Phoenix (William Craig, project manager; Frank Roberts, principal).*
Clients: *Arizona State University (Jason Eslamieh).*
Site: *25,000-sq-ft flat site at the north end of the campus.*
Program: *100,000-sq-ft architecture school addition.*
Structural system: *concrete frame with waffle slabs.*
Major materials: *precast concrete veneer blocks, Arizona sandstone, granite, stucco (see Building Materials, p. 186).*
Mechanical system: *built-up air handler units, university chiller system.*
Consultants: *Architecture One Ltd., landscape, interiors, mechanical, electrical; Robin Parke & Associates, structural; Stanley Group, civil; Bridger & Paxton, tunnel utilities.*
General contractor: *Oakland Construction.*
Costs: *$9,909,500 ($94.38 per sq ft).*
Photos: *© Jeff Goldberg, Esto, except as noted.*

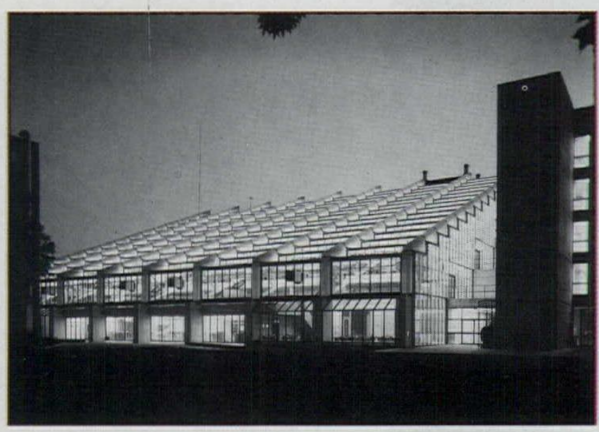
The Architecture of Architecture Schools

Alan Plattus discusses the various images or models that have guided the design of architecture schools.

As in the case of most modern institutional building types, the architecture of schools of architecture has oscillated between a generic institutional monumentality and a machine-like expression of program and function. The exemplars of that polarity can be found on opposite sides of Quincy Street in Cambridge, Massachusetts. On the west side of the street – and part of Harvard Yard, the core of the campus – stands Robinson Hall, built by McKim, Mead & White in 1904 to house the School of Architecture. It is a quintessential American Beaux-Arts production, the principal role of which is to provide a northern flank to the focal monument of Sever Hall and, in conjunction (and harmony) with Emerson Hall to the south, frame Sever Quad as an open space fronting Quincy Street. It is also, secondarily, a modestly monumental representation of the place of architecture on campus and identifies itself as such mainly through the graphics and applied iconography of its façade. Within, the elements of the program are symmetrically disposed, with pride of place given to the Hall of Casts, around which studios and classrooms are grouped.

The front elevation of McKim, Mead & White's Robinson Hall at Harvard University.

On the east side of Quincy Street – and beyond the pale of the Yard, but forming a sort of "Arts Row" with Le Corbusier's Carpenter Center, the Fogg Museum and Stirling's Sackler Wing – is Gund Hall, designed by John Andrews Architects and opened in 1972. Gund Hall houses not simply a "school of architecture," but the modern corporate entity of the Graduate School of Design. It does so in a structure conspicuously configured to express, as well as embody, its program – or at least the salient elements of its program in the form of an open "stadium" of studio trays cascading down the east side of the building. It is as close as one has come, mercifully, to a panopticon for architectural education and quacks loudly in relation to the understated decorated shed of McKim, Mead & White's Robinson Hall.



The rear face of John Andrews Architects' Gund Hall at Harvard University.

Surprisingly, but perhaps fortunately, very few 20th-Century buildings for architecture schools have been as strongly characterized, in terms of programmatic expression, as Gund Hall. In the post-war years, most schools seemed to favor a low-key version of the sort of functional articulation exemplified by Gropius and Meyer's buildings for the Bauhaus at Dessau of 1926. Buildings as apparently different as the 1955 Architecture Building at Georgia Tech, Wurster Hall at Berkeley of 1964, and the School of Architecture and Urban Planning at Princeton of 1963, were all composed of various combinations of wings, towers and/or slabs, which articulated the various components of the program. Very few of these buildings seemed to embody a particularly profound meditation on either the question of the relationship between the curriculum and its container or the relationship of architecture to the rest of the campus and, ultimately, to the larger context and culture; much less an appreciation of the intriguingly Post-Structuralist-sounding question of an architecture about architecture, for the purpose of reproducing the culture of architecture.

With respect to these questions, the early years of the architecture school as a building type, and even its prehistory, seem more interesting. In its formation, in the 19th Century, when so many other Modern types were being formulated, the school of architecture is, like those other types, often based initially on a mixed metaphor or shot-gun wedding of forms generated by related programs. Insofar as it is a conjunction of private atelier and public institution, the school of architecture looks back to the atelier-schools of architects like Sir John Soane, a key figure in the professionalization of architecture in modern England, and forward to critically inspired alternatives to the "academy," like Frank Lloyd Wright's Taliesin Fellowship. In the service of the self-reproduction of an exceptional individual, these examples combine the house and the school, and, in the case of Soane's house, the museum as well, where a radically eclectic space is assembled from the various tools and emblems of the trade.

Karl Friedrich Schinkel's Berlin Bauakademie of 1834 proposes another characteristic combination, that of the public institution, presented in terms of a four-square palazzo, combined with the modern space of production, based on Schinkel's appreciation of the industrial architecture of England. If Schinkel's solution has heirs, with respect to its insistence on a simple volume of absolute architectonic lucidity and integrity, then surely one must include Mies van der Rohe's Crown Hall of 1956, where, however, the radical simplification of space, if not program, actually tends to personalize, rather than institutionalize. In any case, the image of a pure and singular, unified form is dramatically different from the urban heterogeneity of another important early school, the Écoles des Beaux-Arts in Paris.

The Beaux-Arts is the work of Félix Duban from the 1830s on, but it incorporates several earlier buildings on the site, as well as including, in its extended definition, the various ateliers of professors scattered throughout the Left Bank neighborhood. Several of the pieces, such as the Palais des Etudes, with its covered court of casts, have considerable monumental identity and presence, but considered as a whole, the

"Very few of these buildings seemed to embody a particularly profound meditation on either the question of the relationship between the curriculum and its container or the relationship of architecture to the rest of the campus."

École seems more interesting as a piece of urban fabric and a collection of architectural fragments of exemplary. significance, such as those self-consciously presented in the main entrance court. This dissemination of the institution into its urban context seems to run counter to the image and role of the École as a vehicle of a centralized and authoritative official culture and anticipates the more explicit dissolution of 1968, when the Beaux-Arts gave way to 21 Unités Pédagogiques placed throughout not only Paris, but the entire country. This arrangement is generally tolerated only as a temporary condition, detrimental to both curriculum and institutional identity, although in a period of recycled buildings and incremental infill it may, as we shall see, suggest some interesting alternatives.

In general, however, the Modernist orthodoxy that gradually wrested control of American schools from the Beaux-Arts "system" in the Mid-20th Century, identified that system with a debased monumentalism and replaced it with the low-key, late-Bauhaus functionalism mentioned earlier. So when the "new monumentality" became a rallying cry for revisionists in the 1960s, there were few opportunities or sites for architecture to celebrate itself in those terms. One such site, however, was at the corner of Chapel and York Streets in New Haven, where in 1963 Paul Rudolph achieved an extraordinary, and highly controversial, tour-de-force by conflating – but certainly not resolving – monumental, spatial, programmatic, and contextual statements of great power and considerable specificity.

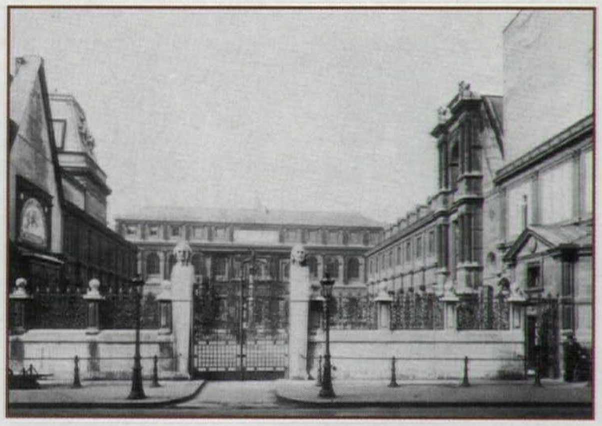
At the time, what Rudolph seemed to have accomplished was to give that sort of heroic monumentality a bad name. Although compared to the thoroughly a-contextual monumentalism of a more recent vintage, such as Philip Johnson's architecture school at the University of Houston (P/A, Feb. 1984, p. 66), with its direct quote of Ledoux's House of Education, the Yale Art and Architecture Building looks overly ambitious but at least not schizophrenic. Johnson's building can only be excused as some sort of misguided didacticism. But in relation to the thoroughly integrated didactic and institutional idea of Thomas Jefferson's University of Virginia campus (genuinely in the spirit of Ledoux), most Post-Modern pastiche such as Johnson's pales considerably.

Jefferson's Lawn was not, of course, a school of architecture in an explicit and modern sense (would that it were!), but the idea of an "academical village" reminds us of another model for institutional architecture that has been recently reinvigorated in a variety of contexts, including that of the architecture school. The idea of the institution as a small, microcosmic city – or, at least, a miniature campus – seems to underlie several recent projects. Aldo Rossi's little acropolis for the University of Miami (P/A, May 1988, p. 34) attempts to both urbanize and monumentalize the predominantly suburban context of the Coral Gables campus, as well as the experience of going to architecture school. On the other hand, Alvaro Siza's little village for the School of Architecture in Porto eschews any obvious monumentality, dissolving the program into an episodic engagement with the experience of the site.

There is always a middle course, which in this case might be described as something like a building that engages the complexity and specificity of a contemporary architecture curriculum but confines that exploration to the interior of an envelope that responds formally and representationally to the role of the school in the campus. In recent years, most of the opportunities to design architecture schools have had the further constraint of being additions to existing buildings. Several projects come to mind in this category, including the almost invisibly contextual addition to Anderson Hall – itself a recycled classroom building – at Rice University by James Stirling and Michael Wilford (P/A, Dec. 1981, pp. 53–61). More assertive, but equally ingenious, is Steven Holl's recent addition to the School of Architecture at the University of Minnesota (P/A, Jan. 1990, pp. 83–85). If Stirling links a simple double-loaded bar to another double-loaded bar, with a little volumetric expression for the jury space, Holl adds an open round court to a closed square court and expresses the jury spaces as strategically sited towers. Finally, at Arizona State University, Alan Chimacoff of the Hillier Group adds a surprisingly urban palazzo packing a complex array of spaces – Schinkel by way of the Arizona Biltmore – to a characteristic 1970 essay in State U. architecture, and makes the bridge between new and newer the place of representation. Otherwise, the project seems to say that a building for the teaching of architecture should be, fundamentally and even quintessentially, a work of architecture – and not a city, a landscape, a machine, or any of the other images that both engage and distract the inhabitants of such buildings.

Alan J. Plattus ■

The author is the Associate Dean at Yale's School of Architecture, currently working on a book The New American Vitruvius.



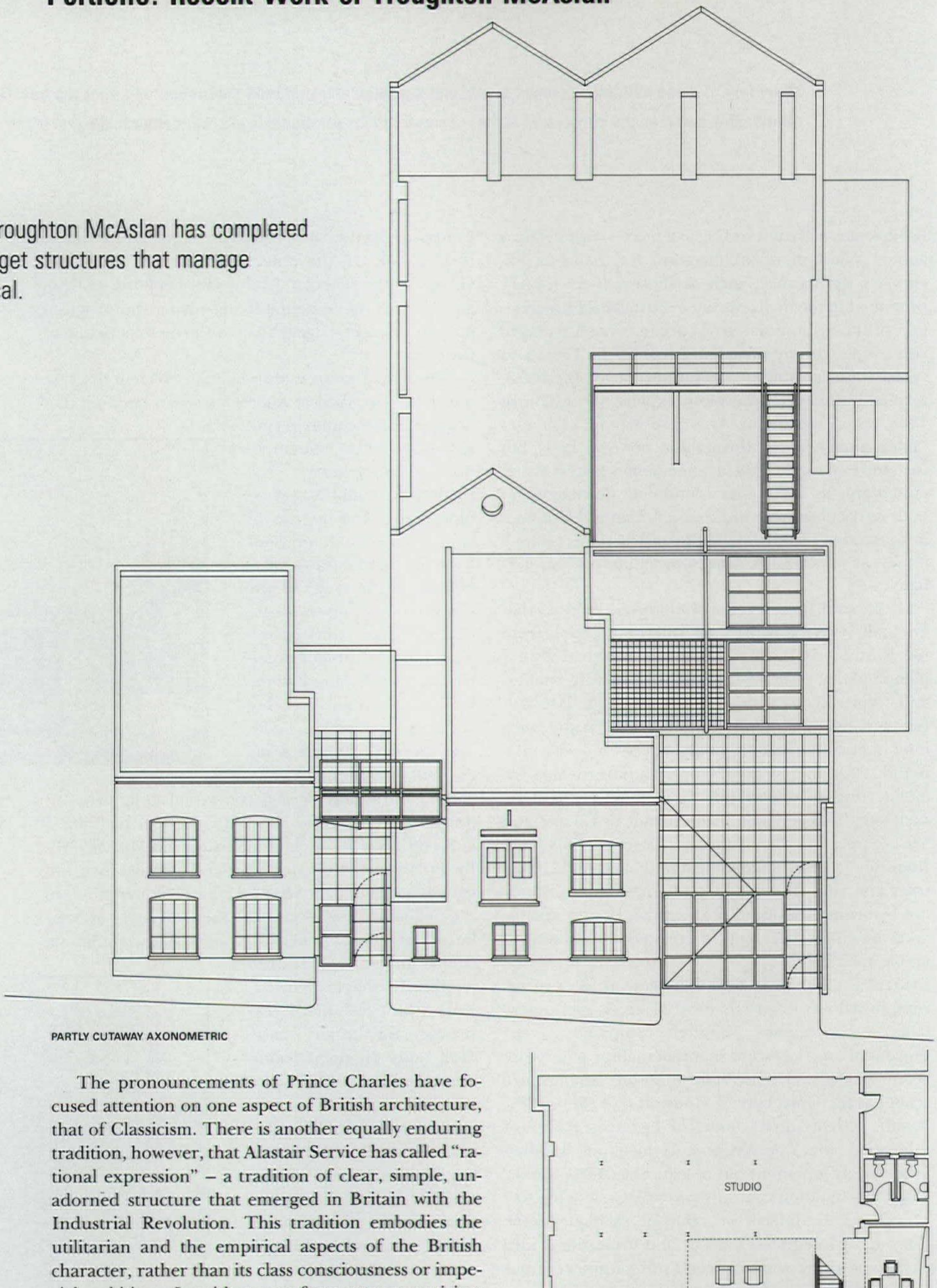
The street front of Felix Duban's Écoles des Beaux-Arts in Paris.

Photo: Yale University

The front of Paul Rudolph's Art & Architecture Building at Yale University.

Portfolio: Recent Work of Troughton McAslan

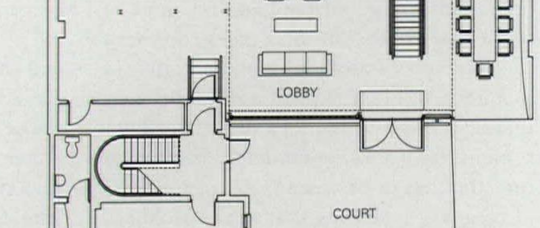
The young London firm of Troughton McAslan has completed a number of small, low-budget structures that manage to be elegant and economical.



PARTLY CUTAWAY AXONOMETRIC

The pronouncements of Prince Charles have focused attention on one aspect of British architecture, that of Classicism. There is another equally enduring tradition, however, that Alastair Service has called "rational expression" – a tradition of clear, simple, unadorned structure that emerged in Britain with the Industrial Revolution. This tradition embodies the utilitarian and the empirical aspects of the British character, rather than its class consciousness or imperial ambitions. It neither runs from nor romanticizes the machine, as some British architects are wont to do today, but draws inspiration from its economy and efficiency. And however much the Prince might wish it otherwise, this tradition is still very much alive in the work of such British firms as Troughton McAslan.

Jamie Troughton, a graduate of Cambridge University, and John McAslan, a graduate of Edinburgh University, both worked in the office of Richard Rogers & Partners before establishing their London firm in 1983. Their early buildings revealed the influence of Rogers, with the obligatory exposed ducts and mechanical equipment. But the more recent projects, some of which are shown here, are at once more

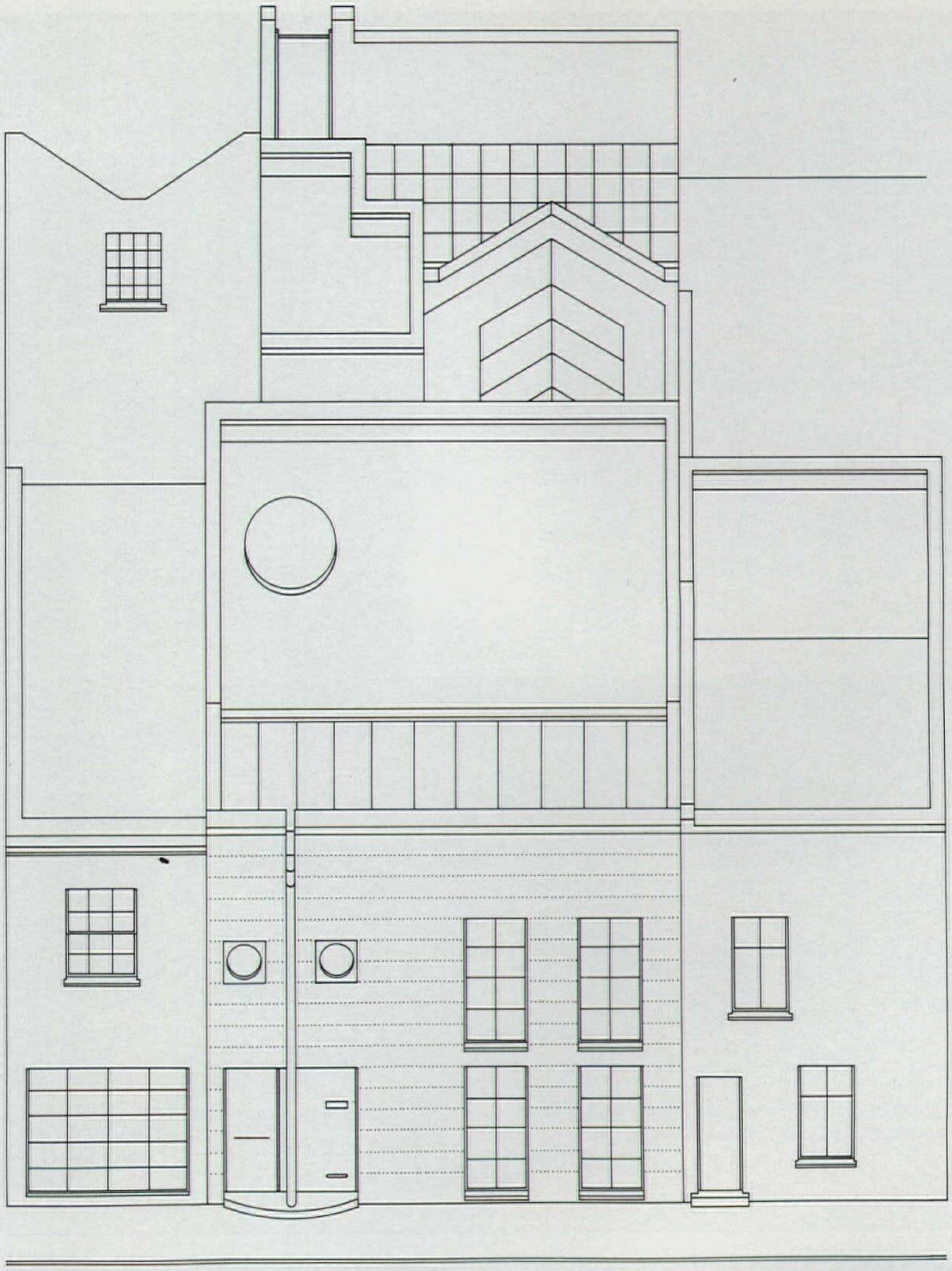


FIRST FLOOR PLAN

St. Peters Street

"The Maison de Verre remains a constant source of inspiration," says John McAslan. And nowhere in his firm's work is that more apparent than in this rehabilitated industrial building. The existing structure consists of two parts: a front brick building, with small rooms and short spans, and a rear, steel-framed building, with an open plan and broad spans. Troughton McAslan created a courtyard entry off of the street, with a steel gate and refaced the rear building so that it became the studio complex's main entrance (photo, top left; plans and axonometric, facing page). This new, recessed façade has a traditional form, with a shallow hip roof clad in metal, but its planar composition of glass, glass block, and stucco is definitely Modern. There is a similarity here with the Maison de Verre in that both present Modern façades framed by traditional construction. The real parallel, however, is in Troughton McAslan's handling of details at the entrance and in the lobby (bottom left). The façade, like that of the Maison de Verre, has glass and glass block set within simple steel frames and exposed steel columns and beams. And, like the double-story, book-lined living area at Maison de Verre with its custom steel ladder, the two-story lobby at St. Peters Street has a steel stair, with a similar linear design. A smaller stair, repeating the same steel details, connects the front part of the complex to the rear loft space. Unfortunately, a tenant has recently filled the building's open plan with conventional open office partitions. Amidst that clutter, the simplicity of the façade and lobby space are all the more welcome.

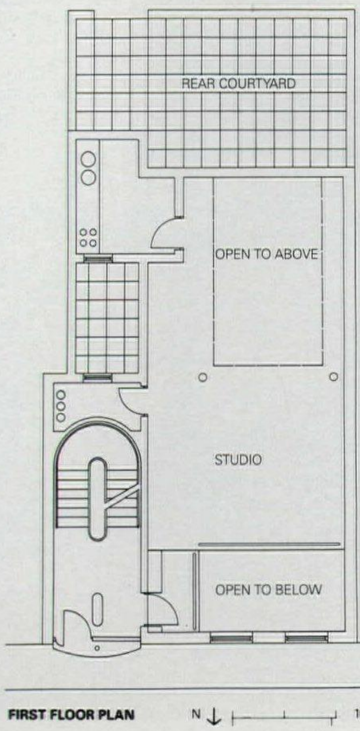
Project: *3 St. Peters Street, London.*
Architects: *Troughton McAslan Limited, London (Jamie Troughton, John McAslan, Mark Wilson).*
Client: *Paul Williams, Colebrook Estates.*
Site: *warehouse on a flat infill site.*
Program: *6500-sq-ft studio.*
Structural system: *existing steel frame.*
Major materials: *stucco, glass block, steel-framed glazing, metal roofing, wood floors, steel stairs.*
Mechanical system: *low pressure hot water perimeter radiators.*
Consultants: *Jampel, Davison & Bell, structural; Boyden & Company, quantity surveyors.*
General contractors: *William Green Builders, Hilton Building Services.*
Costs: *$300,000 ($46/gross sq ft).*
Photos: *Peter Cook.*



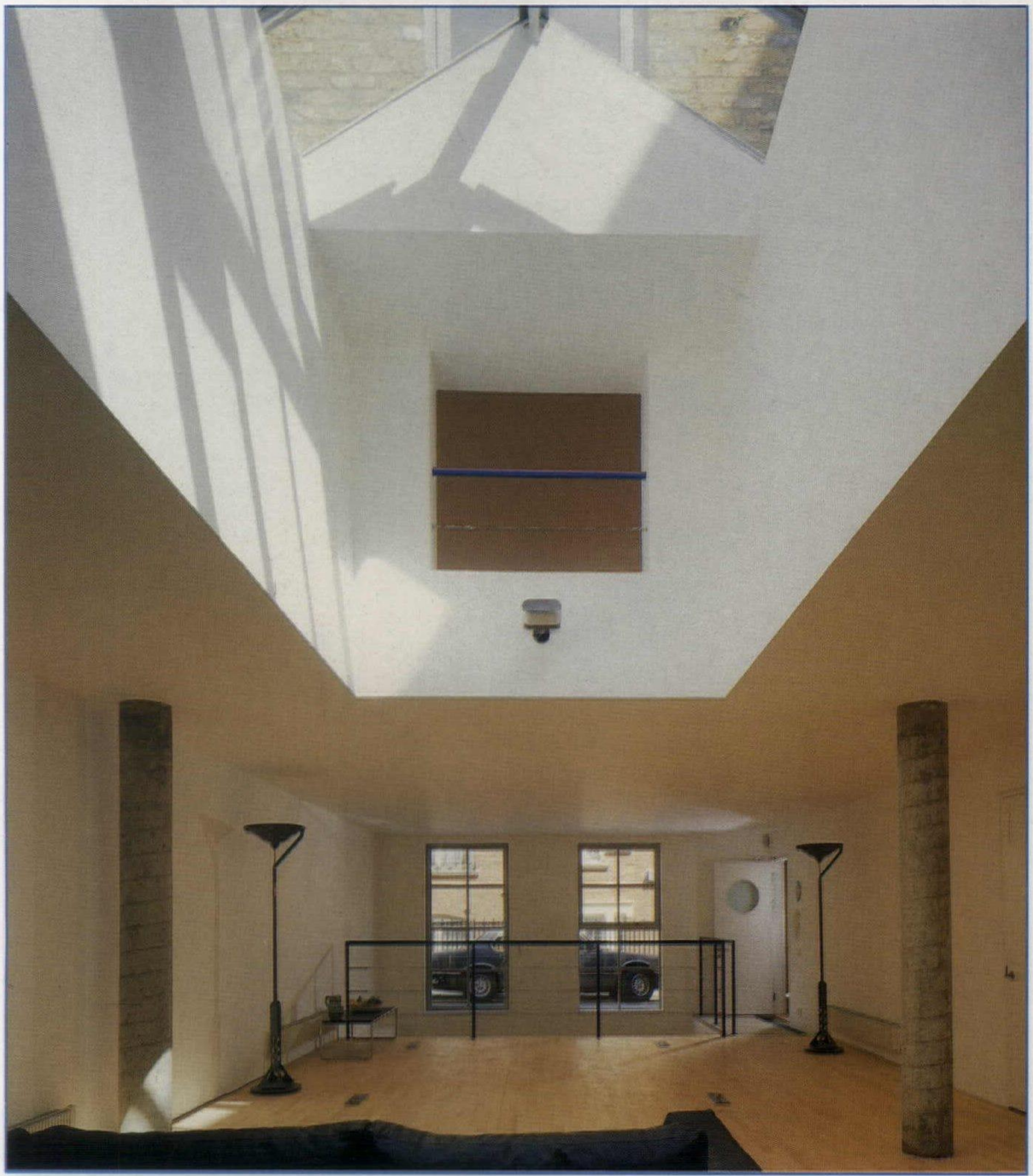
AXONOMETRIC

purely Modern and more responsive to the context. The warehouse/office on Merton Road in South London (p. 99), for example, recalls the nautical imagery of Modernism, with its porthole windows and gangplank ramp, yet the building also responds, with its striped brick façade, to the Victorian rowhouses on either side. A similar mix of Modernist elements within a contextual form marked the façade of an office/workshop on Pond Place in Chelsea (p. 97), which was recently defaced under pressure from local preservation authorities. Where the firm's work is not explicitly contextual, as in two neighboring studio buildings in Islington (p. 95), with their spare compositions of glass, stucco, and steel, Troughton McAslan has pulled the new façades back from the street or treated them in a modest way to respect the scale of the neighborhood.

These commissions are not glamorous. Most are small structures with low budgets on very constrained or irregular sites for use as warehouses, back offices, or studios. Troughton McAslan nevertheless manages to wring architecture out of such projects by concentrating on those few areas where careful design and



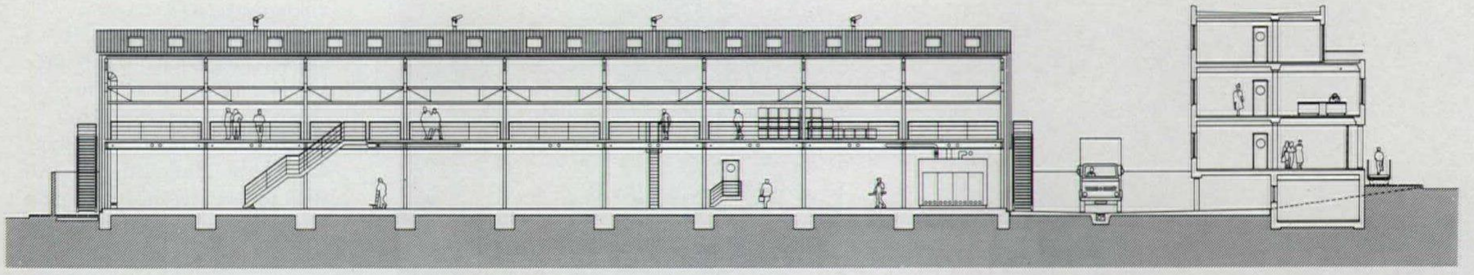
FIRST FLOOR PLAN N 10'/3m



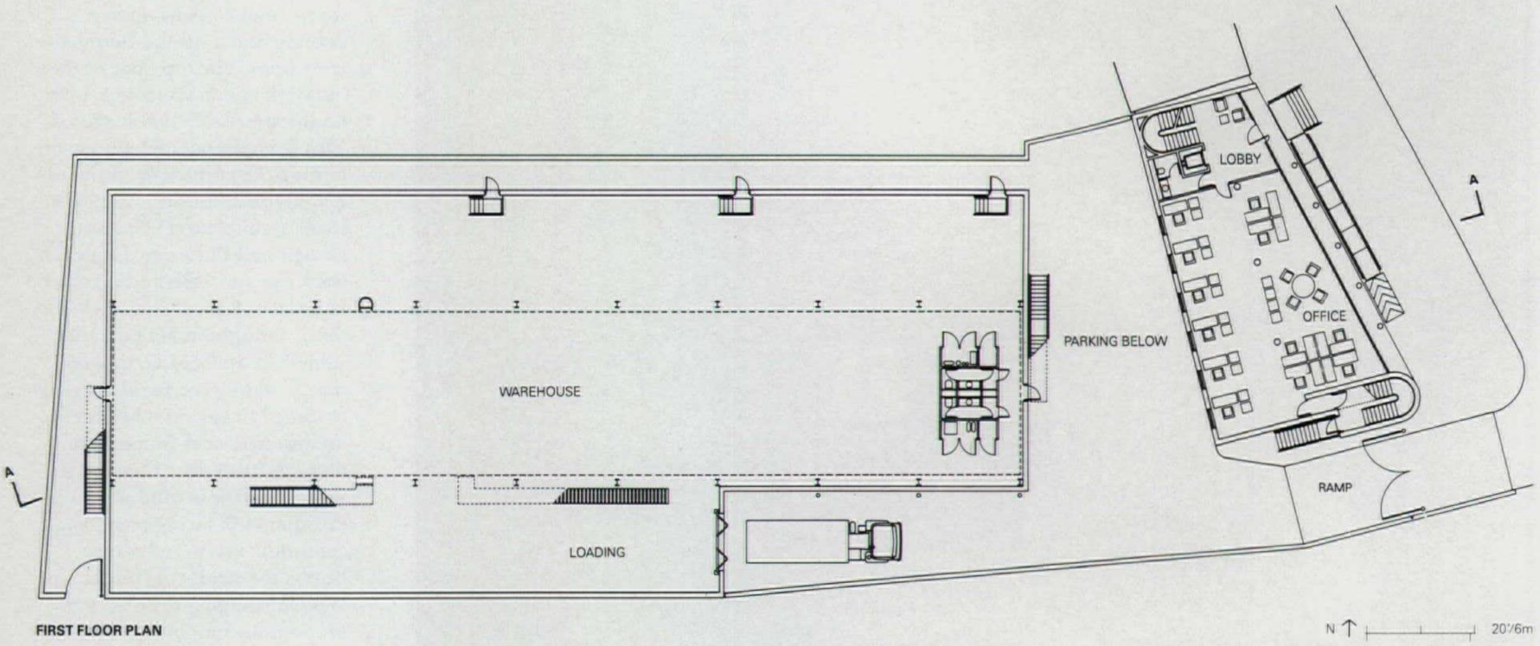
Pond Place

Interest in saving vernacular buildings and landscapes is a fairly recent phenomenon, although it is sometimes done with a vengeance, as Troughton McAslan found out at Pond Place. Along a narrow side street within a historic district in Chelsea, they designed a loft building on a 1000-square-foot site. The building, although only 3000 square feet in size, is quite complex, spatially. From the front vestibule, which occupies a narrow service bay, you enter the main space across a small bridge that overlooks the basement (plan, facing page bottom). To the rear of that space, a double-story volume opens up to a skylight and a second-floor balcony (top). The top floor of the building has an angled glass wall on the street side that is pulled back from the parapet, thus maintaining the cornice height of the neighboring buildings. The dominant architectural elements along Pond Place are simple brick exterior walls and relatively large steel-framed windows (bottom). Troughton McAslan designed an updated version of that, cladding the façade in polychrome brickwork, into which are inserted steel-framed windows. At the entry, they placed precast porthole windows (axonometric facing page) and a columnlike rain leader that bisects the small concrete stoop. While managing to be at once Modern in composition and contextual in its materials and form, this façade met with resistance from the local preservation societies, who eventually forced the owner to alter the nearly complete front wall. The façade was partly covered with stucco and painted; the rain leader was shortened. If there ever was a case of misplaced preservation zeal, 18 Pond Place is it.

Project: *18 Pond Place, London.*
Architects: *Troughton McAslan Limited, London (Jamie Troughton, John McAslan).*
Client: *Robert Bourne, London House Group plc.*
Site: *small flat site in Chelsea.*
Program: *studio and workshop space.*
Structural system: *concrete frame.*
Major materials: *polychrome brickwork, steel-framed glazing, wood doors, polished concrete columns.*
Mechanical system: *perimeter radiators.*
Consultants: *Jampel, Davison & Bell, structural; Boyden & Company, quantity surveyors.*
General contractor: *Heath Construction.*
Costs: *$480,000 ($160/gross sq ft)*
Photos: *Peter Cook.*



SECTION AA

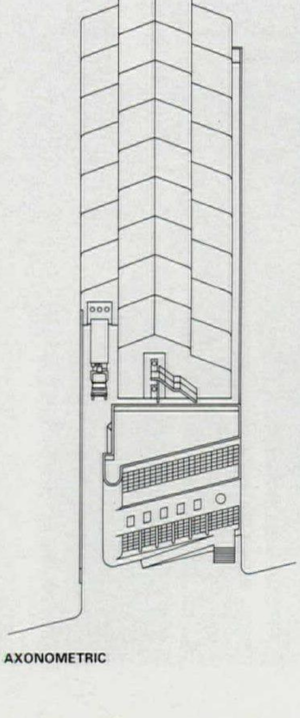


FIRST FLOOR PLAN

detailing can make a difference and letting the rest largely alone.

That, in its own small way, speaks to the larger question of Modernism versus Classicism now being debated in Britain. Whatever its strengths in terms of legibility and familiarity, Classical architecture is simply not appropriate for certain programs or budgets. Modernism arose not only for ideological reasons, but as a pragmatic response to the needs of an industrial economy. The simple, elegant, understated Modernism of Troughton McAslan is not just another design option. For commissions that demand a lot be made from very little, it is the only defensible approach.

Thomas Fisher ■



AXONOMETRIC

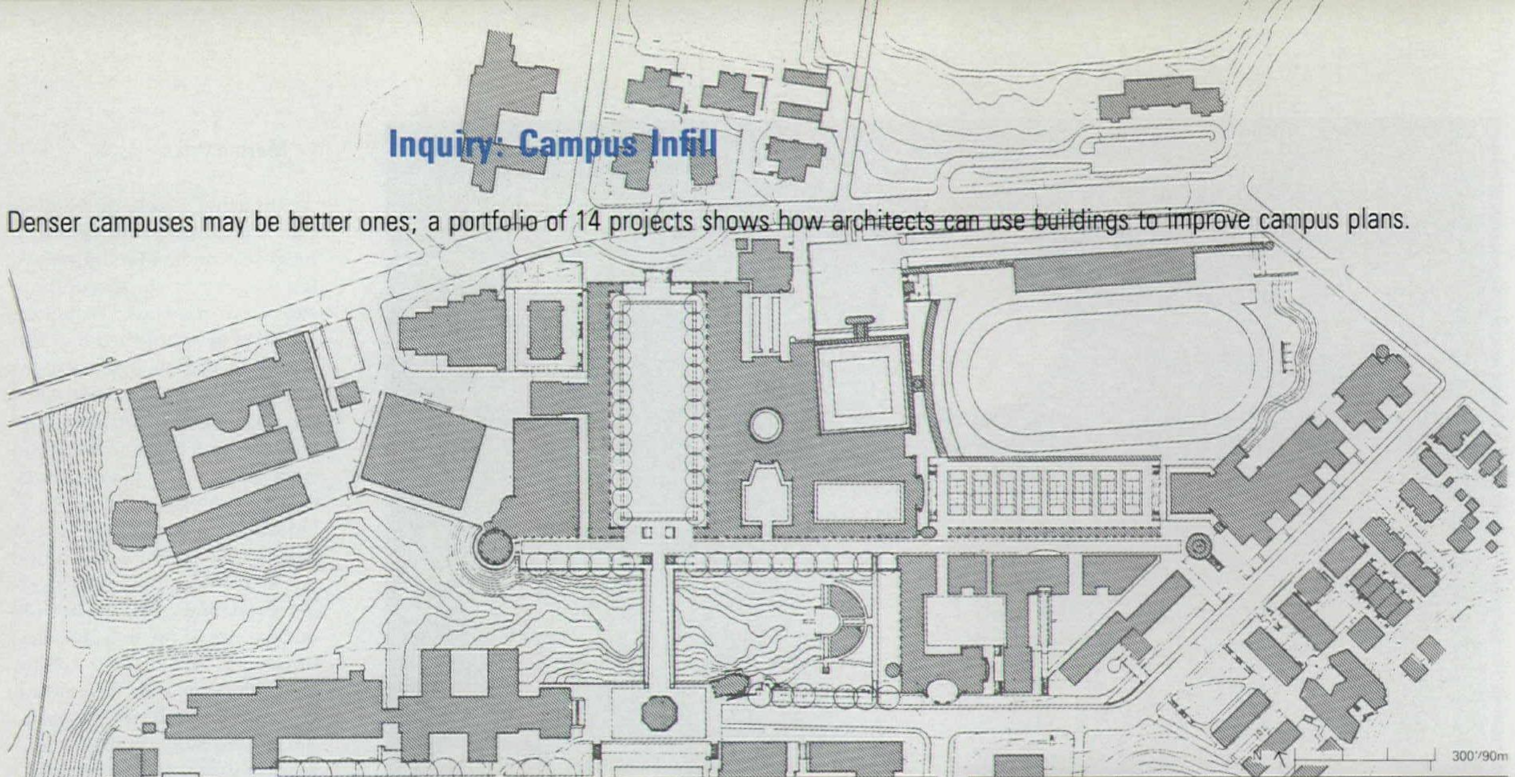
Merton Road

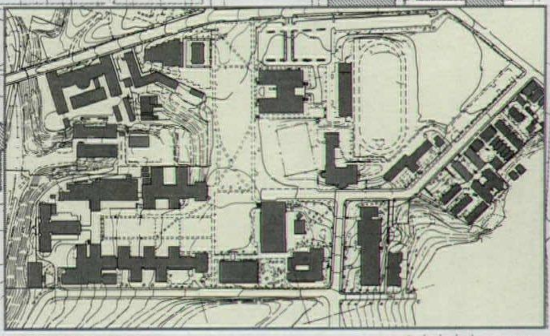
Inserting a large distribution warehouse into a residential neighborhood without disrupting the scale or rhythm of the street is no easy task. Troughton McAslan accomplished that feat by taking advantage of a drop in grade to lower the mass of the warehouse and by shielding it from the street with a front, four-story office block (plan and section, facing page). The office building is forthrightly Modern. The first floor pilotis, the round-end stair tower, the linear steel entry stair and ramp, the horizontal banding of the polychrome brickwork, the porthole window above the door are all signature elements of Modernism (top). Yet the massing of the office block, with its top floor setback, and the use of brick and punched windows have the effect of integrating the building into the surrounding residential streetscape (bottom). The building's interior strikes a similar balance between the entry's nautical imagery – its round windows and cable-strung steel rails – and the loftlike office interiors that accommodate standard furniture. But there is a lesson in this building that goes beyond that of responding visually to a context. It offers a functional response to the problem of fitting large buildings and light-industrial uses into traditional cities without destroying them. At a time when architects and planners face the conundrum of reviving traditional urban forms while accommodating Modern functions, the office and warehouse on Merton Road become prototypical.

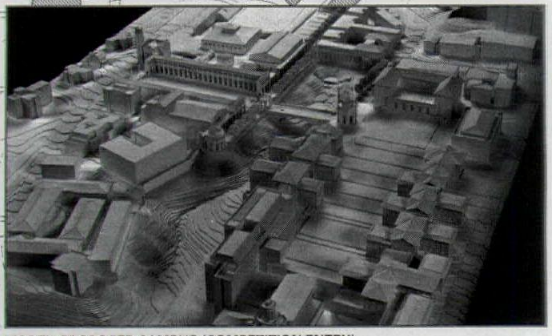
Project: *Merton Road Offices and Distribution Warehouse, London.*
Architects: *Troughton McAslan Limited, London (Jamie Troughton, John McAslan, Stephen Pimbley, Kevin Lloyd, Jonathan Parr, Aidan Potter, Bob Atwal, Christopher Mascall).*
Client: *Ian Pearce, Shilton plc.*
Site: *sloping 20,000-sq-ft site.*
Program: *offices containing 8000 sq ft and a 22,000-sq-ft warehouse.*
Structural system: *concrete frame for the offices, steel frame for the warehouse.*
Major materials: *office: polychrome brickwork, steel-framed glazing, polished concrete columns; warehouse: profiled cladding, exposed steel frame.*
Mechanical system: *office: perimeter radiators, operable windows.*
Consultants: *Jampel, Davison & Bell, structural; Boyden & Company, quantity surveyor.*
General contractor: *John Nugent Construction.*
Costs: *$2,080,000 ($74.30/gross sq ft).*
Photos: *Richard Bryant.*

Inquiry: Campus Infill

Denser campuses may be better ones; a portfolio of 14 projects shows how architects can use buildings to improve campus plans.







PROPOSED SITE PLAN (COMPETITION ENTRY)

PRESENT SITE PLAN

MODEL, PROPOSED CAMPUS (COMPETITION ENTRY)

The P/A award-winning (Jan. 1989, pp. 113–115) design for Carnegie Mellon University exemplifies the way infill projects can reconfigure a campus. Michael Dennis, Jeffrey Clark & Associates, winners of a limited design competition, proposed a sequence of figured spaces (large plan above is competition entry, subsequently revised) to be overlaid on a campus that lacks any synthetic plan (present plan, inset above).

When the multiphase redesign is complete (completion model, inset above), Carnegie Mellon will incorporate several infill strategies: A new quadrangle will provide a center of activity, and a cross axis of walkways (marked by rotundas) will link new and established parts of campus. Large public rooms will be embedded in a perimeter of contiguous buildings, which will provide definitive margins where there had once been an aggregate of object-buildings.

Campus infill is inherently impure architecture – a mediation between preceding and present philosophies about planning. Given the shakedown Modernism has undergone and our renewed appreciation for traditional urban spaces, architects who build on American campuses today are assemblers who seek patterns within our aggregate campuses.

Schools and colleges, as well as sprawling state universities, are upgrading their campuses. Some need new science laboratories to sustain a competitive edge in research. Grade schools are expanding to accommodate the progeny of baby boomers. The ranks of college applicants, however, are becoming a bit thinner, and colleges are upgrading their campuses to make them more marketable to a selective pool of applicants. Another motive for rehabilitation (an intriguing one for architects) is that students fault the modern campus's lack of character and complain about faceless buildings. Few colleges have coherent outdoor spaces; their planning structures are often overly abstract or simply nonexistent.

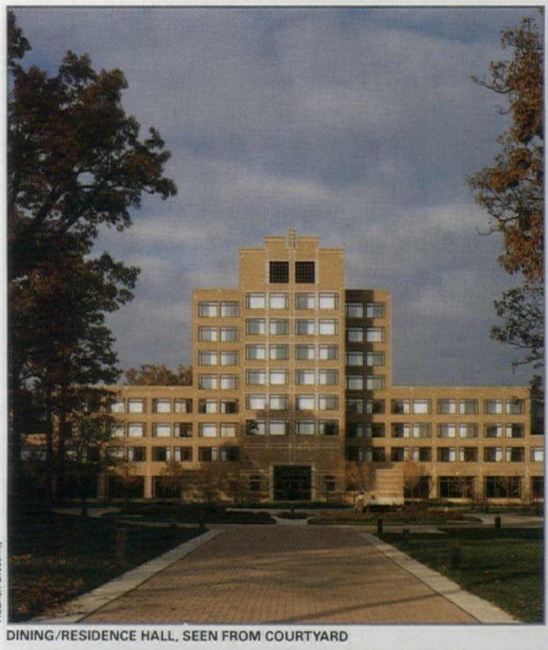
As the architect Michael Dennis observed, these problems are a great learning opportunity for architects: "We're at the same point where G.M., Ford, and Chrysler found themselves a few years ago, when high gas prices and foreign competition forced them to build better cars. As campuses become more densely developed, we are likewise forced to be more judicious. We're finally understanding that campus planning issues are actually urban design issues."

The fundamental problem in infill architecture is to configure buildings so that they help define an outdoor space – something that a proliferation of object-buildings has not been able to do. Juxtaposing these with regular, background buildings (a logical way to increase the density of a campus) is yielding some new hybrids of modern and traditional plans. As Dennis noted, one can find great freedom with regular, wall-like buildings; they provide a framework that complements the eccentricities of modern buildings.

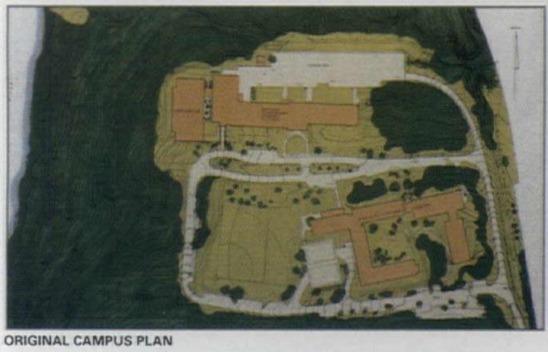
Campuses are amalgamations of successive building campaigns. Often, they are not governed by a master plan, but were seamed together over time – not by architects, but by the students who inhabit the campus. By studying their paths and points of congregation, the architects Fred Koetter and Susie Kim found implicit structures that link campus buildings. They suggest that architects pay close attention to the edges of buildings so that infill projects are to maximize the patterns created by students. While it seems mundane, this empirical approach shows how others perceive and use outdoor spaces; architects who use it may be more likely to add buildings that consolidate the campus.

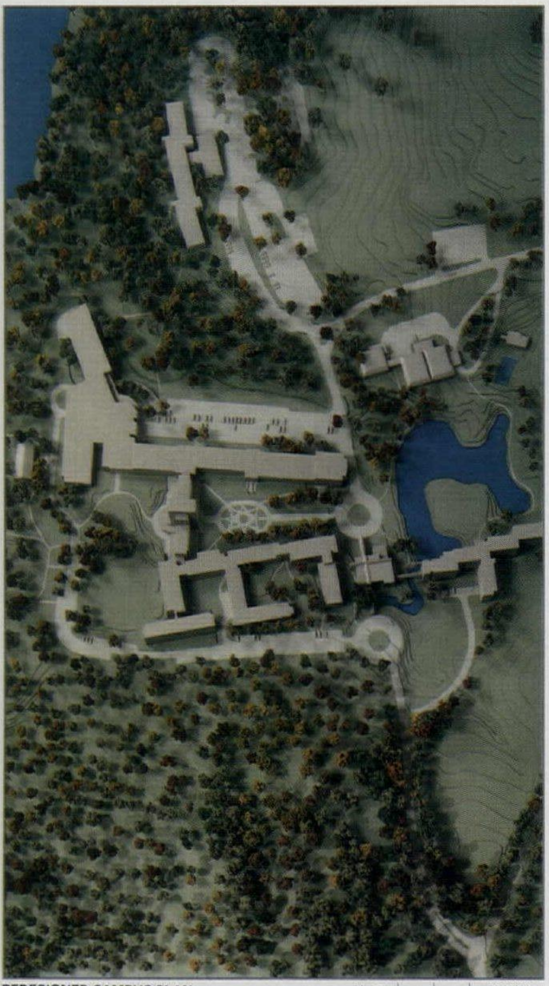
Edge conditions are important on campuses because they're intricately layered places; few other sites offer architects such rich patterns, spatially or programmatically. Adding buildings to campuses can be as delicate as surgery; to ensure success, architects might consider infill buildings pieces of a larger organism. Each operates on several levels at once, and internal issues ought to be correlated with broader concerns, such as the configuration of an academic quadrangle.

We illustrate these observations with 14 projects for North American campuses; each the result of a systemic approach. Every building that follows is an intervention – not an autonomous entity, but a structure that serves the overall campus plan. Each is a part that makes the whole stronger. **Philip Arcidi** ■


Hedrich-Blessing

DINING/RESIDENCE HALL, SEEN FROM COURTYARD

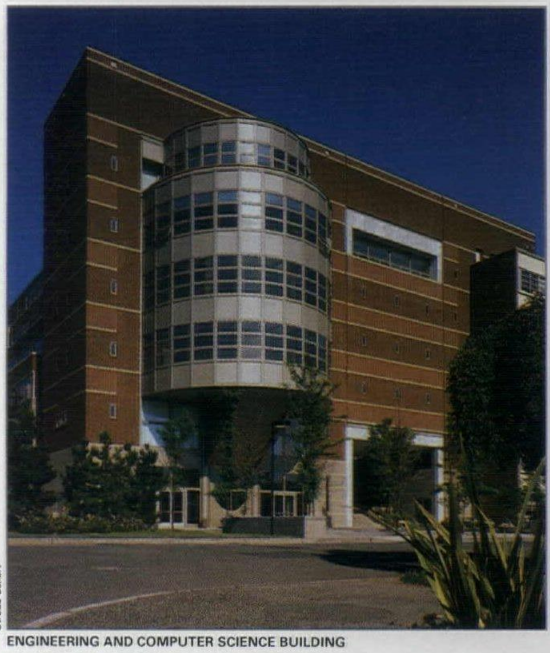

ORIGINAL CAMPUS PLAN


REDESIGNED CAMPUS PLAN N 200'/60m

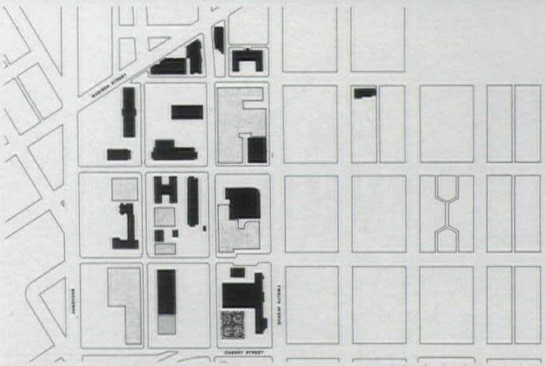
Enframing the Center

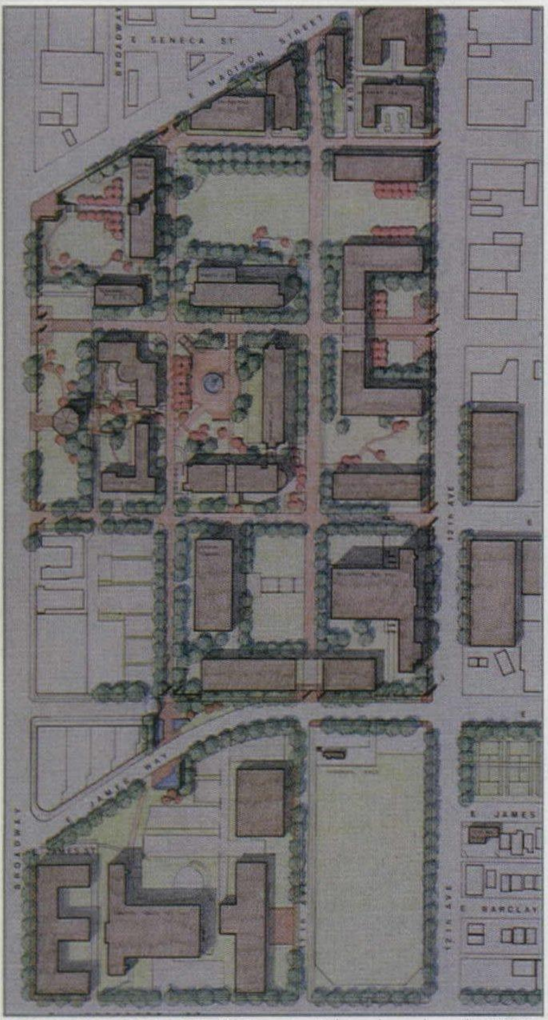
When Arthur Andersen & Company transformed a defunct private college in St. Charles, Illinois, into its training center, it began with a modern campus of rambling buildings oriented to the landscape, but not to each other. The firm asked Skidmore, Owings & Merrill, Chicago, to reconfigure the campus and give it a new image. Their solution is as dramatic as it is simple: they linked two buildings to make a trapezoidal courtyard; what was once a centrifugally-directed campus now has an axial plan with an outdoor space analogous in plan to Jefferson's University of Virginia. The periphery, however, maintains its loose configuration, with wings that extend into the landscape.

Two new circular drives lead employees to a reception hall, classrooms, and a dormitory added by O'Donnell Wicklund Pigozzi and Peterson Architects. Their placement enhances SOM's configuration and reveals a rediscovered dividend of the Classical plan: It provides a structure that governs component buildings and can be expanded without any loss of clarity.


Strode Eckert

ENGINEERING AND COMPUTER SCIENCE BUILDING


CAMPUS CENTER, ORIGINAL PLAN N 300'/90m


CAMPUS CENTER, REDESIGNED PLAN N 300'/90m

Over its 100-year history, the urban campus of Seattle University grew by accretion, using the city's gridiron as its campus plan. It comprised blocks of housing and commercial structures, painted beige as a campus identification, and converted to academic use. The university had no architectural image or plan of its own; the geographical center was a disappointing array of buildings and a parking lot.

Commissioned to draw a master plan, Broome Oringdulph O'Toole Rudolf Boles & Associates used the existing grid as a framework for locating gateways and plazas, starting with a campus center. A 60-year-old building (once an apartment house) was demolished, and its former occupant, the arts and sciences faculty, was relocated in a new corner building, adjacent to a plaza with a fountain – the new campus crossroads. On the square's southern edge, a new science building was linked by bridges to an existing academic building. Sallyports provide pedestrian access to the rest of campus, and a multistory curved bay marks the junction of the old and new buildings. It resembles a large lantern, by which the campus can be identified.

Centered Buildings

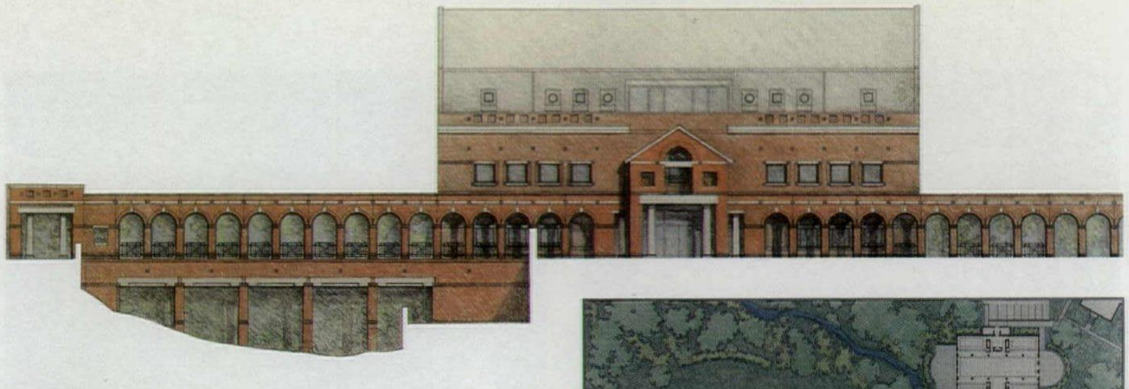
Mary Washington College, in Fredericksburg, Virginia, has always been a divided campus, segregated into two halves by ravines. VMDO/Vickery, Moje, Drinkard, and Oakland, commissioned to build a new library and student union, established a center for the campus in a novel way. Unable to set their new pair of buildings around a central lawn, the architects aligned them on a new campus walk.

VMDO's student union spans the ravine with an outdoor stage set near the stream. This structure, like the library next door, covers the walkway with an arcade to provide both architectural stature and protection from the rain. The rest of the campus walk is open to the sky, an attenuated campus green linking new and existing buildings; it reveals a rhythm that was present on the campus but obscured by its unresolved plan. The walk is also a datum for future development: Secondary axes can traverse the campus walk and become the armatures for new quadrangles, such as the dormitories proposed to the west of the library.

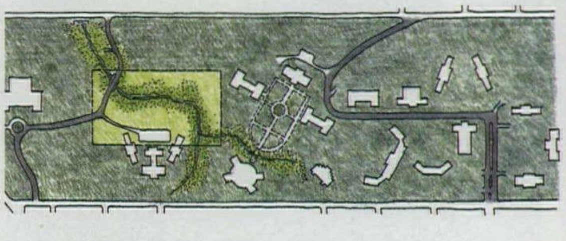
The lawn of Western Maryland College in Westminster is more spacious than it needs to be. A library addition by the Hillier Group will give the campus a central focus and define two lawns where there had been an irregular green.

Set in front of the present library, the addition will act like a hinge between two open spaces. The architects deliberately set the addition on, rather than alongside the green. Ostensibly a transgression, it proved to be an elegant and subtle move; the library addition is the new center for the campus and also acts like a background building to the two quadrangles.

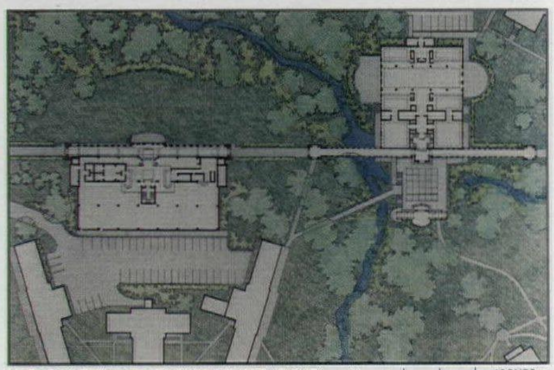
The building's Classical configuration accommodates these ostensibly contradictory roles. Modeled on foursquare Renaissance villas, its elevations are nearly identical, so that they seem to be replicate units of a standard module; the building will seem more like a piece of an ensemble, rather than an eccentric centerpiece. The Beaux-Arts-inspired floor plans will reinforce the library's stature, with an entry that commands its quadrangle and a cupola that marks the building as the campus centerpoint.



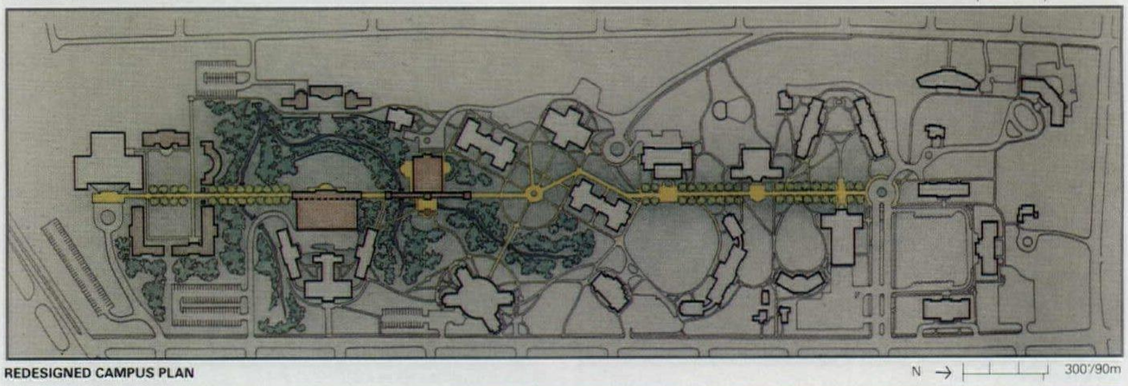
STUDENT CENTER



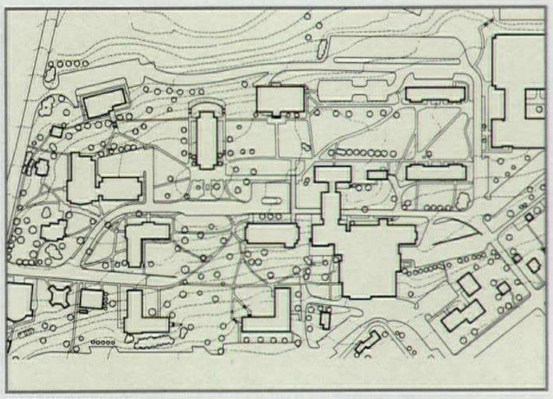
ORIGINAL CAMPUS PLAN



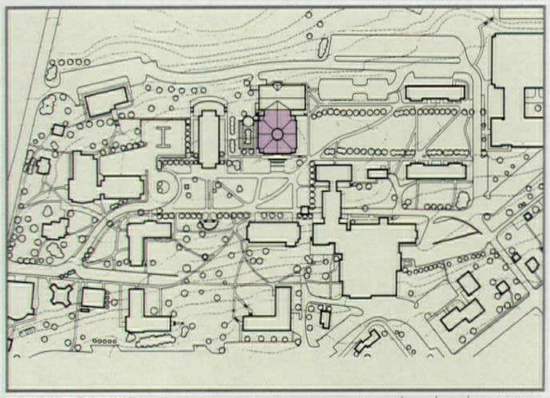
LIBRARY (LEFT) AND STUDENT CENTER (RIGHT)



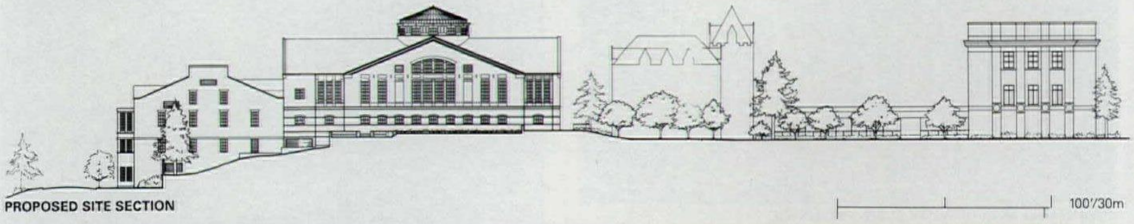
REDESIGNED CAMPUS PLAN



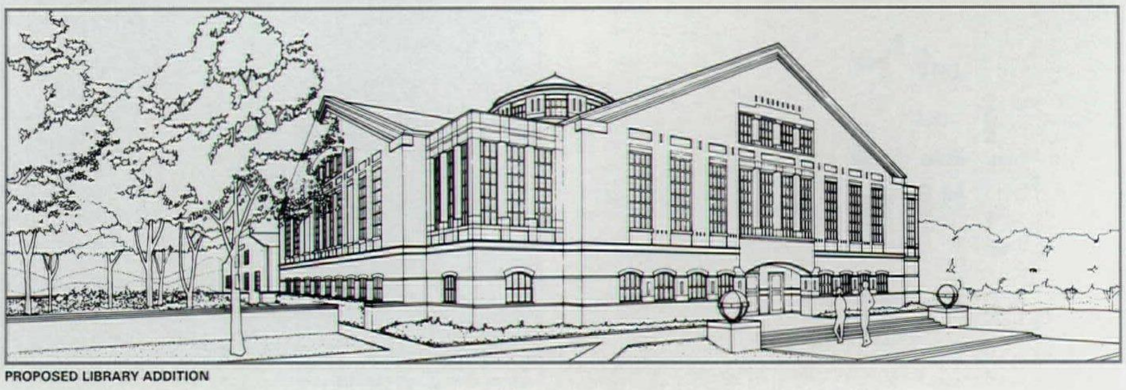
PRESENT SITE PLAN



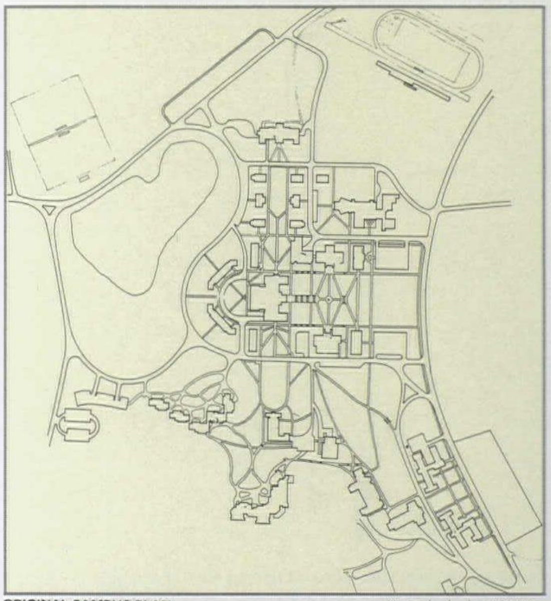
PROPOSED SITE PLAN

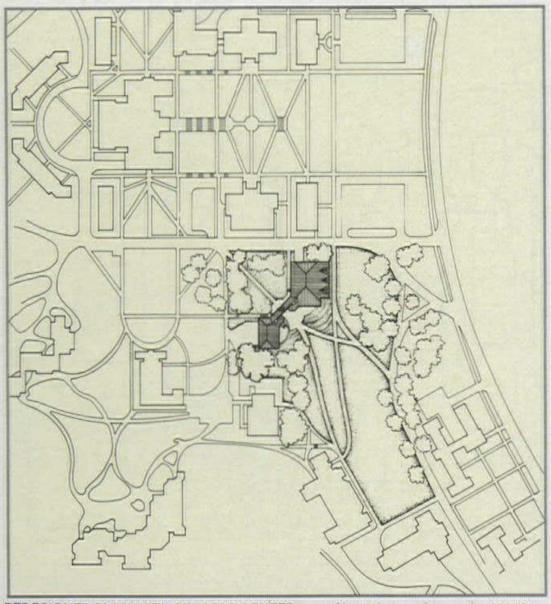


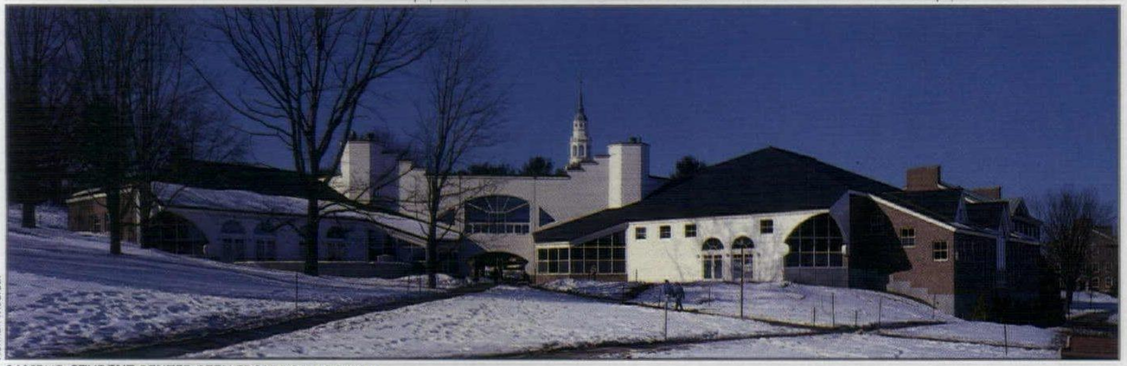
PROPOSED SITE SECTION



PROPOSED LIBRARY ADDITION


ORIGINAL CAMPUS PLAN N 200'/60m


REDESIGNED PLAN WITH STUDENT CENTER N 200'/60m


Norman McGrath

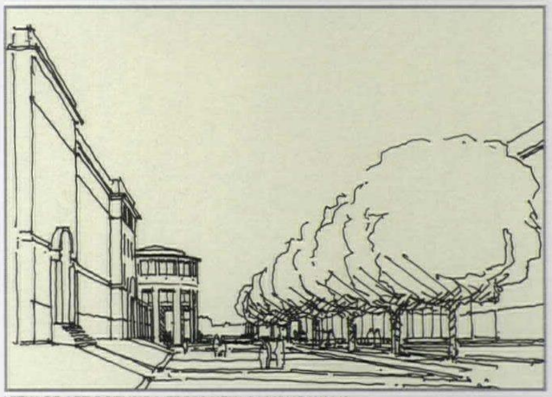
CAMPUS STUDENT CENTER SEEN FROM DORMITORIES

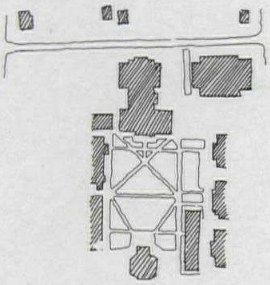
Marginal Links

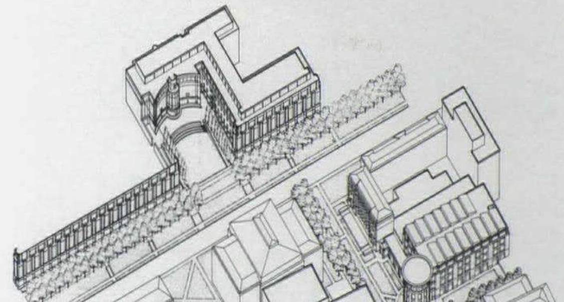
Like most 19th-Century campuses, Colby College in Waterville, Maine, has a central academic quadrangle and an adjacent cluster of dormitories. Linking the two districts, Centerbrook Architects found, was a delicate problem; their new student center had to function as the boundary between two parts of campus and a permeable building as well.

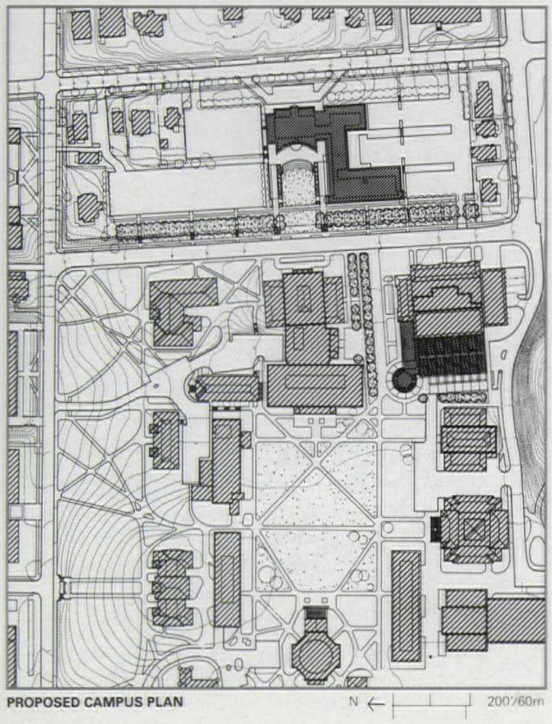
Approached from the quadrangle, the center looks like a pair of compact buildings that define a square lawn. They are joined by an arched passageway that leads students to a broad, lower lawn. From this side, the center appears to be a rambling house that screens the backside of the buildings beyond.

As an architectural linkpiece for the campus, the center is an object building, an island between two parts of campus. At the same time, it's a background building that defers to the outdoor spaces it defines. Its strength lies in Centerbrook's campus planning strategy: They added two coherent spaces to the Colby campus, where there was once a single, undefined lawn.


VIEW OF ART ROTUNDA FROM NEW CAMPUS WALK


EXISTING CAMPUS PLAN


SCIENCE & TECHNOLOGY CENTER AND SHAFFER ARTS CENTER


PROPOSED CAMPUS PLAN N 200'/60m

When Syracuse University asked Koetter, Kim and Associates, in association with Kling-Linquist, to plan a new Science and Technology Center, the architects resolved an increasingly common issue: how to design a periphery of urban density so that it corresponds to the academic quadrangle within.

The first segment of the science center, which will eventually fill most of a city block, has been built with a courtyard that extends the quadrangle's long axis. It has a concave façade to imply its alignment with the campus.

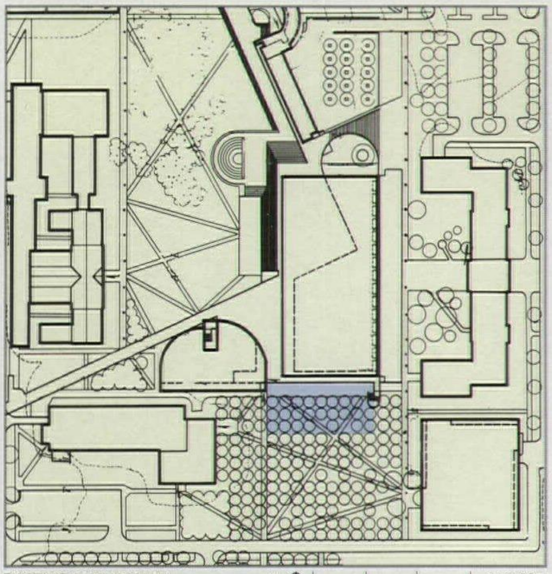
Across the street from the science center, a tree-lined walkway (once a parking area) will provide a formal entry to the campus and lead students to the "art rotunda" at the corner of the new Shaffer Arts Center by Koetter and Kim, in association with Fuligni Fragola/Architects. They made the building's cylindrical tower a pivot point at the intersection of the new walkway and a diagonal path across the quad. Visually, the tower is a cross-reference for the inside and outside of the campus; it also provides an architectural image on the quadrangle for the adjoining theater and studios.

Objects and Edges

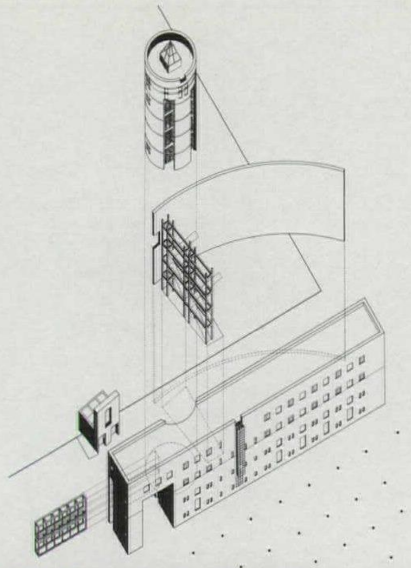
Despite claims made for design flexibility, many 1960s campuses confound attempts at infill development; their planning structure is often too rigid or obscure for subsequent architects to expand. I.M. Pei's State University College in Fredonia, New York, is a case in point; its center is commanded by Reed Library and cut by walkways.

Pasanella + Klein, hired to design an addition to Pei's library, adapted his formal vocabulary so that their building would be as visible as its established counterparts, despite its constricted frontage. It will have a cubic entry pavilion, a cylindrical tower for rare books, and a curved façade to enclose the open stacks.

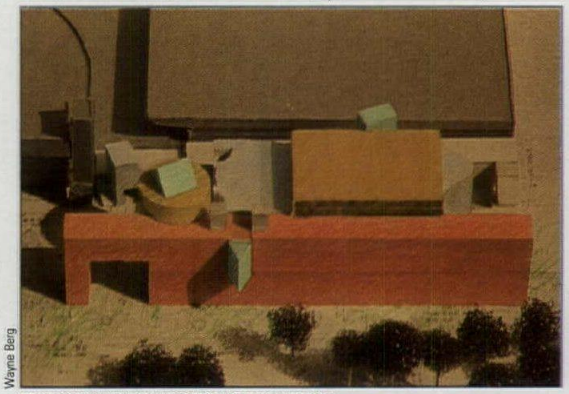
Pasanella + Klein's forms, which look like Pei's buildings in miniature, are a foil to the library's new five-story block of reading and study spaces that covers the southern edge of the site. A vast wall gridded by windows, this block will terminate the campus of object-buildings, while opening a three-story sallyport to an adjacent quadrangle of rectilinear plans and façades.



EXISTING CAMPUS PLAN N 300'/90m

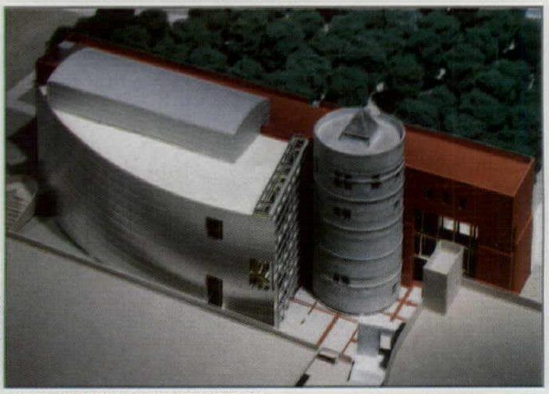


AXONOMETRIC DIAGRAM, PROPOSED LIBRARY ADDITION



Wayne Berg

PROPOSED LIBRARY ADDITION (STUDY MODEL)



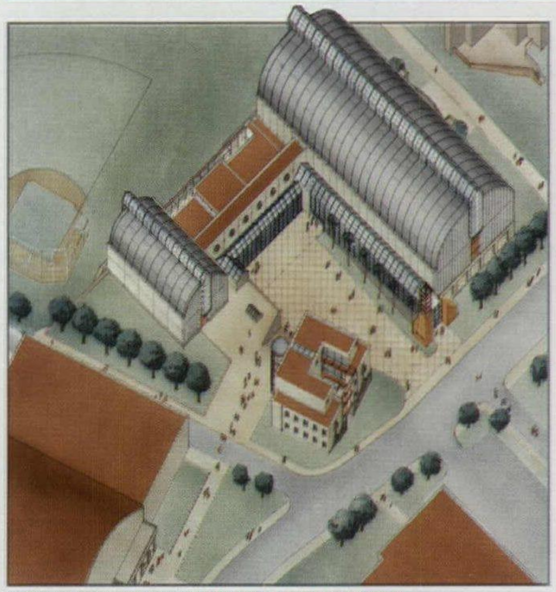
© Jock Pottle/Esto

ENTRY, PROPOSED LIBRARY ADDITION

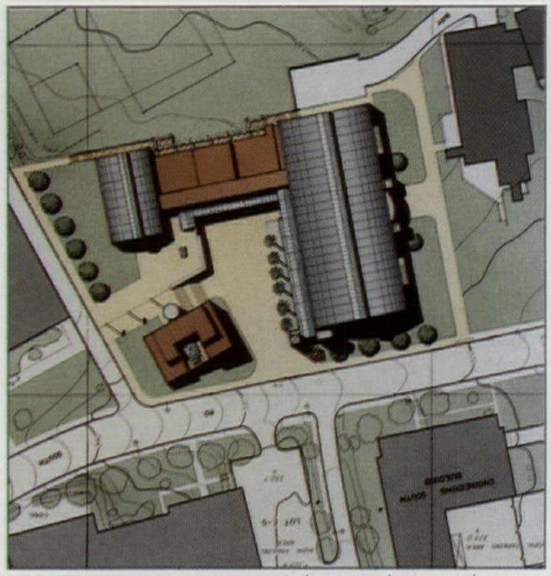
The campus of California Polytechnic at San Luis Obispo is organized around two concentric streets but little else. Buildings were erected with scant attention to their space-making capabilities; most of the university's outdoor places are merely the peripheries – paved or sodded – of freestanding buildings. A new gymnasium/events center designed by ELS/Elbasani & Logan Architects will be an object-building, too, but it will define the edge of the campus with particular ingenuity.

ELS divided the gymnasium into two arc-roofed sections; together with a retaining wall they form a three-sided courtyard – a figural outdoor space rare on Cal Poly's campus. A sports laboratory will occupy the street corner; it is both an anchor for the gym courtyard and a freestanding pavilion, rotated to align with two transverse axes that can be drawn from ELS's center.

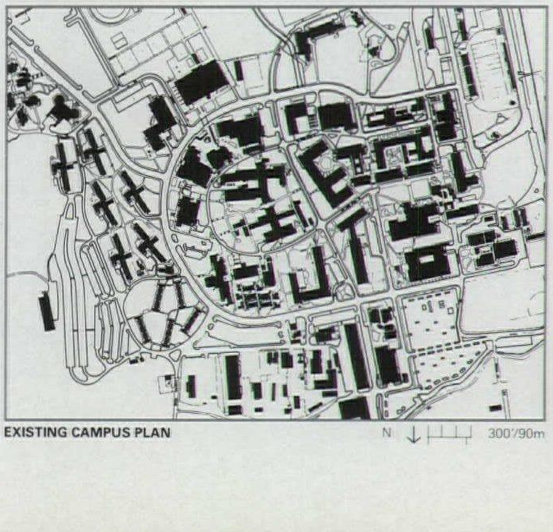
Implicit in ELS's design is a planning strategy to integrate Cal Poly's aggregate campus. The architects are creating an implied structure to be developed by succeeding architects as they fill the campus's interstitial spaces in coming decades.



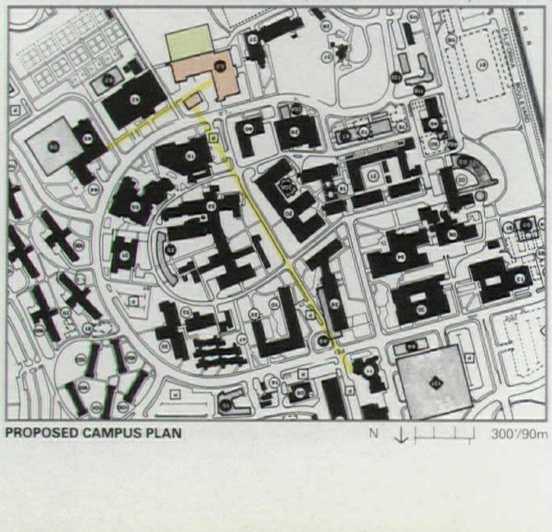
AXONOMETRIC, PROPOSED GYMNASIUM/EVENTS CENTER



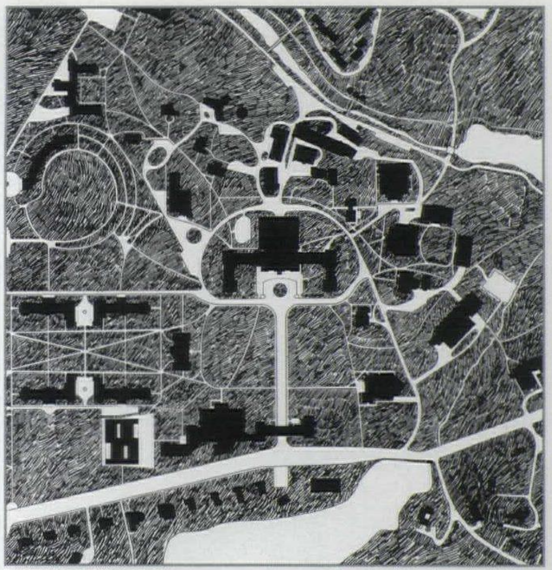
PROPOSED PLAN N 200'/60m



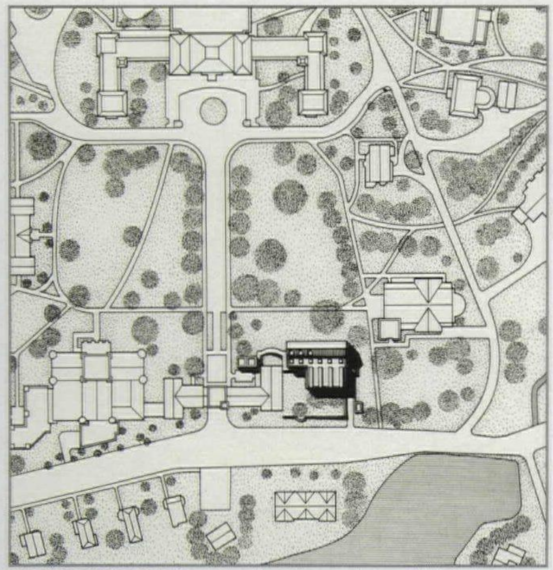
EXISTING CAMPUS PLAN N 300'/90m



PROPOSED CAMPUS PLAN N 300'/90m



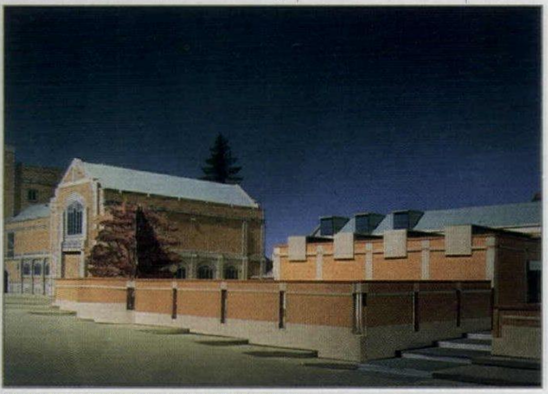
EXISTING CAMPUS PLAN



PROPOSED CAMPUS PLAN

VIEW OF EXISTING LECTURE HALL AND PROPOSED ART GALLERY

Photos: Kenneth Champlin



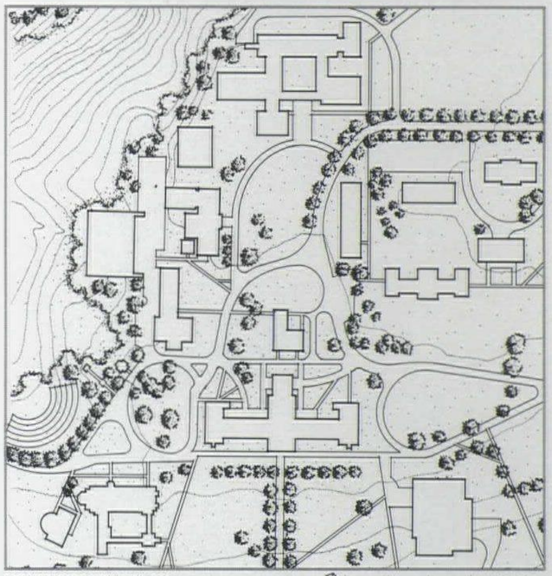
VIEW OF SCULPTURE GARDEN FROM STREET

Turning the Corner

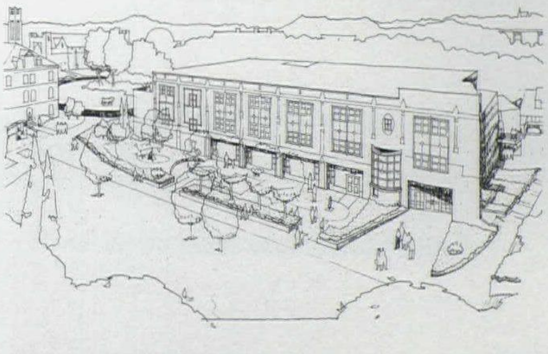
At Vassar College in Poughkeepsie, New York, a vast French Second Empire structure stands opposite a rambling Gothic Revival building; they form the east and west boundaries of the main quadrangle. The two are a lopsided pair; the Gothic structure is unfinished on one side, leaving the southwest corner of the quadrangle vacant.

Cesar Pelli has designed a new art gallery that will complete the quadrangle. While it will emulate the gabled roofs typical of its neighbors, the gallery will be a modern structure set slightly apart from a lecture auditorium that faces the quadrangle.

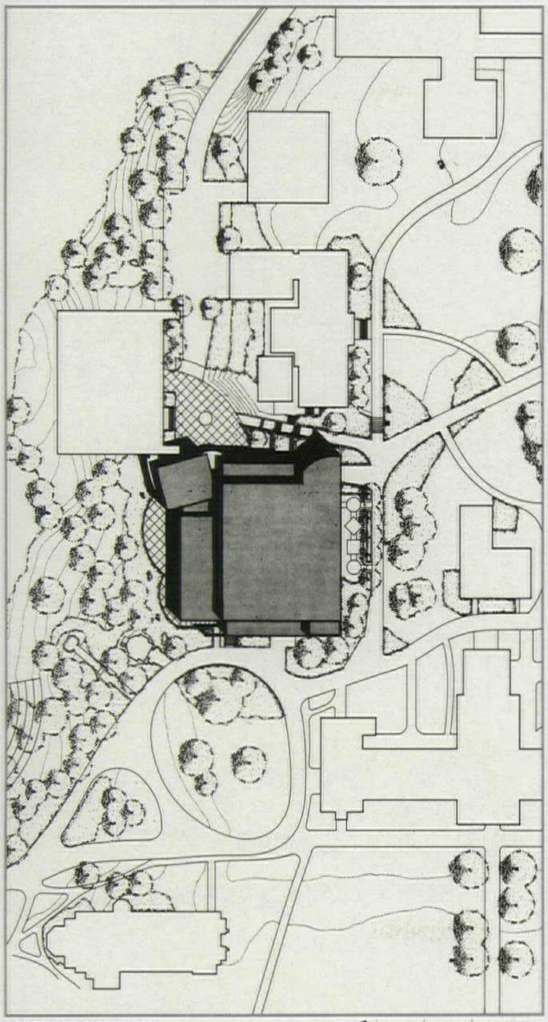
The main exhibition space will lie between the gable-roofed spine and the college's front lot line. Both the gallery and the campus benefit from this sideline location: An outdoor exhibit area will adjoin the interior exhibit space, providing a landscaped garden within the art department's domain. Just as important, it will fill in the vacant corner and add a new wall to the campus perimeter, so that both the quadrangle and Vassar's streetfront will have a more consistent edge.



EXISTING CAMPUS PLAN



VIEW FROM MAIN CAMPUS



PROPOSED SITE PLAN

It seems paradoxical to describe the largest building on a campus as "infill"; bulky structures are more likely to overwhelm an established quadrangle than to improve it. Dagit/Saylor's Performing Arts Center at Swarthmore College near Philadelphia is an exception; its size is an advantage. The building fills an awkward corner and assumes a different character on each of three sides.

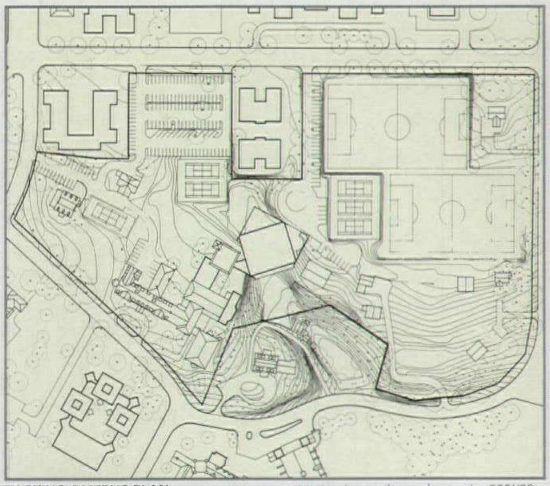
The east façade will follow the setback of its neighbor and defer to Parish Hall, the Beaux-Arts building that dominates the campus. On the north side, a theater lobby will overlook an adjacent music building designed by Mitchell Giurgola in 1972; a pocket of outdoor space will turn a back lot (once bisected by a service road) into a plaza for the performing arts. The center's third elevation overlooks a cul-de-sac (the appropriate place for the scene shop and loading dock); it aligns with the main route from the dormitories to the main campus and faces the student center. Together with an amphitheater in the adjacent woods, the pair of buildings marks a new outdoor place on campus, where Swarthmore's social and artistic spheres come together.

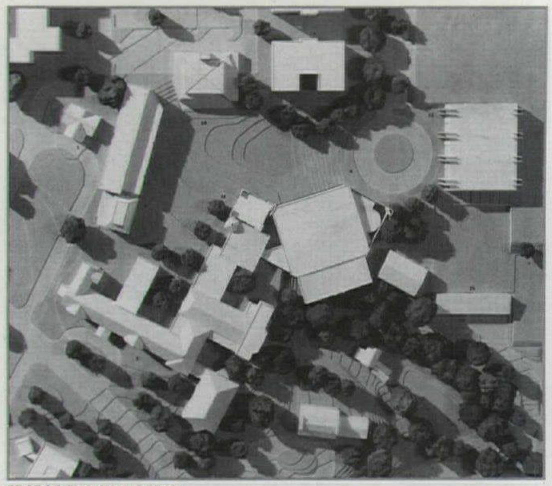
From House to Campus

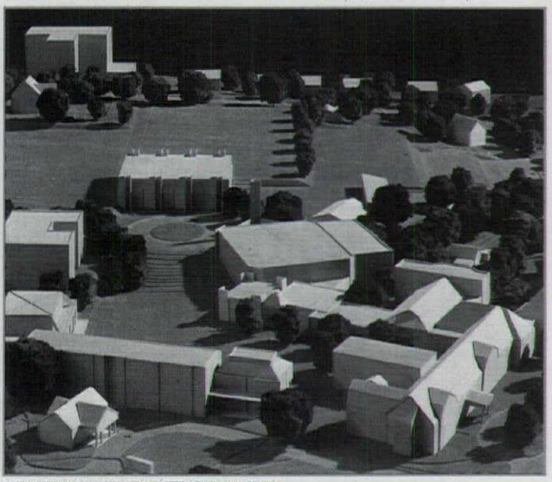
The Shipley School, an academy established a century ago in Bryn Mawr, a suburb of Philadelphia, expanded by simply annexing houses to make one rambling structure. When Kieran, Timberlake & Harris proposed an expansion, they faced a lopsided campus concentrated on one edge of the lot.

The architects have proposed four new buildings behind the original to define an L-shaped green in what was once a backyard. As an ensemble, they create a subtly layered plan without overwhelming the environs' suburban density.

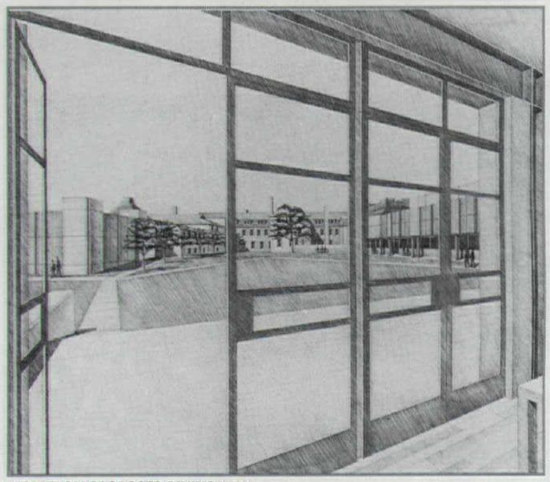
A new entry drive to the southwest of the upper school will create a more coherent path of arrival and a place for admissions and administration that is separate from the academic realm. A middle school next to the U-shaped drive will act as the north face of the campus green. The adjacent dining hall will be set opposite the upper school. The architects also proposed a new gymnasium; it will segregate the athletic fields from the academic lawn and preside over the back half of the campus.


EXISTING CAMPUS PLAN N 300'/90m


PROPOSED CAMPUS PLAN


Barry Halkin

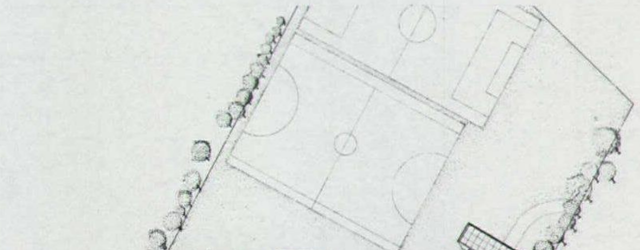
VIEW TOWARDS PROPOSED GYMNASIUM

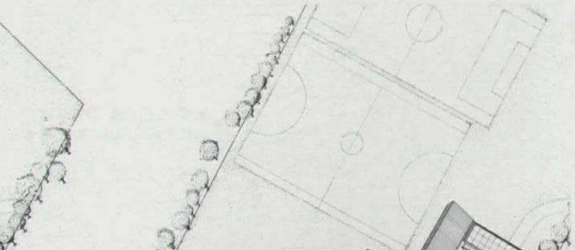

VIEW FROM PROPOSED DINING HALL

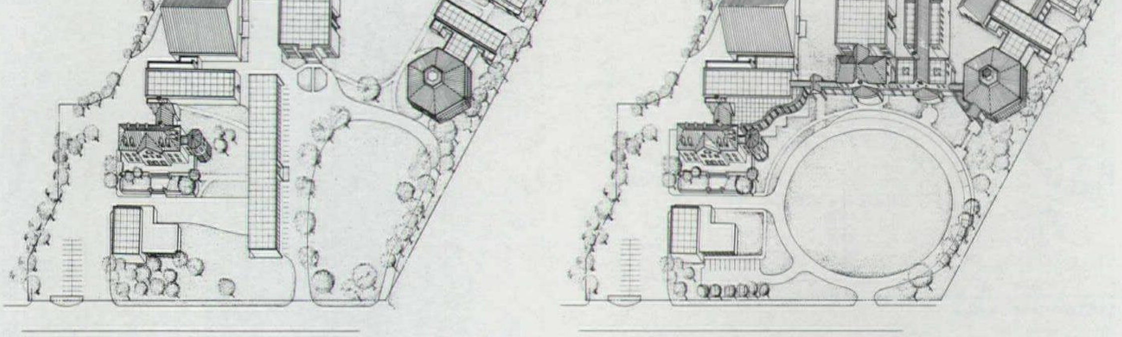
Setting a private school in an old mansion is at once an advantage and a problem: By virtue of their enrollment, students become heirs to a dignified architectural image. But if the school grows without any master plan, it can overwhelm the original estate and eventually resemble an overcrowded side yard, rather than an academic campus.

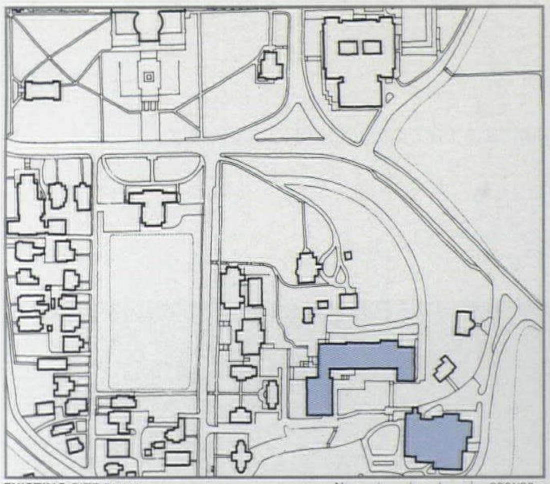
The Shore Country Day School in Beverly, Massachusetts, epitomized this pattern; its initial building, a Palladian-style mansion, was nearly engulfed by several modern structures.

Perry Dean Rogers and Partners have proposed a rehabilitation of the school's modern structures into a campus green. They will demolish an obtrusive classroom building and build a glazed arcade to link four separate structures, some new and others enlarged. Most will have entirely new façades, designed as classical counterparts to the original estate. The front yard of the mansion, blocked years ago by a building for the art department, will be supplemented by a common, the new formal entry. No longer a random array of institutional boxes, the campus will be reconfigured as an educational village.

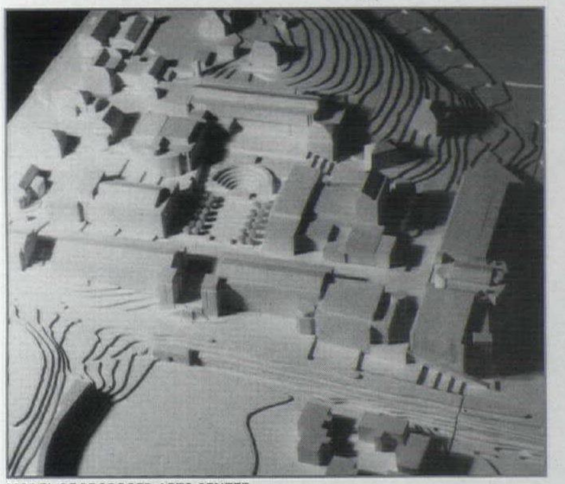

EXISTING CAMPUS PLAN


PROPOSED CAMPUS PLAN N 100'/30m

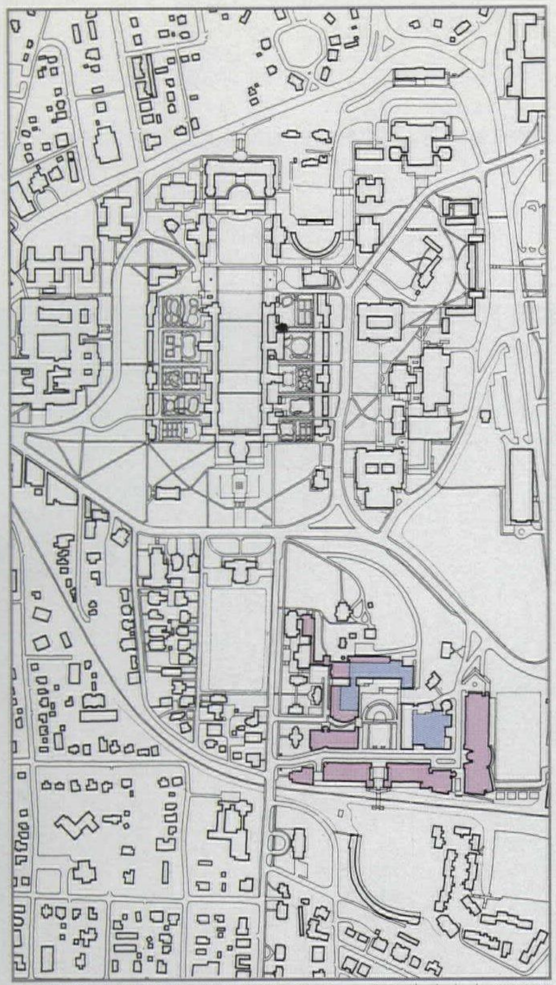

PROPOSED CAMPUS COMMON



EXISTING SITE PLAN N 300'/90m



MODEL OF PROPOSED ARTS CENTER



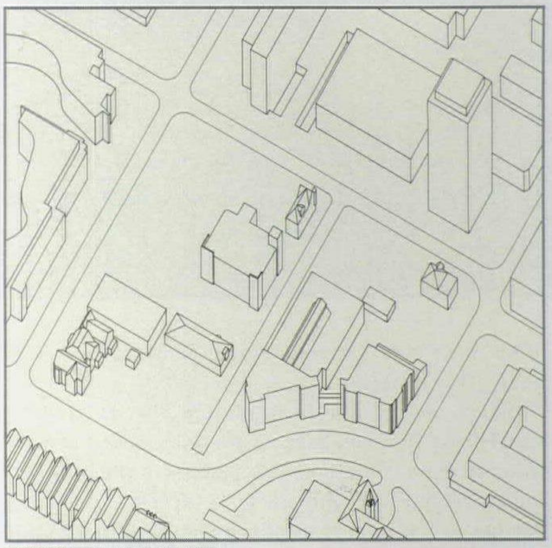
CAMPUS PLAN WITH PROPOSED ARTS CENTER N 300'/90m

Assembled Quadrangles

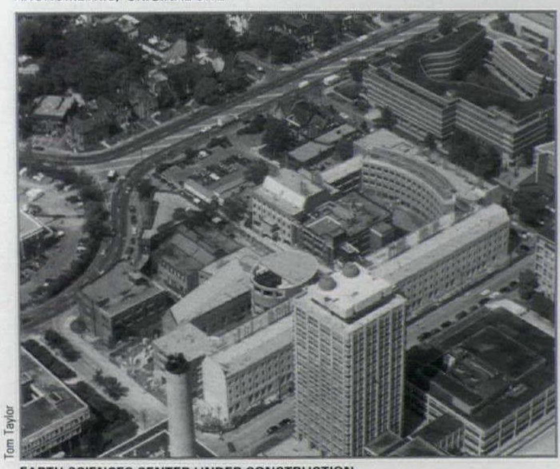
For campus buildings that are much larger than their neighbors, the infill process can be reversed: Expansion plans may call for the separation of new and established buildings, so that the more finely-scaled context is not overwhelmed. Michael Dennis and Associates face this scenario in their proposal for a new arts center at the University of Virginia; their site is adjacent to the drama and architecture departments, two sprawling structures set on a hilltop behind a street of houses.

Dennis saw that a new quadrangle would provide the arts a territory of their own and minimize the center's impact on the established houses. It will not be isolated but will have lawns inserted between new and existing buildings, both to provide new gathering spaces and to maintain the site's views.

When seen from the rest of the university grounds, the new center will be an "acropolis for the arts"; from within, it will be a multilayered collection of buildings, centered around a new figural space that complements Jefferson's academic village.

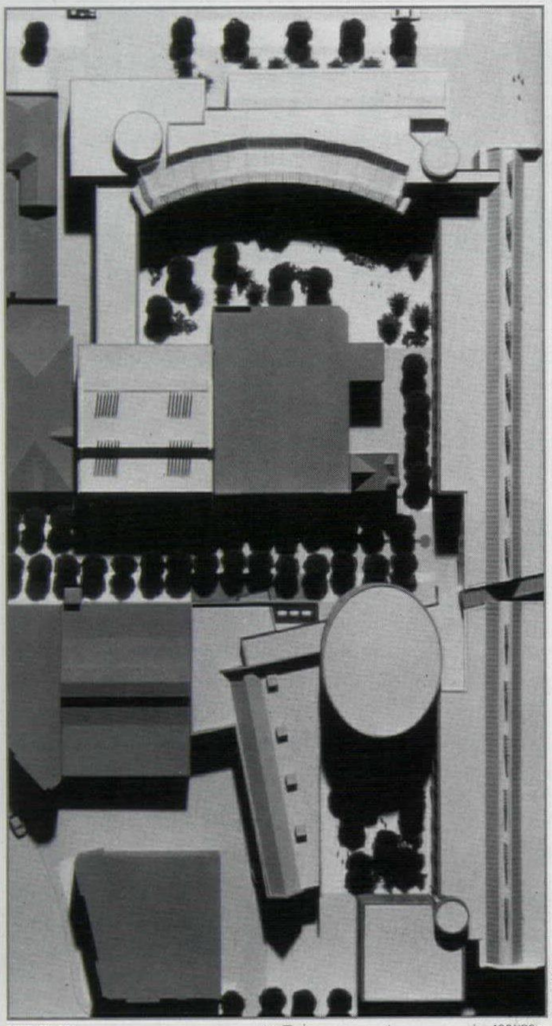


AXONOMETRIC, ORIGINAL SITE



Tom Taylor

EARTH SCIENCES CENTER UNDER CONSTRUCTION



Tony Wibley

SITE PLAN N 100'/30m

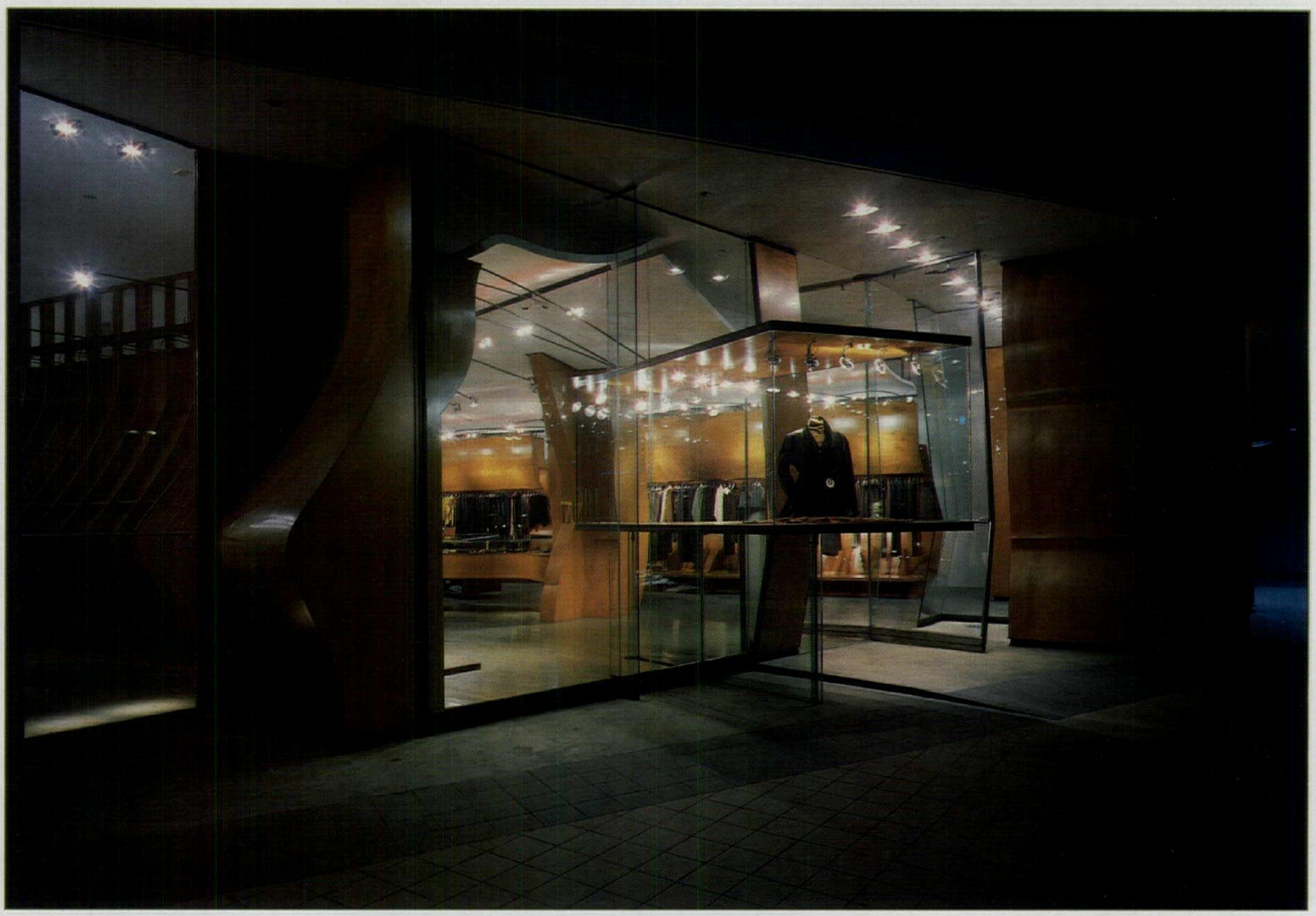
The Earth Sciences Centre, an annex to the University of Toronto, was once a parking lot and has become a double block of three arcaded courtyards. Several Edwardian townhouses, remnants from decades past, are now linked to a wraparound building that incorporates laboratories, offices, a greenhouse, lecture hall, and library. Designed by A.J. Diamond, Donald Schmitt and Company, in association with Bregman & Hamann Architects, the new complex brings the perimeter block, a traditional urban model, to the campus.

The centre exemplifies the *bricolage* strategy advocated by Koetter and Rowe in *Collage City:* Houses have been assimilated into a new structure scaled for an urban campus. Projecting windows mark major entrances; a gabled roof crowns the library, and the lecture auditorium is housed in a cylindrical drum.

The Centre's outdoor spaces refer to the street that once bisected the site, while creating a place students can identify as their own. Diverse buildings, old and new, are distinct parts of a coherent whole; places like this would be a welcome feature in any contemporary city.

Out on a Limb

Two projects by Michele Saee of Building embody a commentary on the mandate and makings of architecture.



Saee rebelled against the blandness of the two-story open shopping mall, which contains the Ecru boutique, puncturing its uneventful street wall with sculptural forms that invade the sidewalk: A glass vitrine (above) protrudes out of the store, supported on a fin of structural glass that pierces the glazed storefront. In the foreground, placed at an angle to the boutique's convex glass door, stand plywood sculptures (facing page, far right), whose silhouettes were inspired by an Indian figurine (facing page, background). In order to preserve a sense of the entire figure in the enlarged fragments, the designers translated the forms into a proportional system of measurements. Building these and other such fancifully contoured pieces was the project's greatest challenge. Saee recorded the process of mounting the curved plywood panels on a wooden frame (facing page, top right).

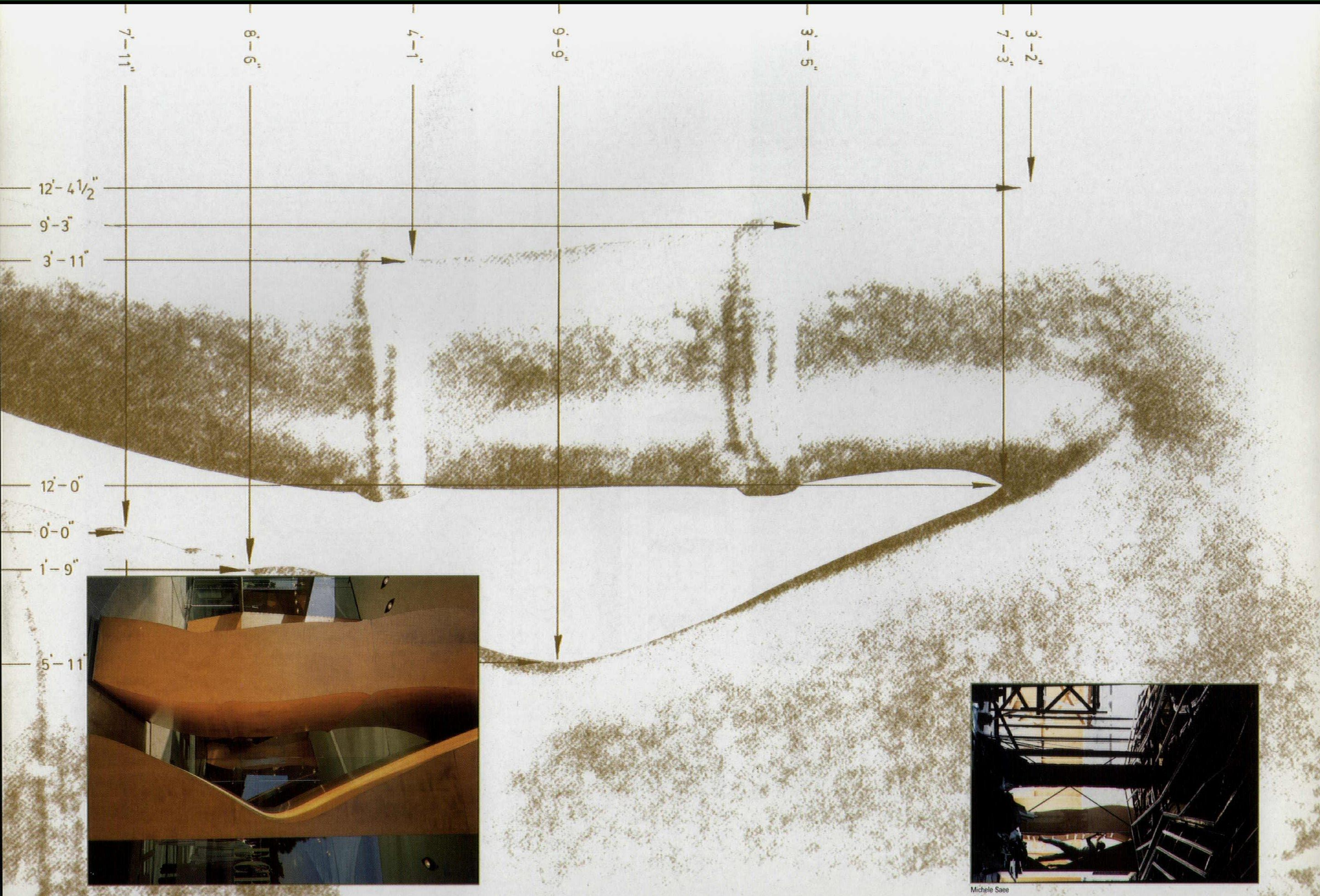
Some architects are content to draw their inspirations – and justification – solely from the realm of architecture. But not Michele Saee. With each project the young designer continues to broaden his scope. As the clothing store and restaurant featured in the following pages illustrate, Saee is frankly fascinated with form and how it is perceived. But beyond the immediate visual appeal of his work, there is almost always a contextual element, comprising urban gestures as well as more subtle allusions to specific characteristics of the site and program. The result is a complex architecture that prizes communication above arbitrary image. "I think the definition of architecture is greater than buildings or technology," Saee says. "Humane and political and social values are becoming the issues, not just architectural ones."

Ecru Boutique, Marina del Rey, Los Angeles

There is a strong urbanistic rationale behind the design of the store's façade. It constitutes a "billboard," addressed to the car culture of Los Angeles. In this, it follows previous Saee projects, such as the Design Express franchise in Culver City (P/A, June 1989, p. 78), or Trattoria Angeli in West L.A. (P/A, Sept. 1988, p. 112).

To create the storefront of an earlier Ecru outlet on Melrose Avenue, Saee employed a plastic composition derived from the outsize letters of the company logo. Initially, he intended to develop that idea further in the treatment of the second store's façade by taking the characters and enlarging them even more. The abstraction that resulted was formally rich but connected only tenuously to the typeface from which it originated. This liberated the design team to explore other sources. "We started looking at imagery in a different way," Saee explains. "Clothing is closer to our body than any design. I thought, 'Why don't we take the human body?' " The team looked at figurative sculpture from different periods and diverse cultures: Buddhist, Mayan, Hindu, and African. They selected a highly stylized Indian figurine and adapted its sensuous contours for sections and elevations of the store's interior partitions, as well as the figural "billboard" on the street.

This affinity for evocative biomorphic form is characteristic of much of Saee's work. He believes that

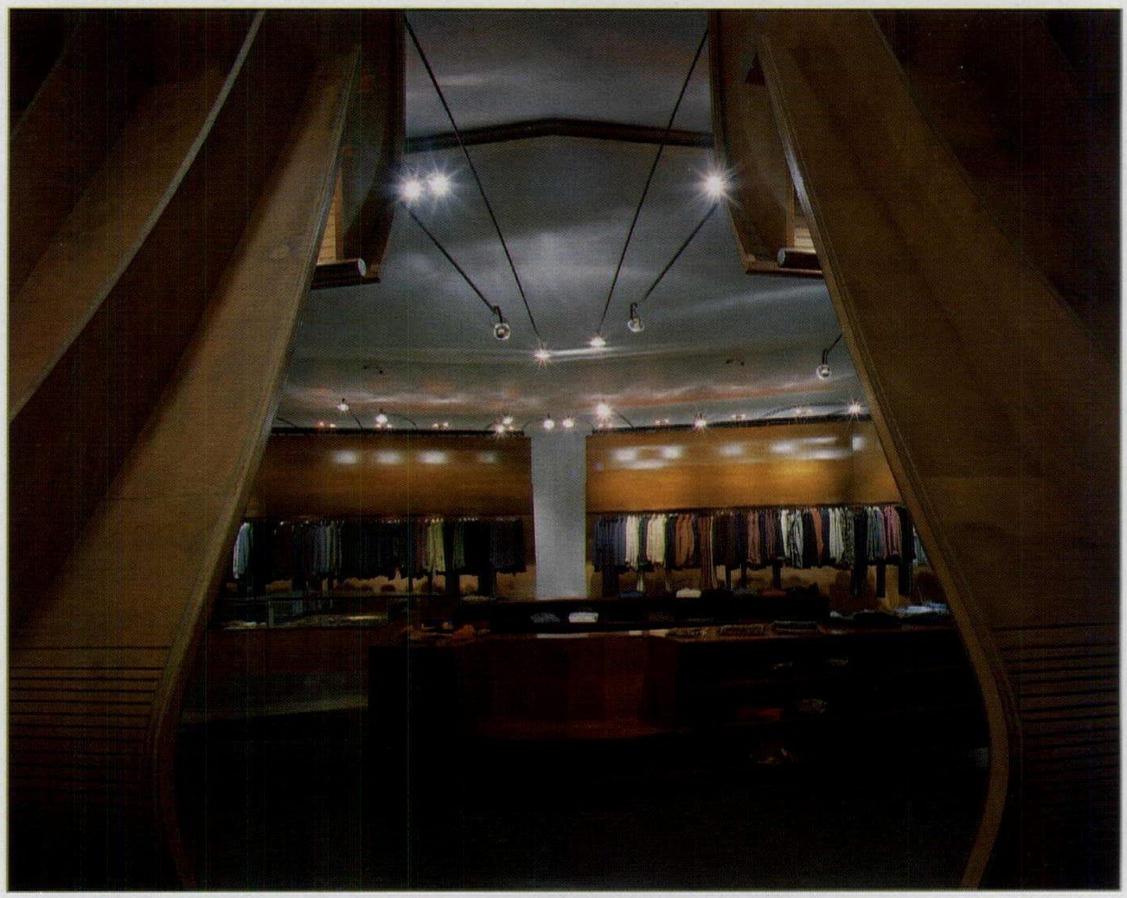


Michele Saee

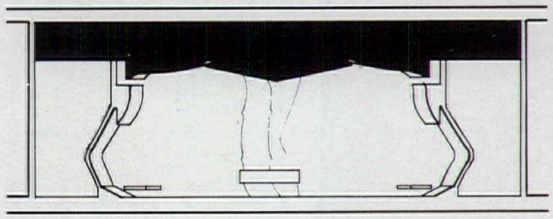
"I think a lot about why buildings follow a geometry of right angles so much. I'm sure it's a matter of convenience. Our industries moved toward that, but they could very well have taken another direction. I don't see that cubes or boxes are related to our lifestyle in origin."

"A beautiful plan [or] section doesn't necessarily make great architecture. We can't analyze physical response by looking at plans and elevations . . . In the Sagrada Familia the fear of God comes to me. What part of [Gaudí's] mind created it?"

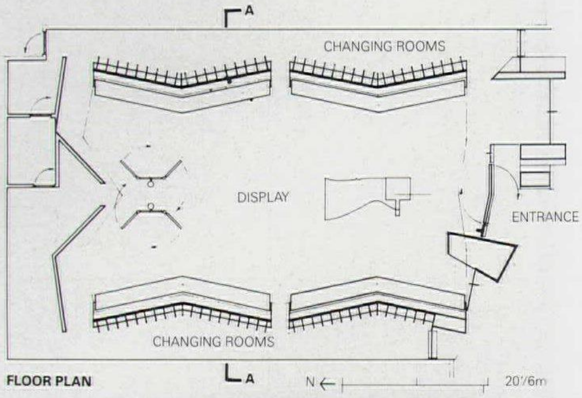
"I think the definition of architecture is greater than buildings or technology. Humane and political and social values are becoming the issues, not just architectural ones."



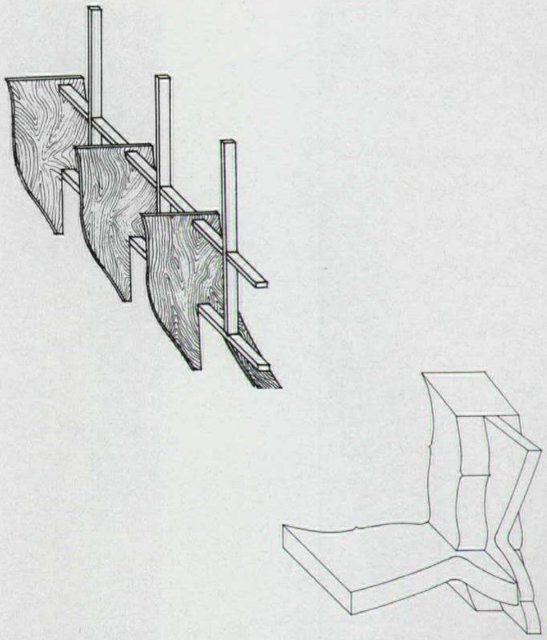
ELEVATION



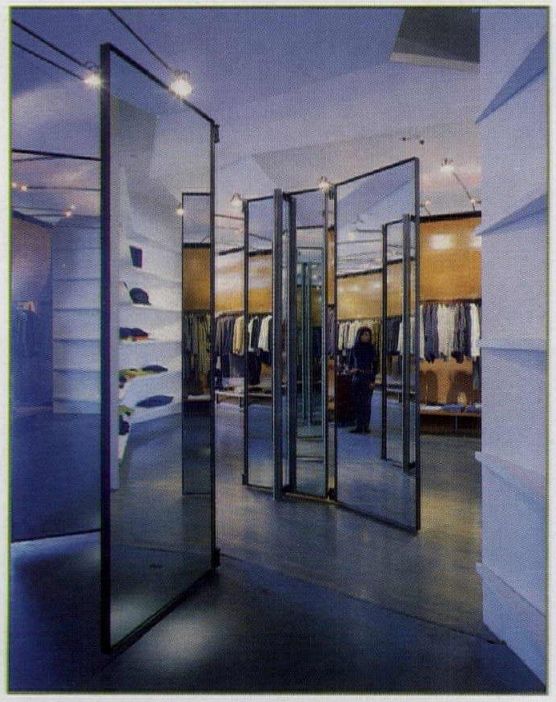
SECTION A-A



FLOOR PLAN



AXONOMETRICS OF UPPER RIB SUPPORT (TOP) AND DISPLAY CASE CANTILEVERED OFF FIGURED COLUMN (BOTTOM)



architecture should be "felt," as much as seen, and is skeptical about the rewards of design that is entirely cerebral. "A beautiful plan [or] section doesn't necessarily make great architecture," he says. "We can't analyze physical response by looking at plans and elevations." Lengthy geometric and compositional analyses of works by modern masters reveal very little about their intrinsic power, he contends. "The beautiful part of it is that when you're in the space you're blown away. When you're in Ronchamp every vein of your body starts moving. In the Sagrada Familia the fear of God comes to me. What part of [Gaudí's] mind created it?"

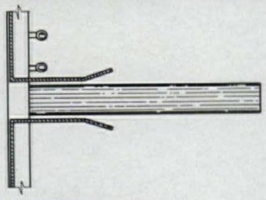
Besides the urbanistic gesture that generated the bold imagery of this Ecru, there are subliminal contextual references at work. Given the store's proximity to the Venice marina, Saee indulged a longtime fascination with boat construction, shaping the ceiling of the space like the ridged bottom of a boat. He'd hoped to build it out of wood. That proved too costly and so the ceiling formation was made of molded gypboard. The latter was expensive, too, albeit in labor and frustration: To achieve the curved planes it was necessary to wet and score drywall panels, which tended to dissolve when too much water was applied. The margin for error was agonizingly slim.

The wetting and inch-by-inch scoring technique was also used to bend the plywood panels for the curvaceous partitions that frame the main space. Since the discrete panels had to blend into a fluid continuity, here, too, tolerances were extremely low. Saee spent a good deal of his time on site. "To figure out how to build those walls – just to make those things happen – was the biggest challenge," he recalls. "At first, you give [something like this] to the carpenters and they just look at you."

The extensive use of wood throughout the store has in itself a nautical, and thus contextual, connotation. Saee fantasized about having a shipwright tackle the construction "because a boat builder would have come up with much more than a carpenter could imagine," but the limited budget ruled it out. Even so, the workmanship that was lavished on every element is a pointed reminder of craft traditions worth preserving.

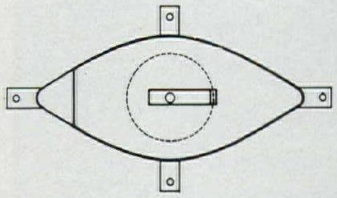
Saee's hands-on commitment to quality construc-

Saee divided the store into three strips: The "nave" (above) is bracketed by undulating, plywood-paneled walls mounted on wooden ribs. The elongated spaces on either side of the store are reached via "slots" in the ribbed walls, and serve as changing rooms with fabric partitions. At the front of the store, Saee built a contoured column, from which a massive glass and wood display case is cantilevered (above, center). At the other end, he erected a stand of pivoting mirrors (facing page, bottom). Angled display credenzas of wood (above left and right) incorporate faceted benches (facing page, top). Part of the floor in the main space was covered with wood to level a two-inch difference in grade. The remainder of the floor is stained and sealed concrete. The ceiling is made of warped gypboard, evocatively shaped like the bottom of a boat. Saee's graceful custom boom lighting throws the sculpted ceiling into relief.



DETAIL OF DOOR HANDLE

6"/.15mm



DETAIL OF RECESSED LIGHTING FIXTURE

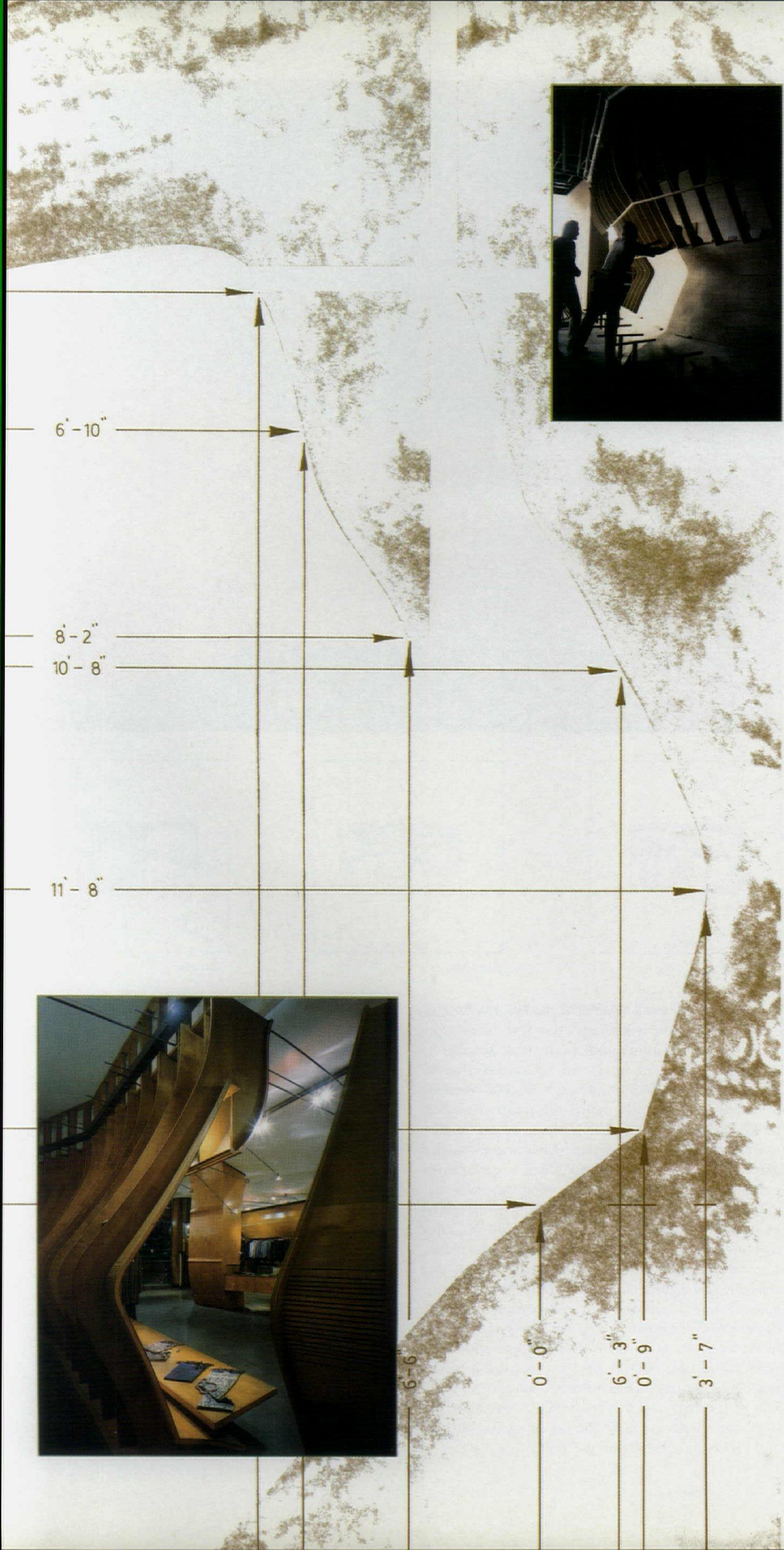
6"/.15mm

The contours of the Indian figurine's breast and torso (facing page, background) yielded the profiles of the interior walls (facing page, bottom). Studs suspended from a gridded beam were used to support the partition panels. To bend the plywood into the requisite curved planes, each segment was submerged in water and scored. Once mounted on the contoured studs (facing page, top) they dried and set into position. The scoring remained as a decorative reminder of the process, visible on the ribbed, changing-room side of the partitions. The pivoting front door (above, right) exhibits a similarly high level of workmanship. Its angled panes of glass are held with structural silicon. A diamond-shaped void surrounds the handle (above). In keeping with the anthropomorphic motifs elsewhere, the recessed lights in the exterior canopy are set into eye-shaped cavities.

tion, so abundantly evident in Ecru, reflects the political side of the young architect, particularly his opposition to a profit-driven, "fat cat" developer-dominated building industry. When architects become overly enamored with the end product, he says, "we miss the true quality of the end experience, and we lose the process. When we lose the process we lose values, such as craftsmanship, and love." A resistance toward technology-dictated form is a corollary of those values. "I think a lot about why buildings follow a geometry of right angles so much," he says. "I'm sure it's a matter of convenience. Our industries moved toward that, but they could very well have taken another direction. I don't see that cubes or boxes are related to our lifestyle in origin."

Saee's interest in organic forms legitimately links him to predecessors like Wright or Nervi, as well as to contemporaries like Calatrava. But though his imagery is quite literal in this project, he did not pursue anatomical or metabolical analogies for its structure, functional organization, or circulation. On another level, however, Saee's "body architecture" is decidedly interactive. Details such as the front door's handle – a rod suspended in a diamond-shaped void – imply the presence of, and are completed by, the human hand, so turning the user into an integral part of the design.

In contorting plywood and gypboard into curvilinear shapes, Saee might be accused of what Jean Prouvé condemned as the "torment" of inappropriate materials. Certainly, budgetary constraints are an extenuating circumstance. Would it have been better to produce a boxy space to maintain the "integrity" of drywall panels? It is precisely such insular architectural mores that Saee finds so limiting and the products of such "purity" so mute. Weighed against the sensory rewards of Ecru, his bending the rules may well be excused. It remains to be seen what kind of design the young architect can deliver on a larger scale, where his labor-intensive methods are much less feasible.



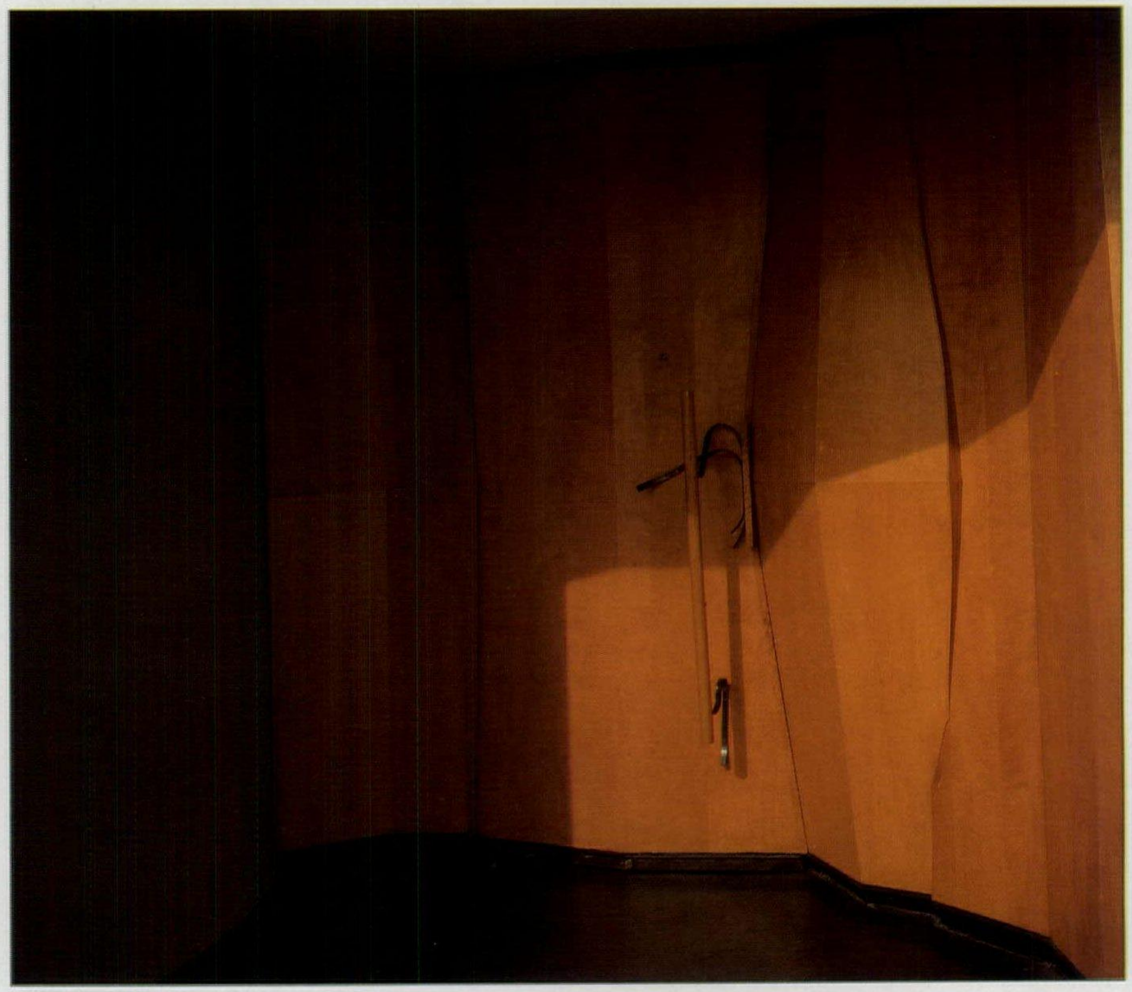
Michele Saee

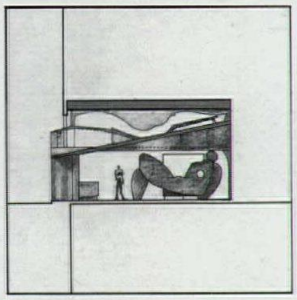
Project: *Ecru clothing store, Marina del Rey, Los Angeles.*
Designer: *Building (Michele Saee with Richard Lundquist and Sam Sulhaug, designers; Max Massie, David Lindberg, Florence Blecher, design team).*
Client: *Ecru.*
Site: *Streetfront store within two-story open mall near the marina.*
Program: *3000-sq-ft retail space including changing rooms, office, and storage.*
Major materials: *Wood, plywood, glass, structural silicon, drywall, steel framing, concrete. Custom light fixtures designed by Building.*
Mechanical system: *Ward's Heating & Airconditioning.*
Consultants: *Andrew Nasser, Miguel Castillo, engineers; Saul Goldin, lighting.*
Contractor: *Rotondi Construction, John Rotondi, G.C.; Vince Naso, supervisor.*
Fabricators: *Jeffers Machine Shop; Danny's Ornamental Iron Shop; Heritage Painting; Animal Fronts, glass.*
Costs: *$200,000.*
Photos: *Marvin Rand, except as noted.*

The restaurant's front door (right) is masterfully made of overlapping irregular wood planes. Until the moment that it swings open, how the wings will separate remains a mystery. With virtually no orthogonal elements, the door was all but impossible to draw; Saee used models to explain its formation to the carpenters, who then had to "eyeball" the actual construction.

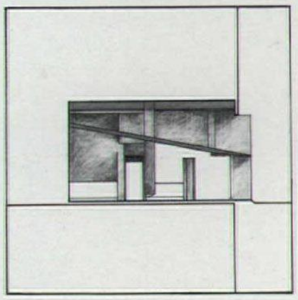
Given the complex program he had to accommodate in a relatively tight, awkwardly proportioned space, the floor plan had to remain simple, Saee explains. Much of the spatial interest is generated by diverse ceiling treatments, as evidenced in the way sections vary from segment to segment (below right). The dining hall (facing page, top) was conceived as an extroverted space. Associations to outdoor restaurants are triggered by its transparent front and trellis-like ribbed ceiling construction (see Selected Detail, p. 116). HVAC and other mechanical systems are enclosed in a wave-like section built of sculpted gypboard. In keeping with the marine motif, the dining tables are topped with marble in which shellfish fossils are embedded.

The bar is meant to be a more private space (facing page, bottom right). It is shielded from the street by wood paneling and draws daylight in through a skylight, floor-level "clerestory," and translucent "prow" (facing page, bottom left). A figural steel wine rack operates like a freestanding sculpture (facing page, top, and middle right) that reinforces the dining hall's outdoor feel as it screens the bathrooms and waiter station.

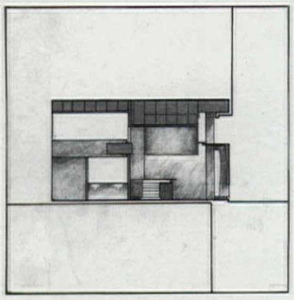




SECTION AA



SECTION BB



SECTION CC

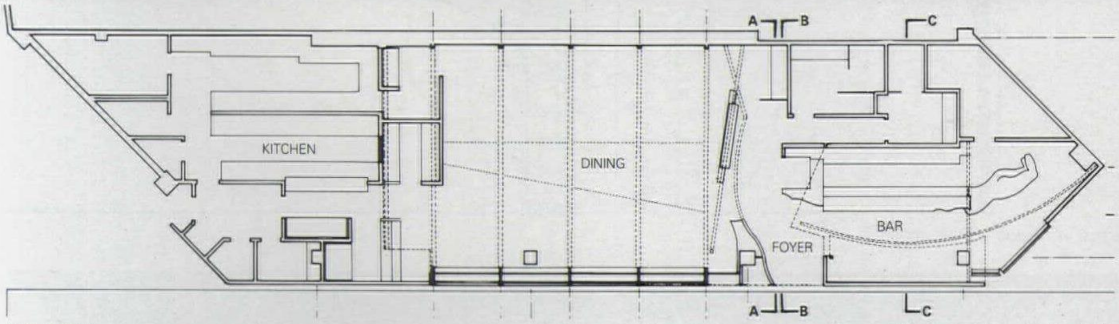
Angeli Mare Restaurant, Marina del Rey, Los Angeles

The restaurant is located just a few doors down from Ecru, also within the shopping mall. It was commissioned before the store, and Saee recalls that before he could begin to work on it he had to overcome a "strong resentment" toward the uninspiring host building. His choice of materials and shapes used on the exterior – wood and glass plates and an angled glass bay at one end – were intended to give the impression that the restaurant preceded the mall.

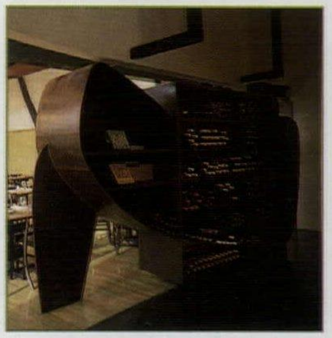
Inside, Saee was confronted with an extremely elongated space, which he divided roughly in three to house the bar, main dining space, and kitchen. Locating the entrance between bar and dining simplified circulation and enabled the designer to develop different characters for each segment. Saee addresses Angeli's function as a seafood restaurant and its closeness to the marina with multiple and sometimes conflicting metaphors: The structure is loosely analogous to that of a fish, with an opaque head which houses the bar, and a "vertebrate" construction for the body, which contains the dining space. Kitchen and services are located in the "tail."

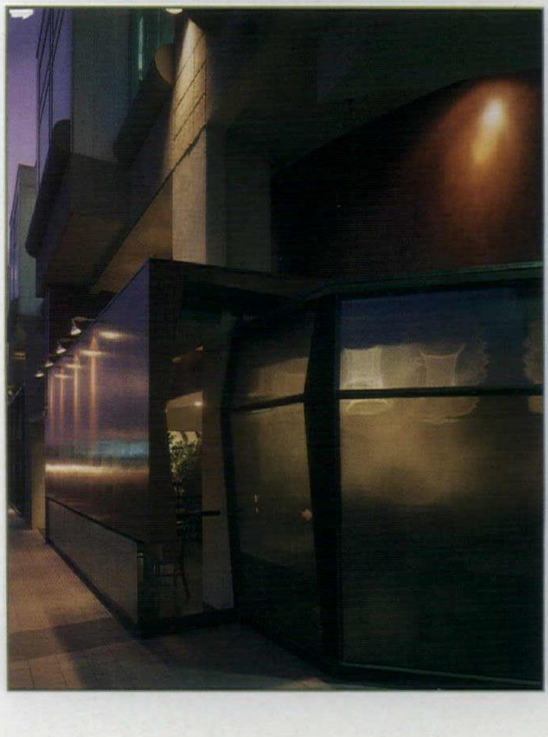
Saee intended the main dining area to read as an exterior space. Oddly enough, there aren't many open air restaurants in L.A., and Saee wanted Angeli to compensate, if only figuratively, for that lack. The ceiling is treated as a trellis, built of vaguely biomorphic ribs connected with wooden louvers. But Saee has no qualms about using another, quite contradictory image – of a space submerged beneath water – which is implied by the greenish cast given to the stained wood floor and angled wood wall panels, and by a witty "water line" incised, about seven feet above floor level, in the glazed front wall.

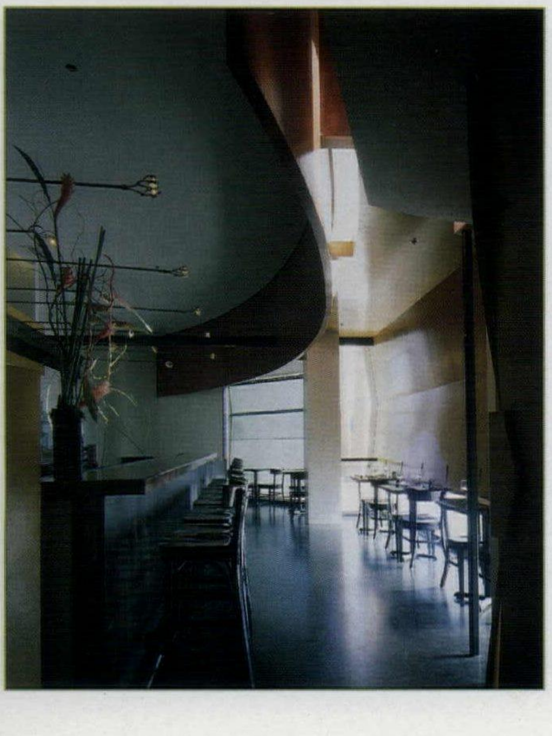
While the restaurant as a whole falls short of the formal and spatial impact of Ecru, it is nonetheless engaging and built to reward closer scrutiny. If anything, as restaurant design veers increasingly toward the loud and sensational, Saee is to be commended for his restraint here. It is appropriate that in what the architect considers his most public commission, design takes a back seat to conviviality. **Ziva Freiman** ■



FLOOR PLAN





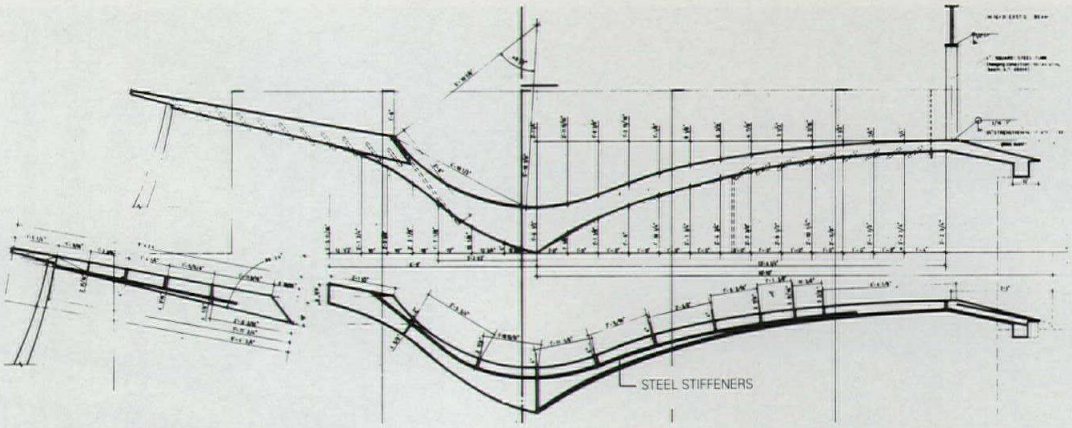


Project: *Angeli Mare restaurant, Marina del Rey, Los Angeles.*
Designer: *Building (Michele Saee, designer; David Lindberg, John Scott, design assistants; Max Massie, Richard Lundquist, Florence Becher, Sam Sulhaug, design team).*
Clients: *Evan Kleiman, John Strobel.*
Site: *Ground floor corner space within open shopping mall near marina.*
Program: *4000-sq-ft including kitchen, dining, bar, bathrooms, storage.*
Major materials: *Steel, wood, glass, plywood, steel frame with drywall, concrete, tile. Lighting by Building.*
Consultants: *Andrew Nasser, Miguel Castillo, engineers; Sam Goldin, lighting; Kitchen by Tony Singaus.*
Contractor: *Rotondi Construction, John Rotondi, G.C.; Vince Naso, supervisor. John McCoy, steel fabricator; L.O.S Glass, glass.*
Costs: *$100/sq ft excluding kitchen equipment.*
Photos: *Marvin Rand.*

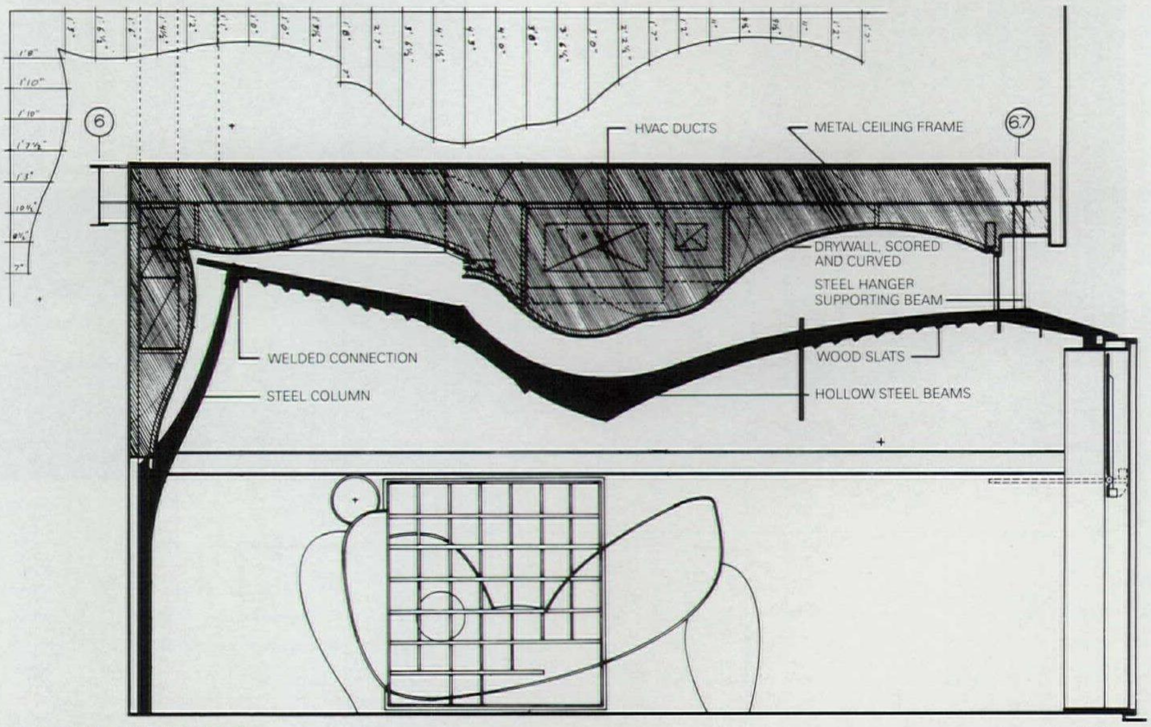
Selected Detail

Ceiling structure
Angeli Mare
Marina Del Rey, California

One of the dictionary definitions of organic is: "organized, systematically arranged." And so it is with the organic forms of the ceiling at Angeli Mare by Michele Saee and his firm Building. The ceiling's profiles were drawn from those of the human body. But behind these organic forms is a clear order and systematic arrangement of parts. The undulating ceiling, which hides ductwork, was made by scoring and bending sheets of drywall to fit the profile of a curved metal frame hung from the structure above. Below this surface stands a steel structure, with shaped steel beams supporting angled wood slats (bottom right). The steel beams are hollow, with steel stiffeners for strength (drawings, top right). At the front of the restaurant, each beam is hung from the structure above, and at the back each rests on a curved steel column that emerges from the rear wall (section drawing, middle right). The angled wood slats provide lateral support for the beams and help create the desired effect of an outdoor space with latticework. The drawings give the dimensions of these undulating profiles at regular intervals, much the way a civil engineer might dimension the contours of a landscape. Such is the organization that underlies the organic. ■



ELEVATION AND SECTION THROUGH STEEL BEAM



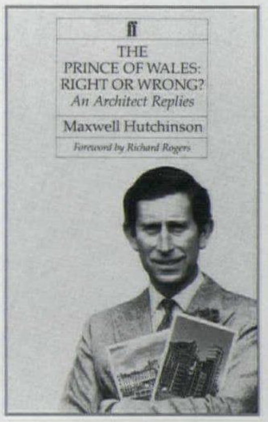
SECTION THROUGH DINING ROOM

Marvin Rand

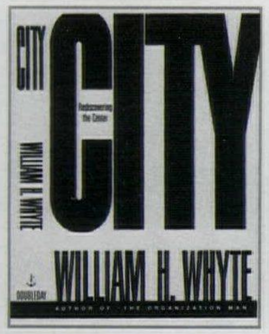
Books

David Lewis notes that the Prince of Wales and his critics share a common respect for the city, despite their disagreement on Modernity's impact.

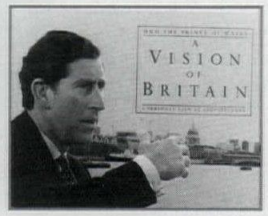
"Rogers would certainly agree with Prince Charles's statement that 'when a man loses contact with the past he loses his soul.'"



The Prince of Wales: Right or Wrong? An Architect Replies *by Maxwell Hutchinson, Faber and Faber, London, paper, 203 pp., $8.95.*



City: Rediscovering the Center *by William H. Whyte, Doubleday, New York, 1989, 386 pp., illus., $24.95.*



A Vision of Britain: A Personal View of Architecture *by HRH The Prince of Wales, Doubleday, New York, 1989, 160 pp., illus., $40.00.*

Perhaps His Aim is True

Everyone who reads this magazine knows that Prince Charles has brought a long-standing debate to a head. In 1984, in a much publicized speech to the Royal Institute of British Architects, he socked it to them. He accused architects of willfully inserting Modern buildings into cities, without concern for context and continuity, or for the feelings of the people who use them. The speech clearly cut close to the bone, or else, like almost every other royal address, it would have been forgotten.

Phrases still echo in our heads and won't go away, sick though we may be of hearing them; they remain obstinate images of conscience. This was the speech where the Prince referred to a skyscraper proposed by Mies van der Rohe for the heart of London as a glass stump better suited to Chicago, and to a proposed addition to the National Gallery on Trafalgar Square as a carbuncle on the face of a much-beloved friend. But for the majority of the British public, most of whom had never heard of Mies and couldn't care less about the addition to the National Gallery, his accusation struck a deep chord.

Ironic though it may seem to Americans, the heir to the throne was speaking, not as a remote and future king, but as a citizen. Talking about mass housing for working families, and about concrete and glass office structures rising sheer from the streets and squares of traditional cities, he begged architects to listen to the voices of ordinary people and to hear their aspirations as users, instead of committing them to environments that they find cold and alienating and destructive to the human spirit.

That speech, given nearly six years ago, was instantly assailed by Britain's architectural establishment as intellectually sophomoric. And it was. But that was precisely its value. From his heart Charles said things that needed to be said, and because of who he was they made the front page of every newspaper. I doubt very much that he wanted to polarize the profession or whip up broad public anti-architectural sentiment. Indeed the anger of institutional architects at the impact of his speech and the incredible outpouring of support for his position led him, in the months and years that followed, to deepen his understanding without blunting his insight.

In speech after speech, in Britain and in the United States, he has returned to his theme that architects and developers are remote from their real clients, the people, and pay little heed to the cultural continuity and context of cities. He has made a widely distributed documentary for the B.B.C. and has published a book, *A Vision of Britain.* In rebuttal, the President of the Royal Institute of British Architects, Maxwell Hutchinson, has published his own book, *The Prince of Wales: Right or Wrong? An Architect Replies,* with a foreword by R.I.B.A. gold medalist Richard Rogers. So broad has the furor become that in a London Sunday Times poll last September, one third of the British public was aware of the issues – and 87 percent sided with the Prince.

U.S. architects might like to think of this as a purely British tempest in a teapot. They couldn't be more wrong. In spite of many wonderful buildings, our horrors, like Britain's, far outweigh our triumphs. The cores of our cities are perforated with office towers that could equally well be in Minneapolis or Tulsa, Denver or Dallas, and that come down to the street with the sensitivity of guillotines. Public housing slabs and townhouses in every major city, conceived as utopian answers to inner city slums, are living hells for the families who occupy them, imprisoned by segrega-

(continued on page 192)

Books of Note

Wexner Center for the Visual Arts, The Ohio State University, ***Rizzoli, New York, 1989. 208 pp., paper, illus., $29.95.***
This is a handsome book, with design sketches, working drawings, construction photographs, and views of the completed building. Anthony Vidler and Rafael Moneo offer insights on the Center's monumentality and relation to its site.

Russian Architecture of the Soviet Period ***by Andrei Ikonnikov, Raguda Publishers, Moscow, 1988. 396 pp., illus., $19.95.***
Party-line politics notwithstanding, this is a handy survey, extending to the 19th Century; first and second rate works are illustrated, to reflect the range of Soviet architecture.

Architectural Education and Boston: Centennial Publication of the Boston Architectural Center 1889–1989 ***by Margaret Henderson Floyd, Boston Architectural Center, 1989, 177 pp., illus., hardcover $45.00, paper $35.00.***
More than an account of the BAC, this is a study of Boston's architectural circles. Interviews and first person accounts, as well as a section on landscape architecture, illustrate Modernity's impact on a city of strong traditions.

Southern Comfort: The Garden District of New Orleans, 1800–1900, ***by S. Frederick Starr, MIT, Cambridge, Massachusetts, 1989. 308 pp., illus., $39.95.***
This study reveals a suburb as rich – financially and architecturally – as most American cities. It presents the Yankees who developed the Garden District, the architects they hired, and the cotton boom that funded New Orleans' premier suburb.

See Tech Notes (p. 45) for listings of other publications of interest.

Perspectives

Steve Badanes of Jersey Devil talks about the value of building his own work.

Interview: Steve Badanes

Steve Badanes and his colleagues in the loose design-build confederation known as Jersey Devil completed their first house in 1972, after Badanes graduated from architecture school at Princeton. Since then, the group has operated on the fringes of the architectural establishment, occasionally appearing in the media because of their unusual product and even more unusual process. Jersey Devil members design – and build themselves – one project at a time while living on the jobsite. (Badanes travels in a 1950s' Airstream trailer.) Working drawings are sketchy, and much of the design comes out of the process of construction. Mark Alden Branch checked in with Badanes in Los Angeles in early March.

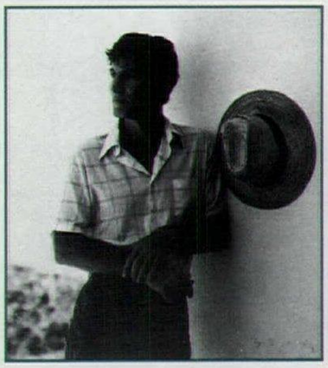
Photos: Alan Weintraub

P/A: What are you up to these days?

Badanes: I just completed a house in Mexico, and now I have this commitment to teach a design-build class at the University of Washington. We're doing a beach pavilion at Seaside next year, and we're looking at a remodeling of a historic house in the Florida Keys. I've been doing a lot of lecturing. I'm amazed that the design/build way of doing things is receiving so much interest in the schools; I've had a lot of invitations to come and speak about it. And when I come, the place is packed, whereas five or six years ago when I spoke, there was a lot more hostility toward the notion of architects actually making their own buildings.

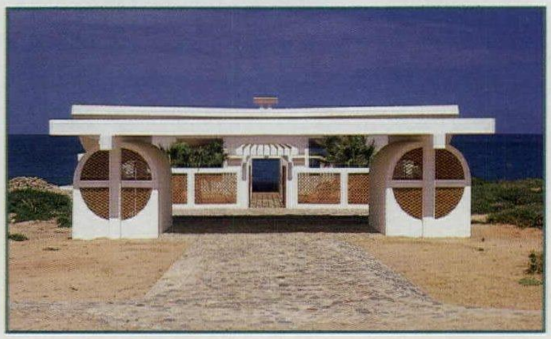
P/A: Why do you think things have picked up?

Badanes: I'm not sure; I think the profession is getting to be a lot more automated, so things are specialized, and, at least on the part of the students, there's an interest in a simpler way of doing things. I think what we do represents a way of retaining control over the design process. That's one reason. Also, I think that people respond to our work now because it's energy efficient; with environmental concerns, I think in the 1990s we're going to see a return to energy-efficient buildings. Another reason I think has something to do with style or fashion. While Post-Modernism was almost a stick-on aesthetic and did not in many cases involve a return to craftsmanship, I see in current work an interest in making things well. The aesthetic is completely different from ours, but there's a real interest in materials and building. In the earlier years, we were seen as outlaw guerrilla builders, but if you've been doing it for 20 years and some of it turns out to be pretty well made, all of a sudden you become artisans, craftsmen. But we haven't changed our clothes; we're still wearing blue jeans and construction shoes.



Steve Badanes

"The guys that made the Gothic cathedrals spent half their life on one job . . . now we have people flying around from job to job and sketching on the plane."



The distinctive roof form of "Camino con Corazon" (top), a retirement home in Baja California for a second-time Jersey Devil client, aids in passive cooling and – in a subdivision where pitched roofs are required – provides bigger vistas of the Sea of Cortez. The roof unites three functional areas separated by breezeways. Folding mahogany-and-glass doors (right) overlook the ocean. A garden and trellis separate the carport area (left) from the main house.

P/A: If you wait long enough, they come back into style?

Badanes: Well, I don't think we've ever been in style, and I think that's probably fortunate. I think we've received just the right amount of publicity. We've never been unknown, but we've never really been famous, either. By working outside of a big city or outside the glare of publicity we're able to focus on what interests us, which is very rarely what interests the architectural media.

P/A: And what about Jersey Devil? Are you guys still working on projects together?

Badanes: Jersey Devil is more like an idea than an actual operation. Jim [Adamson] is mobile enough to be able to go anywhere. He came down to Mexico and worked on the cabinetry and the doors and windows there. Greg [Torchio] has his own practice in Virginia now, as does John [Ringel] in New Jersey, although John's still involved; he keeps the Jersey Devil post office box and phone number there. I think if there were to be another project of significant size, we would actually regroup to do it. But as long as it's something small, it's just the three of us working on our own things and keeping in touch. The common thread is

"We're now able to achieve an expressive or emotional effect without doing something that makes your jaw drop; maybe we're just growing up."

that everything is design-build.

P/A: What kind of client do you look for, someone who likes to get involved in the design and construction or someone who'll turn it over to you?

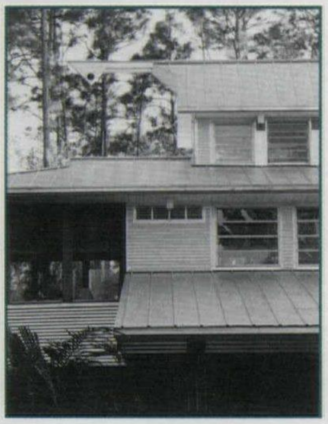
Badanes: It depends. The right project in the right location seems to be what we need. If you're going to make a commitment of a year or two, then I think it should be something that involves some kind of personal growth and, in the design process, an interesting site. In our case, it's usually got to be some place nice if we're going to live there. One type of project we're looking for is in the public domain, where the kind of work we do can be experienced by a lot more people than just a homeowner. And that's the reason we're interested in doing this beach pavilion at Seaside, because it is, in a way, a public structure.

P/A: And in a more urban setting, while most of your buildings seem to be set off by themselves. Would you ever like to do something in the middle of a city?

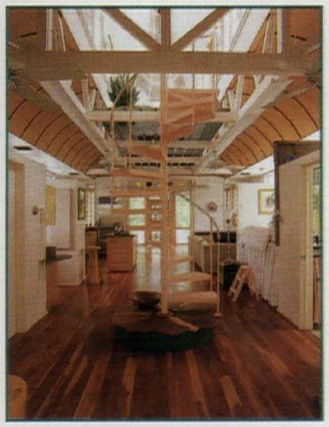
Badanes: It would depend what it was. I wouldn't mind working in that kind of context, but we've never been able to make that step, whether we wanted to or not. Architects have generally used houses as stepping stones to bigger work, and in our case I think we could build something bigger, but we've been pretty much buttonholed as house constructors.

P/A: I'm wondering about the preoccupation in your work with circular geometries and certain things that reflect the organic school of Bruce Goff and others.

Badanes: I don't think it's a preoccupation. If you look at the recent stuff, we've been getting a lot more simplified, rectilinear, and abstract. I think in the earlier buildings, in particular, there was much more of a sense that something could be expressionistic, and that was a goal. I don't know if it came so much from the organic school. It probably does have to do with the fact that, as you say, the sites are isolated, and the context is nature. So we're reacting to site conditions, climate, regional technology, energy orientation, and often that doesn't turn out to be a box. Some of it has to do with building technology: Our early buildings were made out of silos, barn rafters, manhole risers, all circular items. We were using them because we were working with a limited budget and trying to do something interesting by using off-the-shelf materials in an unusual way. You think we're obsessed with circular geometries?



The design for the Palmetto House (top) in Southern Florida was also driven by the area's tropical climate. Its screened porches, raised living area, and vented walls help cool the house passively, and the metal siding and roof are more durable than wood in the high humidity. The ridge pole is detailed with a "flag" (above) that is lighted from within at night. Inside, a floor of metal grating in the loft also assists in ventilation (below).



P/A: I didn't say obsessed, I said preoccupied, but I'll concede that the Florida house is a departure.

Badanes: Yeah, those people, in the program, didn't want any curves. And if you look at the plan of the Mexican house, you'd be totally surprised to find that there's a curve in the section. I think we're now able to achieve an expressive or emotional effect without doing something that makes your jaw drop; maybe we're just growing up. The last three [houses] have been pretty strong in terms of energy performance and in that they fit together as we imagined they would on the boards.

P/A: To what extent do you see the way you practice as a model for the profession?

Badanes: I don't know. In the old days, all architects were builders, and they traveled around with tools; the guys that made the Gothic cathedrals spent half their life on one job. And of course now we have people flying around from job to job and sketching on the plane. The profession has kind of strayed from its roots. What we're more of an example for is the people entering the profession who have a choice to make. The profession likes to have guys like me because it makes them feel good that somebody out there is idealistic. Once in a while I give a lecture to an AIA group, and everybody says, "That's great; I'd be doing that if I could do it." And they don't necessarily mean it. They come out to the site in a little Porsche sports car or something like that, and they say, "This is fabulous. I'm really glad you guys are doing this," and they get back in their sports cars – It's too cold for them – and go back in their offices.

P/A: Is your teaching philosophy similar to your building philosophy?

Badanes: Definitely, and it's a really popular class, too, because although everyone might not want to become a designer-builder, they certainly want some hands-on experience, and what we give them is a chance to actually make something. What we end up with at the University of Washington is something that stays as a permanent fixture on the campus. So there's a certain amount of appeal, in learning the technical skills, but also in the notion that design and construction can be integrated. In the beginning we used to have a competition, and the winner would get built. But we're starting to realize that consensus is what's needed, although this works against the idea of the architect as the original individual – the old Goff notion. For a class it's better to try and get a group to work together. I don't know how many of my students have gone on to have careers like this, but a lot of them have gone on to be unintimidated by being on a jobsite and to have a little bit more respect for the tradesmen who work on their projects. ■

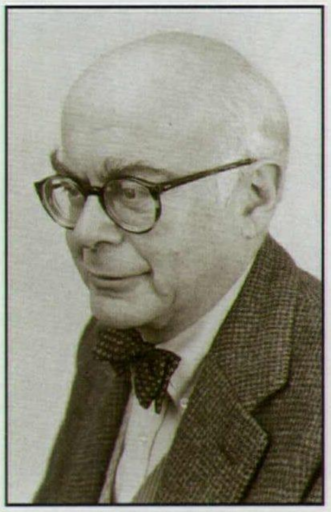
Robert Gutman comments on the changing conscience of the profession.

Taking Care of Architecture

The AIA Vision 2000 report that was published in 1988 concluded that environmental quality, affordable housing, and the architect's role in the design of more attractive and efficient cities and suburban communities will be major issues the profession must address in the next century. The report was as much an expression of sentiments that are beginning to be articulated by architects as it was a statement of "findings" by the consultants who prepared the document. The conclusions of the report are hardly surprising. Social concerns, the unfinished agendas of the welfare state, are becoming prominent issues in the minds of many constituencies, not only professionals. The promises of the Bush administration, even if their policies do not live up to them, indicate as much. I find similar views among many students. My architecture students at Princeton are more actively concerned about housing and urban issues than they were during the Reagan years. The enrollments in courses on housing are larger, students are asking for additional studies in urbanism, and they are organizing conferences and seminars on affordable housing and homelessness.

To the extent that architects are trying to connect their discipline to social and economic questions, it surely represents a change from the attitudes that have dominated architectural discourse for the past 20 years and that are usually equated with Post-Modernism. One of the major sources of the social doctrine associated with Post-Modernism is Robert Venturi's text of 1966, *Complexity and Contradiction in Architecture*. In the preface to that book, Venturi said that the cause of architecture could be best served "by narrowing [the architect's] concerns and concentrating on his own job." Venturi wrote that the architect's job was architecture itself and that in his book he would "talk about architecture rather than around it." By around it, Venturi meant "the relation of architecture to other things." He evidently believed that for the architect to deal too much with these other things – science, technology, and the subjects of the social sciences – were somehow bad for architecture, a distraction. He adds that, paradoxical as such an outcome might appear, the narrowing of their concerns could increase architects' "effectualness" in shaping society and the built environment.

Venturi's assertion of a possible increase in the architect's influence as a result of the discipline turning in upon itself has, in one sense, turned out to be very prescient. Certainly architecture is more conspicuous in the general culture than it was 25 years ago, and the demand for architectural services has expanded far beyond what anyone then conceived possible. However, it has also become increasingly evident that the cultural significance of architecture has not been translated into greater control by architects over the design of the built environment; nor is there much evidence that the attention that popular culture lavishes on architects and building has resulted in a deeper commitment by the public to architectural values and ideals. The crucial decisions about building projects are still largely in the hands of clients, often developers whose interest in protecting the quality of the overall environment is minimal compared to their ambition to increase the size of the rent roll and achieve greater profitability. Substantial segments of our population cannot afford the housing that is built for sale. Urban decay and congestion continue to proliferate; the once comfortable suburbs are overrun by traffic jams, and even elegant sections of great cities are becoming less safe and harder to navigate for both vehicles and pedestrians. Such facts are a cause of continuing disillusionment among many architects despite the tremendous growth in their business. The curious imbalance between cultural attention and political influence is an important reason for the reaction against the movements that developed in the wake of Venturi's 1966 manifesto and the ambition to recover some of the consciousness of social problems associated with Modernism.



Robert Gutman

The author, Robert Gutman, is a faculty member of Rutgers and Princeton universities, where he teaches architecture and sociology. He is the author of Architectural Practice: A Critical View. *Professor Gutman is currently making a study of the relation between theory and practice in architecture.*

"There is still considerable hesitation and much intellectual confusion about how to conceive of theory, research, and programs within the realm of architecture."

Can we do anything to assure that architects could have a greater impact on the quality of the built environment? It is important to proceed with caution in making claims for architecture in this realm: Architecture is the art of building design. Even buildings that are well-designed are limited in their capacity to ennoble life and improve the lot of men and women.

Consider the homeless problem as one example. Architects have proposed ingenious mobile and compact housing designs that meet the needs of nomadic and much disadvantaged men and women in cities and rural areas. But one root of the homeless problem is the lack of adequate programs of building finance. The funding for subsidies must be greatly expanded and new modes of sponsorship for low-cost housing communities provided. Livelihoods have to be found for indigent groups. Architecture cannot directly produce changes in these underlying conditions.

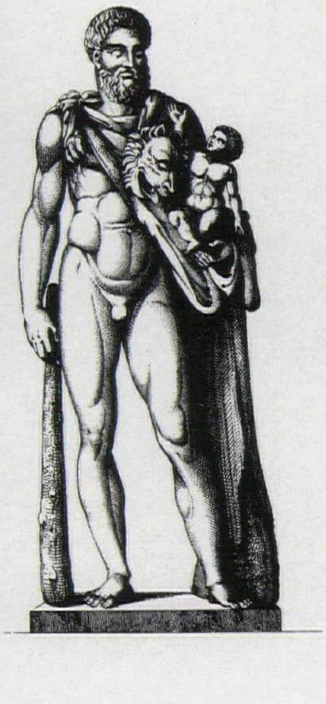
Or take the interest of some architects in reducing crime and drug addiction or increasing user involvement in housing and planning decisions. The recent discussions of these issues recall debates that were popular during the 1960s. It was then, when the housing and urban schemes of Team X were widely imitated, that architects believed they could design spaces and forms that would reduce isolation and alienation and produce, through form, a sense of community. Various failures of the period, symbolized by the decision to dynamite 11 high-rise apartment buildings in Pruitt-Igoe, permanently undermined these convictions. Most architects know now that a designer can hope that a space will be used in a specific way, but whether in fact it will be used as the architect intends is contingent on the social characteristics of the inhabitants and the administrative policies of the officials who supervise the space.

The following excerpt from **Vitruvius's** introduction to Book II provides a glimpse of the golden age of marketing.

I am sympathetic to the views of educators and critics who argue that there is no way to cram the discipline of architecture with the knowledge and know-how that would make designers effective in dealing with political and economic problems, and still have the discipline excel in handling problems of building design itself. The argument is perhaps better understood by an analogy to the function of disciplines in the work of the medical profession. The medical disciplines are contained by the biological laws of human physiology and functioning, by the germ theory of disease, and the canons of experimental science. In order to be proficient, physicians must respect these truths and learn how to apply them in their practices. On the other hand – and this is the principle I wish to emphasize – physicians recognize that if they concentrate all their efforts on medical science alone, the quality of medical services available to the public might never improve. The medical community realizes that question about who received medical care, and the efficacy of the services received requires just as much intensive critical study as the subject matter of medical science. Significant numbers of physicians regard it as their responsibility to engage in activities that address these issues.

For some reason, the architectural profession and the schools of architecture have not introduced similar distinctions in thinking about the needs of the building field. Despite the growing interest in political and social questions, there is still considerable hesitation and much intellectual confusion about how to conceive of theory, research, and programs within the realm of architecture that are comparable to investigations and action in the field of public health. Just because architecture is an art does not relieve the profession of responsibility. The critical temper does not have to stop at the borders of the discipline. It can encompass issues of practice, too!

In this regard, it is striking how seldom a prominent designer speaks to issues of mass housing, environmental pollution, urban congestion, central city decay, or any other issue involving how the benefits of architecture could be distributed more equitably. Perhaps because of the way we have defined architecture in the Post-Modern period, architects regard these questions as nonarchitectural. I agree that, in the sense defined by Venturi, they do not belong to the discourse of architectural design. Nevertheless, some group of experts and critics is needed to examine the big issues of planning, urban design, housing, and transportation. In the absence of resolute investigation of these questions, there is small chance that we can make much progress toward realizing the goals and ideals of the discipline. In failing to formulate a definition of the field that concludes these subjects within the scope of the architect's knowledge and competence, the profession encourages a situation in which architectural values are not given the weight they deserve. **Robert Gutman** ■



Excerpt: Dinocrates, Architect

1. Dinocrates, an architect who was full of confidence in his own ideas and skill, set out from Macedonia, in the reign of Alexander, to go to the army, being eager to win the approbation of the king. He took with him from his country letters from relatives and friends to the principal military men and officers of the court, in order to gain access to them more readily. Being politely received by them, he asked to be presented to Alexander as soon as possible. They promised, but were rather slow, waiting for a suitable opportunity. So Dinocrates, thinking that they were playing with him, had recourse to his own efforts. He was of very lofty stature and pleasing countenance, finely formed, and extremely dignified. Trusting, therefore, to these natural gifts, he undressed himself in his inn, anointed his body with oil, set a chaplet of poplar leaves on his head, draped his left shoulder with a lion's skin, and holding a club in his right hand stalked forth to a place in front of the tribunal where the king was administering justice.

2. His strange appearance made the people turn round, and this led Alexander to look at him. In astonishment he gave orders to make way for him to draw near and asked who he was. "Dinocrates," quoth he, "a Macedonian architect, who brings thee ideas and designs worthy of thy renown. I have made a design for the shaping of Mount Athos into the statue of a man, in whose left hand I have represented a very spacious fortified city, and in his right a bowl to receive the water of all the streams which are in that mountain, so that it may pour from the bowl into the sea."

3. Alexander, delighted with the idea of his design, immediately inquired whether there were any fields in the neighborhood that could maintain the city in corn. On finding that this was impossible without transport from beyond the sea, "Dinocrates," quoth he, "... while thinking that your design is commendable, I consider the site as not commendable; but I would have you stay with me because I mean to make use of your services."

4. From that time, Dinocrates did not leave the king but followed him into Egypt. There Alexander, observing a harbour rendered safe by nature, an excellent center for trade, cornfields throughout all Egypt, and the great usefulness of the mighty river Nile, ordered him to build the city of Alexandria, named after the king. This was how Dinocrates, recommended only by his good looks and dignified carriage, came to be so famous. But as for me, Emperor, nature has not given me stature; age has marred my face, and my strength is impaired by ill health. Therefore, since these advantages fail me, I shall win your approval, as I hope, by the help of my knowledge and my writings. ■

Still pointed decades after they were written, the following passages reveal the extent of **Mumford's foresight** and perception.

Excerpts from the Writings of Lewis Mumford

In so far as we have learned to care more for empire than for a community of freemen, living the good life, more for dominion over palm and pine than for the humane discipline of ourselves, the architect has but enshrined our desires. The opulence, the waste of resources and energies, the perversion of human effort represented in this architecture are but the outcome of our general scheme of working and living. Architecture, like government, is about as good as a community deserves. The shell that we create for ourselves marks our spiritual development as plainly as that of a snail denotes its species. If sometimes architecture becomes frozen music, we have ourselves to thank when it is a pompous blare of meaningless sounds.
From "The Imperial Façade," 1924.

We can no longer treat the machine as an exclusive architectural symbol at a moment when the whole ideology of the machine is in process of dissolution, for culture is passing now from an ideology of the machine to an ideology of the organism and the person – from Newton and Descartes to Geddes and Whitehead. We know that the mechanical world is not the real world but only an aspect of the real world, deliberately abstracted by man for the purpose of expanding his physical power . . .

"Architecture, like government, is about as good as a community deserves. The shell that we create for ourselves marks our spiritual development as plainly as that of a snail denotes its species."

Do we or do we not want architecture? If we do, it may be necessary to retrace some of our steps and seek a new point of departure. For if we want architecture, we must ask for a margin of freedom – a margin above the necessary, the calculable, the economic. It is in that margin for free choice and free decision that architecture moves and breathes and produces a visible effect, designed to impress the human spirit.
From "Monumentalism, Symbolism, and Style," 1948.

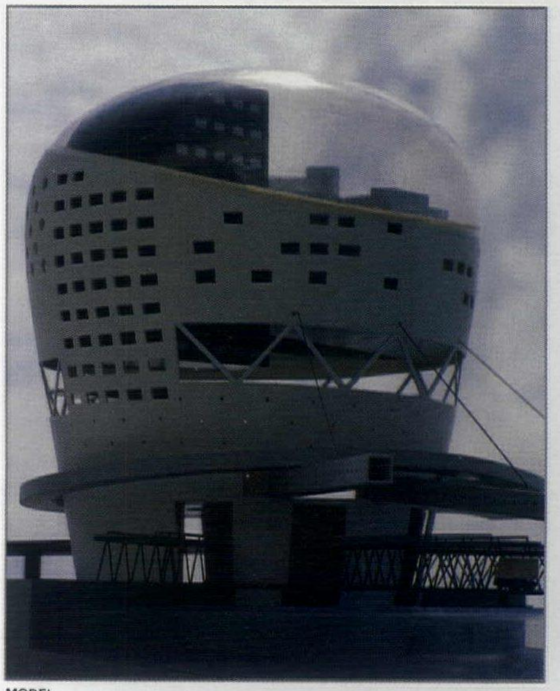
By now, many architects have become aware of a self-imposed poverty: In absorbing the lessons of the machine and in learning to master new forms of construction, they have, they begin to see, neglected the valid claims of the human personality. In properly rejecting antiquated symbols, they have also rejected human needs, interests, sentiments, values, that must be given full play in every complete structure. This does not mean, as some critics have hastily asserted, that functionalism is doomed: It means rather that the time has come to integrate objective functions with subjective functions: to balance off mechanical facilities with biological needs, social commitments, and personal values.
From "Symbol and Function in Architecture," 1951.

The notion that Modern architecture had not existed in America until the so-called "International Style" was transported here was almost too silly to be worth refutation; for it rested purely upon the debater's trick of defining the Modern as just that particular set of geometric abstractions and restrictive formulae that the leading architectural figures had derived from Mondrian and Ozenfant. This made no sense as history either in Europe or America; for the roots of contemporary form strike just as deep there as in our country, if not deeper, since the constructive audacity of Modern architects and engineers had its earliest exemplars in the Gothic cathedral builders, and in their lineal successors, the more exuberant among the Baroque masters. Though each cultural period has a tendency to emphasize its discontinuity with the ideas and forms of its predecessor, no one can understand Eric Mendelsohn without taking into account Hans Poelzig, or Le Corbusier without reckoning with Auguste Perret, or Gropius without remembering van de Velde, who had built an earlier Bauhaus. If this is true for even the limited span of a generation or two, it is even more true for the larger movements of architecture: Without Morris in England and Richardson in America, the inchoate Modern forms that were already in existence would have waited longer to find their effective aesthetic expression. The "International Style" was only an eddy, in some ways a regressive backwater, in the development of contemporary form; for, under the increasingly perverse leadership of various leaders, it turned more and more into an external imitation of the outward forms of a mechanically functional architecture, with a sedulous disregard of human needs, functions, and purposes . . .

Modern architecture is a continuation of the great traditions of historic architecture, not a break with or a rejection of them, merely because it does not pay more ancient modes the base flattery of outward imitation or mechanical revival. When modern architecture departs from the past, it does so for good reasons, either because the conditions of life generally have changed, or because fresh technological facilities offer fresh incentives for their imaginative use, or because new feelings and values demand a fresh form of esthetic expression, or for all these reasons together. In these departures, Modern architecture is no further away from the architecture of the Renaissance than the forms of those times were distant from those of the Gothic period . . .

The American contribution to the universal forms of Modern architecture indicates that our contemporary mode of building is the repository of many regional and national traditions, each of which has contributed something of value to the universal movement and, without forfeiting its national or regional characteristics, can absorb something in return.
From the preface to The Roots of Contemporary American Architecture, 1959. ■

Rem Koolhaas and the Office of Metropolitan Architecture explore the arbitrariness of form in these three recent projects.



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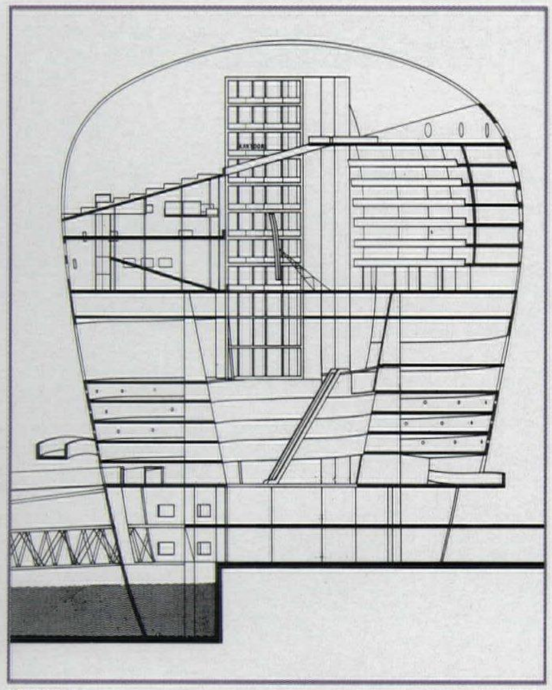
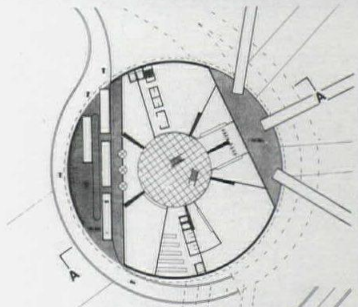
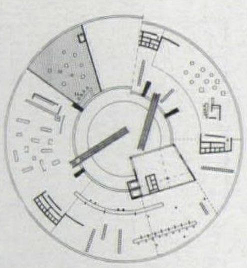


SECTION AA

40'/12m



3 ENTRY FLOOR/RESTAURANT



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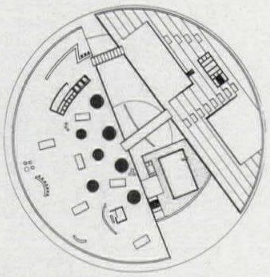
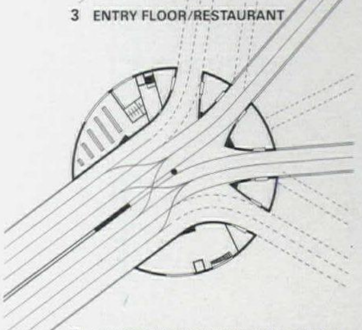


9 CASINO/CONFERENCE



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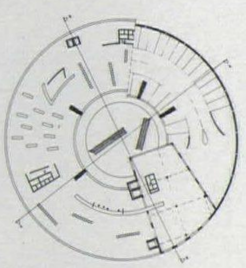
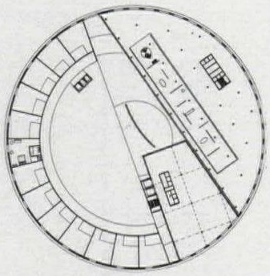
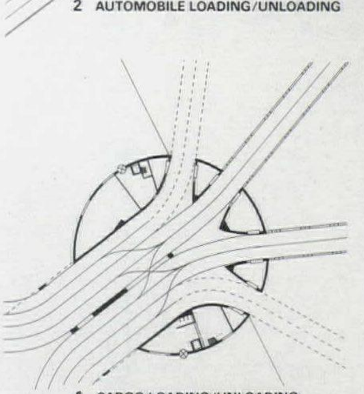


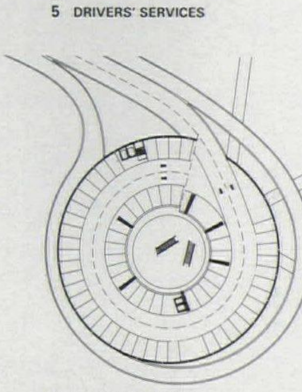
5 DRIVERS' SERVICES



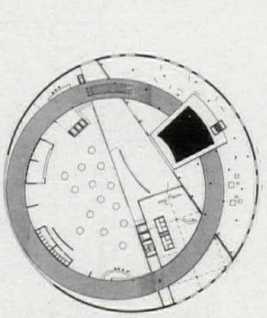
8 HOTEL/LOUNGE



1 CARGO LOADING/UNLOADING



4 PARKING GARAGE



7 LOBBY/RESTAURANT/CINEMA

N 100'/30m

Architectural thought in this century has been preoccupied with justifying form. We have been told that form should follow function or reveal its structure or make an analogy to nature or the machine or, more recently, that it should refer to other historical or contextual forms. But why do we need such justifications? Is there a place for pure form in architecture, as there was for pure color in Abstract Expressionist painting? Rem Koolhaas and his Office of Metropolitan Architecture raise such questions in these three projects.

In his proposal for the new sea terminal at Zeebrugge in Belgium (left), Koolhaas pursues this idea of arbitrary form. He and his design team at OMA, in conjunction with Ove Arup & Partners, used a foam head from a mannequin as a study model, modifying it until they arrived at a "form we found pleasing," says Koolhaas. The headlike shape is itself redolent with meaning. It brings to mind the colossal statues that once guarded the harbors of ancient Greece, the watchfulness of people waiting in the terminal for ships to come in, and even the fact that transportation terminals are often called headhouses. The form's arbitrariness comes in the way it was developed as a sculptural object, apart from the functions it would contain.

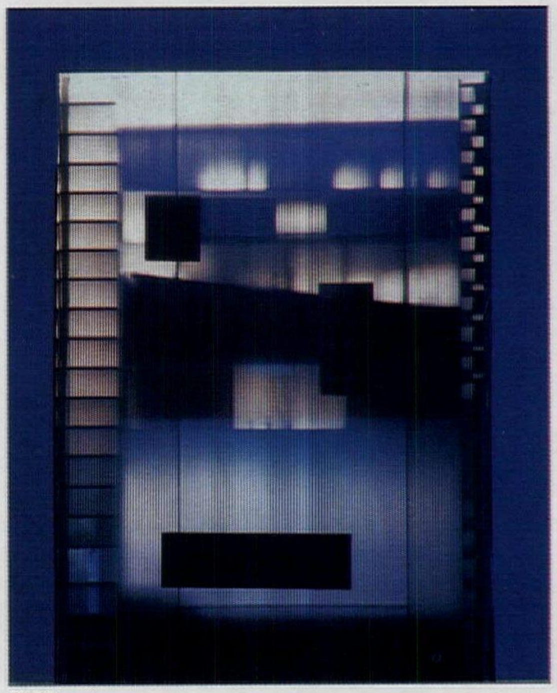
To make the point, Koolhaas has treated the mix of facilities within the terminal as so many loosely arranged shapes. The lowest two levels contain ramps for service vehicles and automobiles entering and exiting the ships and ferries. Above that spirals a multistory parking garage with a central atrium whose escalators and adjacent elevators connect the entry level to the public spaces and hotel above. A completely glazed section midway up the building reveals two levels of restaurants and bars, above which stand the hotel lobby and a movie theater. The semicircular bank of hotel rooms, expressed on the exterior with porthole windows, is capped by a casino, pool, and meeting rooms, all enclosed by a great glass dome.

It is not arbitrary form, but

the arbitrary section that Koolhaas explores in his winning competition scheme for the Center for Art and Media Technology in Karlsruhe, West Germany (right). The building, about 150 feet square in plan, contains a media theater, film and video screening rooms, three floors of exhibition space, an open-air museum on the top floor, and various meeting rooms and restaurants. To provide clear-span space for the theater and museum, OMA and their engineers, Ove Arup & Partners, placed parallel Vierendeel trusses through alternating floors, with gravity loads handled by bearing walls at two ends. Wrapping around this container is a narrow, glass-enclosed space, 10 to 20 feet wide, that contains stairs, escalators, elevators, ramps, corridors, and theater flyspace.

This project reflects Koolhaas's admiration of the skyscraper, with its ability to accommodate a variety of functions, separated vertically on different floors. He notes that there is certain arbitrariness as to what goes where in such buildings. "Each floor becomes autonomous," says Koolhaas. "The elevators become the destabilizing elements." At the Karlsruhe project, Koolhaas stacks the various functions according to whether they require clear-span space or not, resulting in a somewhat random placement of uses in section. The only spatial connection among these floors occurs along the perimeter, where the "destabilizing" stairs, elevators, and escalators zip about with a certain abandon.

Koolhaas's competition proposal for the new Library of France (see P/A, Feb. 1990, p. 123), in many ways the most daring of the three projects, investigates the idea of arbitrary space (facing page). There are precedents, in Expressionist architecture, for the making of arbitrary external forms and, in the modern skyscraper, for the arbitrary placement of functions within a section. But we have felt compelled to justify the shape and arrangement of space within buildings. Koolhaas challenges that compulsion.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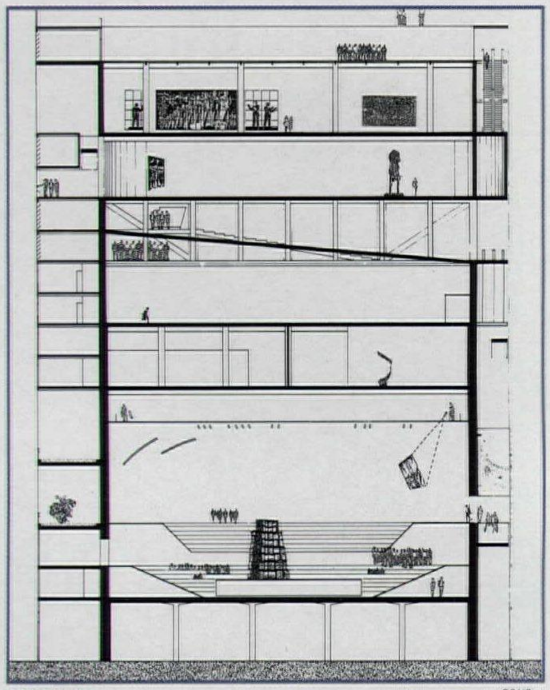
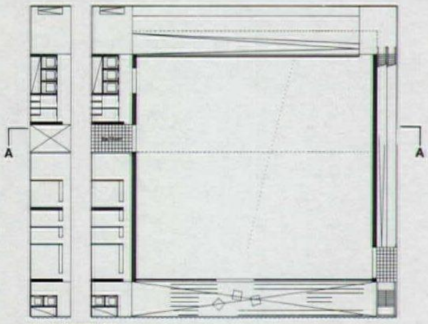
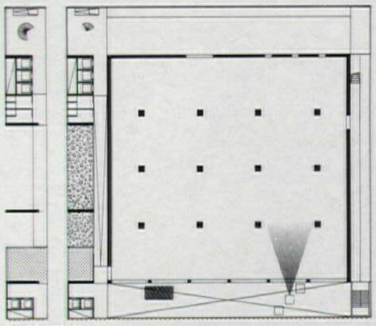
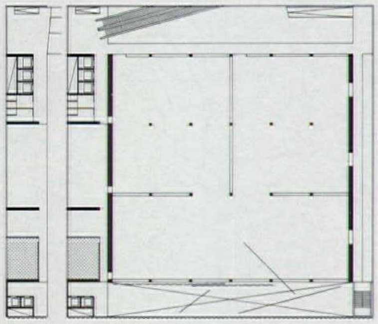
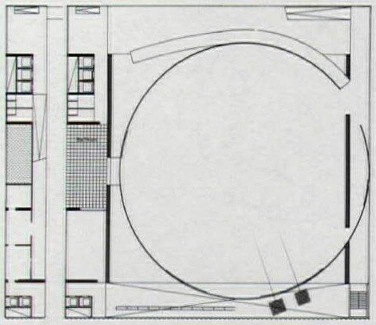
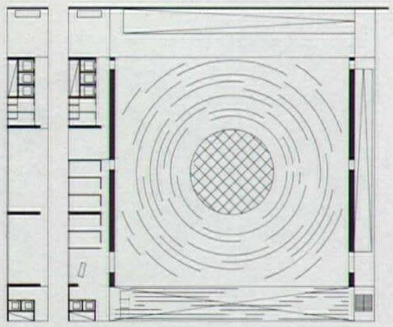

SECTION AA 20'/6m

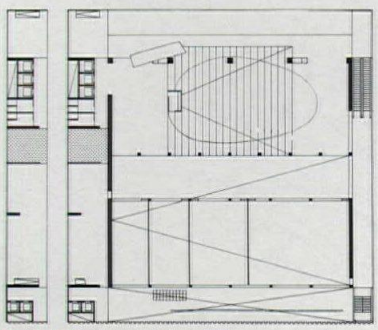

3 MUSEUM

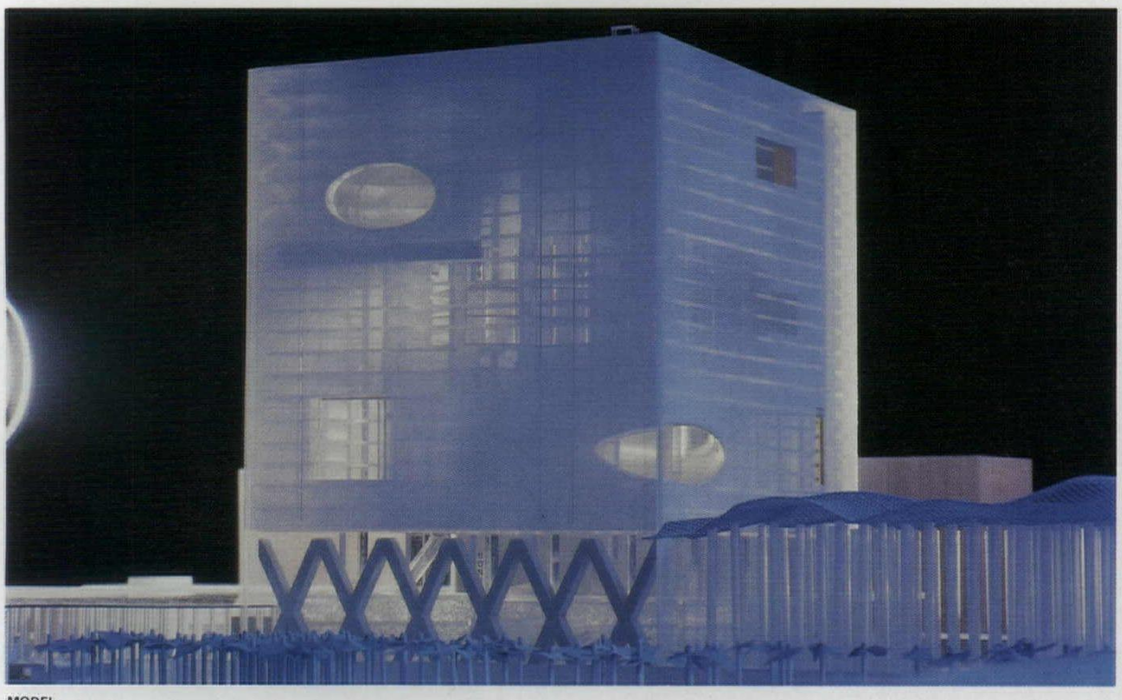

6 MUSEUM


2 WORK AREA/FLYSPACE


5 MUSEUM


1 THEATER SPACE


4 FILM THEATER/MEETING ROOMS N 40'/12m



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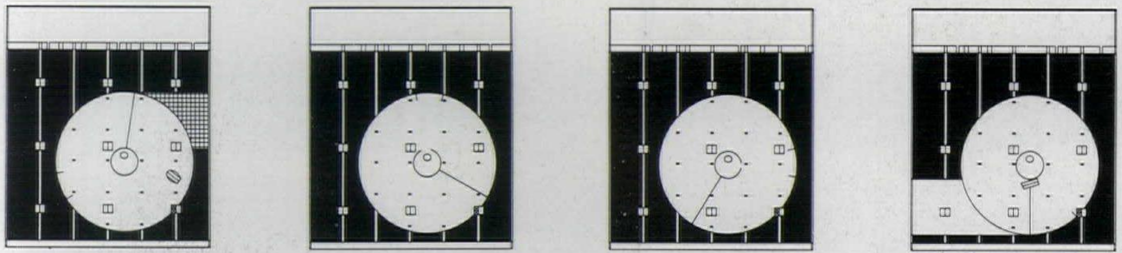
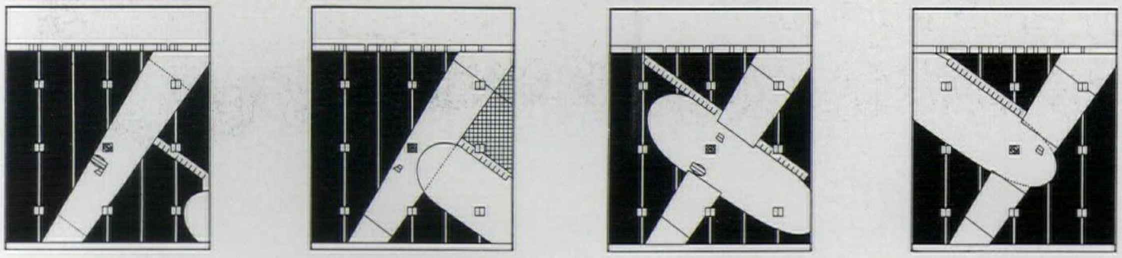


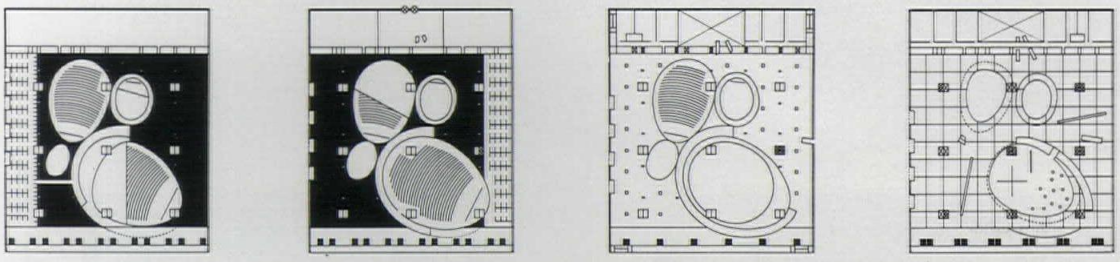
9 10 11 12

SPIRAL REFERENCE LIBRARY READING ROOM WITH ROBOTIZED STORAGE THAT EXTENDS THROUGH SEVERAL STACK FLOORS, ENDING IN A LOUNGE



5 6 7 8

MULTISTORY RECENT ACQUISITIONS READING ROOM INTERSECTED BY ANGLED AUDIO/VIDEO READING ROOM SURROUNDED BY FLOORS OF STACKS



1 2 3 4

CINEMAS AND CONFERENCE ROOMS, WITH ENTRANCE LOBBY LEADING TO AN EXHIBITION SPACE AND FINALLY THE "GREAT HALL" N 100'/30m

As in the Karlsruhe project, he envisioned the French library as a cubic form, with a bank of offices in a narrow perimeter zone. But here, he treats the many floors of book stacks as a solid out of which the five main reading rooms are willfully carved. "The major public spaces," says Koolhaas, "are defined as absences of building, voids carved out from the information solid." The Sound and Moving Image Library occupies pebble shapes embedded in the podium; the Recent Acquisitions Library, an angled cross shape; the Reference Library, a spiral shape; the Catalog Room, an egg shape; and the Research Library, a rectangle that does a loop-the-loop. These spaces are all connected by escalators. Ordering the apparently arbitrary spatial forms is a series of parallel shear walls and a grid of nine elevators. A curtain wall of clear and translucent glass, forming cloudlike patterns of the façades, encloses the whole complex.

The idea of treating the reading rooms as hollow, shaped objects within a regular matrix of shelves came partly from Koolhaas's urban design studies. "In the U.S," he says, "there is so much open space that density is indicated by the number of objects in the landscape. But in Europe, the density of development is such that we must carve space out of the urban fabric. The voids become the solids."

His French library scheme was commended, but not premiated by the competition jurors. As so often happens in competitions, the projects that almost win are the most challenging and ultimately the most influential. Koolhaas, in this project and in the preceding two, has opened up new areas of design exploration, showing us the freedom possible once we stop trying to justify architectural form.

Thomas Fisher

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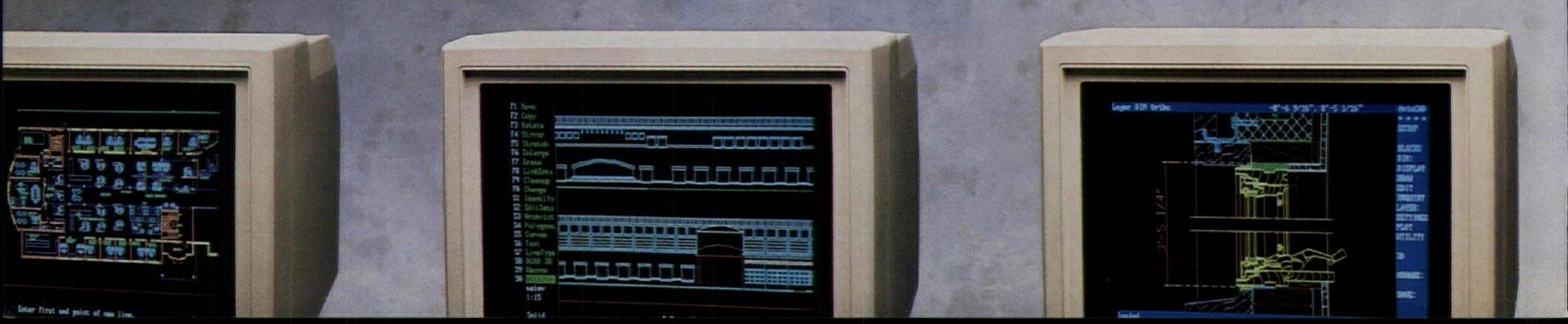

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Technics Focus: Ceramic Tile

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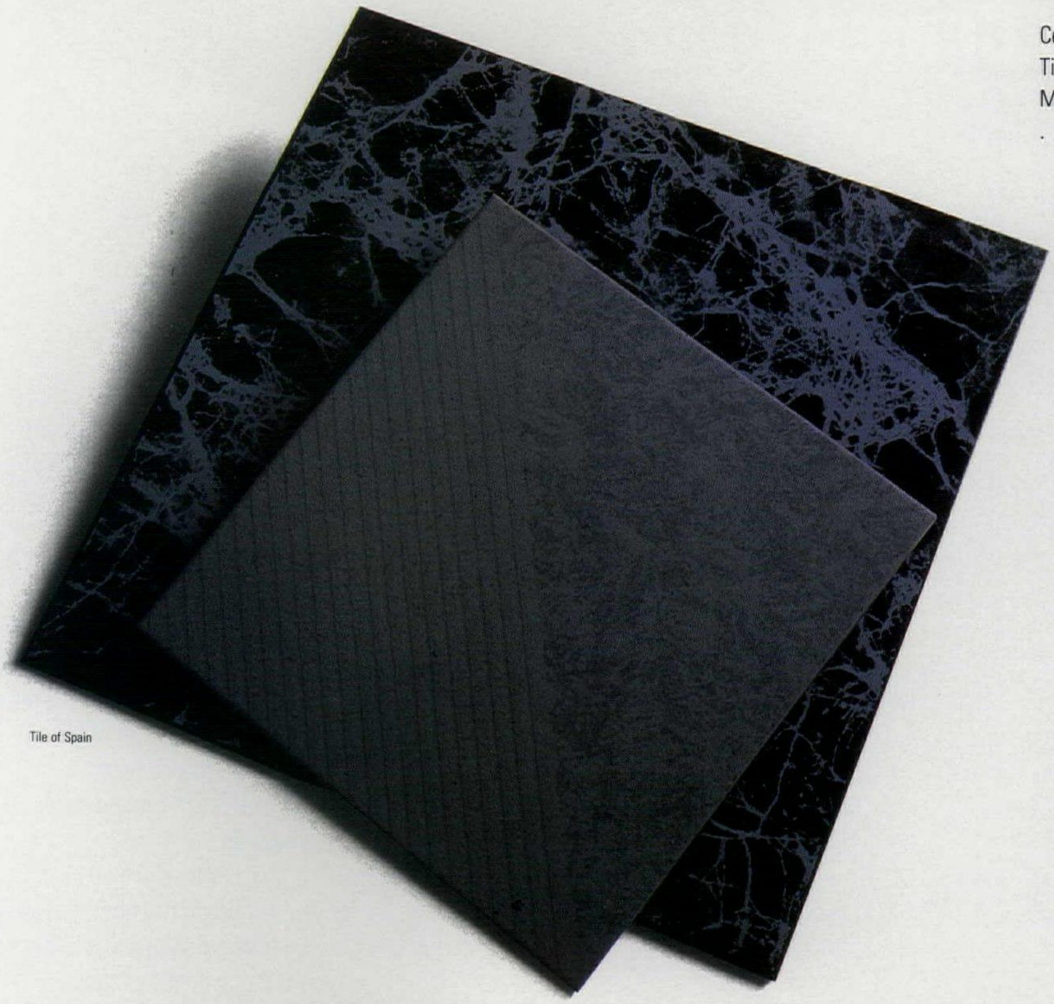
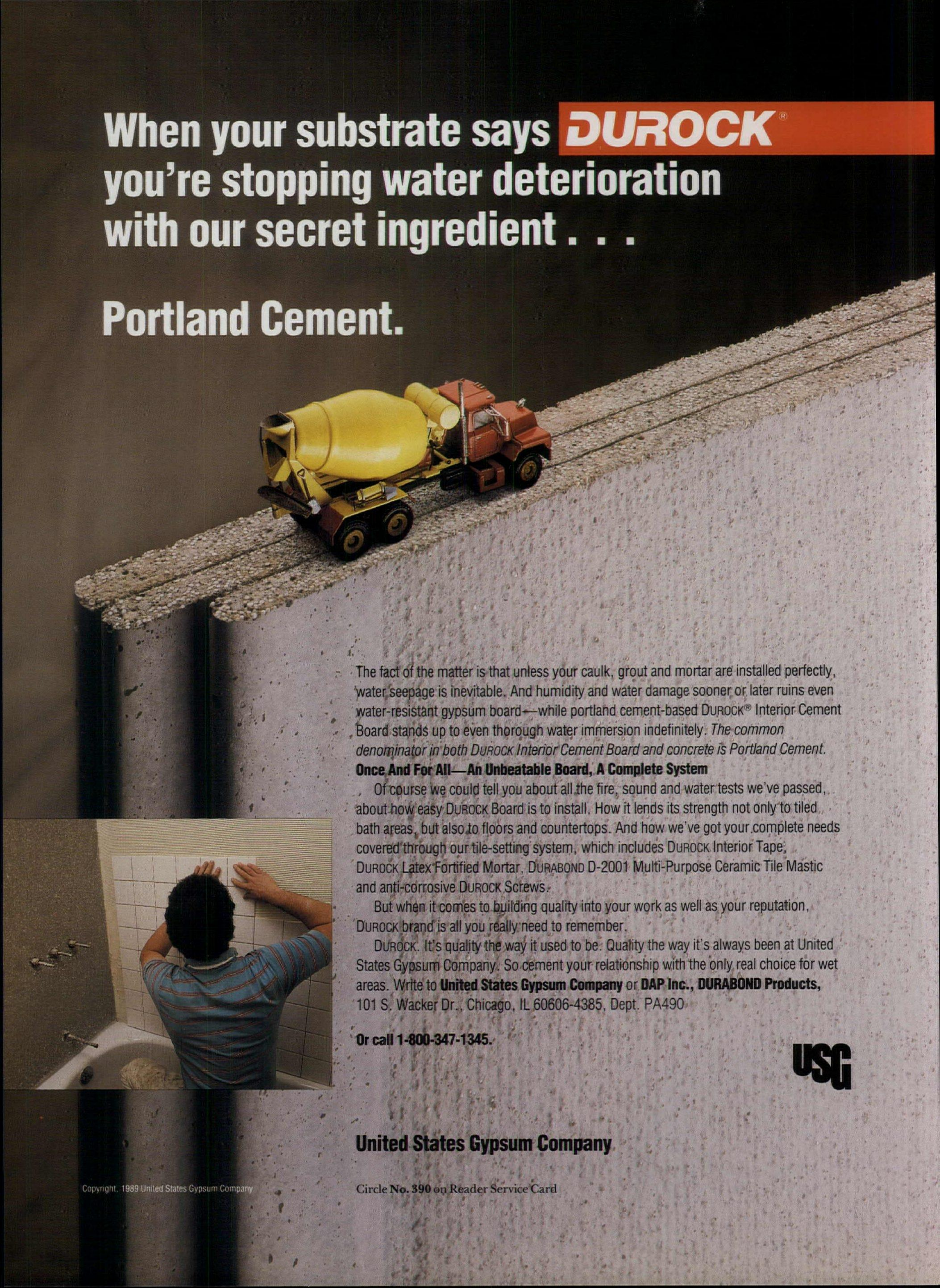


Tile of Spain

Three ceramic tile experts discuss in depth the technical issues surrounding tile installations in specialized situations.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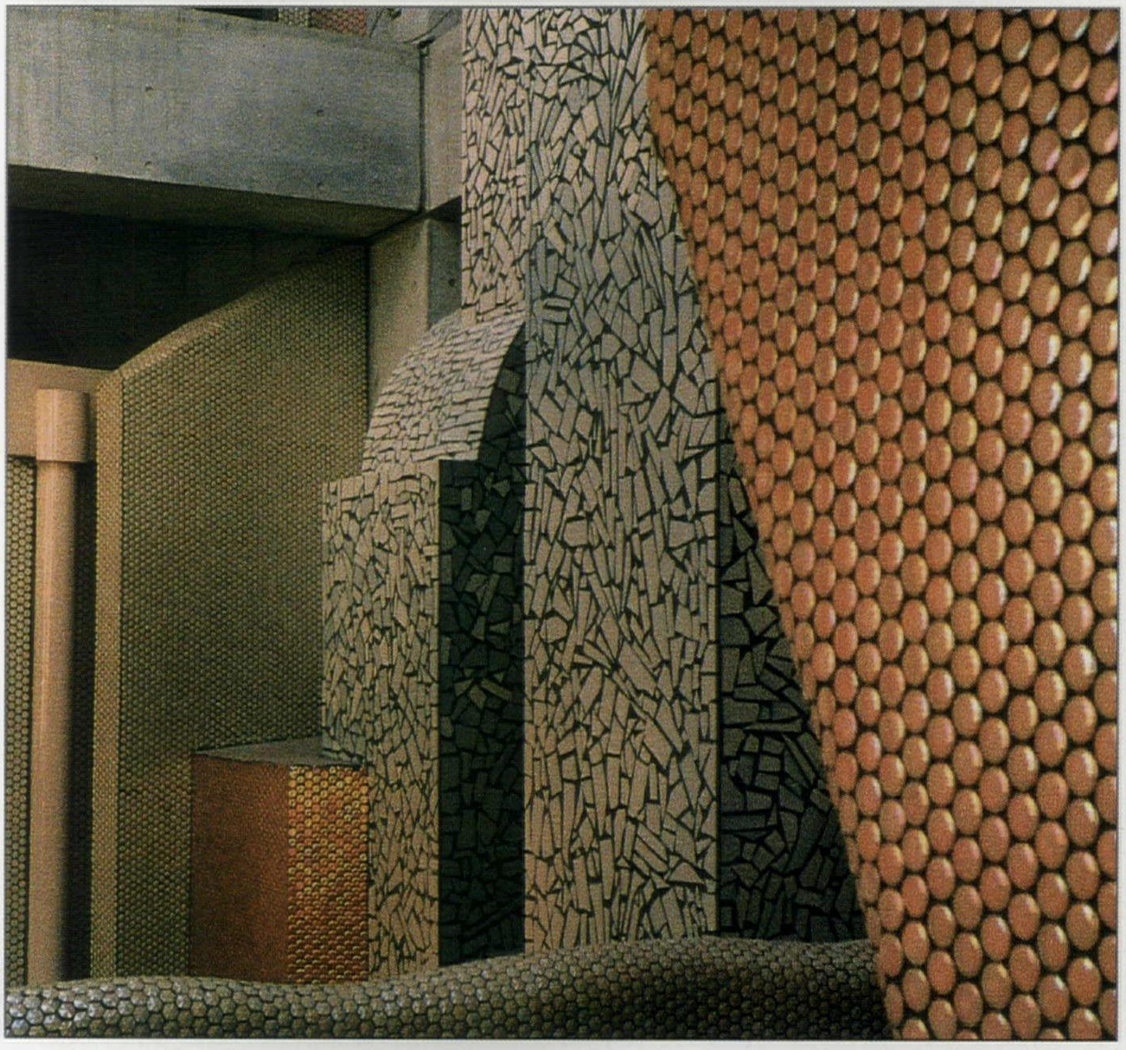
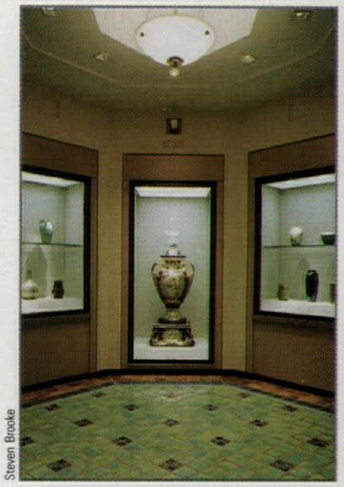
Placing Tile

New ceramic tile designs and setting methods increase tile's potential use for architects and designers.



John Morris Dixon

A variety of tile, representing different architectural styles, was used on the exterior of the Unagidani Children's Museum in Osaka (left) by Hiroyuki Wakabayashi, Kyoto. Fulper Glazes made the tile floor (below) in the Newark Museum by Michael Graves, Architect, using traditional arts and crafts fabrication methods.



Steven Brooke

Since its first appearance over 6000 years ago, ceramic tile has undergone transformations in fabrication and setting methods, yet has remained consistent in appearance. European ceramic tile came to North America largely from England and the Netherlands; later, Mexican, Spanish, and Portuguese tiles influenced design and fabrication on the West Coast. During the Industrial Revolution, the ability to mass produce tile was achieved; fabrication continues to evolve today with the goal of achieving consistency in appearance and quality.

New setting methods are more recent: Thin-set installation was developed in the 1950s, and after some initial difficulties, rapidly gained currency in the 1960s. Recently developed setting methods have involved prefabrication, for example, large-scale exterior tile panels or computer-planned mosaic tiles set directly onto backing.

As far as the tile market goes, consumption has been on the increase, worldwide and especially in the United States, for quite a while. Between 1978 and 1988, United States tile consumption increased from just over 545 million square feet to almost 1 billion square feet. And the United States market is still considered to be wide open. Between 1983 and 1984 – the first big marketing push from the Italian tile companies – imports jumped from 48 percent of United States tile consumption to 58 percent. Since then, American companies have been struggling to gain back their market, with some success: Imports accounted for slightly under 52 percent of consumption in 1988. Of that, Italian tile accounts for about 67 percent. Other countries are increasing manufacturing and marketing; producers from the Far East and South America will have a substantial effect on the tile industry in the coming decade.

United States consumers differ from Europeans in their attitudes toward tile use. For instance, Americans each use less than four square feet of tile annually; Italians use 35. Explanations range from the paucity of trees and prevalence of earth-based products in Europe to the United States notion of ceramic tile as a permanent product. In one attempt to increase per capita consumption, tile manufacturers are attempting to convince Americans that tile is a design element to be changed frequently.

Literature

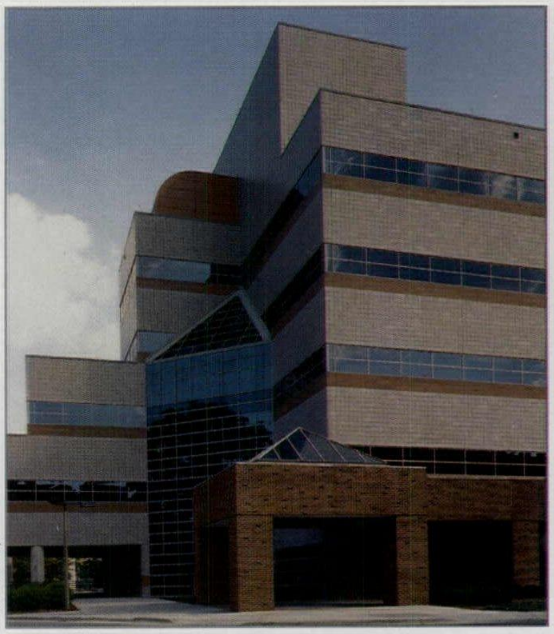
P/A began its focus on ceramic tile by asking consultants and the technical support staff of trade associations and manufacturers what questions and problems architects most often raise about tile and its applications. One response eclipsed all others: Architects aren't using the Tile Council of America's *Handbook for Ceramic Tile Installation.* The real problem must be that architects don't realize that this indispensable guide is bound into *Sweet's Catalog* under 09300/TIL. We also heard that designers too often use old specifications and don't keep current on materials and terminology. And joints – both incorrectly detailed and not located on plans – are recurring problems. Following is a basic tile library for architects.
Kenneth Labs

Handbook for Ceramic Tile Installation, 1989, Tile Council of America, Princeton, NJ (609) 921-7050.

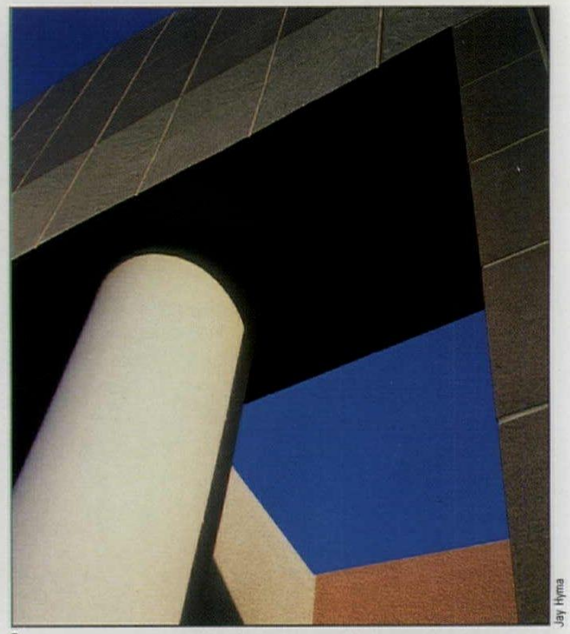
American National Standard Specifications for Ceramic Tile (ANSI A-108 series), 1988, and *American National Standard Specifications for the Installation of Ceramic Tile* (ANSI A-137.1), 1985, published by Tile Council of America (see above).

MMSA *Bulletins* 1-16, 1988, Materials and Methods Standards Association, P.O. Box 332, Grand Haven, MI 49417.

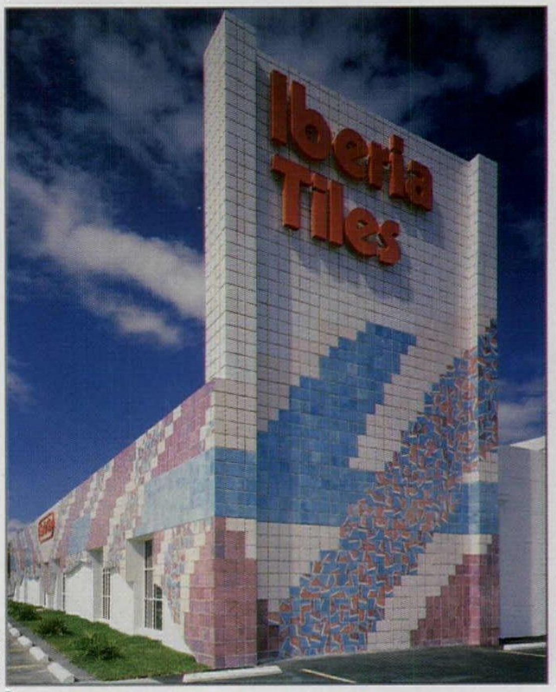
Ceramic Tile, CSI Monograph Series 09M310, 1984, and *Ceramic Tile SpecGUIDE* G09310, 1987, The Construction Specifications Institute, Alexandria, Va. (703) 684-0300.


Hansen Lind Meyer

1


Jay Hyma

2



Iberia Tiles

3


Casal Grande

4

The John W. Eckstein Medical Research Building (1) in Iowa City, designed by Hansen Lind Meyer, Iowa City, combines ceramic-tile-faced masonry with brick. Large terra cotta tiles clad the walls of the University Montessori Pre-School (2) in Irvine, California, by Leason Pomeroy Associates, Orange, California. Spanish artist Elisa Arimany designed a tile mural for the Iberia Tiles headquarters (3) in Miami using 10" x 10" tiles. Approximately one-third of the tiles were hand-painted; the rest were standard. Floor tiles in different colors were used for the pattern on the floor of the North York Civic Center (4) in Willowdale, Ontario, by Moriyama & Teshima Architects, Toronto. Studio Morsa in New York designed the mosaic pattern which was set into terra cotta tiles in the Hastings Tile & Il Bagno Collection showroom, New York (facing page).

Yet although Americans' use of tile is limited, the variety of products – and installation methods – is constantly increasing. In addition to the different colors and patterns that appear yearly, new sizes and shapes are produced, forcing consideration of ceramic tile for floors, walls, external cladding, and decorative uses. Large tiles, up to 2' x 2', have new applications in prefabricated tile panels for cladding; right now, those large sizes can only be fabricated with European equipment. Decorative tiles, on the other hand, can be made anywhere, and designs change frequently. Standards change frequently as well; some of the newest revisions and additions are concerned with tile's slip resistance and with exterior uses.

In this special focus on ceramic tile, P/A has asked three industry specialists – with over 110 years of experience between them – to review specifying and detailing of common installations such as floors and wet areas, as well as common pitfalls. In addition, an article explains tile panelization for exterior uses, which is rapidly gaining currency. **Andrea E. Monfried** ■

P/A would like to thank the following people who contributed to this focus on ceramic tile: Jess McIlvain, Jess McIlvain and Associates; Robert J. Kleinhans, Kenneth Erikson, Tile Council of America; Joe A. Tarver, National Tile Contractors Association; David Rothberg, Dominic Dicenzo, Laticrete; Scott Broney, Sara Robins, American Olean; Jerry Fisher, Steve Fisher, Tile & Decorative Surfaces; Craig Barnes, Ceramic Tile Marketing Federation; Roscoe Reeves, Masterspec, AIA; Joseph A. Taylor, Tile Heritage Foundation; Harry Swanson; Leigh Speakman, Cadillac Fairview Shopping Centres; William Amick, Kevin Callahan, Merle Thomas, Dal-Tile; Liliana McGuire, Trans Ceramica; Judith Gura, Joann M. Rustemeyer, Gura Public Relations; Karen Ellis, Martin Meisel, Hansen Lind Meyer; Rada Fulper, Fulper Glazes; Melanie Bazil, Pewabic Pottery; Allen Prusis, Michael Graves, Architect; Carrie Connolly, Leason Pomeroy Associates.

Hastings Tile & Il Bagno Collection


TILE IL BAGNO COLLECTION


...like a kid in a candy store.

Prefabricated Exterior Ceramic Tile Cladding

Ceramic tile consultant **Jess McIlvain** examines various types of prefabricated tile cladding with recommendations and specifications for their use.

Buchtal

The Northridge Mall in Milwaukee, designed by Richard Trott & Partners, was clad with 24-inch-square tiles and accented with 6-inch-square and 4" x 8" tiles. A mechanical installation system uses a screw bonded to the back of the tile to attach it to the substrate.

Prefabricated exterior ceramic tile cladding includes several innovative construction systems, which are not used to their potential. Although the first United States prefab tile panel job using steel framing was installed on the 22-story Tishman office building in Los Angeles in 1960 (then the tallest commercial building in the city), few buildings made use of this prefabricated system until the mid- to late-1970s. Framing components for the Tishman building were custom fabricated from four-inch steel channels, which priced the system out of the market. Technology for manufacturing light-gauge steel studs (generally limited to 18 gauge and heavier) has made them cost competitive and structurally acceptable.

In the mid-1970s, precast concrete panels with ceramic tile finishes started appearing on buildings in the United States, after wide acceptance in Europe and Japan. Mitchell Giurgola led the architectural profession by choosing a precast concrete cantilevered sunscreen covered with quarry tile for the Life Sciences Building at New York City's Columbia University (P/A, Mar. 1978, p. 54). Other buildings followed in the Pennsylvania/New Jersey/New York region, an area with severe freeze-thaw conditions. Some of these have been plagued with various problems, such as spalling of tiles and concrete surfaces.

Lightweight, prefabricated light-gauge steel-framed panel systems offer the widest design and cost savings potential for ceramic tile and other thin facing materials. These systems are less expensive to manufacture than precast concrete panels. They also have weight and insulating advantages over concrete panels. Light-gauge metal framings are generally available in the United States, Canada, and the European community.

Three basic systems are used for adhering tiles to light-gauge metal framing systems. One is the latex-modified portland cement mortar bed applied over metal lath and gypsum sheathing. Another uses lighter weight, prefabricated cementitious backer boards, which are screwed directly to metal stud framing. Tiles can be installed over both substrates with latex-modified thin-set mortars. Some systems use liquid or sheet-applied waterproof membranes over the backer boards. Tiles are then applied over the membranes, with latex-modified thin-set mortars. Liquid-applied urethanes have recently been introduced as both waterproofing and adhesive for adhering tiles. With WonderBoard and Hydroment Ultra-Set, this system exceeded test requirements for water penetration under severe hurricane conditions and racking from a simulated earthquake.

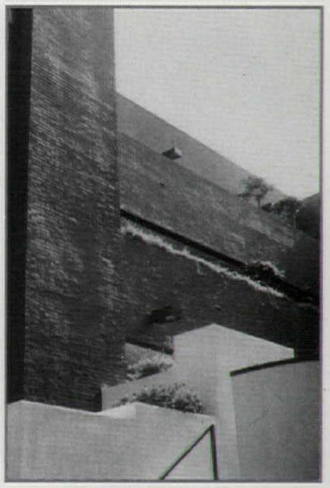
A third method for adhering tiles to light-gauge metal framing uses metal decking welded to the framing and silicone adhesive/sealants for adhering tiles to the face of the metal decking. This system is efficient with tiles 12 inches square and larger, while tiles of any size can be used on the other systems.

The first two systems normally use cementitious grouts for filling joints between tiles. In the silicone adhesive system, silicone sealants are used to fill joints between tiles.

The newest prefabricated systems, which are coming from Europe, are similar to mechanical systems used for dimensional stone. With these systems, 24-inch-square and larger ceramic tiles (ceramic panels) are mechanically attached with back-mounted bolts and clips to aluminum or steel modular framing systems. No visible anchors are used on some of these systems. Others use clips that wrap around edges of tiles, exposing the end of the clips on the face.

These new systems have been developed for application over both existing and new buildings. They can be used as an insulated, waterproof exterior skin by sealing joints between tiles with elastomeric sealants. These systems are also marketed as "breathable" walls, in which joints are not sealed and air can flow between the tiles and the water-tight building face.

Recently, in contrast to the *laissez-faire* atmosphere of the late 1970s and early 1980s, more research has



The Klein Partnership selected ceramic tile panels fabricated on cementitious backer board for the Allan Koon Building in Houston. The panels were attached directly to metal stud framing.

For the Grandway office building in El Segundo, California, Kober Rippon Associates used two colors of 12-inch-square tiles. The tiles were thin set to mortar beds.

Tile panels – using highly impervious 4" x 8" brickplate tiles – were prefabricated for both the column covers and the spandrel panels at 3 Bala Plaza in Bala Cynwyd, Pennsylvania. Architect The Ballinger Company had to test the system to ensure that the small tolerances between the u-shaped panels and the column covers performed adequately.

gone into prefabricated ceramic tile cladding systems. United States Gypsum offers a comprehensive system including light-gauge metal stud framing, backer boards, and latex-modified thin-set mortars for installing ceramic tile, marble, or stone on both interior and exterior walls. USG's system can be either prefabricated in a factory or constructed on the building. USG offers a warranty covering metal stud framing, cementitious backer board and latex-portland cement mortar when the complete system is used.

Modulars, Inc., the company that pioneered glass-mesh-reinforced light-weight concrete backer boards, has done extensive research and development on prefabricated tile panel systems. Laticrete International is another company that has pioneered marketing of both backer boards and installation systems for installing tiles on prefabricated panels.

Disadvantages of Prefabricated Panels

The only disadvantage of prefabricated ceramic tile cladding is that its use requires skills of four disciplines: design/engineering, fabrication of light-gauge steel framing systems, application of backer board/mortar beds and tiles, and transportation and erection. Should any one of the four disciplines lack experience or not follow recommendations and specifications, the finished product will show deficiencies.

Advantages

Slick metal and glass curtain wall clad buildings have proliferated over the past few decades. Prefabricated ceramic tile cladding systems offer competitive choices with improved aesthetics that are limited only by the architect's imagination.

An important indirect cost advantage is realized by reduction of weight. Prefabricated ceramic tile cladding using light-gauge steel studs and prefabricated cementitious backer boards weighs only about 15 pounds per square foot. In contrast, precast concrete panels weigh between 50 and 80 pounds per square foot, while brick masonry weighs 40 pounds per square foot. Structural framing required for tile panels is substantially lighter.

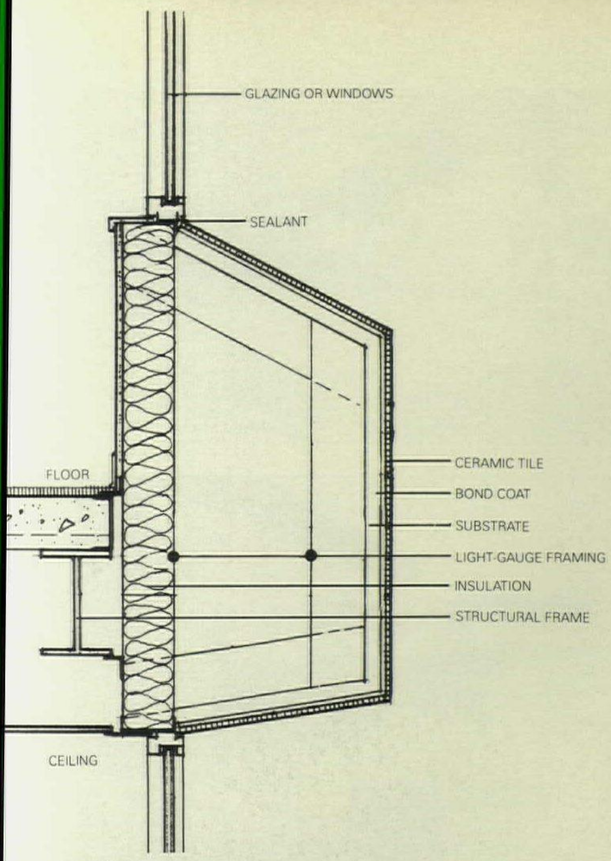
Another advantage that makes prefabricated ceramic tile cladding attractive is that it can be shop fabricated under controlled temperature conditions, all year round. There are no delays caused by cold and inclement weather. Grouting of panels within a controlled shop environment produces better results than are often obtained in field operations. Quality control is improved with production-line methods of shop fabrication and by closer supervision. There are no worries about wind and sun causing premature drying of installation materials, such as skinning over of bonding agents, and no worry about mechanics falling off scaffolds. Installing tile on panels in a horizontal position is faster and easier than installing field-applied tiles on vertical walls from scaffolding.

Finished prefabricated ceramic tile cladding panels can be stockpiled at the fabricator's plant until installed on the building. Cranes or hoisting equipment already on site are normally used to lift panels into place on the face of the building.

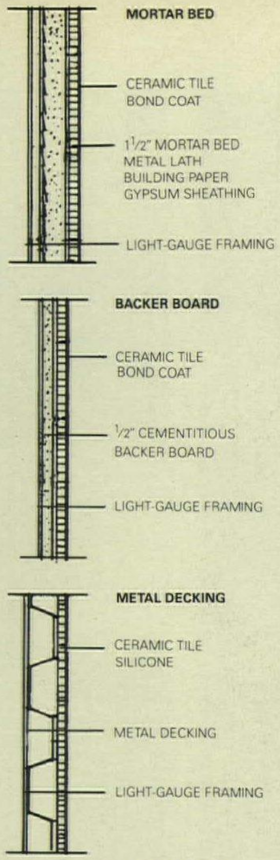
By fabricating ceramic tile cladding into panels before scheduled installation time, actual on-site erection time is reduced, making it possible to maintain tight construction schedules. With panels mass-produced ahead of erection time, they can be quickly installed on the face of the building, providing time savings that usually permit occupancy of new facilities ahead of schedule and within budget.

Prefabricated ceramic tile cladding systems have a wide range of design flexibility. Panels can be flat spandrel panels, three dimensional shapes, curved, or geometric in design. Colors, shapes, and sizes of ceramic tile available for exterior cladding are almost unlimited.

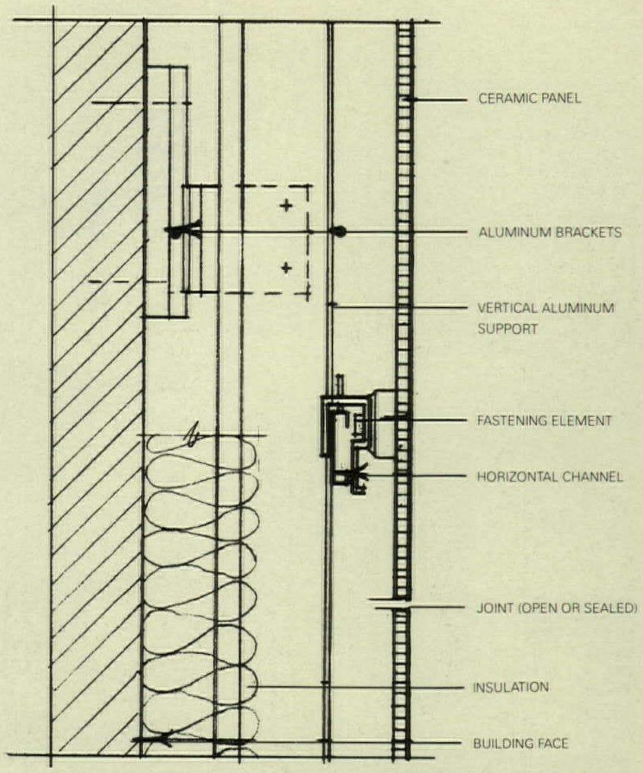
Another advantage is that ceramic tile cladding fabricated over metal studs provides a noncombustible exterior wall. Building codes recognize steel studs with



COMPONENTS OF PANEL SYSTEM



SUBSTRATES FOR PANEL SYSTEMS



MECHANICAL ANCHORING SYSTEM FOR LARGE CERAMIC PANELS

⅞-inch portland cement plaster on one side and ⅝-inch gypsum wallboard on the interior face as one-hour fire-resistant construction. Building codes recognize other steel stud wall systems as having two-, three-, and four-hour ratings.

Design Considerations

Size, which has always been a consideration in prefabricated systems, is generally limited by what can be conveniently and economically handled by available transportation and hoisting equipment. Panels within the recommended 150-square-foot range normally need no expansion or control joints within themselves and are easily transported and lifted into place on the face of buildings. Knowledgeable backer board manufacturers recommend installation of expansion joints spaced a maximum of every 15 feet and preferably every 12.

Building height considerations should also be taken into account. To date, the tallest building using cementitious backer boards to support ceramic tile is four stories tall. This system has also been used successfully as the backing for ceramic tile on mechanical penthouses of high-rise buildings. Prefabricated systems with mortar beds have been used on buildings up to 26 stories tall; mechanical anchoring systems and silicon adhesive bonding systems, on buildings up to 10 stories.

Severe freezing and thawing conditions that prevail throughout most of the United States, Canada, and Northern Europe do not seem to be a problem, on the evidence of exterior walls of more than 50 projects inspected during the past ten years. The use of latex in mortar beds and thin-set mortar appears to provide adequate frost resistance for setting and back-up materials.

Unlike brick panel systems, which are designed to permit water to pass through the brick and be expelled through weep holes at the base of each panel, tile systems are designed to keep water from entering. Strict quality control is required to produce tile panels meeting this requirement.

On some buildings, tile is field-applied by hand on the ground floor walls because of economic considerations. Tile is the only material that can be selected where joints between field-installed materials and shop-fabricated units can readily be aligned.

Tile Bond Tests

The interface between tile and setting material, be it latex-modified thin-set mortar over cementitious substrates or silicon and metal decking, is the one area which has raised more concern than any other part of prefabricated tile cladding systems. The success of the interface between tile and bonding material is dependent on two factors: 1) the bond or shear strength of the bonding material (latex-portland cement mortar or silicon); and 2) the bond strength of the tile, or its ability to be bonded with the bonding material.

There are three schools of thought on the subject of the type of back that should be used on exterior prefabricated tile panels. One school believes that rib-back tile, the type of ribs found on most extruded quarry tile, provides the better bond between the tile and bond coat. The second school believes that this type of back is not sufficient to develop adequate mechanical bond and that a "keyback" or dove-tail configuration is better. With the latter, mortar is pressed into the dove-tail slots to form a mechanical lock between the mortar bond coat and tile. A third school of thought believes that flat back tile, which is found on porcelain and other larger tiles, provides the best bonding surface.

Independent testing has shown the biggest difference in bond strength between these different tile backs is between back-buttered and non-back-buttered tile. Tiles should be back-buttered for maximum bond strength. Back-buttering also fills voids that can occur between mortar bed and tile when tile is only beat-in. Full coverage is most important to exclude

Specifications

Standards that need to be included in specifications for prefabricated ceramic tile cladding systems using cementitious backer boards include:

Materials:

- **16 gauge and heavier metal framing: ASTM A446, A570, and A611**
- **Galvanized finish: ASTM A525**
- **Cementitious backer units: ANSI A118.9 (proposed)**
- **Ceramic tile: ANSI A137.1**
- **Latex-portland cement mortar: ANSI A118.4**
- **Latex-commercial cement grout: ANSI A118.6**

Fabrication:

- **Steel framing: ASTM C955**
- **Cementitious backer boards: ANSI A108.11 (proposed)**
- **Installation of ceramic tiles with latex-portland cement mortar: ANSI A108.5**
- **Grout installation: ANSI A108.10**
- **Gypsum sheathing used with mortar bed systems should conform to FS SS-L-30 and mortar to ANSI A108.**
- **Silicone used for adhering tiles to metal deck substrates is the same type used in structural glazing in glass curtain wall and must conform with ASTM C920.**

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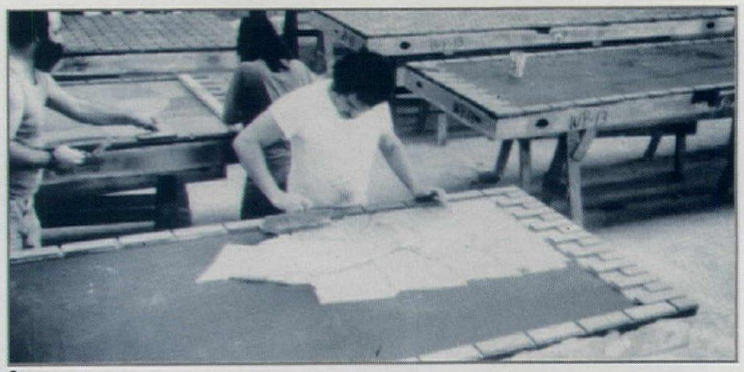

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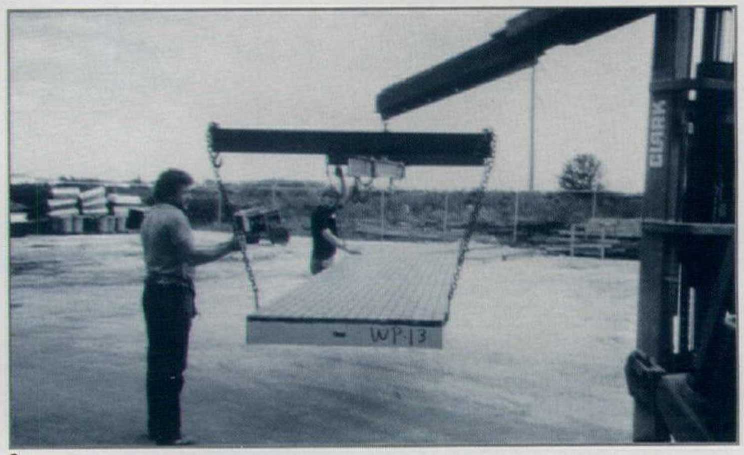

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Fabricating and Installing Tile Panels

A cementitious backer board is applied over lightweight steel framing. After a waterproofing membrane is installed, ceramic tiles are applied with latex-portland cement mortar (2). The completed panels are moved as units from the fabrication area to storage and curing areas (3), and then loaded onto trailers for transportation to the building site. The panels are lifted and erected on the face of the building structure using the same cranes used in construction of the building or by smaller mobile cranes (1).

pockets where water can be trapped and freeze.

Latex-modified dry-set (thin-set) mortar is recommended for bonding tiles to cementitious backing materials. Preferably, latex and dry-set mortar materials used in a project should come from one manufacturer and conform with ANSI A118.4, *Latex-Portland Cement Mortar*. It is recommended that the latex-portland-cement mortar bond coat be a factory-prepared blend rather than a field mix of sand and cement. Quality of local sands varies greatly in many parts of the country, affecting the quality of the bond strength. Also, factory-prepared dry-set mortars contain additives that enhance performance beyond that which can be obtained from locally prepared job mixes.

Light-gauge metal framing systems are somewhat flexible when compared to precast concrete panels. 6″ x 6″ and 4″ x 8″ tiles are normally not affected by the flexibility and minute thermal movement inherent in these framing systems. Porcelain tiles, especially larger ones, require special, more flexible mortars. Their impervious nature reduces the bonding ability of typical dry-set and latex-modified mortars. A new generation of latex-portland-cement mortars, using high-solids-content latex, provides additional flexibility and improved adhesive properties necessary to bond these large, impervious porcelain tiles permanently to panel systems.

Specifications

Traditionally, materials used in fabricating ceramic tile panels are specified in three or four different sections of the project specifications: 1) Light-gauge steel framing is normally a separate section; 2) Installation of gypsum sheathing and cementitious backer boards is usually covered under Rough Carpentry or Gypsum Drywall work; 3) If the mortar bed is considered plaster work, it and metal lath may be specified in the Plaster section; and 4) Ceramic Tile is covered in a fourth section. If sealants are considered part of the panel system, there will be an additional section. Coordination between sections can become impractical, if not impossible. With such specifications, it is difficult to assign responsibility for the panels to any one of the involved parties. In order to overcome these difficulties, it is suggested that the entire system be covered under one specification section, since it is fabricated and installed as a unit.

Design Potentials

The potential for creating and constructing prominent building façades is unlimited with prefabricated exterior ceramic tile cladding. Architects have a broad pallet of colors, textures, and sizes with which to design ceramic-tile-clad exteriors. Flexibility in design of light-gauge steel framing systems provides infinite configurations for creating building façades. Clear, concise drawings and technical specifications will communicate architects' designs to fabricators and erectors, who translate the designs into reality. The lightweight advantages of these prefabricated systems provide economical, practical, functional, and aesthetically rewarding solutions for enhancing exterior building environments. **Jess McIlvain** ■

The author is a registered architect and internationally recognized consultant on installation of ceramic and marble tiles. He is a member of American Society for Testing and Materials and the Construction Specifications Institute. He serves on various construction industry committees, including the National Tile Contractors Association Technical Committee and the Tile Council of America Handbook Committee.

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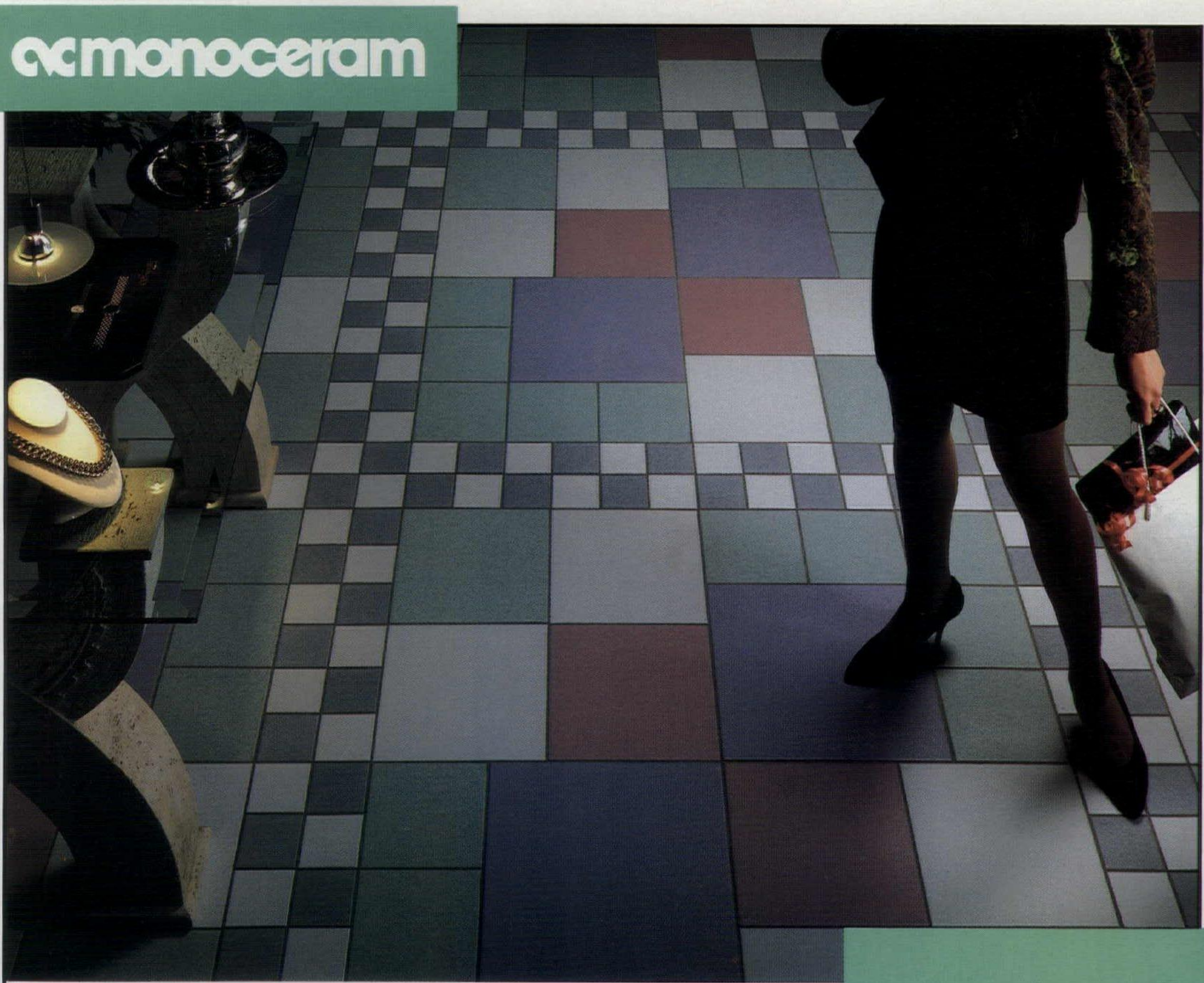

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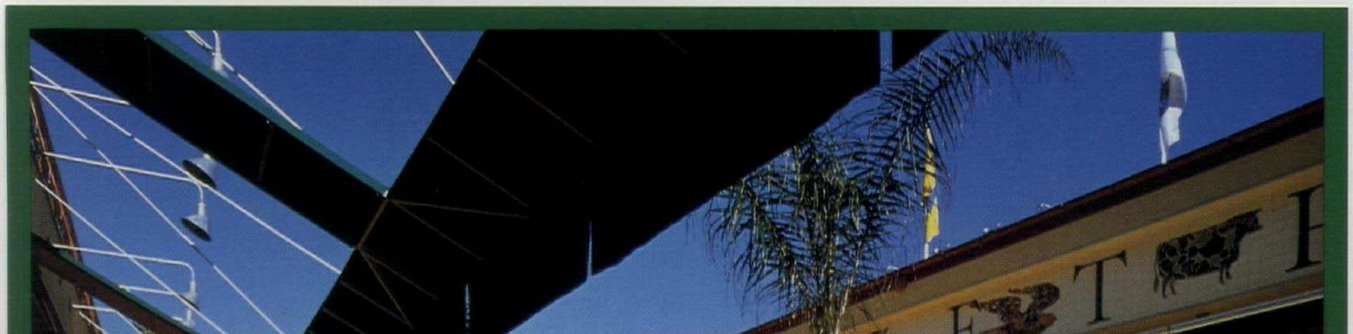

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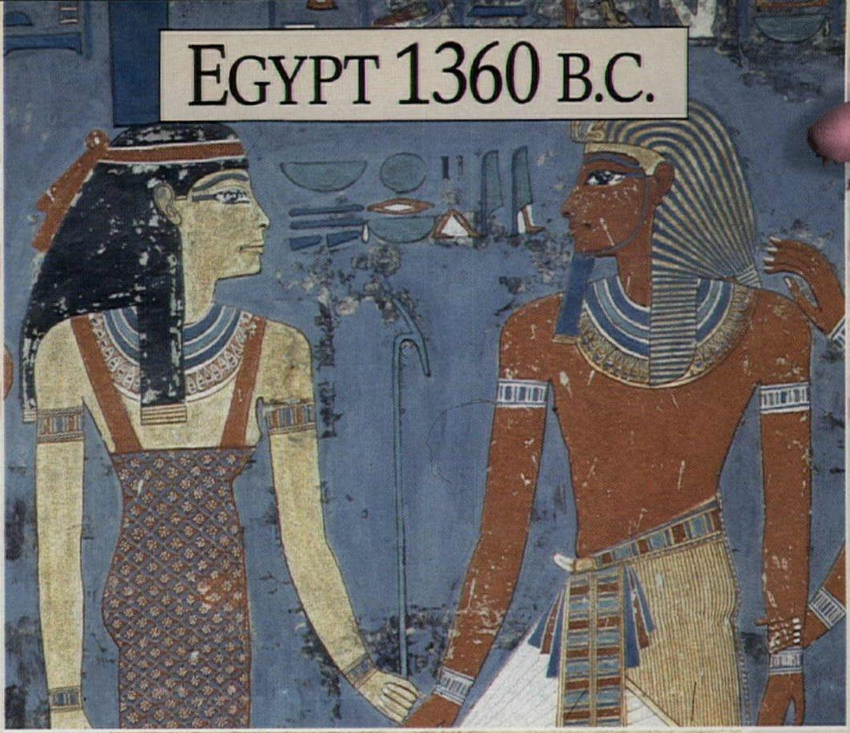

EGYPT 1360 B.C.

Ceramic Tile Floors

Joe A. Tarver examines the proper products, substrates, and bonding and grouting materials for ceramic tile floor installations.

American Olean

Crossville Ceramics

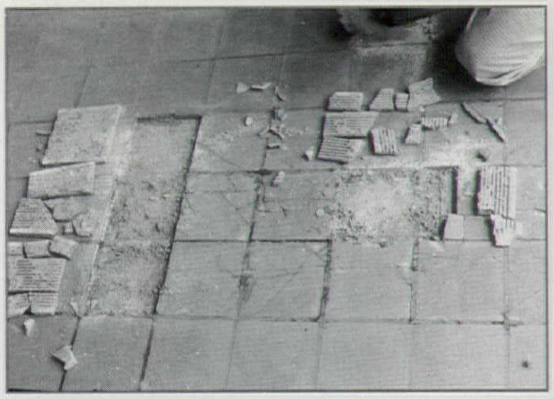
Santa Monica architects Solberg + Lowe used ceramic floor tiles that replicated the feeling of the original in their refurbishment of the Hollywood Roosevelt Hotel, Hollywood, California (top), built in 1926. The architects referred to old drawings of the floor and chose two sizes – 3⅞-inch-square and 3⅞" x 8" – to make a similar pattern. Gobbell Hays Partners of Nashville also used ceramic tile in their renovation of the Cathedral of the Incarnation (bottom). The geometric pattern of glazed and unglazed tiles in a variety of colors refers both to the original 1914 wood floor design and to the bay structure of the cathedral. The architects used the highly decorated ceiling pans as guides to selecting tile colors.

The specification and selection of ceramic floor tiles and the substrates on which they are installed must be a careful and thoughtfully considered exercise. All ceramic tile is not alike, nor are all substrates suitable to receive ceramic tile. One of the most critical factors in specification, selection, and installation is common sense.

It would not be practical or serviceable to purchase an automobile with no tires. Neither is it practical or serviceable to purchase ceramic tiles manufactured for walls and install them on floors. In both examples, the products would function, but not to the satisfaction of the purchaser. It is the responsibility of the specifier, designer, and consumer to ascertain that the products selected will perform in their intended environment. It is the responsibility of the manufacturer, distributor, and contractor to provide product information necessary to make that selection. A few well-placed questions about products and their performance, substrates and their suitability can prevent future problems. Since ceramic tile is a veneer, serving no structural purpose, the aesthetic value becomes the consumer's single most important criterion for selection. Often the architect and designer also share this narrow view, with the result that beautiful tile products are selected for environments in which they fail to perform. As we explore more fully these and other important considerations, the architect, designer, installer, and consumer should be able to acquire enough information to assure a satisfactory ceramic tile floor installation.

Selecting the Proper Product

The variety of ceramic tile products is almost endless. The user is limited only by imagination in the selection of products for residential or commercial use. Some, but not all, products can be used in several areas. For example, some tiles manufactured for floors can also be used on walls, countertops, patios, and around swimming pools. Some tiles manufac-



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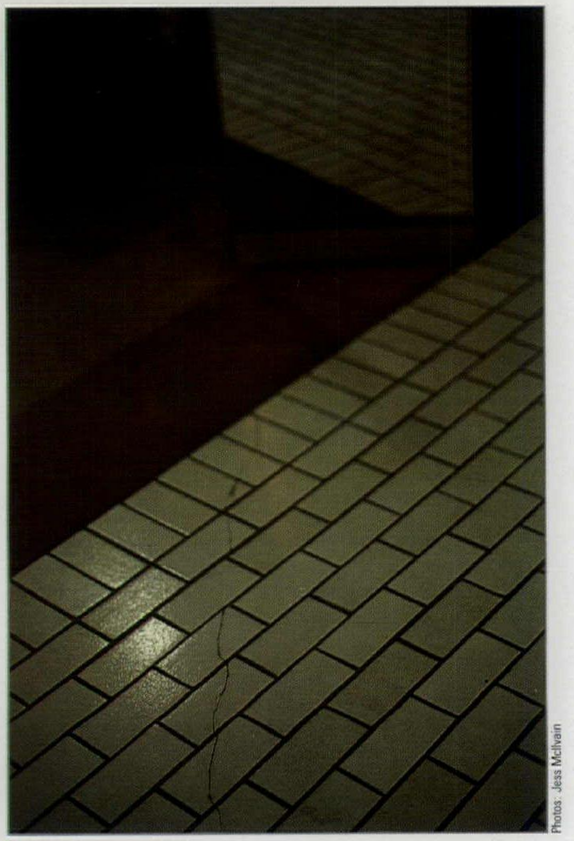

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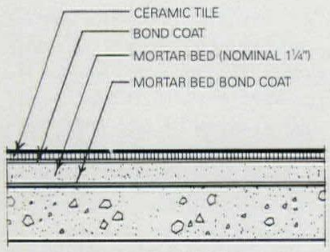
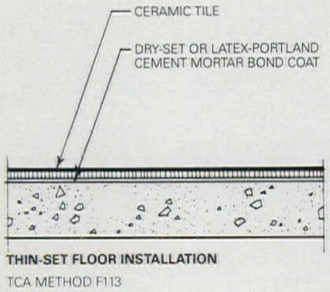
Photos: Jess McIlvain

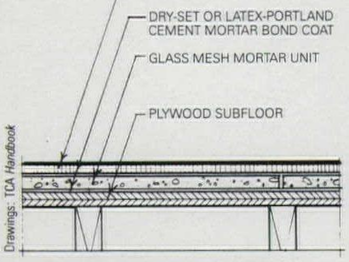
Floor tile installation failures have a number of causes. Quarry tiles, on a plastic mortar bed, were installed with an inadequate amount of pure cement bond coat (1). In addition, they were not "beat in," or burnished with force. Lack of or poorly detailed control joints are another frequent cause of installation failure. Expansion joints in tile were not installed over expansion joints in concrete, causing tile cracking over expansion joints in concrete bed (2). In a similar situation, tiles were installed over a construction joint in the concrete floor with no control joints, causing cracking in the tiles (3).



THICK-SET FLOOR INSTALLATION
TCA METHOD F112



THIN-SET FLOOR INSTALLATION
TCA METHOD F113



FLOOR INSTALLATION OVER GLASS MESH MORTAR UNITS TCA METHOD F144

Drawings: TCA *Handbook*

tured for walls can also be used for light traffic floors. Define your areas of usage and rely upon qualified persons to advise you. Manufacturers' catalogs are also available, containing product descriptions, application recommendations, sizes, colors, available trim, and installation information.

Substrates

Needless to say, ceramic tile installations will never be any better than the substrates to which they are applied. Further, precise attention must be given to the compatibility of the tile, setting material, and substrate. Strict adherence to the manufacturer's recommendations for suitability, mixing, application, and correct tools is mandatory. The Floor Tiling Installation Guide (in the Tile Council of America *Handbook*) is one guide available for the proper selection of products and procedures.

Given the option, the best ceramic tile installation method is in a mortar bed; however, over 90 percent of the ceramic tile installed in the United States today is thin-set. The thick mortar bed, ¾" to 1" on walls and nominally 1¼" on floors, facilitates accurate slopes or planes in the finished tile work. The term "thin-set" (in some areas, "dry-set" portland cement mortar) is used to describe the method of installing tile with a bonding material usually 3/32" to ⅛" in thickness. The TCA *Handbook* illustrates the difference in a cement mortar bed and a thin-set mortar bed, for slab-on-grade construction, in methods F112 and F113. These and other methods in the *Handbook* show recommended uses, limitations, requirements, materials, preparation by other trades, expansion joint requirements, and ANSI Installation Specifications.

Innovative technology also permits installation of ceramic tile over glass mesh mortar units (TCA F144), tile over other surfaces (TCA TR711), and tile over tile (TCA TR912) in renovation and remodeling.

Plywood, particle board, and cement asbestos board are dimensionally unstable and not ideal for backing tile. Plywood may be used on horizontal surfaces in accordance with ANSI specifications.

It is impossible to cover all potential substrates and substrate problems here; however, structural movement, deflection, expansion, and contraction are conditions that exist regardless of commercial or residential design. These conditions and their ultimate effect on completed tile installations must be considered. It is imperative that specifications be followed for the installation of ceramic tile to each specific substrate. Some examples: Plywood subject to moisture can delaminate. The expansion and contraction rates of wood and tile are vastly different, especially when subjected to water. Most thin-set materials for the application of ceramic tile cannot stand the resulting movement. Concrete and wood substrates can deflect beyond the accepted tolerance of 1/360 of span.

It is the responsibility of the architect to specify expansion and control joints and show their location and details on drawings. The TCA *Handbook* lists requirements for expansion joints. Failure to provide adequate expansion and control joints can result in numerous problems, from cracked grout joints to total bond failure. Floors with no perimeter expansion joints have "heaved" as much as 6" to 8" from the substrate in the middle of the room. Heaving can occur from thermal expansion and contraction, deflection, and tile growth due to moisture gain.

Another trend affecting tile installation is the general movement by architects and engineers toward computerized designs. In high-rise construction, for example, thick slabs have been replaced by thinner pre-formed and/or post-tensioned concrete. The thinner slabs are designed to be slightly convex with no load, returning to level under a live load of tile, furniture, and people. Most often they move to a slightly concave position. Thin-bed installations of ceramic tile bonded to substrates of this type, using today's products and methods, most often will fail. The alternatives are using a tapered threshold to compensate for the

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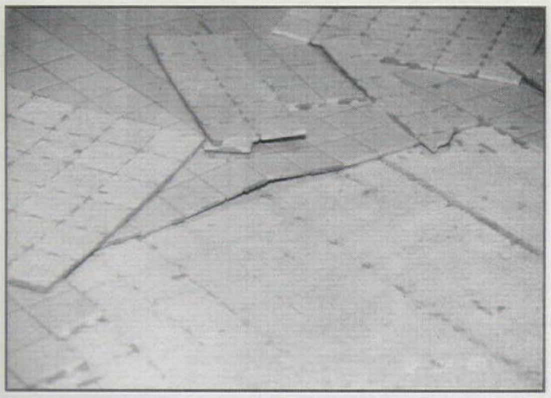

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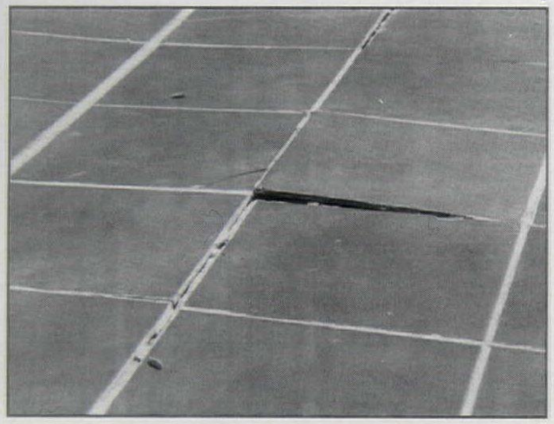

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Omitted or poorly installed expansion joints can cause tile to shear off exterior mortar bed (4). In this case, tile expanded over the mortar bed and the edge of abutting concrete. In other cases, tile "heaves," or pops up. Mosaic tiles were installed with thin-set mortar directly over a structural concrete floor system (5). Omission of expansion joints caused heaving on this roof deck (6).

difference in floor heights (TCA F111) or a membrane for cleavage and waterproofing (TCA F122).

Bonding Materials

Bonding materials are the mortars and adhesives used to bond the tile to the substrate. Instead of the familiar sand, cement, and water, current bonding materials are polyurethane, polyacrylate, and polyester resins, as well as a variety of modified and 100-percent solids epoxies. Furan and Furnan are also available for setting and grouting tile where resistance to chemicals and high temperatures is required.

All of the products have been developed to improve the thin-bed method of installing and grouting ceramic tile, pavers, thin brick, and thin marble and granite tiles. The specifier/purchaser of grouts and thin-set mortar should only use the recommended prepared additives. Generally, the best results are obtained by using products of the same manufacturer.

The most important thing to remember is that latex additives are recommended for use with portland cement mortars and grouts because they improve adhesion, frost resistance, color retention in grouts, flexural and impact strengths, retention of water for proper hydration when grouting high absorption tiles, resistance to staining, and easier cleaning and maintenance due to increased density. The minimal increase in cost for additives is far outweighed by value and performance. These should be specified and used in strict adherence to the manufacturers' recommendations regarding suitability, mixing, and application.

Grouting

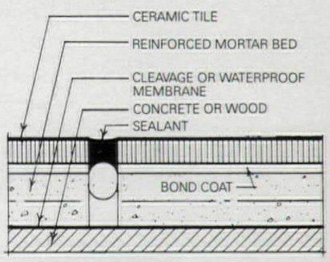
This is the last and the most critical application in a ceramic tile installation. The use of the proper grout and the professionalism with which it is installed will determine the reaction and response of the consumer. The most beautiful tile in the world can't overcome a sloppy grout job.

The most common abuse of portland cement grouts is the use of too much water, both in mixing and cleaning. Pigmented, or colored, grouts are particularly affected by too much water in cleaning. The pigments, prior to hydration and/or curing of the grout, are floating free without any adhesive qualities, and excessive water simply washes them away, leaving discolored grout joints. Grout additives can produce the preferred effect. Selection of grouts can be accomplished by using the Grout Guide in the TCA *Handbook* and the National Tile Contractors Association's *Reference Manual.* New grouting products are emerging and existing old ones such as epoxies are constantly being improved. There is a lack of educational programs to expose these improved and new products to architects, designers, and even to the tile industry. The most immediate source of assistance is to contact the manufacturers for their requirements and recommendations for prevention, correction, and causes of grout problems.

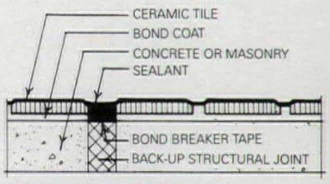
The best defense against tile installation problems is knowledge of the products and systems being specified and used. Familiarity with industry literature, the TCA *Handbook*, American National Standards Institute's standards, and the Materials and Methods Standards Association's Bulletins are a must. If you are unfamiliar with new products, seek help from seminars, workshops, conventions, and expositions. Talk to factory reps, distributors, contractors. Demand answers to questions on how to specify the products that will give you professional results. It is not unusual to find out-of-print literature in architects', designers', distributors', and contractors' offices. Your request for up-to-date literature and product information will get immediate response from industry associations. **Joe A. Tarver** ■

The author has been Executive Director of the National Tile Contractors Association since 1972.

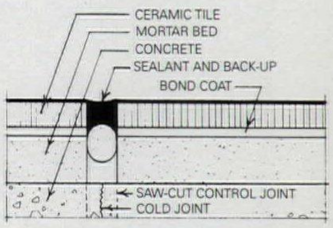
EXPANSION JOINTS TCA METHOD EJ171



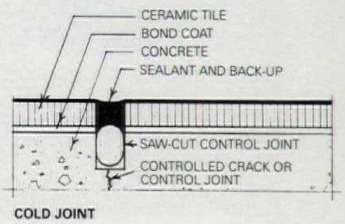
CONTROL, CONTRACTION, ISOLATION JOINT



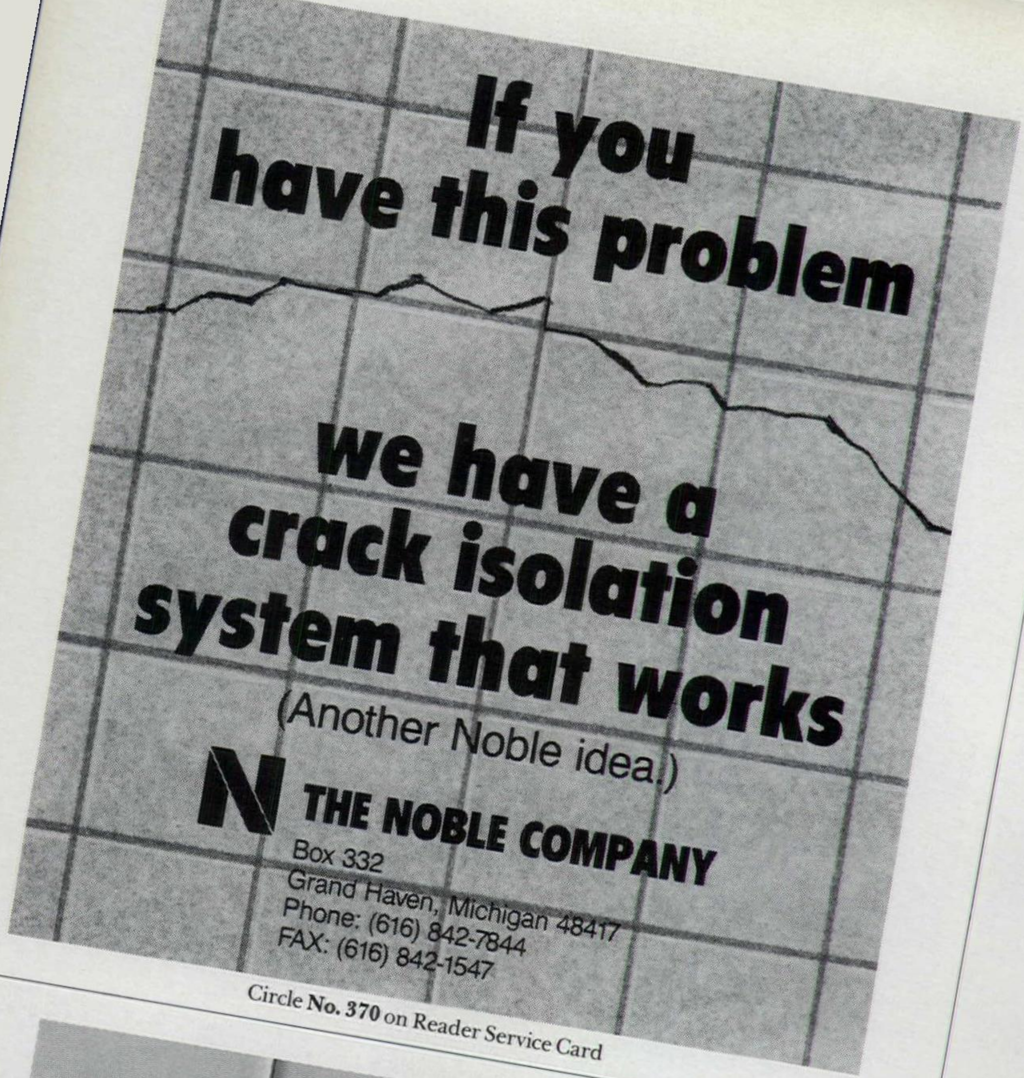
CONTROL, CONTRACTION, ISOLATION JOINT



COLD JOINT



COLD JOINT



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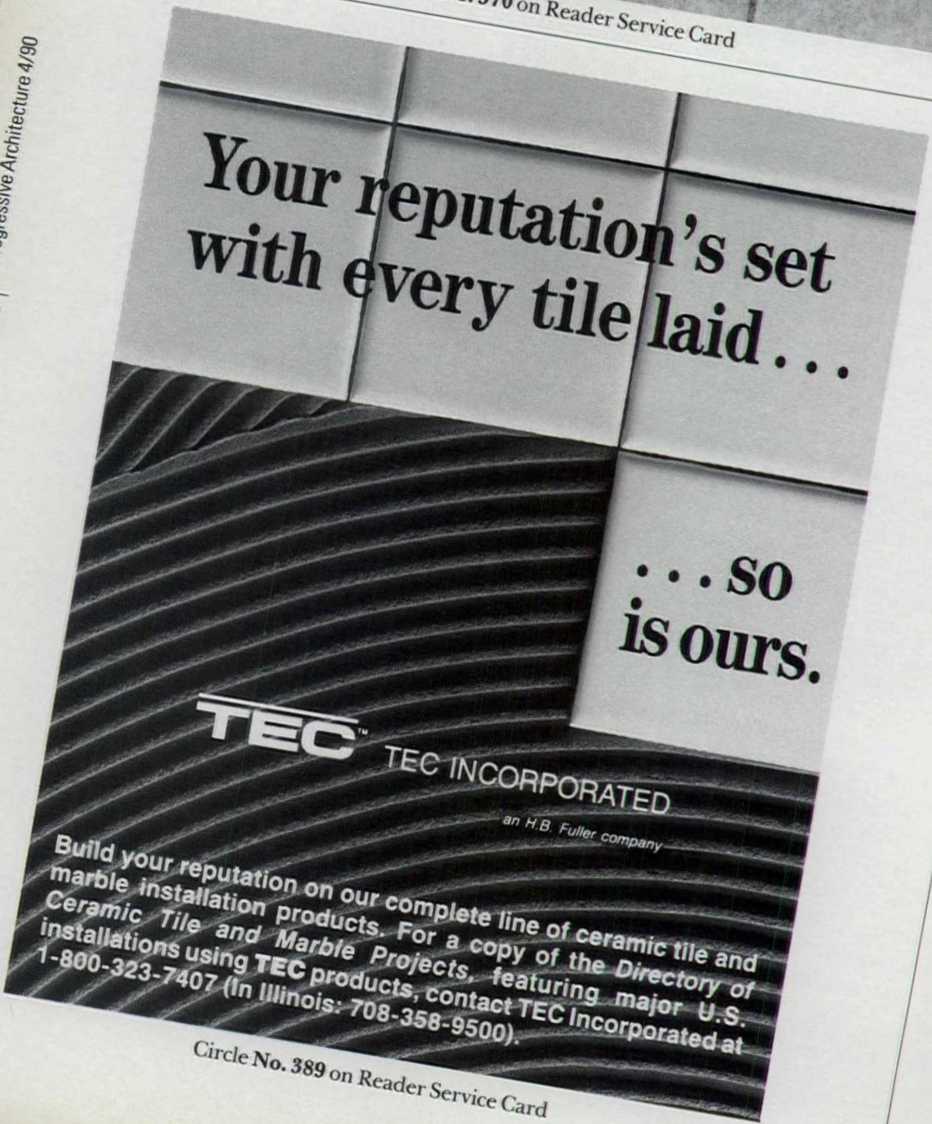

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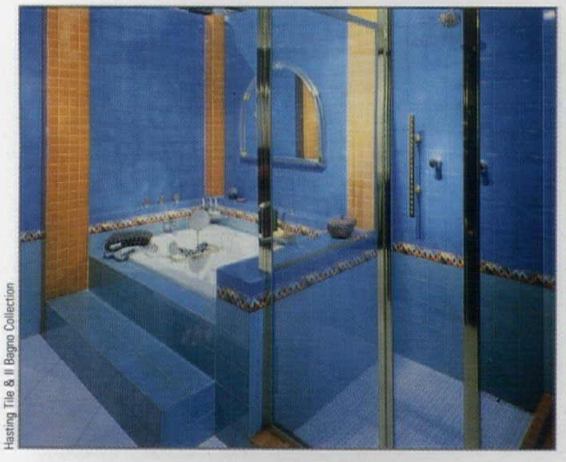
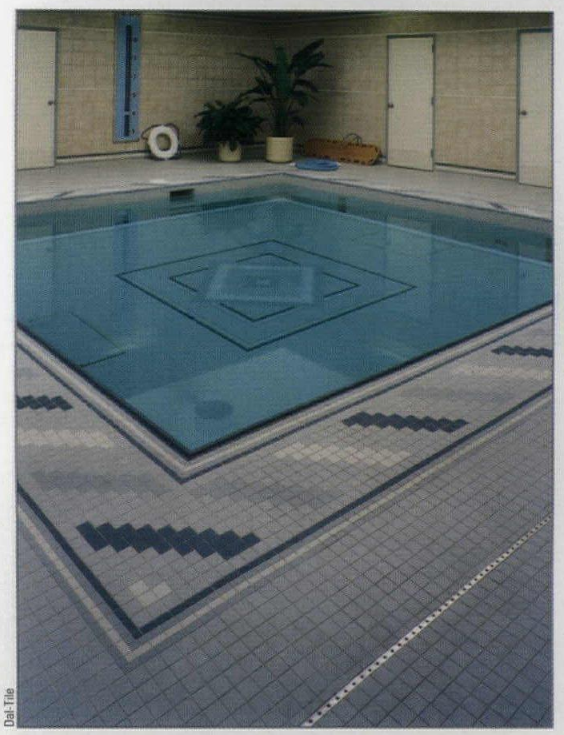
Tile in Wet Environments

Consultant **Robert T. Young** discusses substrates and waterproofing materials for interior and exterior ceramic tile installations.



Hasting Tile & Il Bagno Collection



Dal-Tile

A variety of tile sizes and colors, along with a decorative border strip, are used in this bathroom (top). All tile is monocottura – the floor is matte-finished for durability – and the shower surface is textured for slip resistance. Waterproof grout secures the tilework; other finishes are sealed. The entire floor of this therapeutic pool (bottom) in the Frazier Rehabilitation Center in Louisville, designed by Browning Day Mullins Dierdorf and Elizabeth Meehan & Associates, rises to deck level. The 18′ x 18′ x 18″ floor platform is tiled with 2-inch-square mosaics; the deck adds 1″ x 2″ trim. Spray-on waterproofing was used in this thick-bed installation.

The first step in designing a successful installation of tile in a wet environment is to select a substrate that is not deteriorated by moisture. Tile is not damaged by exposure to moisture (unless it is exposed to freeze-thaw cycles), but some tile substrates are.

Interior Vertical Substrates

Concrete, portland cement mortar, masonry, or glass mesh mortar units are recommended and used successfully as backing for tile that is subject to frequent wetting.

Water-resistant gypsum board is a substrate option in wet areas when the edges, corners, and penetrations of the board are sealed to prevent water from saturating its core, which will cause "water resistant" board to deteriorate as readily as regular gypsum board. This method, approved by the American National Standards Institute, is described in ANSI AN-3.6 and shown in the Tile Council of America *Handbook* B416 details. However, these requirements are rarely followed, and inferior installation is usually the result. Given a second chance, most architects, developers, or owners would spend the extra money required to install glass mesh mortar backing in lieu of the water-saturated gypsum products that usually result when TCA B416 is specified.

Interior Horizontal Substrates

The application of tile to horizontal and adjoining vertical substrates that are subjected to water requires that a waterproofing membrane be used because tile, grout, mortar, masonry, and normal concrete backing materials are not waterproof. Many times it seems that the original budget will not permit good waterproofing materials and procedures, but there always seems to be money to do the installation over in an attempt to correct the initial error or to replace the "more economical system." In areas such as fountains, waterfalls, hot tubs, showers, etc., it is mandatory that

(continued on page 155)

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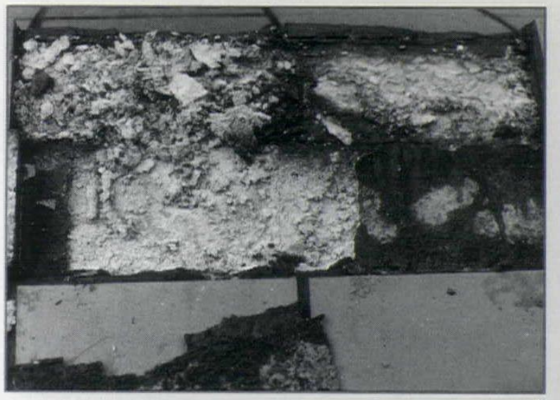

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Photos: Jess McIlvain

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Improper drainage and waterproofing contribute to ceramic tile installation failures in wet or damp areas. An improper waterproofing material caused both waterproofing and mortar to deteriorate (1). Lack of a drainage layer over the pink insulation/protection material and improper "chicken wire" reinforcing also cause mortar bed deterioration (2). Another result of the omission of a drainage layer (in this case, between the roofing membrane and the mortar bed) is the efflorescence that forms on the surface of tile (3).

(continued from page 153)

all tile below and near the water line be waterproofed, using a membrane under the tile system.

The selection of a waterproofing material for a tile installation is complicated, because products vary from cementitious latex with fiberglass reinforcing to rubber and urethane for trowel-on systems. Sheet membranes vary in composition from types of rubber or vinyl sheeting to hot mopped tar applications.

Thick-set method. Waterproofing for interior thick-set mortar bed applications is usually done using one of the sheet membranes. The trowel-on type membranes have limitations that prevent safe use over moving substrate joints or at the wall and floor joints where construction materials change.

The sheet membrane serves as a cleavage membrane when applied over the tile substrate. The substrate under the waterproofing should be sloped to comply with TCA F121 with proper clamping ring installation at the drain. The movement caused by cold joints, cracks, and wall and floor joints occurs under the membrane and the tile system (reinforced mortar bed, bonding mortar, tile, and grout). When the thick-set system is used following TCA EJ171 expansion joint details and ANSI A-108.1 and A-108.5, most interior installations are trouble free.

Thin-set method. The selection of waterproofing for use with tile set in the thin-bed systems becomes even more complicated than with the thick-set systems. Trowel-on systems of cementitious latex and fiberglass do not have the resiliency required to cross expansion joints or other moving substrate conditions. The wall and floor joint also can be a problem with some materials and conditions. The trowel-on urethane systems are more resilient but are also limited in their recommendations for crossing expansion joints or other moving substrate conditions.

ANSI and TCA suggest referring to waterproofing manufacturers' directions. Trowel-on waterproofing manufacturers recommend that their material not be used to cross expansion joints and suggest that these joints be filled with sealant. In other words, the waterproofing system becomes completely dependent on the sealant joints. The flexing of the sealant joints and their natural deterioration ensure that a water problem will occur.

Sheet membrane that is manufactured for thin-bed tile installations will bridge the substrate expansion joints, cold joints, and cracks. The membrane can be turned up to the wall, changing from one substrate material to another to provide a complete waterproofing system that is not dependent upon sealant joints. The sheet membrane can be installed with the tile bonding materials, but a resilient urethane bonding material will allow more elasticity at wall-floor intersections and other areas where excessive movement is anticipated.

It is also possible to combine the sheet membrane with the trowel-on systems, using the sheet membrane to bridge expansion joints, cold joints, and cracks, and for base flashing. The problem of combining two manufacturers' products is the loss of a single company responsibility in the event of a waterproofing failure.

The substrate expansion joints, cold joints, and cracks must be in direct alignment with the surfacing material expansion joints in the thin-bed systems. When it is aesthetically unacceptable to align substrate joints with expansion joints in the tile surface, using urethane bonding material with the sheet membrane seems to be the best of the undesirable choices. It is also possible for sheet membrane combined with a resilient membrane adhesive to bridge cracks or cold joints if the substrate movement is not excessive. A slight crack in the grout joint may occur, but generally the tile will not crack or lose bond. This is a risk that may not be covered in a manufacturer's warranty.

Each project should be considered separately since it is not possible to project the movement anticipated in the substrate cracks or joints. When possible, obtain

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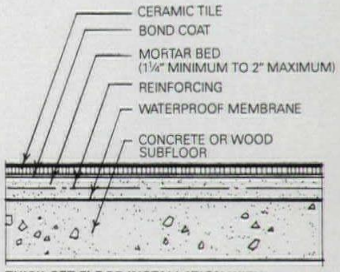
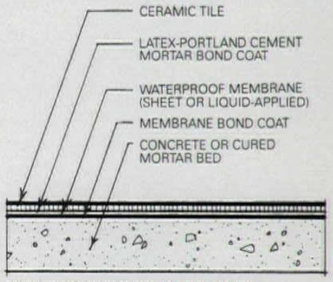
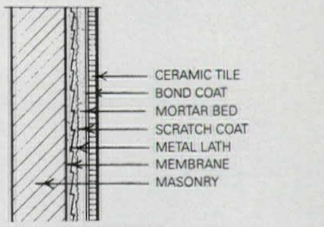


THICK-SET FLOOR INSTALLATION WITH WATERPROOF MEMBRANE TCA METHOD F121

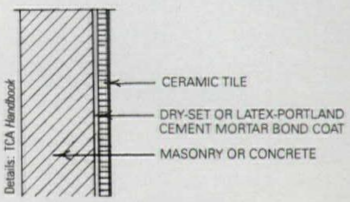


THIN-SET FLOOR INSTALLATION WITH WATERPROOF MEMBRANE TCA METHOD F122



THICK-SET WALL INSTALLATION
TCA METHOD W201

Details: TCA *Handbook*



THIN-SET WALL INSTALLATION
TCA METHOD W202

Photos: Jess McIlvain

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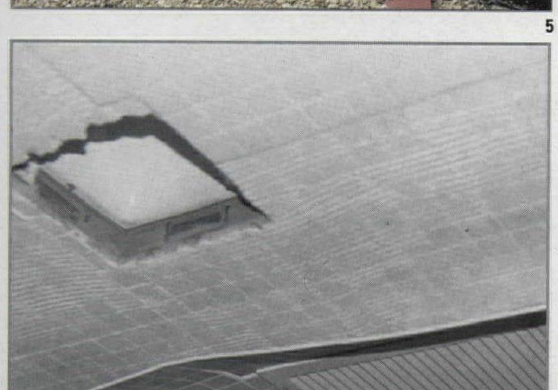

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Installation problems include inadequate bond coat coverage, indicated by its lack of contact with tile backs (4). This example is a thin-set ceramic tile installation. An entire section of tile delaminated from this low wall because the liquid-applied asphalt-modified urethane waterproofing was incompatible with the styrene in a latex additive (5). Another cause of tile delamination is when the bond coat is allowed to skin over before tiles are applied, even when bond coat coverage is almost complete (6).

(continued from page 155)

a warranty covering the particular project under the existing conditions.

Exterior Vertical Applications

The application of tile on vertical surfaces may require a moisture barrier but seldom a waterproofing membrane. Portland cement mortar substrate can be applied over concrete masonry or over felt and galvanized metal lath. ANSI and TCA requirements for mortar applications, expansion joint design, and tile application are described or referenced in TCA W201 for thick-set methods and in TCA W202 for thin-bed. Follow manufacturer's recommendations when using glass mesh mortar units for the substrate.

Exterior Horizontal Applications

Thick-set method. The best system for exterior thick-set tile installations follows TCA F103: The sheet membrane slopes to the drain, with crushed stone or a matting to allow drainage to the drain weep holes. It is important that the sheet membrane continue up the wall or base to extend safely above the water line. The installation of expansion joints in the mortar bed to comply with TCA EJ171 is mandatory.

Thin-set method. The exterior waterproofing systems used with thin bed applications are the source of many tile failures. The expansion joint requirement (12′ or 16′ on center, etc., per TCA EJ171) is seldom considered when areas such as exterior plaza decks are designed. The control and expansion joints in the concrete substrate are generally not in alignment with the module of the tile. A trowel-on membrane cannot be used across the substrate expansion joints, and the use of sealant at a flexing exterior creates a joint that is almost certain to tear and leak in a very few years.

A thin-set sheet membrane must be used across control and expansion joints, and the joints in the tile surface must be cut or placed directly over the substrate joint. The module of the substrate joints, perimeter joints, penetrations, etc. must be constructed to comply with TCA EJ171 and ANSI requirement to avoid leaks and loss of bond.

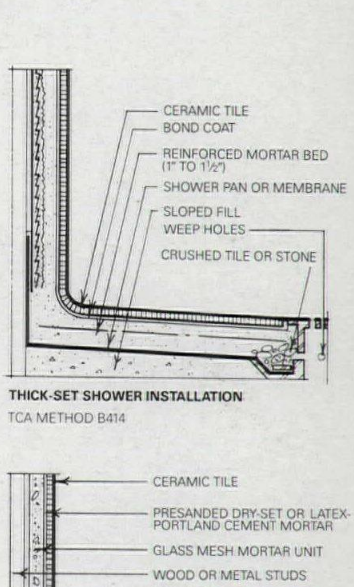
Bonding Exterior Tile

The installation should be closely supervised to ensure that the bond coat coverage and contact area between the tile and the mortar bed be uniformly distributed over a minimum of 95 percent of the back of the tile. Voids in the bond coat will allow moisture to accumulate by migration or condensation. The accumulated moisture will result in efflorescence, plus mortar and tile deterioration in climates subjected to freeze-thaw cycles. Latex additives to the mortar and grout may help densify the materials but will not prevent deterioration if water penetrates into the mortar bed. Large unit tiles will probably require back buttering to achieve the necessary coverage.

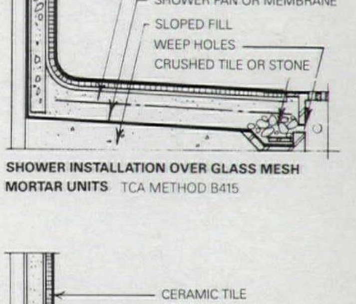
Maintaining Exterior Tile

The normal deterioration of expansion joints and cracks that occur in the grout joints or tile requires that a maintenance procedure be established to avoid deterioration of exterior tile applications. An annual inspection – and repairs to sealant joints, grout joints, or other areas that may allow water penetration behind the tile – should be done in the fall before freezing weather begins. Apply a water-repellant (similar to a 5 percent silicone solution) to the tile and grout joints after repairs are complete. Regular maintenance to a system – exterior or interior – detailed in accordance with these, ANSI, and TCA recommendations, will ensure ceramic tile's appearance and durability. **Robert T. Young** ■

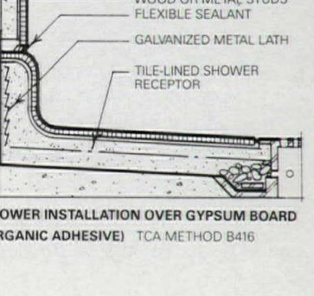
The author is president of Ceramic Tile and Marble Consultants, Inc., in Oklahoma City. He is a lecturer and consultant for architects and tile industry professionals.



THICK-SET SHOWER INSTALLATION
TCA METHOD B414



SHOWER INSTALLATION OVER GLASS MESH MORTAR UNITS TCA METHOD B415



Details: TCA Handbook

SHOWER INSTALLATION OVER GYPSUM BOARD (ORGANIC ADHESIVE) TCA METHOD B416

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Ceramic Tile Distributors
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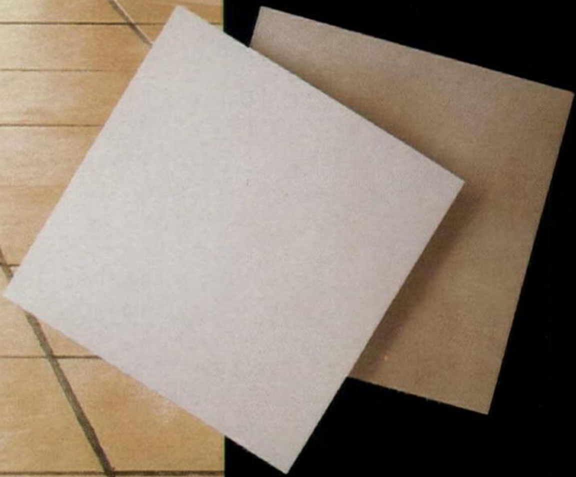

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6511 Salt Lake Avenue
Bell, Calif. 90201

DAP
Dayton, Ohio 45401

Laticrete International
One Laticrete Park, North
Bethany, Conn. 06525

Mapei
2900 Francis-Hughes, Laval
Quebec, Canada H7L 3J5

Miracle Adhesives Corporation
250 Pettit Avenue
Drawer D
Bellmore, N.Y. 11710

Noble Company
614 Monroe
Grand Haven, Mich. 49417

Tamms Industries
1222 Ardmore Avenue
Itasca, Ill. 60143

TEC
Building Products Group
315 South Hicks Road
Palatine, Ill. 60067

W.W. Henry Company
5608 Soto Street
Huntington Park, Calif. 90255

Allied Products

Akzo Industrial Systems
One North Pack Square
P.O. Box 7249
Asheville, N.C. 28802

Care-Lo
3535 N.E. 2nd Avenue
Miami, Fla. 33137

The Clorox Company
1221 Broadway
Oakland, Calif. 94612-1888

Colorco
10 Evergreen Drive
Merrimack, N.H. 03054

Compotite
P.O. Box 26188
Los Angeles, Calif. 90026

ComSenTech
One Lakeside Plaza
Suite 800
Lake Charles, La. 70601

Glessner
1301 Sansome Street
San Francisco, Calif. 94111

James Hardie Building Products
26300 La Alameda
Suite 400
Mission Viejo, Calif. 92691

Hillyard Floor Treatments
302 North Fourth Street
St. Joseph, Mo. 64502

HMC Stone & Marble Care
425 Brannan Street
San Francisco, Calif. 94107

Klein & Company
P.O. Drawer 4
Holly Springs, Ga. 30142

Remgrit
939 Barnum Avenue
Bridgeport, Conn. 06608

United States Gypsum Company
101 South Wacker Drive
Chicago, Ill. 60606-4385

"Elegraph" Collection - 17" x 17"

Produced and distributed by rex CERAMICHE ARTISTICHE Ceramiche Artistiche - Fiorano (MO) - Italy

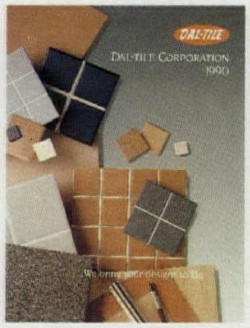
TRUSSARDI

Booth 1845 - International Tile Exposition - Anaheim Convention Center

Circle **No. 377** on Reader Service Card

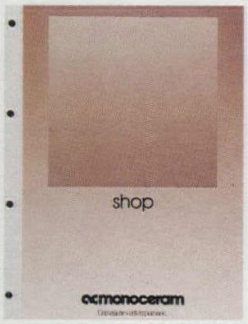
Tile and Related Products Literature Digest

Tile, Mortars, Grouts, Adhesives and other Related Products



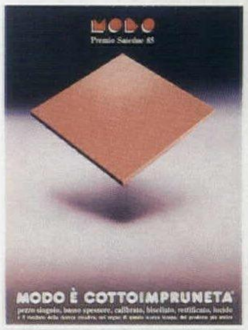
New Ceramic Tile Catalog. DAL-TILE's new full color 56 page catalog for 1990 provides the architect with a valuable reference guide for the selection of ceramic tile. Installation photos; specification, application, size, color and trim information is listed for each product. Contact **DAL-TILE** Corporation, 7834 Hawn Freeway, Dallas, TX 75217. Request catalog 09300/DAL.
Circle No. 424

Systems Folder SA-932 provides architects with the latest technical data including fire and sound tests, assembly details and architectural specifications. DUROCK Interior Cement Board is ideal for use in areas where a durable base for ceramic, marble or granite tile is required. The portland cement mortar panels are reinforced with a glass-fiber mesh and will not deteriorate when wet.
USG DUROCK.
Circle No. 423

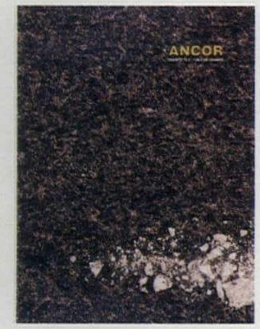


"Shop" is a single-fired, glazed tile with a surface as hard as porcelain that is highly resistant to abrasion. "Shop's" matte finish will not fade over the years. Because of the absence of microporosites, "Shop" is completely stain and acid resistant. "Shop" is offered in twelve colors. Attention: Paolo Capanni, Tile Group Italia, P.O. Box 616, Elk Grove Village, IL 60009-0616. (708) 439-6644; FAX (708) 439-6876. **Monoceram.**
Circle No. 422

Architects and interior decorators have the versatility of mixing, matching and designing with Imperial 3″ x 3″ glazed ceramic (vitreous) tiles from Worldtiles, Inc. Twelve contemporary colors available in Matte, Brite and Floor Glazes plus five special accent colors, raised accent bars and a dozen trim shapes. For architectural kit, call (203) 849-8500. **Worldtiles.**
Circle No. 421



"Modo" is the most modernized version of a most ancient product: terra cotta. 12″ x 12″ square tiles are available in a polished or honed finish. "Modo" is characterized by an extreme hardness, is resistant to excessive climatic conditions, salts, acids and the trampling of crowds. "Modo" also has virtually no absorbency. A brochure is available from Tile Group Italia, attention: Paolo Capanni, P.O. Box 616, Elk Grove Village, IL 60009-0616. **Impruneta.**
Circle No. 420

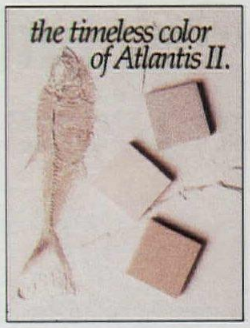


ANCOR GRANITE TILE produces over a dozen Canadian granites in a variety of finishes for residential, commercial, and institutional use. Standard production is a 12 x 12 x ⅜″ tile with other sizes up to 18 x 18 x ½″ available on special order. All polished and honed tiles are fully calibrated and gauged allowing for economical and efficient thin-set installation. Ancor's honed finish tile is particularly suitable for high traffic shopping areas. **Anchor Granite Tile.**
Circle No. 419

This COMPOSEAL catalog describes uses, installation, engineering properties, code approvals, certifications and warranty. COMPOSEAL, a flexible PVC waterproofing membrane used under ceramic tile or marble in showers, etc., is manufactured in 30 and 40 mil thickness, packaged in 100 ft. or 50 ft. rolls, 4, 5, and 6 ft. wide.
Compotite.
Circle No. 418

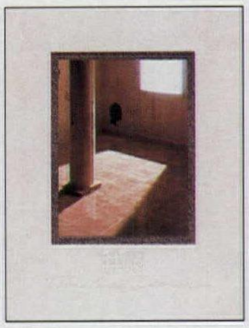
Kolormatts®, Kolorbrites and Kolorbars from Worldtiles, Inc. offer 16 colors (including four accents) in modular sizes of 2″ x 2″ and 4″ x 4″ with matte glaze plus 1″ x 4″ and 2″ x 2″ in Brite glaze. All tiles and 10 trim pieces rated for interior or exterior application (>0.5% water absorption). Call (203) 849-8500 for architectural kit. **Worldtiles.**
Circle No. 417

The strength and durability of GRANITI-FIANDRE tiles are described in this brochure. GRANITIFIANDRE exceptional features allow for interior and exterior flooring and wall applications. The brochure illustrates the numerous finishes, sizes and the extensive palette of colors available. A chart details physical characteristics such as low water absorption, resistance to chemicals and frost. **Fiandre/Trans Ceramica Ltd.**
Circle No. 416

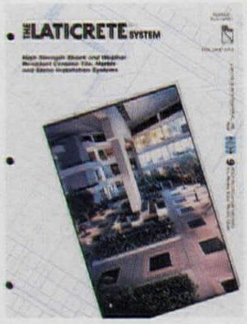


ATLANTIS II porcelain ceramic tiles are featured in a new full-color brochure. The ATLANTIS II line features twenty-four designer colors available in a polished, smooth, textured, diamond-patterned and skid-resistant surface. Technical information, maintenance recommendations and a concise, easy-to-read availability chart are also included in the brochure.
Buchtal Corporation USA.
Circle No. 415

ATLAS CONCORDE introduces STARGRES PORCELAIN TILES—DOSSIER PROGETTO GRAFICO, a comprehensive folder of design aids which architects and decorators planning urban areas or large public projects (banks, airports, malls, etc.) have been looking forward to for sometime. This documentation enables you to compose further combinations.
Concorde Invest Spa.
Circle No. 414

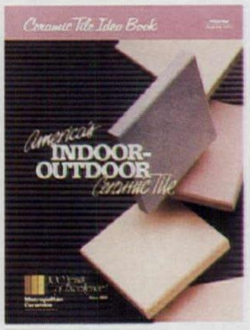


KPT Inc., the leader and pioneer in the domestic manufacturing of single-fired white body glazed ceramic tile, offers over 50 different styles, sizes and colors of ceramic tile. KPT's highly vitrified, extremely hard and dimensionally stable tile is made in the U.S.A. using state-of-the-art equipment and technology. **KPT.**
Circle No. 413



LATICRETE International announces their 1990 Sweets catalog for architects, specifiers and designers. The easy to use guide provides information on the complete line of Laticrete®, Latapoxy® and Drybond® mortars, grouts, and waterproof membranes materials for ceramic tile and natural stone. Call technical service toll free: (800) 243-4788 or Telefax: 203 393-1684. **Laticrete.**
Circle No. 412

GRANI/RAPID is a fast-setting latex hydraulic mortar formulated for the installation of natural & agglomerated marbles, granites and impervious porcelain tiles on concrete, gypsum drywall, cementitious backer units, old unglazed ceramic tiles, old cement terrazzo and plywood, on floors, walls and ceilings. GRANI/RAPID sets in 1¼ hours so grouting can be done in less than 3 hours. **Mapei.**
Circle No. 411

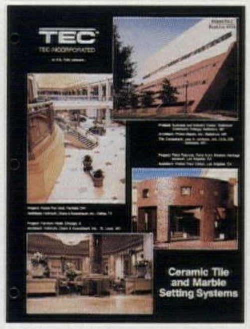


Indoor/outdoor ceramic tile featured in new idea book. Metropolitan Ceramics' colorful new literature details the latest designer colors, product features, installations, specifications, trim shapes, maintenance and more for IRONROCK®, Metro® Tile, and Signet®. It's part of our extensive literature and sampling program. For more information please contact:
Metropolitan Ceramics, Box 9240, Canton, OH 44711 (216) 484-4876.
Circle No. 410

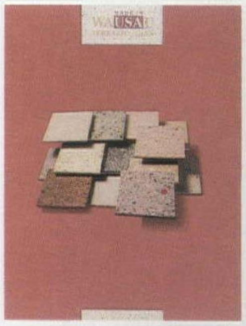
Hand-crafted Architectural Stoneware. Meeting or exceeding ANSI specifications these hand-crafted, hand-glazed ceramic tiles offer durability, low maintenance and beauty indoors or out. They're offered in a wide variety of patterns and beautiful art glazes. **The Meredith Collection,** Inc. P.O. Box 8854, Canton, Ohio 44711
(216) 484-1656.
Circle No. 409

Waterproofing Systems Product Information Brochure. A detailed overview of the company's CPE sheet membranes and accessory products. Includes information on membranes for general waterproofing and specific applications under tile. **Noble.**
Circle No. 408

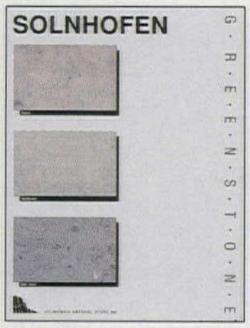
Eight page color catalog detailing unique "Grit-Edge" cutting technology: tungsten carbide particles permanently, metallurgically bonded to tough alloy and tensioned steel. Descriptions, technical data and applications for full line of rod, saber, hole, circular and hacksaw blades. Practical and economical advantages over conventional, abrasive, and diamond blade cutting fully explained. **Remgrit.**
Circle No. 407



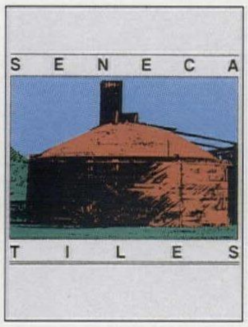
NEW CERAMIC SETTING SYSTEMS CATALOG FROM TEC. Featuring concise product descriptions and complete adhesive and grout selection guides, the new catalog also includes an ANSI performance chart that matches TEC™ mastic, mortar, latex and grout products against applicable ANSI strength standards. For a copy of the catalog, contact TEC Customer Service at 1-800-323-7407 (In Illinois: 708-358-9500). **TEC.**
Circle No. 406



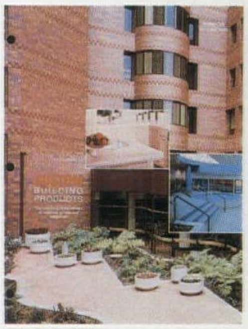
"WAUSAU TERRAZZO TILES." The only Terrazzo floor tiles produced by fully automated methods are colorfully captured in this specification folder. Included are standard color plates and specifications. Durable Terrazzo floor tiles are easily installed where ceramic, marble or granite are used. They require little maintenance and are accented by attractive precast terrazzo accessories which are also shown. **Wausau Tile.**
Circle No. 405



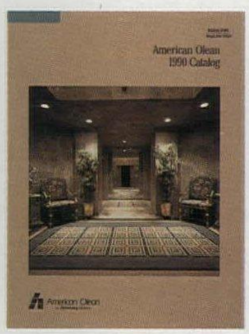
Solnhofen Natural Stone, Inc. introduces greenstone. Greenstone is a unique, green limestone which is cut from blocks, unlike common green slate, and can be shaped in three dimensions. Three shades of greenstone are available as well as surface textures: flamed, sandblasted and satin honed. Greenstone is excellent for floors or façades and is available in slabs up to 40″ x 90″. **Solnhofen Natural Stone.**
Circle No. 404



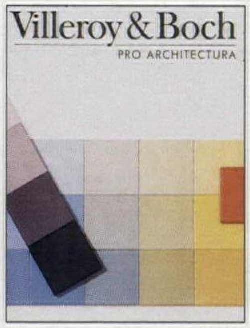
Seneca Tiles, Inc., manufacturers of the broadest line of natural paver tiles on the market today. We feature unglazed products in over forty color ranges, traditional earthen tones to exciting contemporary colors. Glazed tiles are available in an authentic handmolded or our standard semi-rustic format. Twenty modular sizes allow for unlimited patterns. **Seneca Tiles.**
Circle No. 403



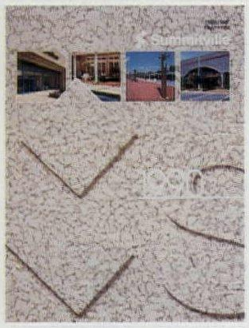
Custom's 1990 Tile Grout & Mortar Catalog. The largest U.S. manufacturer of mortars and grouts, Custom Building Products offers over 75 products for installing and maintaining ceramic tile surfaces. Polyblend grout, in 47 designer colors, is the industry's most complete selection. A new "Product Selection Chart" describes the recommended applications.
Custom Building Products.
Circle No. 402



American Olean's 1990 catalog is a dazzling display of new products and updated colors. The catalog is packed with fresh ideas for residential or commercial jobs. The catalog introduces three entirely new ceramic tile lines: Tahoe, Quest and Benchmark, plus additional colors and sizes in Quarry Naturals®, Crystalline® and Satinglo®. A handy reference guide indicates appropriate uses for each tile line plus all ASTM test information. **American Olean.**
Circle No. 401

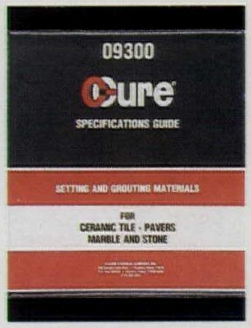


Vitreous Tile. Glazed and unglazed tiles, in a broad palette of colors, are shown in this brochure. Information about the wear-resistance and available sizes of each tile are given, along with illustrations of the available trim pieces. The palette ranges from primary and secondary colors to pastels and neutrals. **Villeroy & Boch.**
Circle No. 400

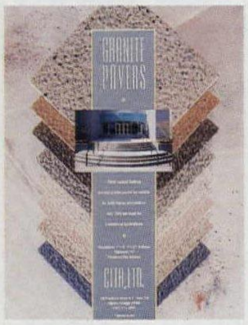


SUMMITVILLE 1990 SWEET'S CATALOG features 40 full-color pages of Summitville's complete product line, including glazed and unglazed ceramic tile, setting/grouting products, and tile-care products. Features information on murals, decorative tile, quarry tiles, signage, and comprehensive specifications on tile and related products. Write to: **Summitville Tiles, Inc.,** Summitville, OH 43962. Price: $3.00.
Circle No. 399

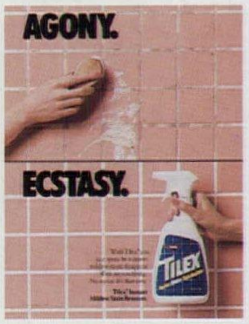
CERAMIC TILE. Full color brochure displays the durable, glass-bonded traffic tile in 19 contemporary colors. Also available in an unlimited range of custom colors, this high-performance traffic tile meets or exceeds all industry standards for commercial and residential installations. Also featured is the Craftsman Line. Both tiles perfect for interior or exterior applications.
Stoneware Tile Company.
Circle No. 398



C-Cure's Architectural Specifications Guide is packed with data, tables, ANSI specifications and detailed recommendations for setting and grouting glass, mosaic, ceramic mosaic, porcelain, quarry and paving tile, slate and marble. This attractive three-ring binder includes comprehensive Setting, Color and Product Guides. For your free copy call 713/697-2024 (Technical Department). **C-Cure.**
Circle No. 397

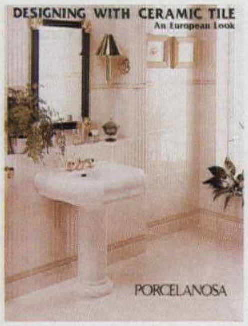


Granite Pavers. The look and performance of flamed granite, at a fraction of the cost: it's possible with CITA, Ltd.'s "Granite Pavers" porcelain ceramic tiles. The line of eight shades contains natural stone looks and fashion accents. These highly durable tiles are suitable for both interior and exterior uses, and are ideal for commercial applications. Call **CITA, Ltd.** at (404) 873-4880 for more information.
Circle No. 396



Tilex Instant Mildew Stain Remover. Tilex is specially formulated to make mildew stains disappear—without scrubbing, acids or harsh abrasives. Simply spray Tilex on tile surfaces and wait a minute or two for stains to vanish. Tilex is safe to use on ceramic tile and grout, plastic shower curtains, fiberglass, shower doors and no wax linoleum floors. **Clorox Company.**
Circle No. 395

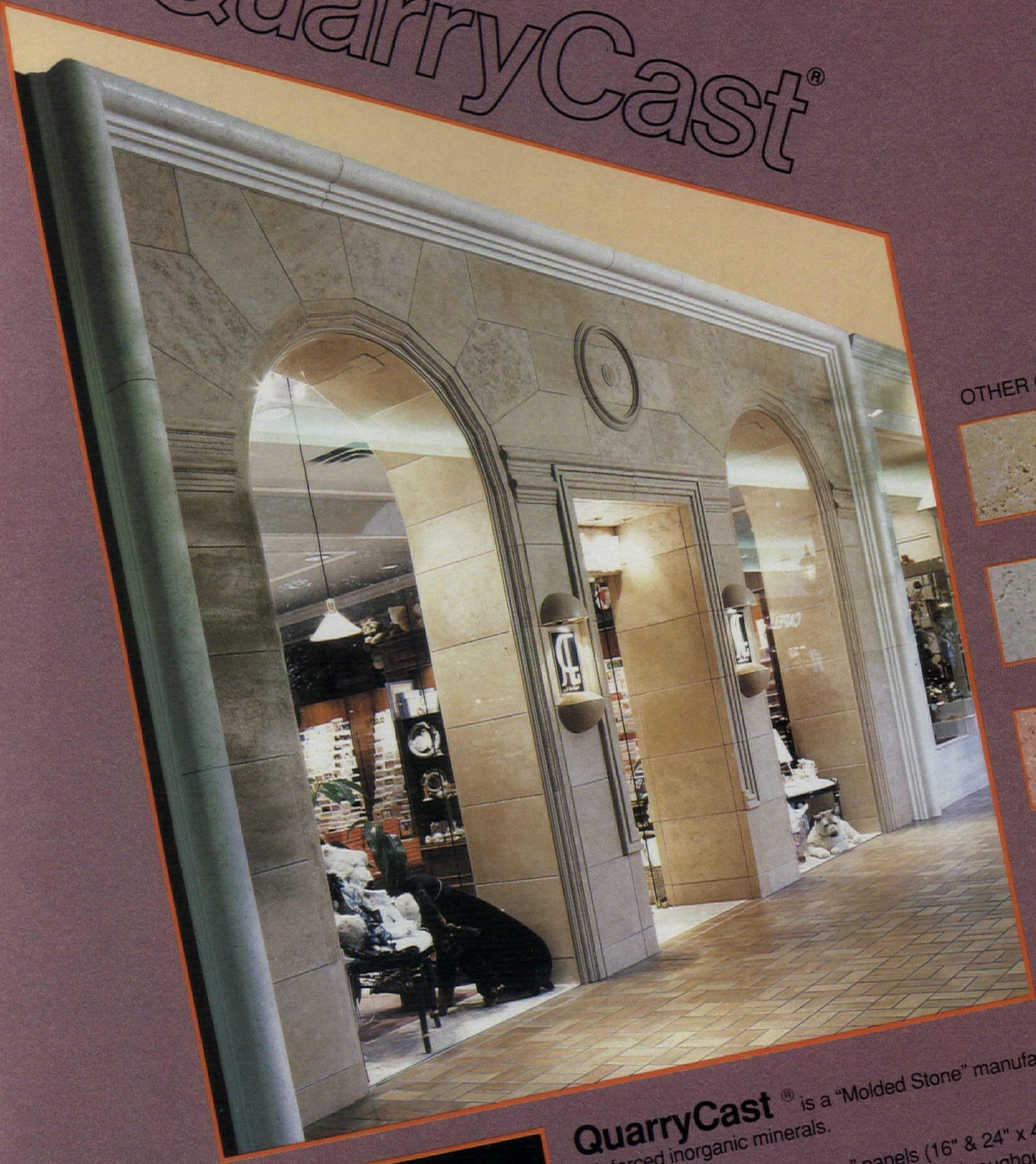
Exquisite color, classic design and hand-crafted beauty available in astra tile hand-made cement floor tile and astra ceramic petites. Dans specializes in a full line of hand-made products uniquely designed for the progressive architect. Faux granites and pavers also available for commercial and residential use. **Dans Trading.**
Circle No. 394



Tile by Porcelanosa. Porcelanosa offers a fully illustrated color brochure on "Designing with Ceramic Tile—A European Look." It features ceramic floor and wall tiles in a variety of shapes and sizes complemented with subtle textures and a palette of colors. Price: $1.00. **Porcelanosa.**
Circle No. 393

Have the hottest stars in L.A. right at your feet. Visit the Pavilion of Spain at the International Tile Exposition, June 6–9, 1990. For information on the Tile of Spain and our 44 exhibitors, contact:
Trade Commission of Spain, 2655 LeJeune Road, Suite 1114, Coral Gables, FL 33134. Tel.: (305) 446-4387.
Circle No. 392

QuarryCast®



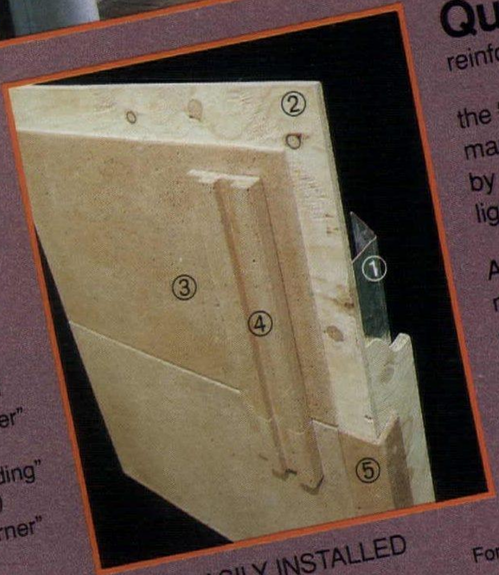
OTHER COLORS AVAILABLE

QuarryCast ® is a "Molded Stone" manufactured with glassfiber reinforced inorganic minerals.

the 5/16" thick standard "Veneer" panels (16" & 24" x 48" long) are manufactured in 4 popular colors. Colored throughout, they can be field cut by carpenters (with regular tools) to suit site conditions and being lightweight can be adhered to almost any type of substrate.

As part of the complete wall system, we supply corners, baseboards, moldings lightsconces, etc. for sizeable projects a variety of interior elements can be custom made in special colors.

QuarryCast is dimensionally stable with a flame spread rating of "0", but is not suitable for exterior applications or floors.



1. Stud
2. Plywood or Drywall
3. QuarryCast "Veneer" (Adhered)
4. QuarryCast "Molding" (Screw Attached)
5. QuarryCast "Corner" (Adhered)

EASILY INSTALLED

Formglas Interiors Inc., 250 Rayette Road, Unit 4, Concord, Ontario L4K 2G6 • (416) 669-5111

Formglas Inc., 1015 Timothy Drive, San Jose, CA, 95133 • (408) 283-1444

Circle **No. 437**

R H A P S O D Y   I N   W H I T E .

Architect: Chumney and Associates, San Antonio, TX ; Photography: Peter Leach, Philadelphia, PA

Terrazzo designs made with Lehigh White Portland Cement bring classic elegance, inside and out, to any building project. With its unique composition and durability, white portland cement terrazzo allows the architect unlimited freedom to develop original and versatile wall and floor designs that are beautiful, functional and economical. The blending of modern design, ancient artistry and Lehigh White Portland Cement produce a terrazzo that is truly a material of timeless function and beauty.

Leading architects continue to specify Lehigh White Portland Cement to insure the consistent and lasting beauty of their terrazzo designs.

Lehigh White Cement is a true portland cement. The raw materials are carefully selected using only the whitest limestone and clay, and manufactured under precise, rigidly controlled conditions to assure uniformly pure white color, consistent performance and reliable strength.

We invite you to discover more about Lehigh White Cements. For additional information or to request literature, call 1-800-523-5488 and speak to one of our representatives, or write to Lehigh Portland Cement Company, P.O. Box 1882, Allentown, PA 18105.

LEHIGH WHITE CEMENT

T H E   D E S I G N E R S   P A L E T T E

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Progressive Architecture

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An exclusive new feature for companies that want to distribute their video cassette presentations to the architectural marketplace. Only $900 per video listing.

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Custom Woodworking

The process of creating a custom wood project is demonstrated in this 11-minute video featuring Anthony Lombardo, the president of Architectural Paneling. Following an initial "idea" meeting, a model is made. Then, a full-scale layout is prepared while select lumber is chosen. Hand carving, finishing, and sanding are part of the process. Furniture making and decorative carving services are also offered. Completed installations and client testimonials are presented in the video which stresses quality material, custom design, and master craftsmanship to "equal the most distinguished achievements of the past."

Lending Library Video

Architectural Paneling, Inc.
New York, New York

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Roofing Product

Ruftac II® is a roofing material suitable for new roofs, repairs, and reroofing, as well as special applications like expansion joints, flashings, and parapets. It is reinforced with asphalt-saturated non-woven polypropylene fabric. On one side is release paper; on the other is a self-sealing edge. This 11-minute video shows the product, as well as its detailed installation onto a commercial roof. The presentation contains instruction and hints for using Ruftac II®, and some drawn details for situations like flashing around vents and drains.

Free Video

Phillips Fibers
Greenville, South Carolina

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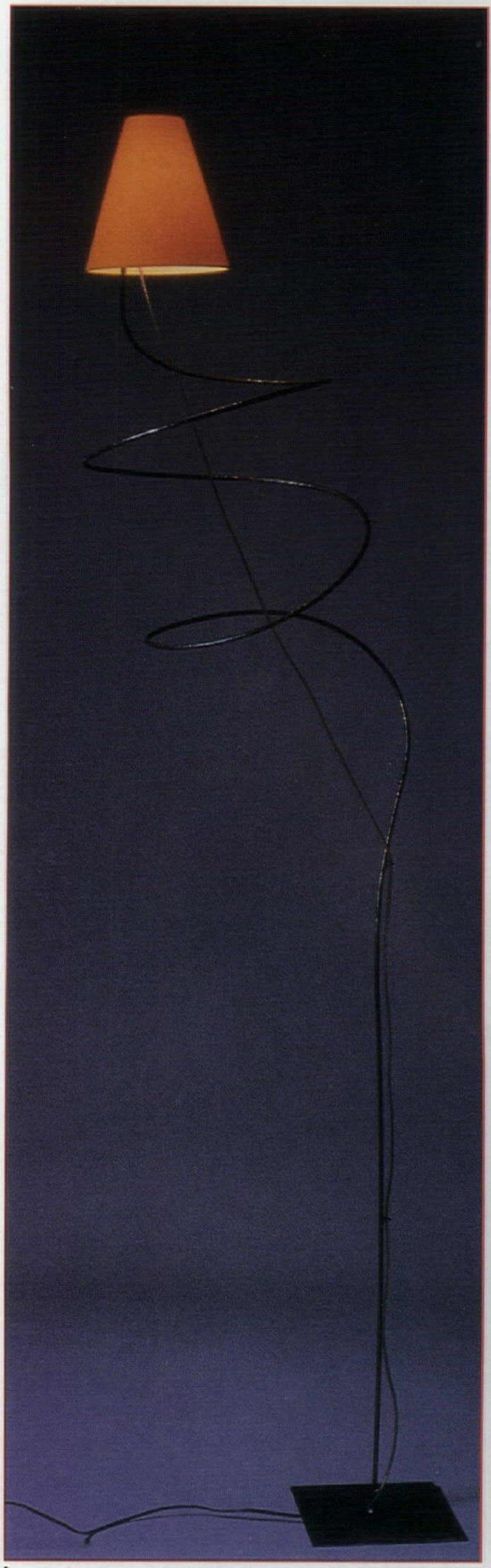
New Products and Literature



1

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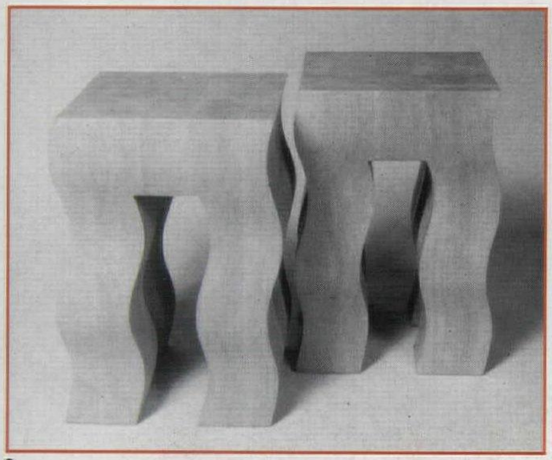
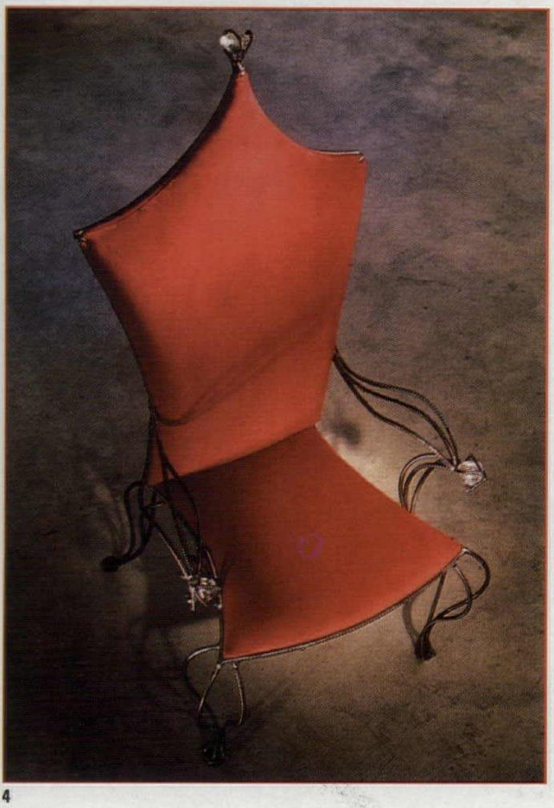


3



4

Paris 90: Bent on Baroque

The 1990 Paris furniture fair offered a heterogeneous mix: streamlined metal tables rubbed shoulders with oversized 1960s-styled lounge chairs, last year's discoveries became this year's celebrities, and abstracted, Baroque-inspired curves and dips took the honors as this year's model.

France's Nouvelle Vague of innovative – and very prolific – young furniture designers again displayed their virtuoso talents at this year's Salon du Meuble in Paris. And the VIA (Valorisation de l'Innovation dans l'Ambeublement) was again responsible for much of the fair's outpouring of creativity.

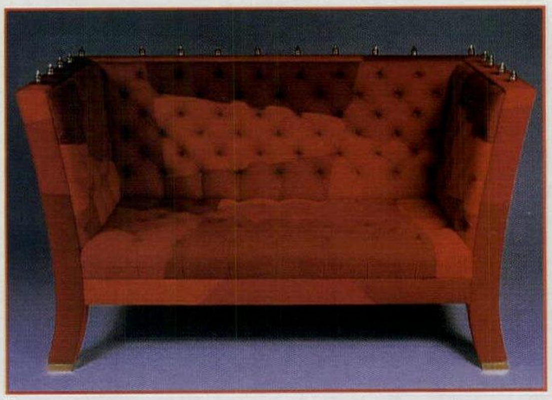
The tendency toward wood and metal, multifunctional – stackable, retractable, fold-away, and telescopic – furniture is still strong. It was, however, somewhat checked by the emergence of a new design direction: Baroque, in a variety of manifestations, was the predominant inspiration for much of the furniture on show.

This highly exaggerated, 1950s-inspired flamboyant furniture, until recently more of a fringe aesthetic than a driving force, walked a precarious line between inspired interpretation of Baroque tenets and what might be found in a forgotten storage room at Miami Beach's Fontainebleau Hotel. An air of vitality and originality did, however, make up for the lapses.

Characteristic of this furniture was unabashed ornament, vivid contrasting color schemes, and unconventional materials – tables were covered in everything from fake fur and carpet-like materials to hardened sand, rope textures and what looked like pulverized

(continued on page 174)

Affolée lamp by Philippe Renaud for Lieux (1); Golf chair by CLO/LVO (2); Milou tables by Benedicte Ollier for Lieux (3); and St. Peterbourg chair by Marco de Gueltzl for VIA (4).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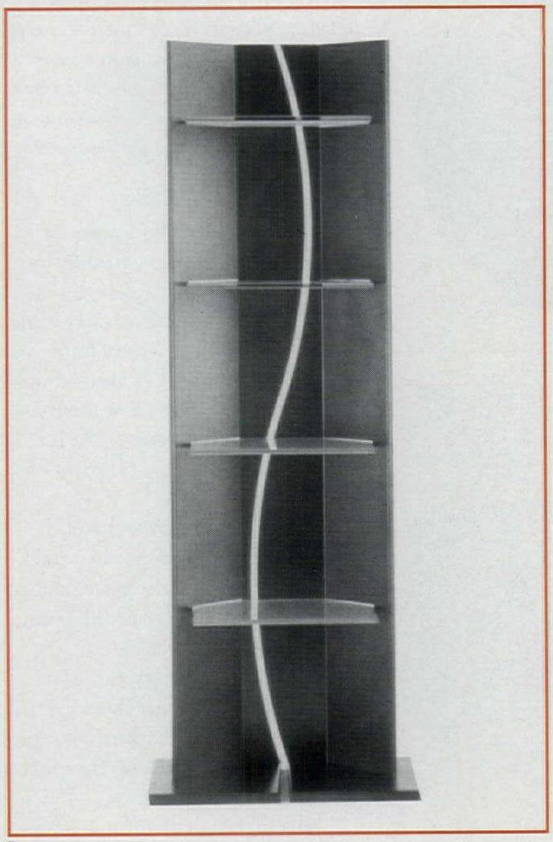
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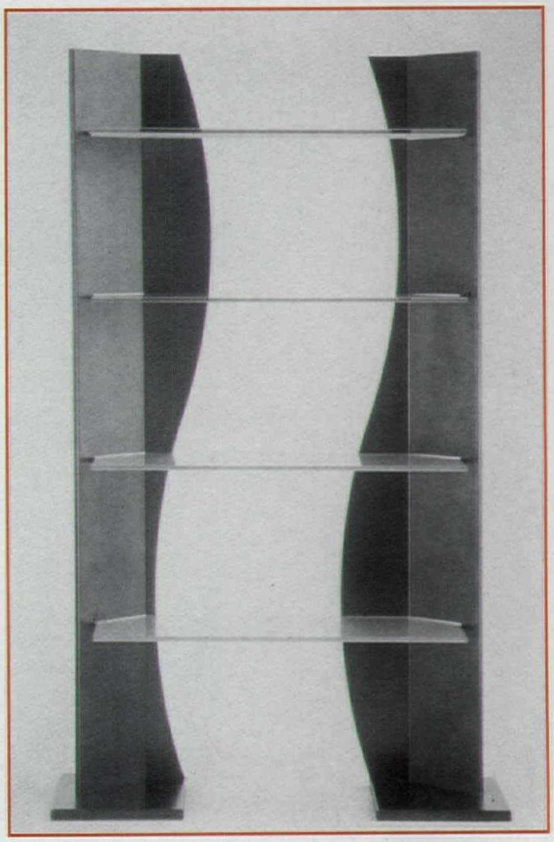
8


9

Paris *(continued from page 173)*
sequins. One chest of drawers was sheathed in Paco Rabanne-styled plastic chain mail. Inlays and incised decoration abounded – either embossed on metal or into wood. Tinted woods and granite and metallic laminates were also popular.

Among the leading advocates of this Baroque revival were Elizabeth Garouste and Mattia Bonetti, a team of designers known for their Neo-Primitive and New Barbarian designs. Their Patchwork collection, introduced in an appropriately theater-like setting, is an assemblage of different color combinations, fabrics, and finishes. A bronze cabochon was the signature throughout. In miniature, it lined the top of a high back sofa (5); enlarged it became table legs.

Marco de Gueltzl jumped on the Baroque bandwagon with his wrought iron and crushed velvet "St. Peterbourg" chair (4) for VIA and Benedicte Ollier mixed it up with a Gehry-inspired set of curvy legged wooden "Milou" tables (3) for Artistes et Modeles. A lamp called "Affolée" (1) by Philippe Renaud for Lieux gave a comic twist to the Baroque motif.

CLO/LVO produced one of the more individual design strokes with their playful, foam rubber and jersey "Golf" chairs (2); and Yamakado offered a series of glass shelves called Virages Dangereux (7, 8).

Sylvain Dubuisson was honored as "Creator of the Year." His mastery of steel furniture design, touted as having the "precision of a machine," was demonstrated by the introduction of an intricate folding table, "Portefeville," (9) for Fenêtre Sur Cour.

Other designers of the thin steel line broke out of the now ubiquitous, monochromatic black and gunmetal mode. Bright colored epoxied polyester metal "Piccolo" chairs by Pascal Mourgue (6) for Fermob looked fresh in combinations of yellow, green, turquoise, blue, and mauve.

Susan Grant Lewin ■

The author is president of Design Communications International.

Sofa from the Patchwork collection by Elizabeth Garouste and Mattia Bonetti (5); Piccolo chairs by Pascal Mourgue for Fermob (6); Virages Dangereux shelves by Yamakado (7, 8); and Portefeville table by Sylvain Dubuisson for Fenêtre Sur Cour (9).

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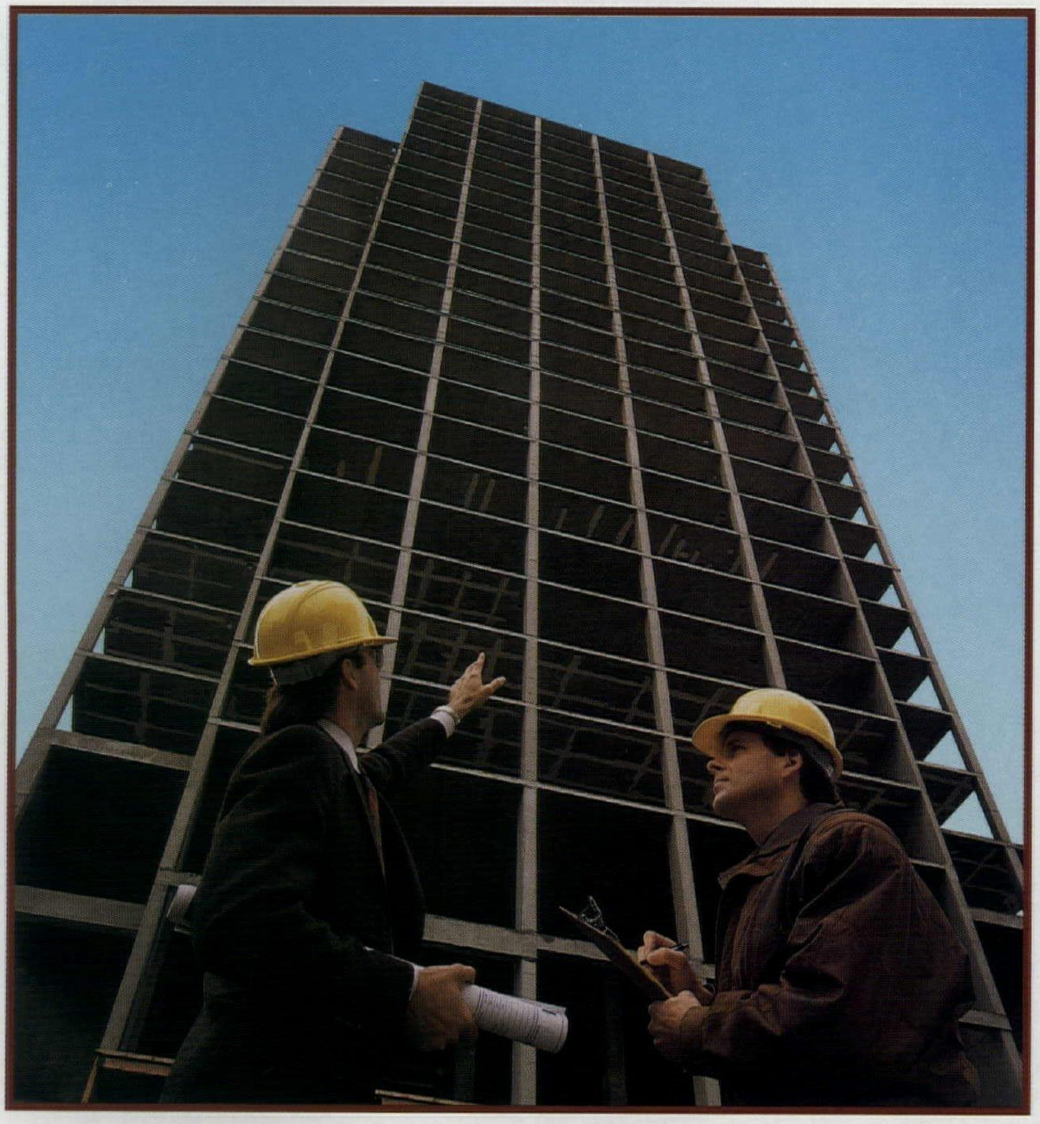

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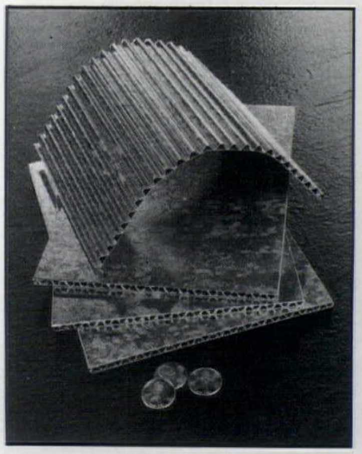
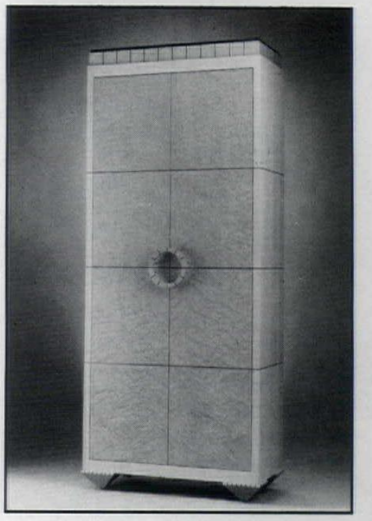


Steel Corrugated Sheets

Galvanized steel corrugated sheets can be reinforced with single or multiple sheets depending on load-bearing requirements and can be fastened by threaded inserts or blind rivets. Metawell.

Circle 100 on reader service card



Armoire

A birdseye maple armoire has two sets of double doors and is framed in plain quarter-sawn maple; it is 94″ tall, 42″ wide, and 18″ deep. Lee Weitzman Studios.

Circle 101 on reader service card

SystemsWall Brochure

A new brochure on SystemsWall, a full-height, demountable, movable wall, includes photographs, drawings, and detailed layouts. KI.

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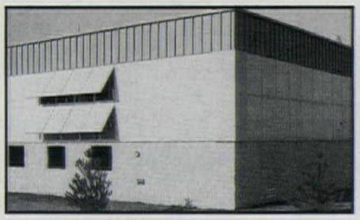

Pressure Venting Panel System

Explovent™, a factory-calibrated explosion and pressure relief panel system, does not use shear bolts, fractionable fasteners or collapsible washers. Panels can be top or bottom hinged; 90-degree swing panels are also available. C/S Group.

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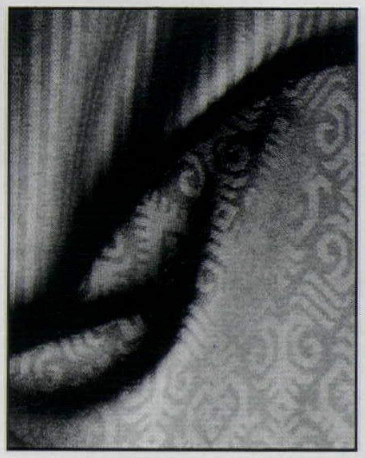


Wool Damask

Two damask fabrics, applicable for drapery or upholstery use, are woven in Scotland of 100 percent wool; each is 54 inches wide. Lee Jofa.

Circle 103 on reader service card

Architectural Glass Guide

This guide includes extensive product specifications and descriptions. Viracon.

Circle 201 on reader service card

Lounge Chair

The Washington Avenue Lounge has been designed by Mark W. Goetz of TZ Design. The chair is 29¼″ wide, 26¾″ deep, and 29⅜″ high. Brickel.

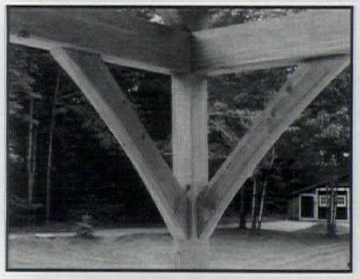
Circle 104 on reader service card

(continued on page 179)

(continued from page 177)

Cedar Siding Catalog
Western red cedar siding is described in a new catalog; product installations are illustrated and shape and size options listed. Shakertown.
Circle 202 on reader service card

Directory of Architects
A national directory of residential architects has 3000-plus listings and 100 photographs. The Greenline Guide to Residential Architects is $34.95. Contact Greenline Guide, 29 East 19th Street, New York, New York 10003.



Timber Joinery Fastener System
Timberlok™ joinery system – for buildings framed with solid or laminated wood timbers – uses factory-installed internal metal fasteners to join timbers; four or more horizontal timbers can be joined to one post in the same plane. Green Mountain Precision Frames.
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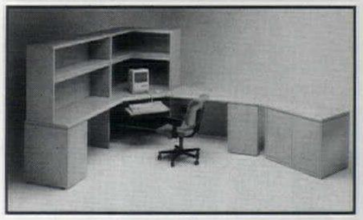
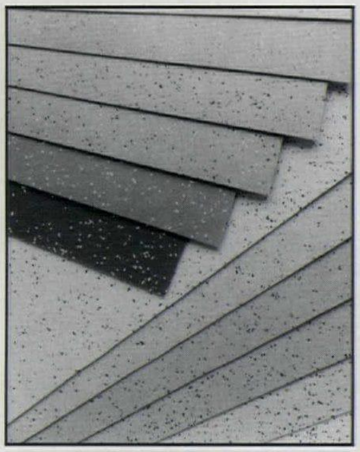
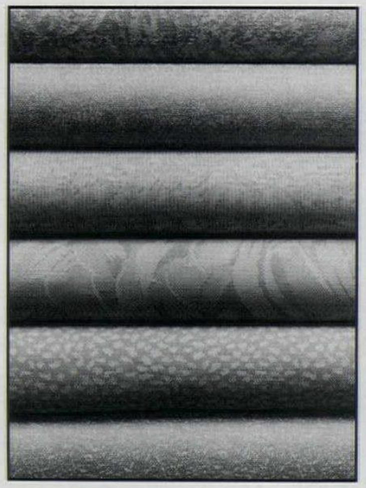


Office Furniture
Infinity is a new office system structured around a core of desks, storage modules, shelving units, and work surfaces. Several finishes and colors are available. Mywest.
Circle 106 on reader service card

Tilesheet Roofing
Tilesheets can be specified in several different profiles, each with translucent skylight panels, anti-siphon drain channels, and Kynar 500 coating system. Verho.
Circle 107 on reader service card



Rubber Flooring
Noraplan Stone is a new, textured pattern with a sandstone-like finish in the Noraplan rubber flooring system; it can be ordered in 12 tones.
Freudenberg Building Systems.
Circle 108 on reader service card



Jacquard Wall Fabrics
The Jacquard Collection, made of Du Pont Dacron polyester, comes in 7 patterns and 12 colors and is suitable for office, hotel, restaurant, and healthcare applications. Eykis.
Circle 109 on reader service card

Vinyl Siding
Monogram™ is a coordinated system of vinyl siding products, trims, and accessories with wood grain or brush stroke finishes; 12 siding and 15 trim colors can be specified. CertainTeed.
Circle 110 on reader service card
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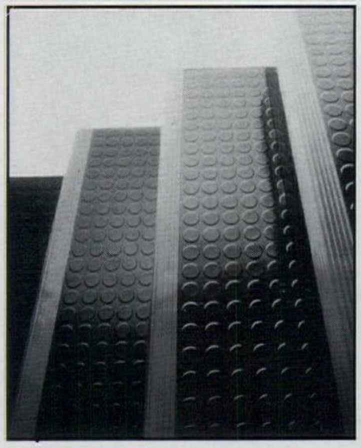
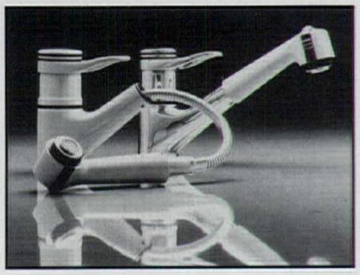


Two-Color Stair Tread
A one-piece stair tread comes with a red or yellow nose and black or gray step and riser. Pirelli Rubber Flooring.
Circle 111 on reader service card

Building Products Catalog
Decorative panels, gypsum, insulation, and roofing are among the 11 product categories in the 1990 catalog; each section is available individually. Georgia-Pacific.
Circle 203 on reader service card

Concrete/Masonry Weatherproofing
A fugitive dye has been added to Chem-trete® so inspectors and applicators can see where weatherproofing has been applied; the pink-colored dye remains visible for 10 to 30 days. Huls America.
Circle 112 on reader service card

Vinyl Floor Tile Catalog
Product and technical data sections have been expanded in the 1990 catalog. Azrock.
Circle 204 on reader service card



Pull-Out Faucet
The EuroPlus™ pull-out spray kitchen faucet has single-handle control, a solid brass body and ceramic cartridge; a ten-inch escutcheon and soap dispenser are optional. Grohe America.
Circle 113 on reader service card

Computer Products
Landscape Software

Photorealistic Renderings
VideoScapes is a library of video images that works with LANDcadd/AutoCAD drawings without requiring special hardware (only a VGA or Targa card) to add textures, plant materials, and common figures that give renderings a photographic look. LANDCADD, Inc.
Circle 114 on the reader service card.

Faster Terrain
TerraCADD Contour for the PC uses a point database that stores coordinate views of contours, cross-sections, site design, and drafting together for quick editing and updating of all files. Plus III.
Circle 115 on the reader service card.

Greenery OnLine
PLANTSearch is a electronic library, updated daily, of ornamental plants and foliage that provides information on where to find any of more than 10,000 plants from 500 nurseries, as well as scientific information, a bid preparation package, and an international calendar of events. Betrock.
Circle 116 on the reader service card.

Landscape Database
The Landscape Architectural Plant and Product Information System (LAPPIS) is an expandable MacIntosh Hypercard stack that contains a database of plant materials and landscape products (including 1500 plants and products and their suppliers) as well as a cost estimator. Landware.
Circle 117 on the reader service card.

AutoCAD Landscaping
Use DCA Landscape in AutoCAD to develop site plan, landscape, and irrigation plans and their corresponding documentation in AutoCAD. DCA.
Circle 118 on the reader service card.
(continued on page 183)

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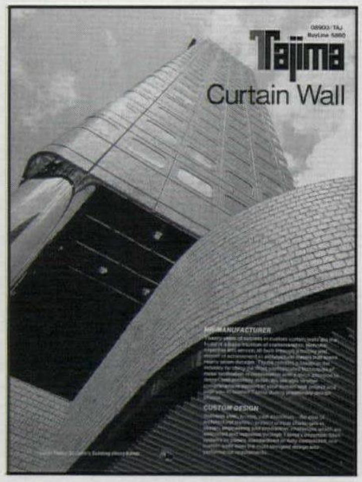
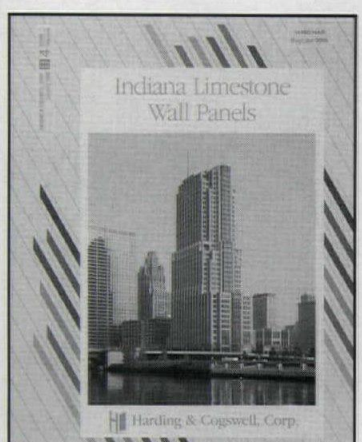
Technics-Related Products



Metal Curtain Walls
Stainless steel, bronze, and aluminum curtain walls are illustrated in a brochure. Tajima.
Circle 205 on reader service card

Metal Products
Light-gauge metal framing products, including some meant especially for curtain walls, are shown and described in manufacturer's literature. Dale/Incor.
Circle 206 on reader service card



Limestone Panels
A curtain wall system, including a steel strongback system and limestone cladding, is illustrated with details and projects in manufacturer's literature.
Harding & Cogswell.
Circle 207 on reader service card

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Circle **No. 426** on Reader Service Card

Circle **No. 002** on Reader Service Card

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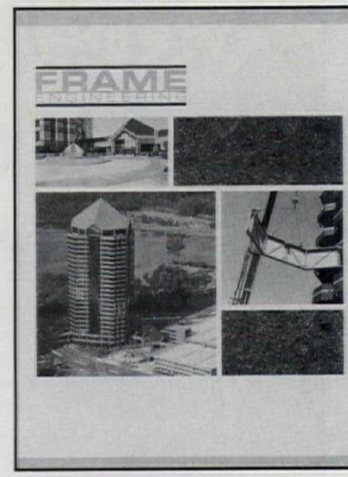

Curtain Walls
Prefabricated stone-on-steel curtain wall strongback systems are illustrated and described in a brochure. Frame Engineering.
Circle 208 on reader service card

Stone Products
Stone panels are among the products illustrated in manufacturer's literature. Bybee Stone.
Circle 209 on reader service card

Glass System
A structural glass wall system is illustrated with details in a brochure. W&W Glass Products.
Circle 210 on reader service card

Roof Pavers
Used instead of gravel ballast, roof pavers protect roof membranes and prevent gravel movement. National Concrete Masonry Association.
Circle 119 on reader service card

Marble Products
Marble panels are suitable for curtain wall applications. Georgia Marble.
Circle 120 on reader service card

(continued on page 186)

(continued from page 184)

Curtain Wall System

A curtain wall system, framed with aluminum members, incorporates one-inch-thick glass and 2¾-inch-thick translucent panels. Extech.

Circle 121 on reader service card

Curtain Walls

Curtain wall systems including stick, silicone, and traditional stone are described in a brochure. Bruce Engineering.

Circle 211 on reader service card

Building Materials

Building materials suppliers for buildings featured this month as they were furnished to P/A by the architects.

College of Architecture and Environmental Design, Arizona State University, Tempe, Arizona (p. 81). *Architects: The Hillier Group, Princeton, New Jersey; Architecture One Ltd., Phoenix.* Concrete spread footings and frame: The Tanner Corp. Concrete masonry walls: Superlite Builders Supply. Precast concrete veneer: Smith & Wolfe Const., Northglan Co. Arizona sandstone: Dunbar Stone Co. Steel windows, entry doors, interior doors: Hopes Architectural Products. Aluminum windows: Kawneer. Skylights: Bristol Fiberlite. Glass block skylights: Circle-Redmont. Steel firedoors: Cookson Rolling Doors. Aluminum doors: Windsor. Concrete paving and flooring: Tanner Corp. Ceramic tile: Daltile. Porcelain tile: Crossville Ceramics. Gypsum drywall: USG. EPDM roofing: Firestone. Insulation and polymer-modified asphalt waterproofing: Owens/Corning. Standing seam metal roofing: Berridge. Latex paint: Kelly-Moore. Mortise hinges: Hager. Lever locksets: Schlage. Door closers: LCN Closers. Panic hardware: Von Duprin. Weatherstripping: Pemko. Auditorium sound system: Dukane. Auditorium and classroom seating: Irwin Seating. Hydraulic elevators: U.S. Elevator. Exterior incandescent lighting: Bega. Interior fluorescent downlights: Prescolite. Fluorescent parabolics: Columbia. Fluorescent studio lights: Illumination Concepts & Engineering. Lavatories and water closets: American Standard. Flush valves: Royal. Toilet partitions: Capitol Partitions. Washroom accessories: Bobrick. Water fountains: Haws. Sprinklers: Gem. Airhandler: Chicago Blower. VAV system: Titus. Computer-monitored environmental controls: Honeywell. Office desks and workstations: Steelcase. Built-in cabinets: Architectural Millwork. Custom library furniture: Chris Fischer. Conference room furniture: Steelcase. Library seating: Metro. Office chairs: Knoll. Blinds: Levolor.

Ecru Clothing Store, Marina del Rey, Los Angeles (p. 108). *Designer: Michele Saee, Building, Los Angeles.* Stained wood, plywood paneling, painted drywall, steel paneling, steel frame with drywall, stained concrete. Lighting fixtures designed by Building. Staining and painting by Heritage Painting. Glass by Animal Fronts. Jeffers Machine Shop, Danny's Ornamental Iron, fabricators.

Angeli Mare restaurant, Marina del Rey, Los Angeles (p. 114). *Designer: Michele Saee, Building, Los Angeles.* Stained wood finish, plywood paneling, steel structure with drywall paneling, concrete, wood, and tile floors. All lighting fixtures, except in kitchen, designed by Building. John McCoy, Jeffers Machine Shop, Danny's Ornamental Iron, fabricators. L.O.F. Glass, glass. Stain and Painting by Heritage Painting.

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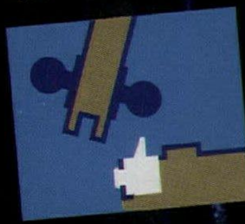

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(continued from page 117)

tion, poverty, drugs, and hopelessness. And you have only to drive along suburban highways, like Washington, D.C.'s high technology corridor, to see a succession of buildings in glass, steel, and gaudy sheathing, each more strident than the last, and all with one characteristic in common: their absolute lack of regard for environmental context or felicity. historic intricacy is replaced by a cold, inhumane homogeneity.

Rogers would certainly agree with Prince Charles's statement that "when a man loses contact with the past, he loses his soul." Although he has drawn fire from architects for being no respecter of reputation and for belittling buildings that have received acclaim in the architectural press – Colin Wilson's library for the British Museum ("a dim collection of brick sheds"), Cesar Pelli's office tower on Canary Wharf in the docklands ("I would go mad if I had to work in a building like that"), and James Stirling's proposals for the No. 1 Poultry site in the City ("like a 1930s wireless set") – he has good things to say about the work of several younger British architects like Jeremy Dixon, Terry Farrell, and John Outram, who look to local context for precedents.

"There are powerful cultural arguments for retaining old materials in our repertoire, just as there are reasons for keeping old and new forms in any art: after an exhibition of Jackson Pollocks you *need* to see some figurative art; after three hours of Stockhausen you *need* a Bach minuet."
Maxwell Hutchinson

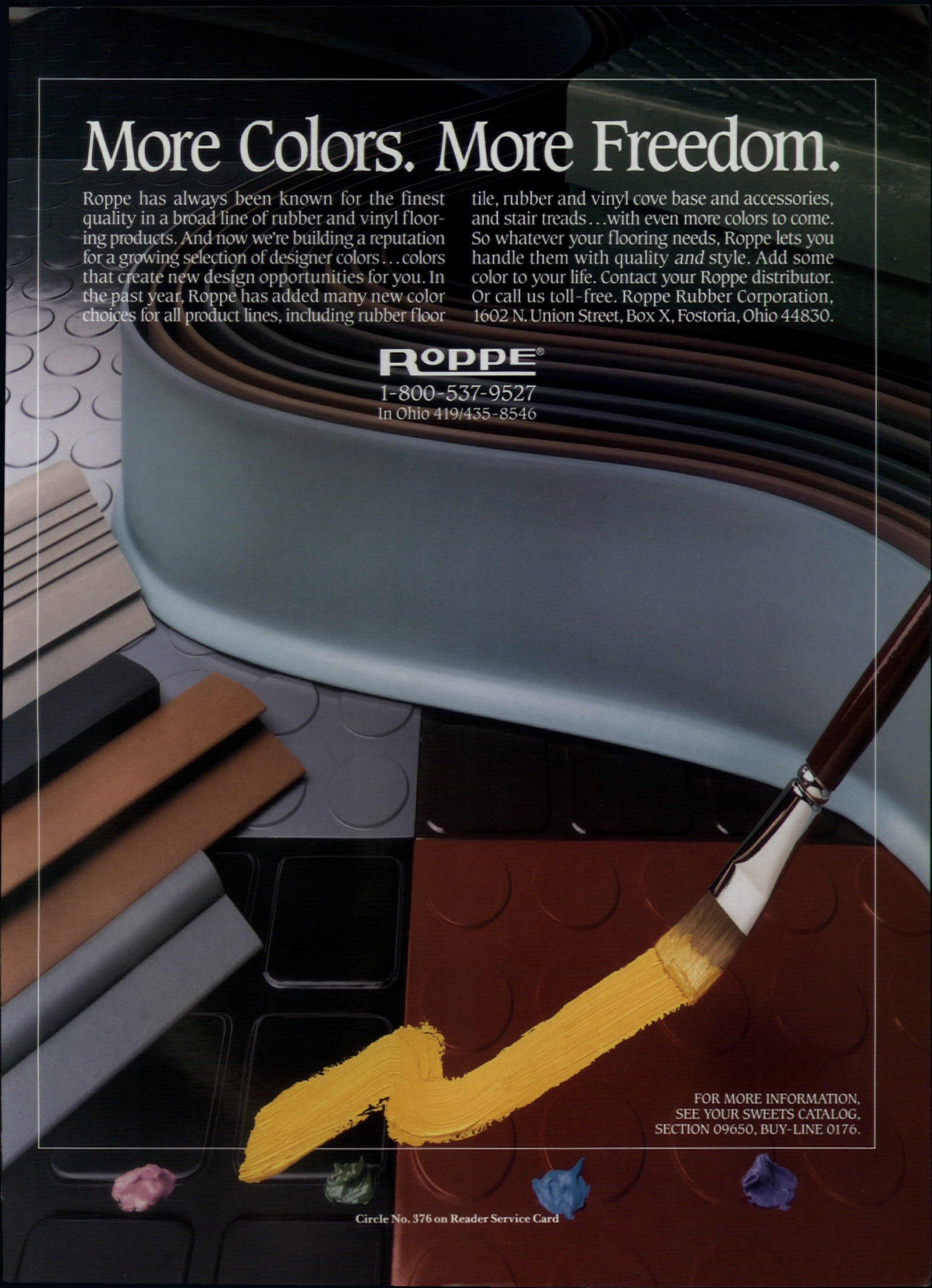
In his book, Prince Charles offers us a British lexicon of modern horrors that should make us all wince, since every one of them has parallels throughout this nation. Max Hutchinson and Richard Rogers do not deny these architectural sins. "While not wishing to excuse the architects who have designed cheap, shoddy developments," writes Rogers in his eloquent essay, "I take the view that blaming them alone obscures the extent to which large corporations, developers, and government are deeply implicated." Building on this argument, Hutchinson recalls the optimism inherent in the origins of Modern architecture, its belief that technology opens up opportunities for rational and more equitable environments, and that architects like Norman Foster are not only creating great buildings, but are exploring new frontiers of architectural language. Yet he also warns, "how close we are to environmental bankruptcy. . . . The challenge now is the quality of life."

No one could argue with that. The problem is that Hutchinson doesn't tell us how to improve our urban malaise. The Prince at least has a shot at it. As an object lesson, he zeros in on London, particularly the river frontages of the Thames and the areas around St. Paul's, which he acidly tells us took 300 years to build up and 15 to destroy. He particularly objects to the new office towers ("there is no need for buildings, just because they house computers and word processors, to look like machines"), which hem in the dome of Wren's cathedral, for centuries the dominant feature of London's skyline. Likewise, he is skeptical of the new developments in the docklands where

Whether or not one feels that off-the-cuff comments like these are subjective and harmful, behind them is an extremely serious challenge to architects. There can be no doubt that the Modern Movement has at worst created monstrous aberrations and at best has opened a wide gap of understanding between our best designs and the public.

The reasons are twofold. The first is that cities are a lot more than aggregations of buildings. We have lost contact with the notion of architecture as city-building – that every city has its own history and character, and every site its unique context and role to play within the evolving whole. Second is that we have lost contact with how ordinary people use cities. If you doubt me, go and get a copy of William H. Whyte's new book *City*, a potent study of life on the sidewalks and squares of Manhattan, particularly Lexington Avenue. We have to find ways of listening to the citizens of our cities and to respond to their joys, fears, and aspirations. It will temper our work, but there are great riches to be gained. **David Lewis** ■

The author is a partner in UDA Architects, Pittsburgh. He is also the Visiting Andrew Mellon Professor of Urban Design at Carnegie-Mellon University.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DEPARTMENT OF LANDSCAPE ARCHITECTURE AND HORTICULTURE

Temple University Ambler, Pennsylvania

Temple University, Department of Landscape Architecture and Horticulture, invites applications for a teaching position to begin September 1, 1990.

The Department is developing innovative B.S. programs in Landscape Architecture and Horticulture, emphasizing an ecological approach to both design and horticulture.

The position is tenure track at the assistant professor rank. Applicants should have a masters degree in Landscape Architecture from an accredited institution, or a doctorate in Horticulture. Strong planning, design and graphic skills, an understanding of natural processes and the ability to communicate are the basic requirements. Areas of expertise may also include plant materials, horticulture, landscape construction and history, computer graphics and professional practice. Salaries are competitive and commensurate with qualifications and experience. Licensing is highly desirable for landscape architecture applicants.

Applicants should send a letter of interest, examples of professional work, a resume, transcripts, and three letters of support to: **John F. Collins, Chair, Department of Landscape Architecture and Horticulture, Temple University, Ambler, PA 19002.**

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ARCHITECT, to provide services to California Main Street, a statewide program for downtown revitalization. Must have 4 years experience (2 years in historic preservation). Travel throughout California. Position located in Sacramento. For an application form, call California Department of Commerce (916) 322-5003. Deadline for receipt of application: May 15, 1990.

NCARB

The National Council of Architectural Registration Boards (NCARB) is accepting resumes from registered architects with broad experience for the new position of Chief Operations Officer. Send resumes and letter of intent to Samuel T. Balen, FAIA, Executive Director, The National Council of Architectural Registration Boards, 1735 New York Avenue, N.W. Suite 700, Washington, DC 20006.

ARCHITECTURAL OPPORTUNITIES

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Furthermore . . .

A look at our own Calendar (p. 34) demonstrates how interested in architecture museums and the museum-going public have become. Besides the special shows being mounted, many institutions are exhibiting architectural drawings, models, and reconstructed rooms in permanent collections, and a handful of specialized architecture museums have been established.

Which raised a question as we were working on a set of articles on museums for our May issue: What has been the effect of architecture's invasion of the domain of art?

For the most part, the effect has been good. There are more architectural drawings and models being preserved and more intelligent design exhibitions being held. But the rise of architecture in museums has coincided with the rise of a Post-Modern sensibility that values the image of a building at least as much as the constructed reality. (We cannot easily acquit ourselves of playing a role in this phenomenon; magazines, like museums, are where architectural images are presented today.) Whether or not those two trends are related, their coincidence is worrisome, for architecture is an art that belongs foremost on the streets, not on gallery walls.

The other point where the paths of architecture and the art museum cross is, of course, in the design of museums. The extent to which museum buildings have themselves become revered works of art—cathedrals for an age where Tom Wolfe says that art is the "new religion"—is epitomized in the recent flap over Louis I. Kahn's Kimbell Museum (see p. 30). All these issues come together in a currently touring exhibition with too-good-to-be-true timing: "The Art Museums of Louis I. Kahn" originated at the Duke University Museum of Art but was recently on view at Kahn's Yale University Art Gallery. The phenomenon of a museum devoting hanging space to pictures and drawings of that very hanging space suggests that things are starting to get very weird. On April 7, the exhibition moves on to—where else—the Kimbell Museum.

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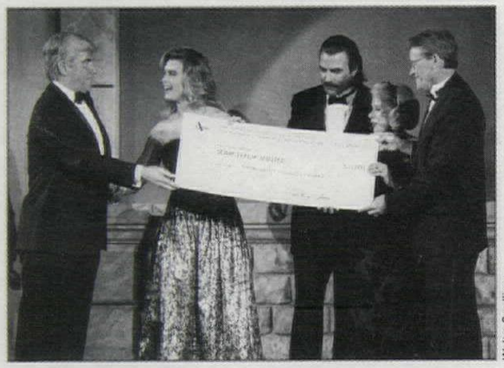
Parking for Jesus: Old St. Mary's Church, Chicago.



Kemp, Brooke Shields, Selleck, Joan Rivers, and Search for Shelter's Blake Chambliss wrestle with Search for Shelter check.

Walter Smalling

And lest you wonder about the state of architecture for the "old religion"—good old-fashioned monotheism—here's one piece of news from that front. Before we read the press release accompanying the picture (top), we assumed we were looking at a church's proposed parking garage. As it turns out, it is itself a church, buried under parked cars in testimony to the financial savvy of its Chicago congregation, Old St. Mary's Church. Fair enough, but let's all pray no blasphemer ever proposes to do this to a museum.

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We didn't mind, really, when the AIA brought Prince Charles over to speak (see News, p. 29). We didn't mind that the "working media" at the big gala munched on cold cuts (courtesy of Du Pont Antron, according to a prominent sign in the press room) instead of the "mignonettes of aged beef tenderloin" that the real guests were eating. We didn't even mind that the title of the event, "Accent on Architecture," sounded like something that a small-town chamber of commerce might dream up. What it took to raise our eyebrows was the spectacle of three Hollywood celebrities accepting, on behalf of Search for Shelter, a check for $65,000 (representing the proceeds from the gala) from HUD Secretary Jack Kemp. It's just that there seemed to be so much money in the air: Kemp commands a $19-billion budget, check recipient Tom Selleck made a movie (*Three Men and a Baby*) that grossed $81,000,000, and the 1200 people polishing off their mignonettes were enjoying an event that must have cost well into six figures. While Search for Shelter is a laudable initiative on AIA's part in an area where initiative is sorely needed, the hoopla over a $65,000 cardboard check in the midst of such glitz was a little embarrassing. Smaller checks with bigger numbers on them would be the answer.

· · ·

Lewis Mumford, as some of his recent obituaries have pointed out, was outspoken about the destructiveness of highways, the barrenness of Modern architecture, and the danger of our dependence upon technology. His private life, though, was anything but outspoken. One of our editors recalls visiting Mumford:

"He lived in a modest farmhouse along a side road in Amenia, New York. The rooms were small and filled with books, in some places floor to ceiling; his study was small, too, but spare, with neat stacks of only the most necessary papers and notes. At the back of his property, he had what he called his "philosopher's walk," a rambling path cut through the undergrowth. Mumford was cordial but reserved with visitors, listening attentively to questions although usually deferring to one of his many books or to those of writers such as Emerson for the answers."

There was, in other words, a public and private Mumford. One did the talking, and the other seemed to enjoy listening to the results.

P/A Advertisers' Index

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