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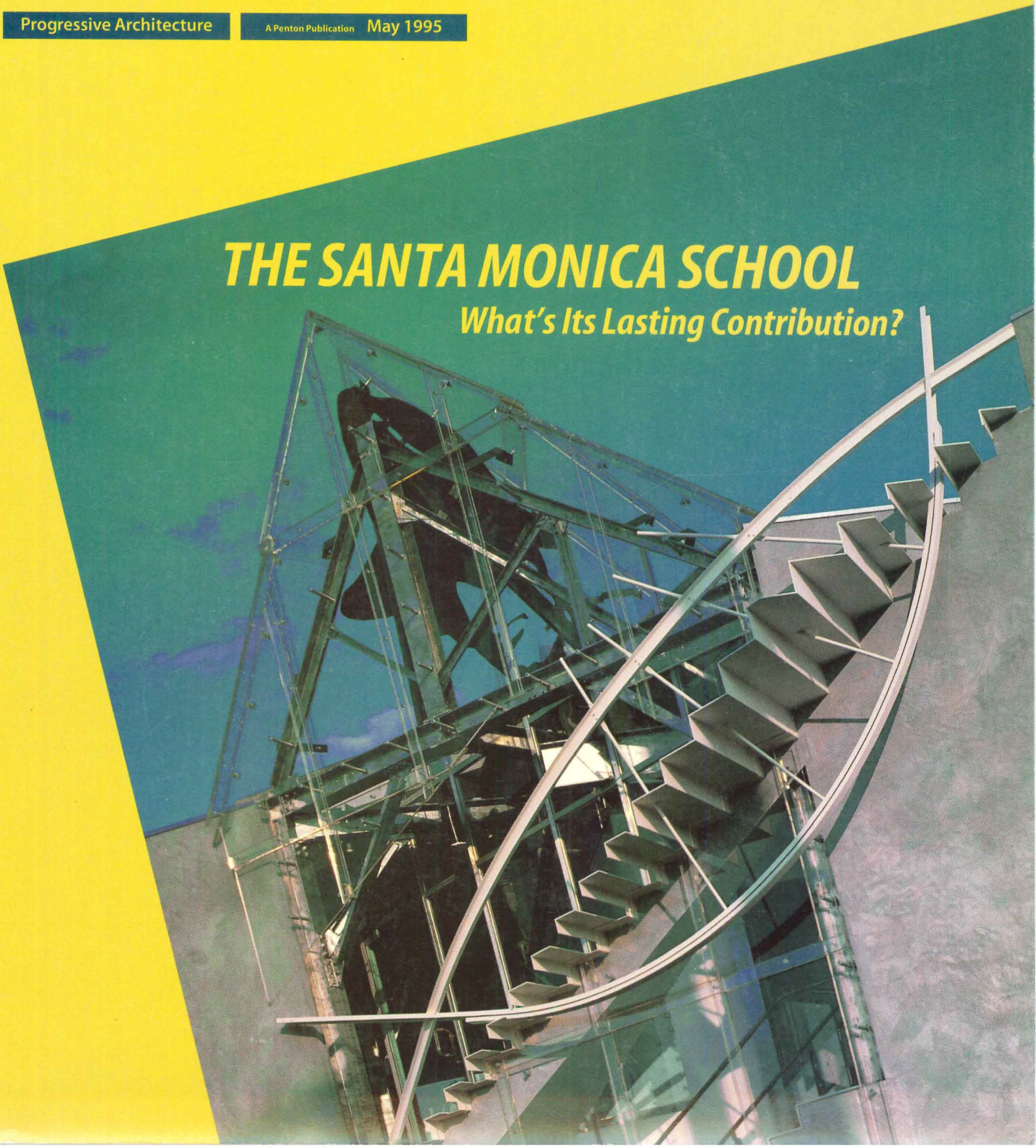

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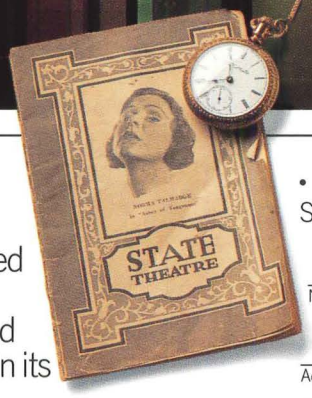

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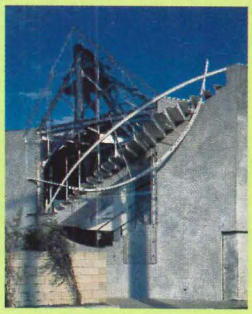

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FACING PAGE
Inspiration for the Globe reconstruction: copy of Johanne De Witt's drawing of the interior of the Swan Theater, 1596 (p. 92)

Features

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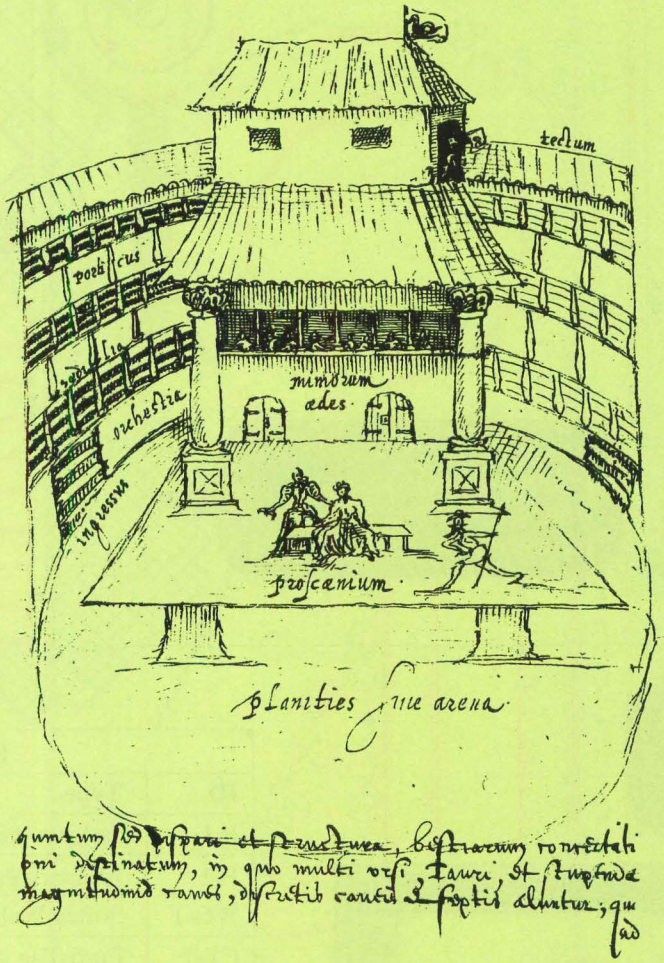

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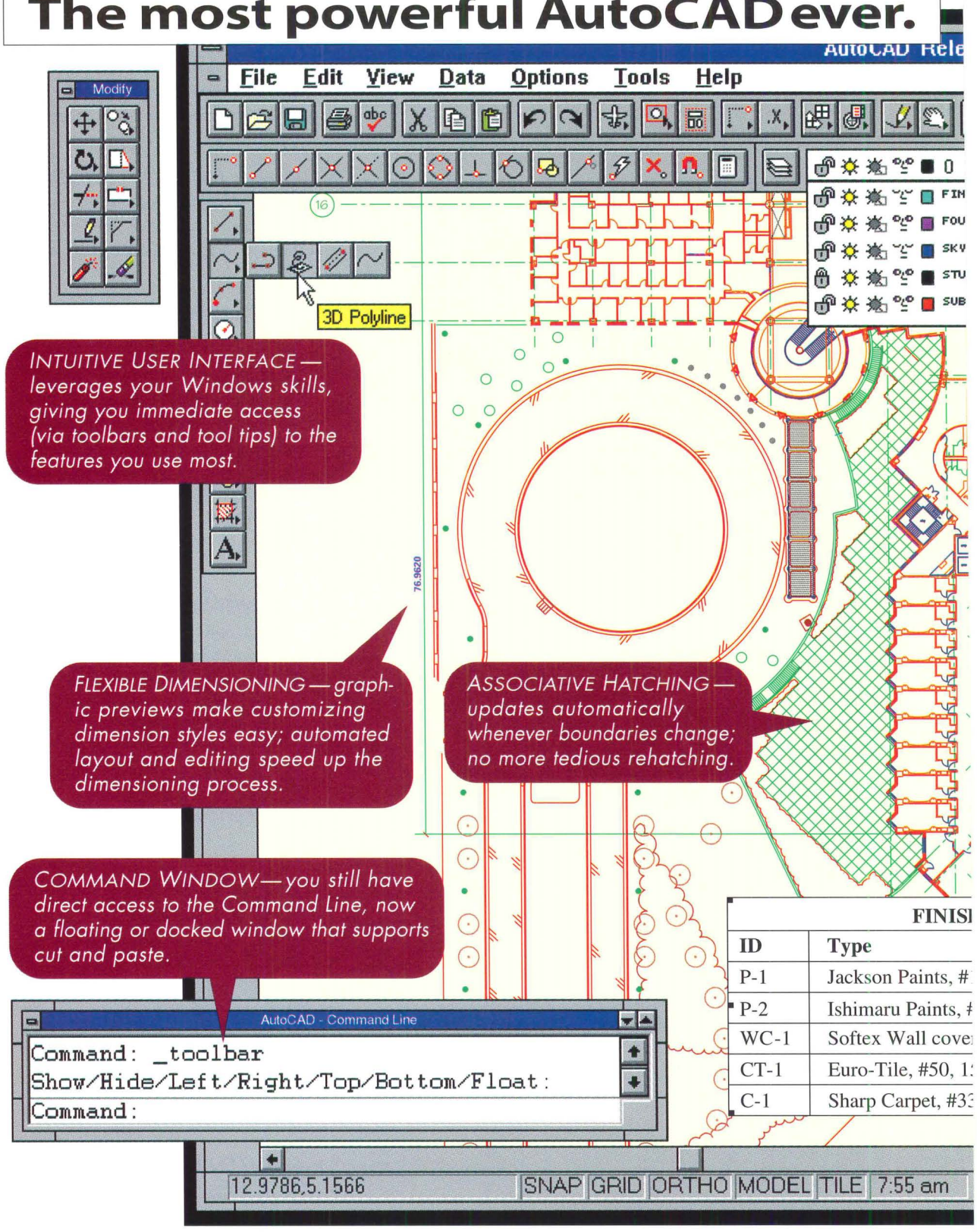

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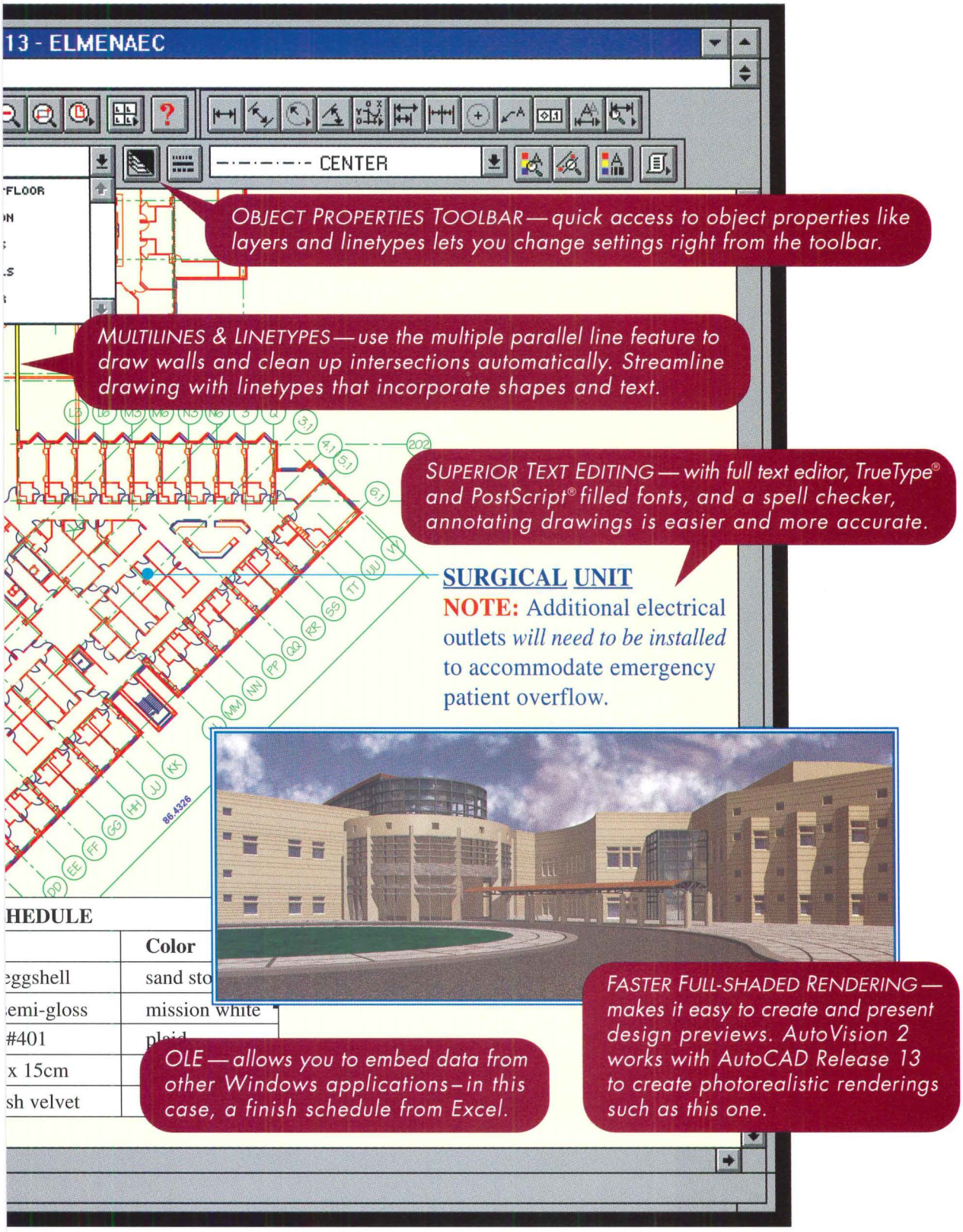

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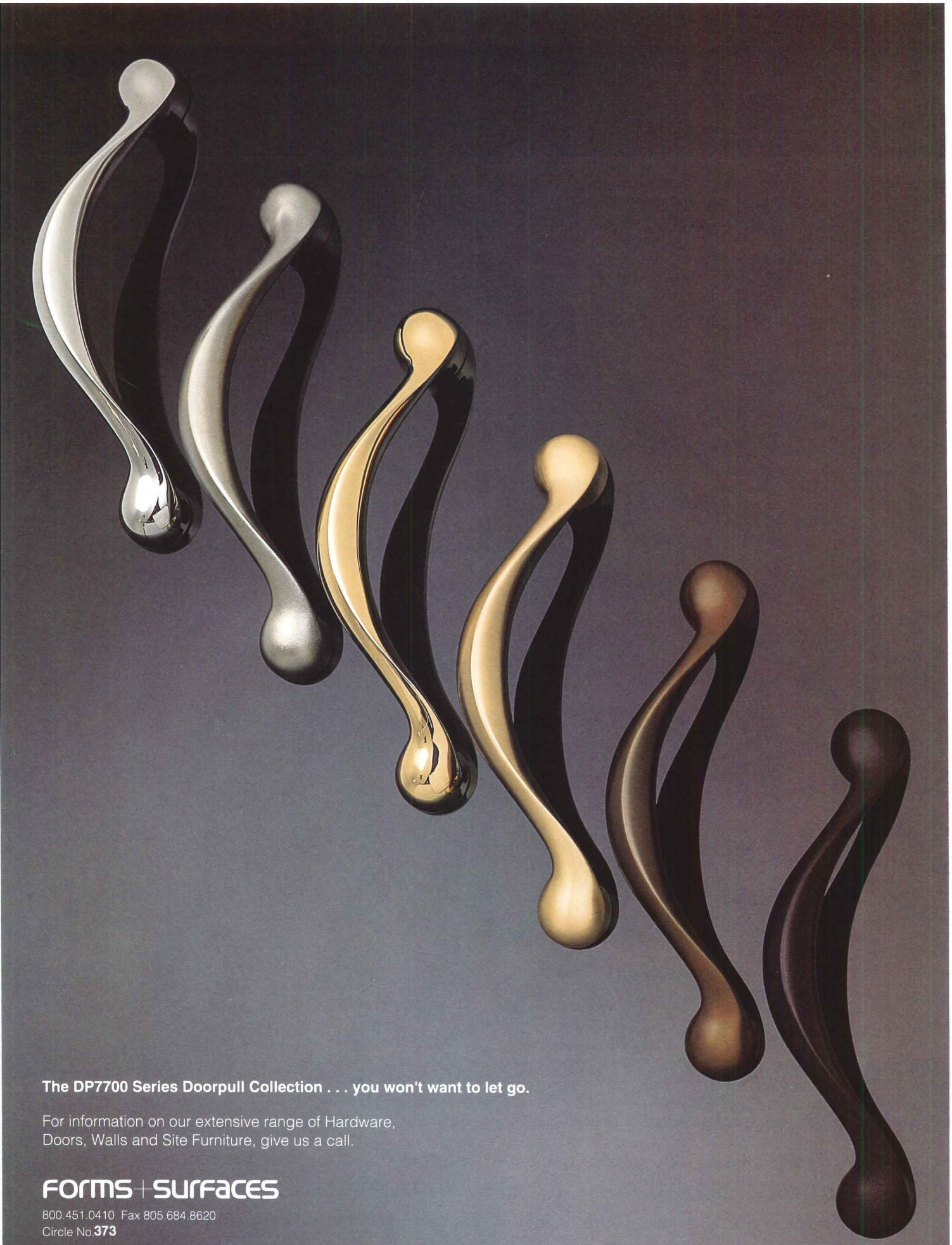
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Learning to See

In 1958, Ada Louise Huxtable wrote an article for the *New York Times Magazine* chastising the mainstream press for failing to cover architectural issues regularly and critically. The responsibility for this omission she placed squarely on our educational system: "The lack of attention of both press and public stems from a basic defect in our school curricula – the neglect of visual education.... The ability to see is as important as the ability to read and write, and it too, must be taught." Huxtable, who later became the *Times's* first full-time architecture critic, laid the groundwork for change, but, 37 years later, visual education is still lacking in our schools.

If taught to see and think critically about the built environment, the public would be more appreciative of architecture.

Huxtable's challenge to the press was met, to a degree, and can be credited with creating a somewhat more savvy public. But many of the architecture columns that cropped up around the country have since either disappeared or turned into style-obsessed how-to guides: dog-as-decorative-accessory was proposed in one recent *Times* article on design. Such fluff not only undermines the value of design, but is an example of our continued failure to take seriously the influence of the built environment on our daily lives. Needed now are the broadly applicable lessons of design education, of which visual education is a component.

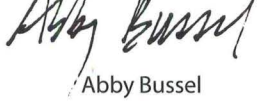
Through architecture our children can be taught to see, so that as adults they will have the tools to think critically about the world around them; they will also be better clients and users. Buildings and public spaces are loaded with political, economic, and social meanings and messages. A lesson in architecture is really a lesson in civics. We live, learn, and work in it; we pass it on the street, we use and share it as a community, but architecture is a subject hardly ever broached in our schools. Our society takes the built environment for granted because we are rarely taught to see it.

At a time when our elected officials are making an all-out assault on the visual arts, we would do well to reinvigorate Huxtable's challenge and to insist on the integration of architecture into our school curricula. There are many successful architectural programs for children and teenagers that can be used as models for the development of more extensive programs in our public schools. Volunteering their time to teach, give tours, and act as mentors, architects play an active role in these programs, which are run, most often, by nonprofit educational organizations, universities, and museums, and are supported by local AIA chapters and other architectural groups. Some architects have developed independently their own programs, and there are also a handful of design-based secondary schools.

This winter I taught a two-hour class on architectural criticism at the Architectural Youth Program (AYP), a hands-on curriculum for "at-risk" inner-city teenagers in New York, currently being duplicated in a number of schools across the country (P/A, Dec. 1994, p. 45). I told the students about the power of the written word to raise awareness and initiate change, and assigned them to visit and critique the Flatiron Building, Daniel Burnham's 1902 skyscraper on lower Fifth Avenue. Many of the teenagers had never seen or heard of the building, which is five blocks from their classroom. But they met the challenge of the assignment, bringing up issues of shape, style, and bulk, and they seemed inspired by the realization that they were capable of forming and expressing opinions about a building and its urbanistic effects.

The most excitement in the class was generated by a piece of abstract sculpture temporarily displayed on a traffic island opposite the Flatiron's apex. Designed by John Hedjuk in 1984 as part of his "Berlin Masque" and built by two Cooper Union architecture graduates, the "Conciliator" was difficult for the teenagers to grasp, but an energetic debate erupted as they considered its purpose. As the class came to an end, one student figured out the meaning of the sculpture: "It's about what's happening right here," he said, realizing that conciliation involves people coming together to work out their differences. Our session was ostensibly about architecture, but had covered sociology, art, history, urbanism, and politics.

All children and teenagers should have the opportunity to learn about the built environment and to understand that they can analyze and influence its shape not only as architects, but as citizens. Architects can do their part to initiate a fundamental change by encouraging their local schools to make architecture a standard part of the curricula. If this were to happen, the profession would be taking steps towards nurturing a public more appreciative of architecture. It is a long-term proposition, but one that would benefit us all. □



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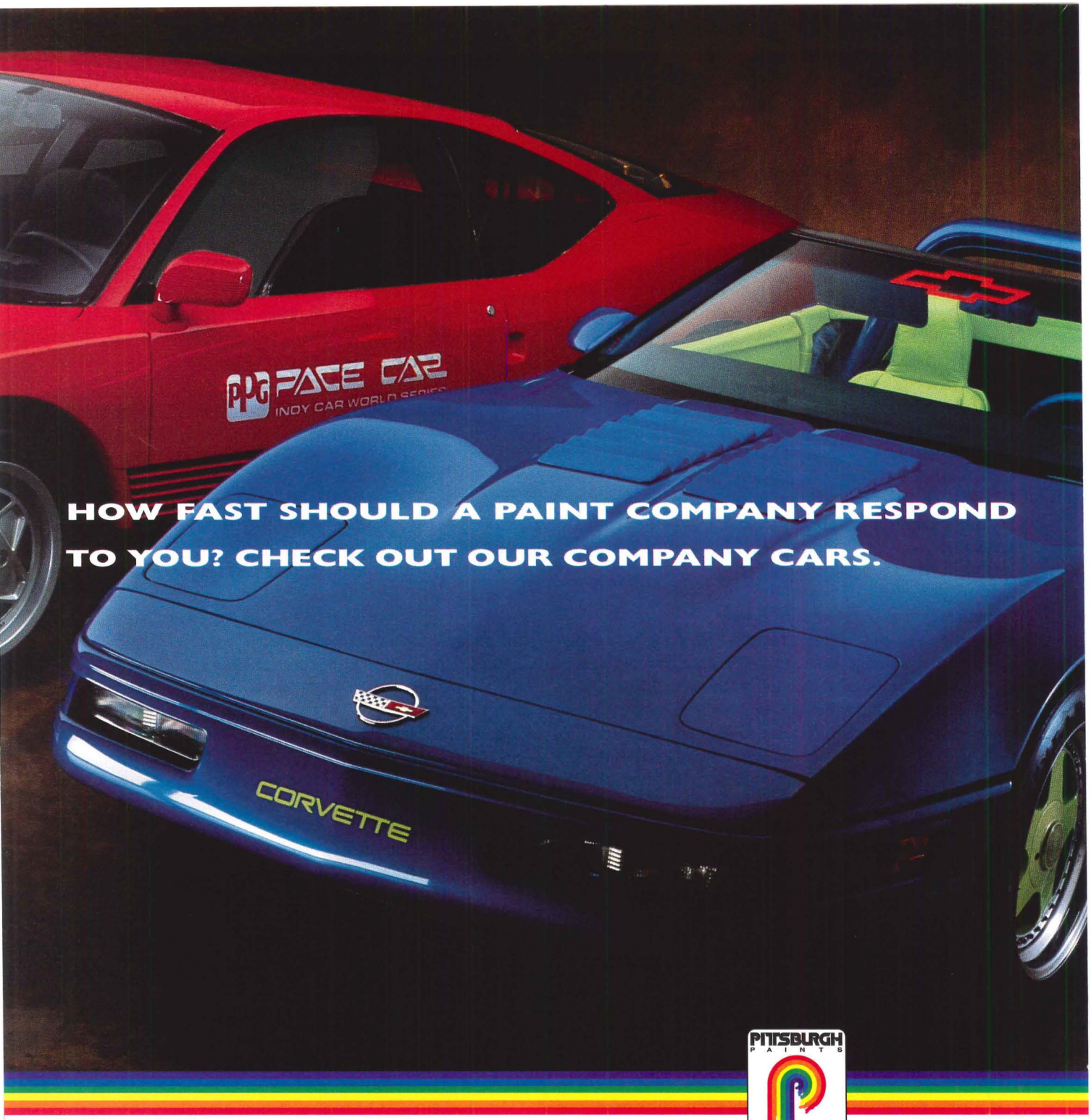

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Ghirardo Responds to Eisenman and Company

Shortly after my article, "Eisenman's Bogus Avant-Garde" appeared in P/A (November 1994), a friend wondered which of his surrogates Eisenman would ask to respond (February 1995). We now know the answer: all of them! A second obvious question concerned the issues to which he would invite responses. As it turned out, not to those about Eisenman's own career, the political implications of his formalism, and his media-manipulated persona, which I raised in my article. The eighteen responses (and who were the two hardy souls who did not answer Peter's call?) help keep the air circulating under a mystique that depends on such air movement to stay aloft.

Rosalind Krauss described their collective response as "elephant pat." Although I am otherwise inclined to defer to her expertise on matters of excrement, I did find much with which I agree in most of the statements. Unfortunately, most of them addressed a set of queries about form and politics independent of any reference to Eisenman. The point I would like to address concerns the role of criticism, and the relations between architects and critics. Even deconstructivist criticism, to which several of the respondents appeal in one way or another, claims to give accounts of how a particular form of knowledge is structured, and even at times to relate texts to non-discursive practices. Michel Foucault and Jacques Derrida and their followers even claim that one of the tasks of their criticism is to expose the social and political functions of the production and conservation of knowledge. Although observed more in the breach than otherwise, this comes close enough to a theory of criticism that I would support. My analysis of Eisenman's claims and practices, although not done as deconstruction, engaged precisely such matters.

Several of the respondents intimated that it was somehow inappropriate to criticize Eisenman, and Kurt Forster even wildly charged me with "turn(ing) him into somebody who ought not to exist." I sought in vain for such a reference in my article. Overall, I am left wondering just what they think the role of criticism is. Personal and business ties often seriously erode the intellectual honesty of criticism, something as true of political criticism as of cultural criticism. Perhaps this is easiest to demonstrate in politics, where, for example, the fact that the new(t) Speaker of the House has received large political contributions from unknown donors through his GOPAC group raises questions about his political freedom: to whom or what is he beholden when he tries to influence legislation?

Much the same is true in cultural criticism. This may explain why we have rarely seen vigorous criticism in architecture: too many critics are beholden, in one fashion or another, to the very individuals whose work they discuss. Blandishments from those able to command vast sums of money for conferences, international contacts, academic appointments, publication in compliant journals and magazines, not to mention invitations to the Four Seasons, are evidently difficult to resist. Stars seek the fawning approval, and critics yearn for the privileges: a happy confluence of interests for the two parties concerned. But these personal choices have implications for criticism. The results are the coy, celebratory, and sycophantic discussions that too often pass for criticism in architecture today.

Some of the responses here remind us that of all the arts, architecture surely has the most anemic criticism. As with the problem of anemia in humans, one might adopt as a remedy the unimaginative but efficacious modern medical practice of fortifying the patient with iron supplements. Unfortunately, architectural criticism seems to be undergoing the quaint and long discredited treatment called bleeding, wherein leeches are attached to the diseased body and allowed to feed off the remaining blood. At best, the leeches do no harm; at worst, they kill *(continued on page 13)*

(continued from page 11) the patient. If nothing else, they represent the illusion of efficacious therapy: and so too might be said of the illusion of criticism.

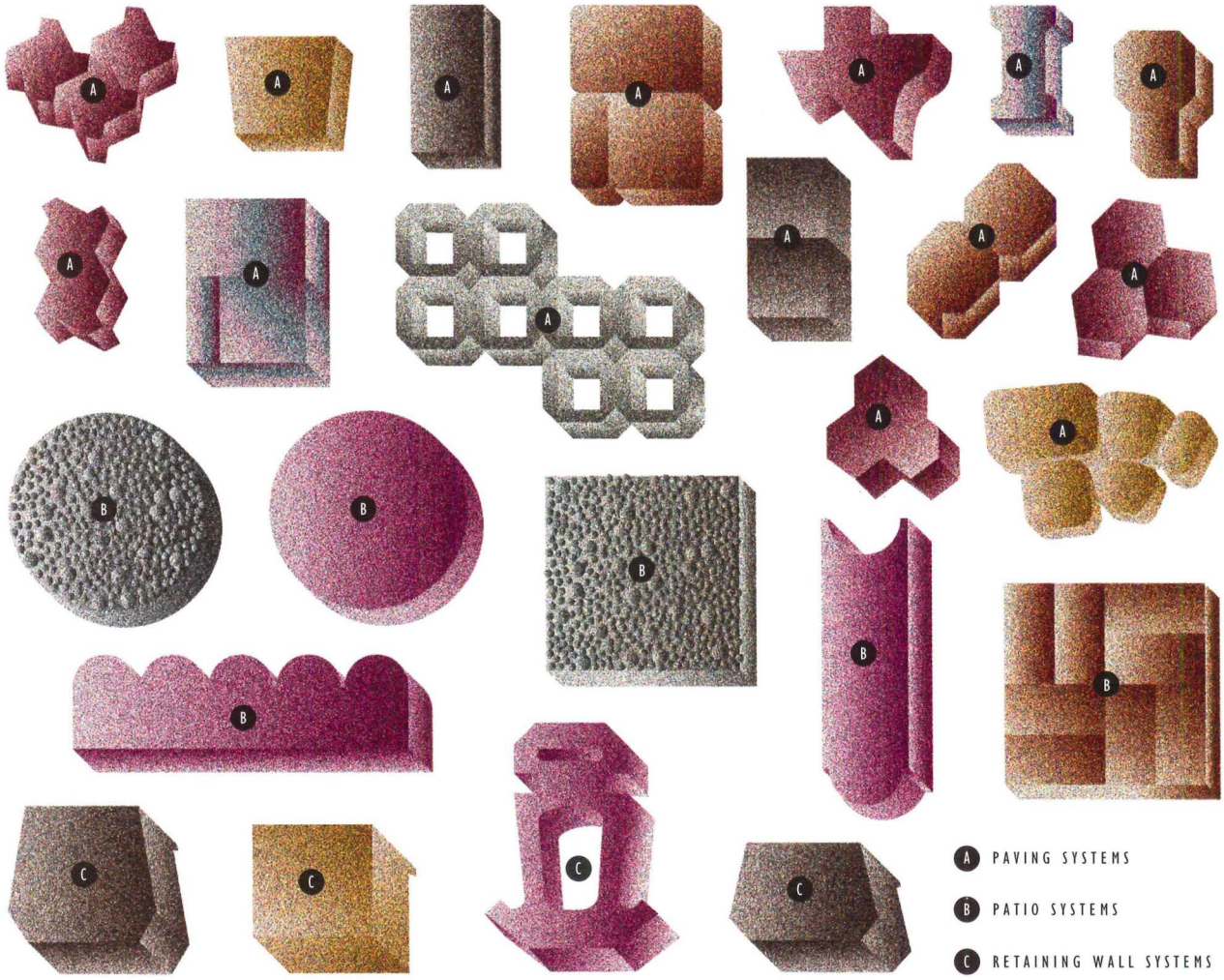
Diane Ghirardo
USC, President ACSA
Los Angeles

Vincent Pecora on Eisenman's Friends

It is hard for a dedicated architectural back-bencher (i.e.. me) to understand why Peter Eisenman needs an enemy like Diane Ghirardo when he has friends like these. Indeed, Alan Balfour neatly elaborates a position implicit in Ghirardo's critique: that (1) there is today a "rising conservatism in the uses of the formal in architecture," which is (2) in conflict with "an insatiable desire for the new" (one which is glibly repeated in almost every statement here); that (3) the "essential nature of architecture remained conservative" despite the claims of an earlier elite avant-garde; and that (4) at the end of the present century "there is no clear guidance for the behavior of an/the avant garde when it becomes the plaything of fashion." This indictment is at the heart of Ghirardo's critique of Eisenman: "Eisenman represents a desire to embrace an avant-garde aesthetic, to stake out the margins of culture in a defiant expression of independence, while simultaneously enjoying all the benefits of being a very centrist cultural icon ... Dissent is inscribed in such a narrow circle of formal choices that it loses any capacity to challenge all but the most banal of issues." Of course, unlike Ghirardo, Balfour may believe that Eisenman escapes the terms of his indictment, but the terms are clear enough, and are hardly even recognized by the majority of Eisenman's defense team.

As for the questions posed by Eisenman in lieu of the issues raised by Balfour and Ghirardo, – "can the formal ever be defined politically?" and "have previous definitions of the formal become problematic today?" – it is hard not to smell a rat, or rather, the bait designed to catch one. I think Eisenman has, in fact, set the trap for his putative friends, almost all of whom answer the questions in a way that directly contradicts Eisenman's own position and thus allows him to go one better in his contribution. That contribution is for all intents and purposes a restatement of a position he took back in 1976, in *Oppositions 6*, which he called "post-functionalism." Then, Eisenman denounced the "idealist ambition of creating architecture as a kind of ethically constituted form-giving." Modernism's big mistake was to assume a "moral imperative" behind its formal practice, which made it no more than a continuation of the "500-year-old tradition of humanism" – a tradition Eisenman was determined to break.

Now Eisenman denounces architecture's use of a "form/content connection as a moral justification for its form making," arguing against "the trap of immanence, of using a moral argument even in a formal context, to justify the making of form." As in the 1976 editorial, it is only when architectural practice renounces this humanist "immanence," connecting form and content (in the earlier statement, form and function), and hence undermines "the tradition of architecture," that it is being most political. Whatever one thinks of it, Eisenman's position in this respect is relatively clear and (for nearly 20 years now!) consistent: architecture is politically subversive only when it rejects architectural tradition; architectural tradition means the moral/political (humanist) assumption of a link between form-giving and moral/political meaning; politically subversive architecture is thus architecture that rejects the connection between form and moral/political meaning. This position is more or less what Ghirardo means by Eisenman's "formalism." It is simply that Eisenman thinks his position, highlighted against an architectural tradition obsessed with the need to justify itself through a host of connections between form and supposedly extraneous matters, is indeed *(continued on page 15)*



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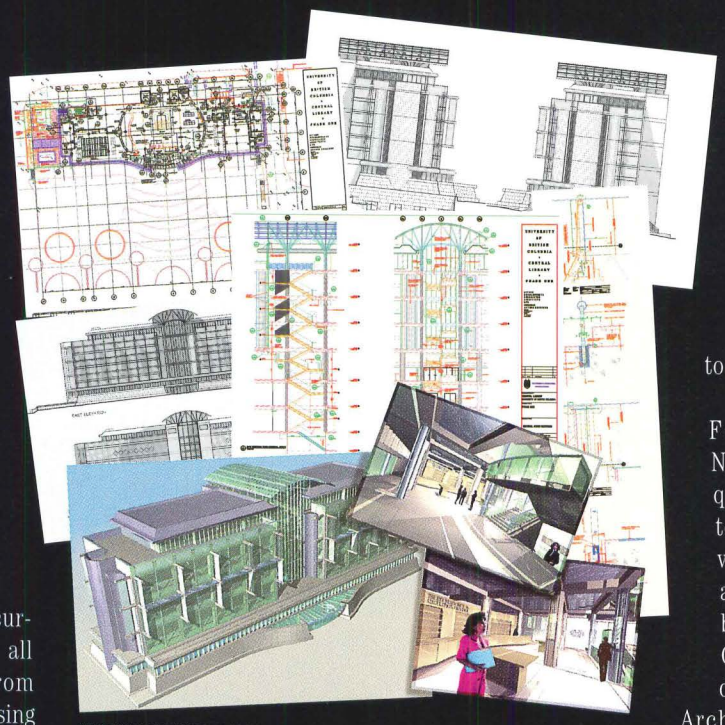

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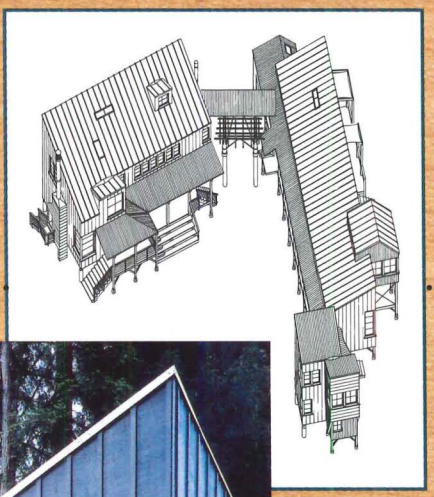

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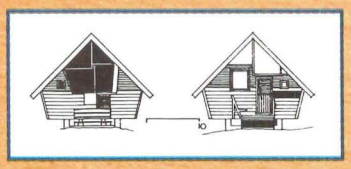

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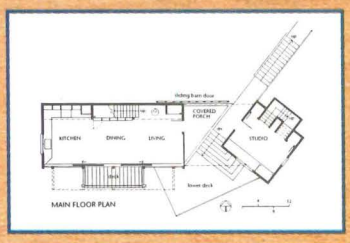

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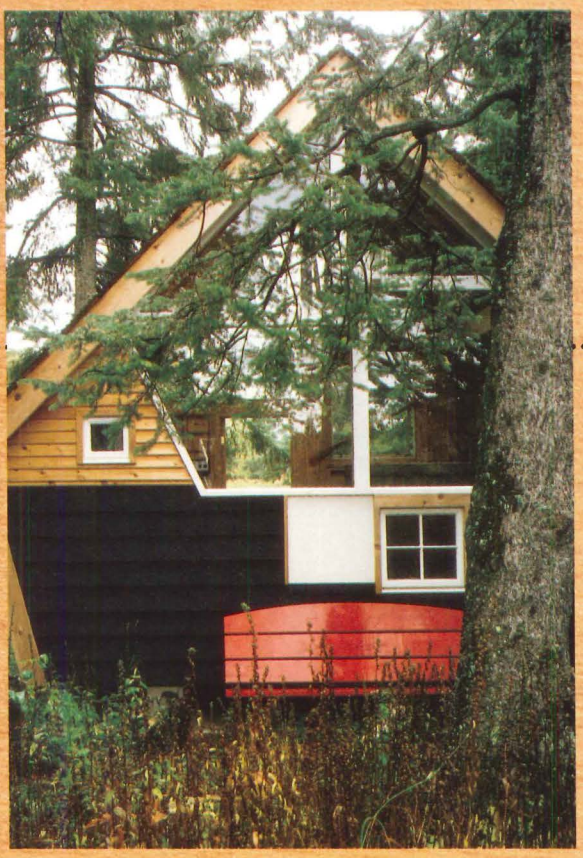

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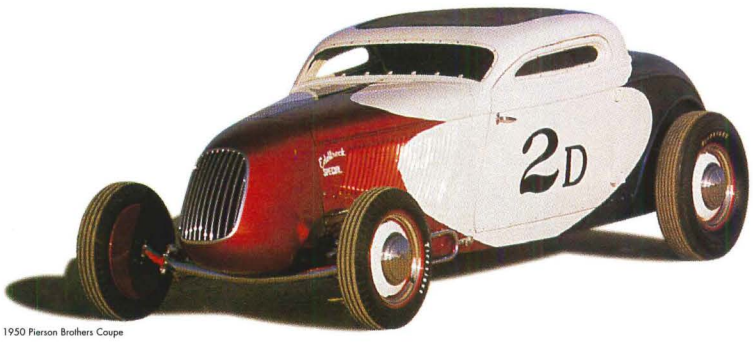

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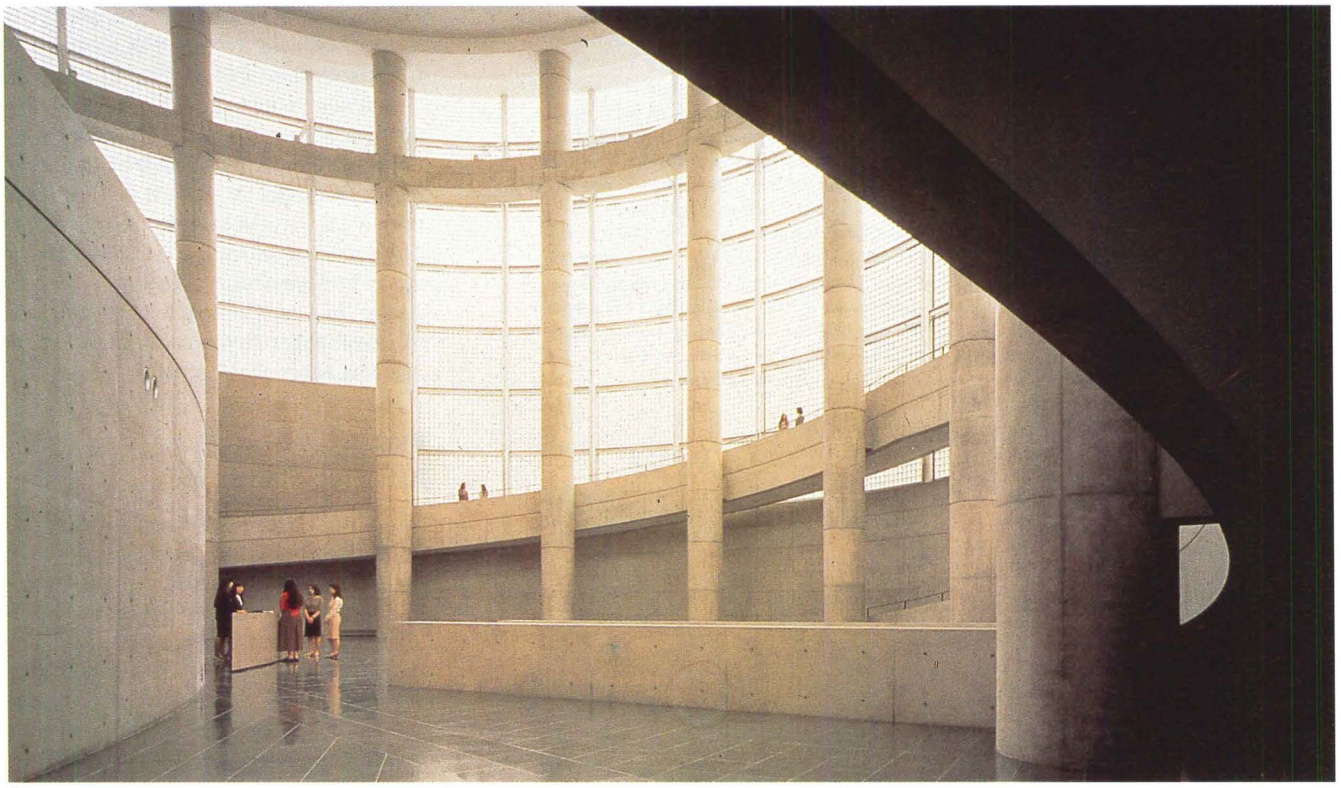


Mitsuo Matsvoka

1

Tadao Ando Awarded the Pritzker Prize

Tadao Ando, the 53-year-old architect from Osaka, Japan, has been awarded the $100,000 Pritzker Architecture Prize by Jay A. Pritzker, president of The Hyatt Foundation. Ando is the 18th recipient of the prize and the third Japanese winner since the award was established in 1979.

In some ways, Ando was a safe selection for the Pritzker. Widely published and honored, with "virtually every art and architecture prize his own country can bestow," in the words of the Pritzker announcement, Ando practices a Modern minimalism that exerts undeniable appeal. The sensual richness and the spatial complexity Ando achieves in his buildings, with a limited palette of materials – mainly concrete, steel, glass, and wood – and with a few simple geometric moves, show a control of the medium that any architect, of whatever aesthetic stripe, can admire (P/A, Feb. 1990, pp. 83–97).

But there is another, less often discussed side of Ando that makes his selection rather daring. In Japanese culture, one tradition is that of resisting Western consumer values, with their dependence upon the latest technology, the newest trend, the most outrageous fashion. And of architects practicing today, no better representative of that resistance exists than Tadao Ando.

He resisted the conventional path to becoming an architect; never formally trained, he taught himself architecture. And at a time when Japan's most successful architects have operated from Tokyo, he has remained in his hometown of Osaka. Likewise, he has resisted the fashions of the last two decades, pursuing an abstract minimalism while many of his peers were producing a more ornamental or self-expressive architecture. Amid the cacophony of styles, Ando remained resolute. "I do not believe architecture should speak too much," he said. "It should remain silent and let nature in the guise of sunlight and wind speak." And in contrast to the visually chaotic urban and suburban settings in which many of them stand, Ando's buildings create restful rooms and quiet, contained landscapes that draw our attention to fundamentals: architectural space, light, surface, and form. It is thus no small irony that Ando has been awarded a prize sponsored by a family that made its fortune spreading Western notions of leisure and hospitality worldwide. As Ando said, when informed that he had won the Pritzker Prize, "I am bewildered by the news." □

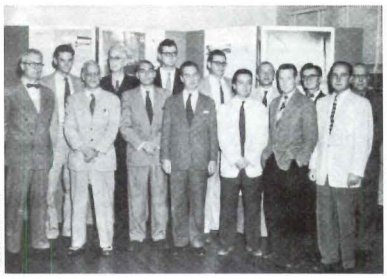
2

Mitsuo Matsvoka

3

The 53-year-old architect (2) is best known for his beautifully built concrete structures, such as his Raika Headquarters building in Osaka (1). The Japan Pavilion at Expo '92 in Seville, (3) was one of Ando's few wood buildings.

Books



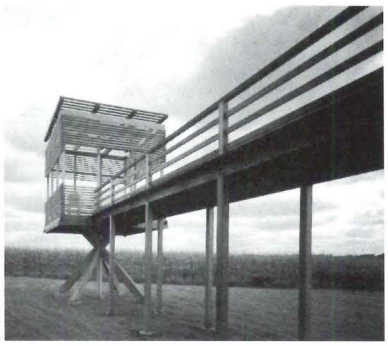
Hoesli Archives

The Texas Rangers: Notes from an Architectural Underground *by Alexander Caragonne, introduction by Charles Moore, MIT Press, Cambridge, Massachusetts, 1995, $50.*
An unusual history of architectural pedagogy, this fascinating book looks at how a few young teachers at the University of Texas at Austin in the mid-1950s – including Colin Rowe and John Hedjuk – rethought the architectural curriculum, steering it away from regionalism and Bauhaus Modernism toward a more spatial and historical orientation, setting the stage for the Post-Modernism that arose a decade later. Caragonne documents, in writing and in elaborate time lines, the enormous influence those "Texas Rangers" had on a younger generation of architects, many of whom have gone on to teach or head architectural schools themselves. (Shown above: School of Architecture faculty, 1954–1955; from left to right: Hugh L. McMath, Lee Hirsche, J. Robert Buffler, Goldwin Goldsmith, Hugo Leipziger-Pierce, John Hedjuk, Harwell Hamilton Harris, R. Gommel Roessner, Bob Slutzky, Colin Rowe, Bernhard Hoesli, Martin Kermacy, Kenneth Nuhn, Robert Leon White.)

The Fractured Metropolis: Improving the New City, Restoring the Old City, Reshaping the Region *by Jonathan Barnett, HarperCollins, New York, 1995, $40.*
The accomplished urban designer Jonathan Barnett devotes his latest book to exploring ways of ameliorating the split between the "old city," which used to be the center of things, and the "new city" on the metropolitan periphery, which now contains "more than half the recently built office space, many of the best shops, the cleanest industries." Barnett discusses an impressively broad variety of recent plans and designs for controlling sprawl, improving urban centers and edge cities, and fitting new buildings in with old. One sometimes wishes he would offer more detailed, trenchant critiques of designers' plans – the writing tends to be terse and circumspect – but, the book is, nonetheless, one of the best available overviews of how urban and metropolitan design issues are currently being dealt with.

The Architecture of Affordable Housing *by Sam Davis, University of California Press, Berkeley, California, 1995, $30.*
Architect Sam Davis, who has designed many affordable housing projects, writes about the generally misguided attitude our society has about affordable housing and its architecture. In Europe, below-market-rate multifamily projects are referred to as "social housing," because, as Davis points out, quality of life issues are a priority of government; in the U.S., where dreams of single-family home ownership still blind us to economic realities, we use the term "affordable," because housing is considered a product that satisfies a basic need, nothing more. Consequently, the value of architecture in affordable housing is undermined. Davis makes a solid, level-headed argument for the merits of well-designed housing and recognizes that the growing number of homeless includes both the long-term disenfranchised and, increasingly, members of the working and middle classes, such as single parents and young professionals who cannot afford market-rate housing. In addition to the value it offers residents, great architecture, argues Davis, can improve public opinion about affordable housing. The book includes several case studies, P/A's affordable housing initiative (P/A, Aug. 1992, p. 44) among them.

Briefly Noted



Agrest & Gandelsonas: Works *with an introduction by Anthony Vidler, Princeton Architectural Press, New York, 1995, $60 cloth, $40 paper.*
More than 40 projects by the New York-based architect-educators. (Shown above: a pavilion at the Villa Amore in Southampton, New York, 1989–1990.)

The Architectural Index 1994 *edited by Ervin J. Bell, The Architectural Index, Boulder, Colorado, 1995, $25.*
Complete listing of articles published in nine American architectural, interior design, and builder magazines in 1994 (including P/A).

Computers in the Professional Practice of Design *by Karen M. Brown and Curtis B. Charles, McGraw-Hill, New York, 1995, $32.*
How-to guide for small- and medium-sized architecture and design firms.

Drawing the Landscape *by Chip Sullivan, Van Nostrand Reinhold, New York, 1995, $34.95.*
A primer on hand-drawn landscape architecture and its importance as a technique in the age of computer-generated design.

Small Houses for the Next Century *by Duo Dickinson, McGraw-Hill, New York, 1995, $39.95.*
Expanded second edition of *The Small House*; analysis of 35 single-family houses for clients of diverse economic status.

Not Your Usual Oscar

"Maya Lin: A Strong Clear Vision" won an Academy Award as best documentary feature of 1994. A crew directed by Freida Lee Mock (who was also producer along with Terry Sanders) followed the New York-based Lin intermittently from 1989 to 1994 to create the 1-hour-40-minute documentary. Lin, whose Vietnam Veterans Memorial in Washington is one of the most beloved monuments of recent years, said, "At times it was a little unnerving to have a camera-person there." Compounding the focus on Lin, the winner in the short documentary category, "A Time for Justice" by Charles Guggenheim, starts with the Civil Rights Memorial in Montgomery, Alabama, which she designed in 1989. □

Vinci to Design Arts Club of Chicago

John Vinci, a Chicago architect known primarily for restoration work, has been chosen to design the new quarters of the Arts Club of Chicago, which occupied portions of buildings being demolished for a North Michigan Avenue project. Vinci, an IIT graduate famous among preservationists for his protests against the demolition of Louis Sullivan's Garrick Theatre and Stock Exchange, was selected in a competition judged by Carter Manny, a former partner at C.F. Murphy; Myron Goldsmith, a former SOM partner; and James Wood, director of the Chicago Art Institute. Only Chicago architects were eligible. The new building, two blocks away, with about 18,000 square feet and a budget of about $5 million, may or may not incorporate the Mies van der Rohe stair that is being saved as the old Arts Club quarters go down. □

New Dean at Rensselaer

Alan Balfour, chairman of the Architectural Association School of Architecture in London, will return to the U.S. July 1 as dean of the Rensselaer Polytechnic Institute School of Architecture in Troy, New York. In his four years at the Architectural Association, enrollment and income grew and a large debt was substantially paid off. For Balfour, who received his diploma from the School of Architecture at Edinburgh College of Art, the foremost attraction of RPI was "the implications that stem from architecture being taught within the context of a great engineering school." Smith Professor and dean at Rice University School of Architecture from 1989 to 1991 and professor and director of programs in architecture at Georgia Institute of Technology from 1982 to 1987, Balfour succeeds Donald Watson, who decided to return to teaching and research. □

Gantt Gets Appointment

Former Charlotte, North Carolina, mayor Harvey B. Gantt, FAIA, has been appointed chair of the National Capital Planning Commission, which reviews federal construction proposals in the capital region and evaluates the federal capital improvements program for the Office of Management and Budget. Gantt, a member of the Board of Regents of the American Architectural Foundation and a member of the AIA's Diversity Committee, is a principal of Gantt Huberman Architects in Charlotte. □

Colin Rowe Awarded RIBA Gold Medal

Colin Rowe, an important behind-the-scenes influence on Neo-Modern and Post-Modern architects, will receive the 1995 Royal Gold Medal for Architecture from the Royal Institute of British Architects and Queen Elizabeth. "What holds together architects as diverse as Graves, Stirling, Eisenman, and MacCormac is the golden thread of his thought," said Dr. Francis Duffy, RIBA president. Rowe, a Cornell professor emeritus who studied architecture at Liverpool and Cambridge and art history at the University of London, is famous for his ability to make connections among seemingly dissimilar things and for his view of architecture as an activity based on ideas. Born in 1920, Rowe helped write one of the first curricula based on formal and historical principles while at Texas in the mid-1950s and established one of the country's first urban design studios at Cornell in the early 1960s. The number of current educators who have studied under Rowe or one of his disciples is enormous, as a new book, *The Texas Rangers*, shows (see Books). Nor is Rowe's influence likely to decline soon: last year Academy Editions published a collection of his essays, titled *The Architecture of Good Intentions*, and MIT Press has three volumes of his essays in the works. As the Gold Medal citation puts it, "his writing represents a continuous stream of profound observations on architecture over the last fifty years." □

Cuts in Services Hit AIA New Jersey

AIA New Jersey is in the midst of drastic cutbacks. The chapter has closed its headquarters offices, dismissed its executive director and her three staff members, and temporarily suspended its bimonthly magazine, its continuing education programs, and its document sales. The chapter's gala convention has been downgraded to a minor event, and the budget has been pulled from its special interests committees, rendering most of the latter "dormant," as President Charles Weiler puts it. Overall, says Treasurer James Gatsch, the chapter's operating budget has been slashed from $750,000 in 1990 to $250,000 this year, with a deficit of about $75,000. The problems are attributed to bad luck, bad planning, and conflicting goals over the last several years. Some events run by local sections compete financially with chapter events.

As part of a reorganization, a management company in the state capital is supplying basic administrative services and a meeting room. Despite the decline in services, members had to cough up a one-time $50 assessment on top of an increase of $40-plus in annual chapter dues. Surprisingly, membership has not dropped significantly from its high of 1,750 five years ago. But two of the chapter's six sections are threatening to secede and apply for chapter status. Section activities are well attended; recent trade shows held by two sections wiped out the profitability of the chapter's convention-time trade event. Bowing to the inevitable, Weiler is hoping to pass control of most programs to the sections while helping them coordinate their efforts, thereby keeping them, and their dues, in the fold. **Susan Doubilet** □

Wright Tours Expand

The Taliesin Preservation Commission has purchased a Frank Lloyd Wright-designed restaurant at the edge of the Spring Green, Wisconsin, compound and converted it into a Frank Lloyd Wright Visitor Center – the gateway to an enlarged array of tours of the 600-acre estate. The long low building, designed by Wright in 1953 to replace an existing restaurant and built in the 1960s, contains a bookstore, exhibits of Wright's work, and a café that commands a sweeping view of the Wisconsin River. Through October, four tours operate, the most comprehensive being a new four-hour $50 itinerary that takes in all of Taliesin's buildings. For tour information, call the Preservation Commission at (608) 588-7900. □

P/A Receives High Honors for Journalism

Progressive Architecture won the distinction of being a finalist in the National Magazine Awards competition, an honor to which the most distinguished American magazines aspire. P/A was one of five finalists for General Excellence in the category of magazines with a circulation of under 100,000; the winner in this category, announced Academy-Awards-style at a lunch in New York on April 12, was *ID, The International Design Magazine*.

As with movies nominated to the Academy Awards, magazines consider it a great honor to be nominated for the field's highest awards. P/A's entry to the competition stressed the conversion P/A made in 1994 from the "picture book" format that has prevailed in architectural journalism to an issues-oriented magazine; the awards jurors praised the magazine for having "helped move the journalism of architecture toward the 21st Century." The National Magazine Awards are sponsored by the American Society of Magazine Editors and the Columbia University Graduate School of Journalism. □

Calendar

COMPETITIONS

Ermanno Piano Scholarship
Deadline, application: May 31
Recent graduates of architecture school may apply for the Ermanno Piano Scholarship, which includes an invitation to conduct materials research at Renzo Piano's studio and a $10,000 grant. Contact Renzo Piano Building Workshop, Piazza San Matteo 15, 16123 Genova, Italy.

Concrete Design Awards
Deadline, submission: June 30
Any type of structure constructed substantially of plant-manufactured precast or prestressed concrete may be entered in the Precast/Prestressed Concrete Institute's 1995 Design Awards program. Contact PCI, Design Awards, Karen Baldwin, 175 W. Jackson Blvd., Chicago, IL 60604. Tel. (312) 786-0300. FAX (312) 786-0353.

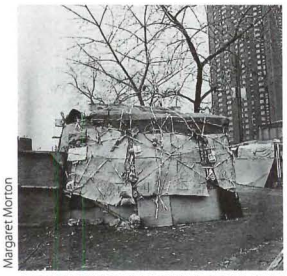
Excellence on the Waterfront
Deadline, submission: July 10
The international Excellence on the Waterfront competition categories include environmental, historic, industrial, recreational, and residential projects. Contact Waterfront Center, 1536 44th St., NW, Washington, DC 20007. Tel. (202) 337-0356. FAX (202) 625-1654.

Visionary Landscapes
Deadline, submission: July 15
For its annual Visionary and Unbuilt Landscapes Competition, *Landscape Architecture* invites participants to consider a "renewed vision" for open spaces in cities, suburbs, and towns in the age of cyberspace. Contact Visionary Competition, Landscape Architecture, 4401 Connecticut Ave., NW, Ste. 500, Washington, DC 20008-2302; Michael Leccese. Tel. (303) 939-9844.

Ruth and Ralph Erskine Fellowship
Deadline, submission: July 31
This biennial award of $10,000 honors a built project designed for the underpriviledged members of society. Contact Erskines Stipendiefond, Svenska Arkitekters Riksforbund, Norrlandsgatan 18 2tr, S-111 43 Stockholm, Sweden. Tel. 46-8 679 27 60. FAX 46-8 611 49 30.

EXHIBITIONS

Koolhaas and Public Architecture
May 6–August 13
Wexner Center, Columbus, Ohio.
An expanded version of "Rem Koolhaas and the Place of Public Architecture," organized by the Museum of Modern Art in New York, is on view.



Margaret Morton
YIPOI LEE'S HOUSE, CHINATOWN, 1991.

Fragile Dwellings
May 19–November 8
National Building Museum, Washington, D.C.
Powerful images of makeshift homes are presented in "Fragile Dwellings: Photographs of Homeless Communities by Margaret Morton" (P/A, Aug. 1993, p. 78).

Architectures of Display
May 20–July 1
Various sites, SoHo district of New York.
The Architectural League of New York and Minetta Brook present the "Architectures of Display," five site-specific installations by architect/artist teams that investigate architecture's relationship to display. A related symposium will be held May 20 at the Drawing Center. Contact Architectural League of New York. Tel. (212) 753-1722.

Mutant Materials
May 25–August 22
Museum of Modern Art, New York.
The evolution of design materials over the past decade is documented in "Mutant Materials in Contemporary Design."

CONFERENCES

International Furniture Fair
May 20–23
New York.
The seventh annual International Contemporary Furniture Fair (ICFF) includes designers and manufacturers of furniture, lighting, flooring, and textiles. Contact ICFF. Tel. (800) 272-7469.

A/E/C Systems '95 and Related Events
June 5–8
Atlanta.
The largest of several computer-related design and construction events taking place in Atlanta next month is A/E/C Systems® '95. Among the other events are "Creating a Future for Quality Architecture: Design Tools, Techniques, and Resources" (June 7); "Total Teach," a forum for educators (June 7); and "SCIBS '95," a symposium on integrated building sciences (June 4–6). Contact Sharon Price, A/E/C Systems® '95, 365 Willard Ave., #2K, Newington, CT 06111. Tel. (800) 342-5718, (203) 665-0153. FAX (203) 666-4782.
E-mail: <aecsys@ix.netcom.com.

Lightfair
June 7–9
Chicago.
New lighting products will be displayed and seminars offered at Lightfair. Contact AMC Trade Shows, 240 Peachtree St., NW, Suite. 2200, Atlanta, GA 30303. Tel. (800) 856-0327.

Aspen Design Conference
June 8–11
Aspen, Colorado.
The theme of this annual interdisciplinary design conference is "New Business: Redefining the Idea of Design." Contact IDCA, PO Box 664, Aspen, CO 81612. Tel. (303) 925-2257. FAX (303) 925-8495.
E-mail: idca@csn.net.

NeoCon®
June 12–14
Chicago.
The annual contract interiors show also includes the Buildings Show™ and TechnoCom™, a business communications show. Contact NeoCon® . Tel. (800) 677-6278 or (312) 527-7600.

CSI Convention
June 23–25
Minneapolis.
The Construction Specifications Institute's 39th annual convention will include more than 1,000 exhibition booths and 30 educational sessions. Contact CSI, Convention Registration, 601 Madison St., Alexandria, VA 22314. Tel. (800) 689-2900. FAX (703) 684-0465.

Practice Notes

Limits for Limited Liability
The Second District Court of Appeals, according to lawyer Timothy Truax of Thelen, Marrin, Johnson & Bridges, has ruled that for liability provisions in design contracts to prevail, both plaintiff and defendant must have equal bargaining power and equal technical knowledge. He recommends that design professionals give clients the opportunity to reject or modify contract terms, offer to negotiate a greater limit of liability for a larger fee, and advise clients to seek technically knowledgeable legal counsel. Contact Dick Lewis (213) 965-6041 for more information.

Qualifications-Based Selection Saved
An administration proposal to exempt all federal procurements under $100,000 from quality-based selection has been killed, says the American Consulting Engineers Council. The ACEC is also trying to get a repeal of the 1939 procurement statute that limits A/E fees to six percent of the total construction cost. For more information, contact Bill Murray at ACEC (202) 682-4356.

Technics Notes

Greening On-Line
GreenClips, an on-line service, publishes summaries of recent articles on sustainable architecture and related government and business issues. The service is currently free, and is published biweekly by Sustainable Design Resources in San Francisco. Approximately 30 publications are scanned for green news. For information call Chris Hammer at (415) 928-7941, or by e-mail at greenclips@aol.com.

Engineered Wood Directory
The Engineered Wood Association has just published a membership and product directory of manufacturers of wood structural panels and glulams. The directory includes charts that show at a glance material sizes, wood species, finishing standards, and trademark approvals. Copies are available from the American Plywood Association, Publications Dept. K815L, P.O. Box 11700, Tacoma, WA 98411-0700; (206) 565-6600, ext. 186.

Steel Joist Guide
The Steel Joist Institute offers a new installment in its technical digest series. *Vibration of Steel Joist-Concrete Slab Floors* contains 44 pages of technical information on the subject. The guide, which costs $12.50, can be ordered from SJI, Suite A, 1205 48th Avenue North, Myrtle Beach, SC 29577; (803) 449-0487.

Demolitionist, Spare That Wallboard

It was probably just a coincidence that "Preserving the Recent Past," a well-attended conference sponsored by the National Park Service and several other organizations, held its concluding session on April Fool's Day. Still, at least a few of the hundreds of participants at the Chicago gathering must have been amused by discussions bearing titles like "Replacing Historic Asphalt Shingles" and "Wallboard History and Preservation Issues." Such subjects indicate that the purview of preservationists is being pulled into a post-World War II environment that abounds with materials designed more for economy, flexibility, and speed than for durability.

Buildings associated with modern and sometimes fleeting ways of life are increasingly being targeted for preservation. The Society for Commercial Archeology, which was founded 18 years ago to study, celebrate, and preserve such 20th-Century structures as drive-in restaurants and tourist cabin courts, had the satisfaction of seeing its perspective taken in earnest by mainstream preservationists in Chicago. The challenges of saving the recent past, however, promise to be immense. By the time the conferees had turned their attention to metal-and-glass curtain walls, thin stone veneers, plastics, and sealants, it was obvious that there will be a raft of technical issues to be resolved. For architects, the result may be plenty of work in making the buildings of the recent past usable for a few more decades. □

Robert A. Kennard, 1920–1995

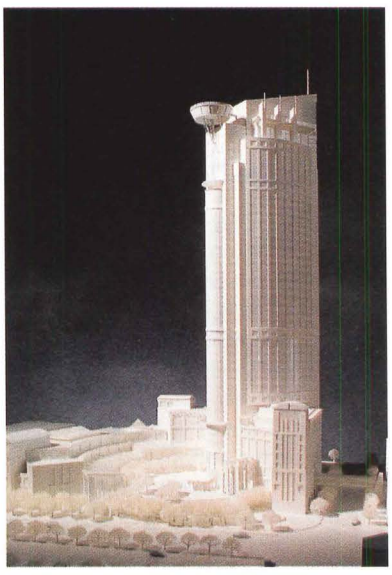
Robert A. Kennard, FAIA, a Los Angeles architect whose struggles as a young black apprentice led him to form Minority Architecture and Planning, a precursor to the National Organization of Minority Architects, died March 24 at the age of 74. In 1957 he established Kennard Design Group, whose work, largely in the public sector, included schools, Metro stations in Washington, D.C., a Federal Aviation Administration center in Hempstead, New York, and the Carson, California, City Hall and Civic Center. His was the oldest African-American architectural firm in the Western U.S. Motivated by the strong resistance he faced when seeking jobs at the start of his career, Kennard recruited black students and created mentoring programs for schools in the Los Angeles area. He earned his architecture degree from the University of Southern California in 1949 through the G.I. Bill. Kennard Design Group continues under four principals: his daughter, Gail Kennard Madyun, Mahmoud Gharachedaghi, William W. Adams, and Mohammad Kashani-Jou. □

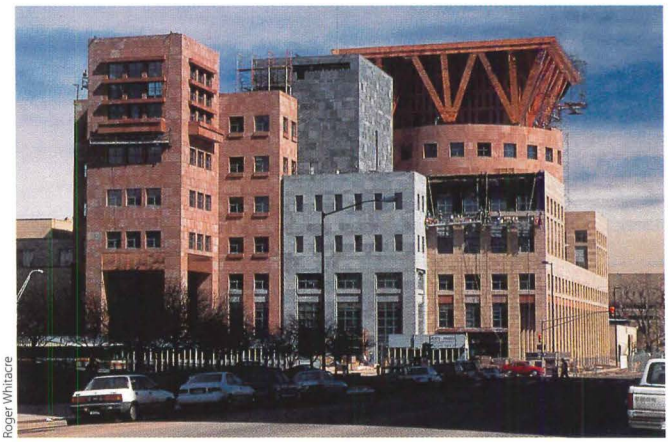
Pelli Wins in Miami

Cesar Pelli won the competition for the $92-million Dade Performing Arts Center in March, promising the public a grand Latin American architectural gesture: an immense colonnaded plaza where crowds can gather during performances at either the 2,200-seat symphony hall or the 2,480-seat opera house. This oval "public living room," with a floor pattern based on West African, North African, and Caribbean designs, will help to unify the two blocks of the complex, which are to be built facing each other across busy Biscayne Boulevard near downtown Miami. The plaza, at least in theory, can be enjoyed whether or not you have a ticket to go inside. Pelli outdistanced two other finalists – Rem Koolhaas's Office for Metropolitan Architecture and an all-Miami team of Arquitectonica with Andres Duany and Elizabeth Plater-Zyberk. The New Haven architect, recent winner of an AIA Gold Medal, intends to demolish most of the derelict 1929 Sears building, an Art Deco structure beloved by preservationists, while saving its most prominent feature, a 90-foot octagonal tower and building a café or an observation room on its top. It's hoped the complex will lift the adjoining down-at-the-heels Overtown area. Indeed, the politics of creating a home for opera and symphony next to the neighborhood where riots raged in the 1980s became one of the central issues for competing architects. Pelli's design attempts to welcome neighborhood residents by placing a café, box offices, and the entrance to the studio theater along the road connecting the site to Overtown. □

An Expensive Triumph in China

Kaplan/McLaughlin/Diaz won an international design competition for the New Shanghai International Plaza, an approximately 1.5-million-square-foot mixed-use project in Shanghai's historic South Bund district. The winning design, on which construction is starting this month, consists of a 46-story office tower and base buildings of five to ten stories surrounding a central plaza. In plan, the design suggests a bird with its wing circled over its head – a motif that, like the phoenix in Western mythology, symbolizes renewal. The San Francisco-based firm said it built a $22,000 model, spent thousands more on renderings, and invested 12,000 man-hours to win the competition. against four other firms from the U.S., Canada, and China. All competitors, according to Kaplan/ McLaughlin/Diaz, made similarly lavish efforts. Their compensation: a token $10,000 each. □

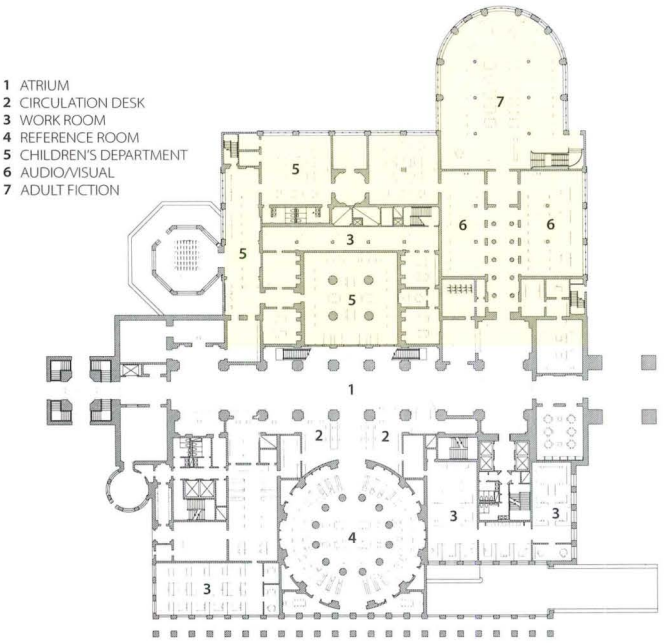




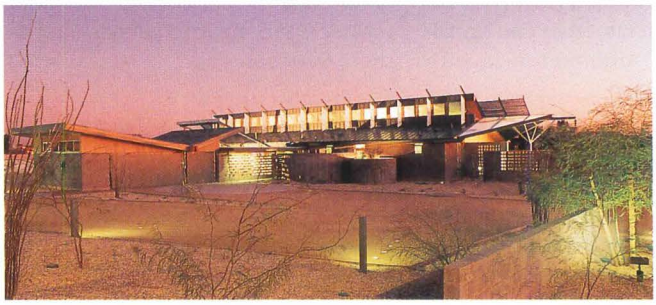
Roger Whitacre

Graves's Denver Library Opens

Winner of a 1991 limited competition, this 407,000-square-foot addition to Denver's Central Library, designed by Michael Graves Architect, Princeton, in association with the local firm Klipp, Colussy, Jenks, Dubois, gives the city a civic building as interesting and as idiosyncratic as the Gio Ponti-designed art museum next door. Like the art museum, the library is tall (seven stories plus two basement levels) and somewhat castlelike. But their differences are more striking. Against the museum's unified, asymmetrical, monochromatic Modernism, the library has a symmetrical monumentality, with a central rotunda flanked by wings and towers, and a fragmentation of materials and figural elements. This same mix of monumentality and fragmentation occurs inside, with a three-story atrium and rotunda reading rooms, combined with widely scattered stack, reading, and work spaces. In this way, the new library reflects quite accurately a culture that is increasingly diverse and yet nostalgic for an earlier time we think of as more unified and civic-minded than our own. Ponti's art museum may not be a better building than Graves's new library, but it was one more content with its own time and perhaps more optimistic about the future.



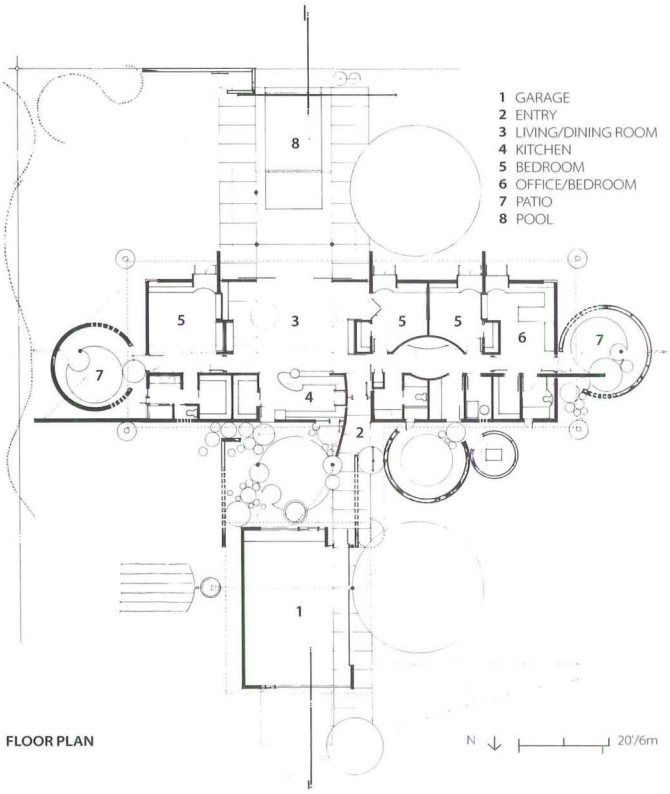
FIRST FLOOR PLAN



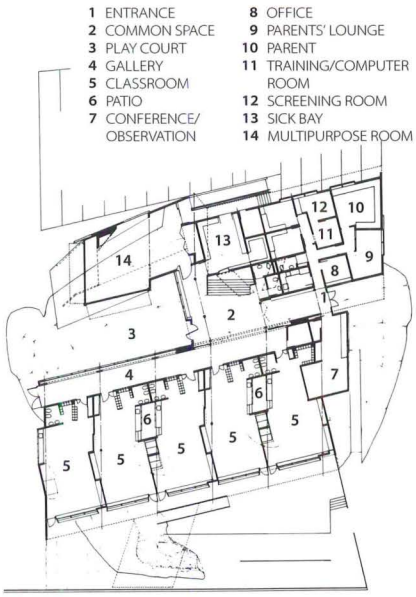
Scot Zimmerman

Showing the Desert Some Respect

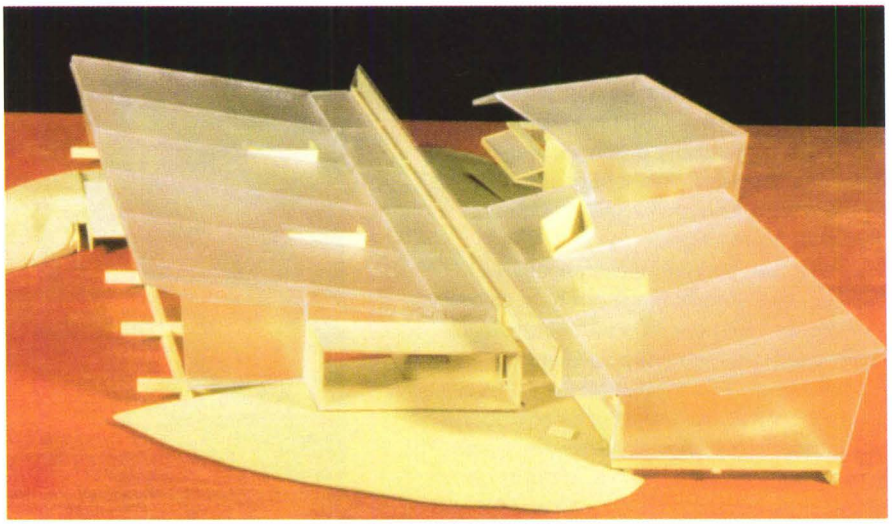
Chock full of energy-inefficient residential construction, Phoenix is beginning to think more sensitively about its impact on the desert landscape. One recent example is an environmental showcase house sponsored by Arizona Public Service, in partnership with the Arizona Environmental Strategic Alliance. The 2,640-square-foot, four-bedroom house was designed by Jones Studio. The house, which will be open to the public for three years before it is sold, is not conceived as a model to be duplicated, but as "a shopping center of ideas," say the sponsors, gambling on the bottom-line appeal of energy-saving, cost-efficient technologies. In addition to exposing the public to the extensive range of sustainable products on the market – three types of heat-pump systems, R-24 concrete blocks made with recycled material, and engineered wood, among many others – the house also demonstrates how architecture can work in concert with the natural environment through strategies from site orientation to window placement.



FLOOR PLAN



FLOOR PLAN, FIRST PLACE SCHEME N 20'/6m



MODEL, FIRST PLACE SCHEME BY HOMA FARDJADI, SIMA FARJADI, AND CRAIG SCOTT

Head Start School Competition

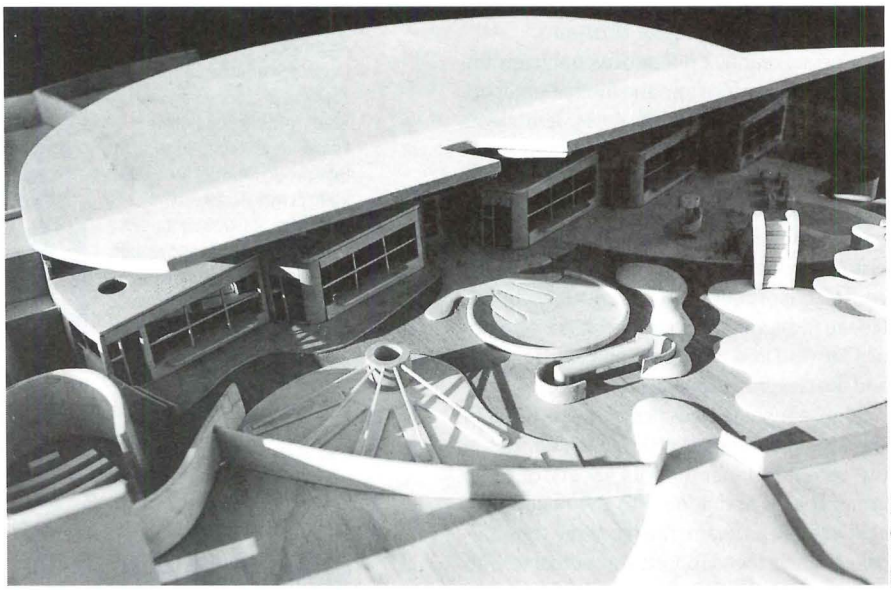
To "raise expectations" about the architecture of early childhood development environments, a national two-stage competition for the design and construction of a prototypical Head Start school was sponsored by the Early Childhood Facilities Fund of New Jersey.

The "Patterns for Head Start Facilities" competition was initiated to secure "a working model" from which others could learn. Designed for a site in East Windsor, New Jersey, the prototype also had to be adaptable to locations nationwide.

The winning scheme was designed by a team that includes architects Homa Fardjadi of Fardjadi-Mostafavi Associates of Cambridge, Massachusetts, Sima Farjadi of Paris, and Craig Scott of Boston. The single-story structure, set on a platform atop a shallow mound, uses the figure of a turtle to guide its parti. An angled axis organizes the plan into three programmatic blocks (community services; classrooms; and multipurpose hall) connected by common spaces.

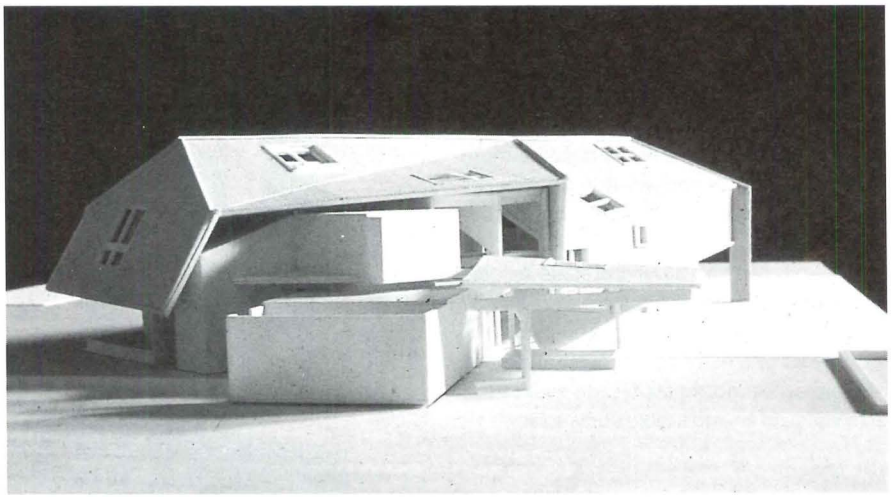
While classrooms are one component of a tripartite composition in the first place scheme, the second place scheme, by O'Brien Design of Venice, California, places the classrooms at the center of the plan. Shaped like an egg, the children's territory – classrooms and outdoor play areas – is protected by the larger, square framework of the adult services area.

The third place scheme by Jones, Partners: Architecture of San Francisco, inverts the idea of house: exterior walls become roofs, and windows become skylights. The two-story scheme is organized around a grand staircase that doubles as an amphitheater for organized events and unplanned encounters.



O'Brien Design

MODEL, SECOND PLACE SCHEME BY O'BRIEN DESIGN



MODEL, THIRD PLACE SCHEME BY JONES, PARTNERS: ARCHITECTURE

A Tale of Two Cities

The new city halls of Ottawa and Jerusalem provide a compelling illustration of how the choice of site for a public building, driven as it is by cultural/political predispositions, can determine that building's character regardless of the architect's intentions.

In this case, both projects (designed, as it happens, by Canadian firms) can be seen as "micro-cities," arising from similar conceptual approaches: in the extensive additions to Ottawa's existing 1950s city hall, Moshe Safdie & Associates envisioned "a series of varied indoor and outdoor spaces" that "aim to create a place of community, pluralistic, democratic in its imagery." Jerusalem's new city hall, part of a complex of three new and ten renovated buildings, was conceived by architects A.J. Diamond, Donald Schmitt & Company as "a civic campus," to serve as "a focus for all citizens."

The substantive differences between the two city halls result from the fundamental oppositions between their two sites. Jerusalem's new municipal complex, on 8.38 acres, is embedded in the urban fabric – located on what used to be no-man's-land between the Arab and Jewish sectors of the city in order to heal a historic "wound." Ottawa's new compound, by contrast, is isolated on Green Island in the Rideau River, with its entrance on the ceremonial Sussex Drive axis between Parliament Hill and the Governor General's residence.

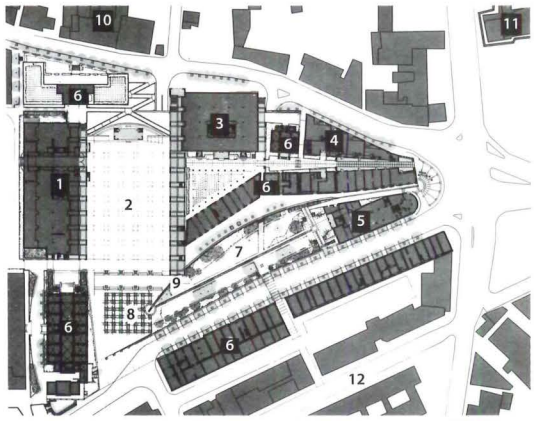
Consequently, Jerusalem has the hope of seeing a spontaneous civic life taking root in the complex, inhabiting its variety of open urban spaces and adding to the mixed uses built into the program. The modestly scaled architecture further supports this outcome with local stone cladding, ironwork, and open arcades that effectively blend with the surrounding buildings.

But if Jerusalem's city hall may be likened to a marketplace, Ottawa's is ultimately a citadel. Its meanly proportioned "public promenade," for example, curving along the complex's southeast edge, is unlikely to become more than the grandiose corridor it is. Likewise, its serene inner court makes an improbable venue for public advocacy, while the plaza in Jerusalem is certainly a political stage. Safdie's architectural forms broadcast a mixed message: the council chamber's glazed pyramidal roof speaks of a more open government, but the fortresslike northeast façade evokes the grim visage of an implacable bureaucracy.

JERUSALEM CITY HALL COMPLEX VIEWED FROM THE WEST

Jerusalem City Hall

Architects: A.J. Diamond, Donald Schmitt and Company, Toronto, in association with Israeli firms Kolker Kolker Epstein Architects, Bugod Figueiredo Krendel Architects, Meltzer Igra Architects.
Program: 250,000 sq ft new construction including public services, municipal offices, retail; 97,000 sq ft basement for computers, archives, and storage; 20,000 sq ft for bomb shelters; 183,000 sq ft renovation. 800-car parking.
Cost: $100 million.
Completed: 1993.

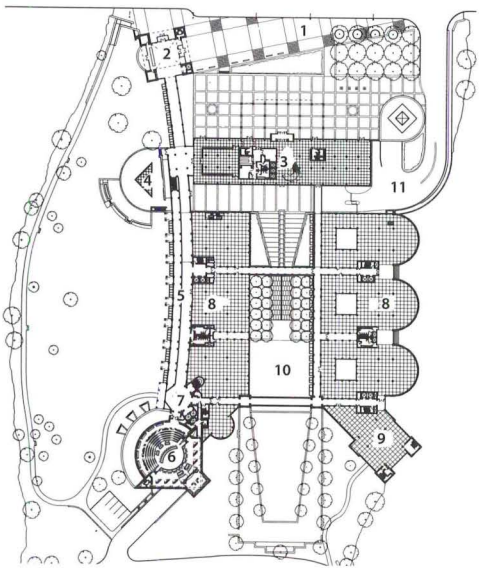


SITE/GROUND FLOOR PLAN

1 MAIN NEW MUNICIPAL BUILDING
2 CITY HALL SQUARE
3 NEW MUNICIPAL BUILDING
4 NEW MUNICIPAL BUILDING CONNECTED TO SHOP-LINED ALLEY
5 EXISTING TOWN HALL (RENOVATED)
6 ASSORTED RENOVATED PUBLIC AND COMMERCIAL BUILDINGS
7 MUNICIPAL GARDEN
8 PALM COURT
9 FOUNTAIN AND AQUEDUCT
10 EAST JERUSALEM (ARAB)
11 CORNER OF OLD CITY WALL
12 WEST JERUSALEM (JEWISH)

ENTRANCE TO NEW CITY HALL WITH CIVIC PLAZA AND ARCADE IN FOREGROUND

Photos this page: © Steven Evans Photography



SITE/GROUND FLOOR PLAN

N 100'/30m

OTTAWA CITY HALL COMPLEX VIEWED FROM SOUTH

William McElligott

Ottawa City Hall

Architects: Moshe Safdie and Associates, Montreal and Toronto, with Murray & Murray Associates, Ottawa.
Program: 400,000 sq ft including new administrative spaces, public cafeteria, ceremonial community hall, Council Chamber, Mayor's Pavilion, 600-car parking.
Cost: $60 million.
Completed: 1994.

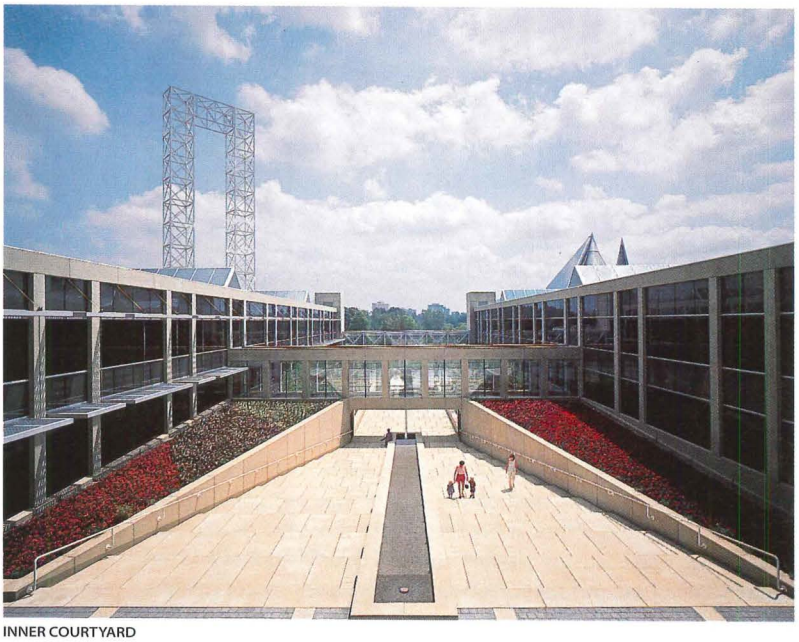
1 ENTRANCE PLAZA ON SUSSEX DRIVE
2 ENTRANCE PAVILION
3 SUSSEX PAVILION (EXISTING CITY HALL)
4 CAFETERIA
5 PUBLIC PROMENADE
6 COUNCIL CHAMBER
7 CEREMONIAL HALL
8 MUNICIPAL OFFICES
9 OBSERVATION TOWER (TO BE CLAD)
10 COURTYARD
11 RAMP TO PARKING

NORTHEAST FAÇADE WITH 1950S CITY HALL ON RIGHT

Timothy Hursley

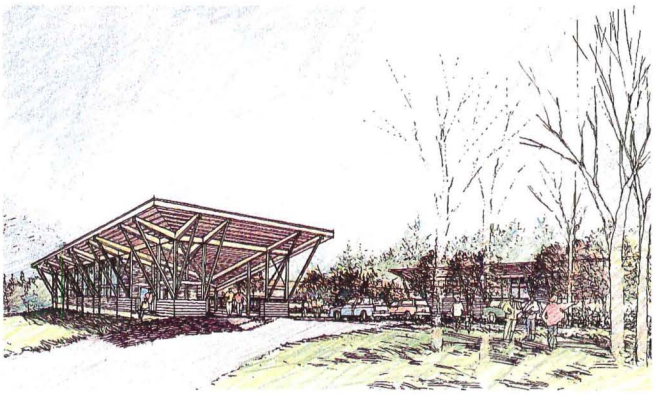
Timothy Hursley

PUBLIC PROMENADE



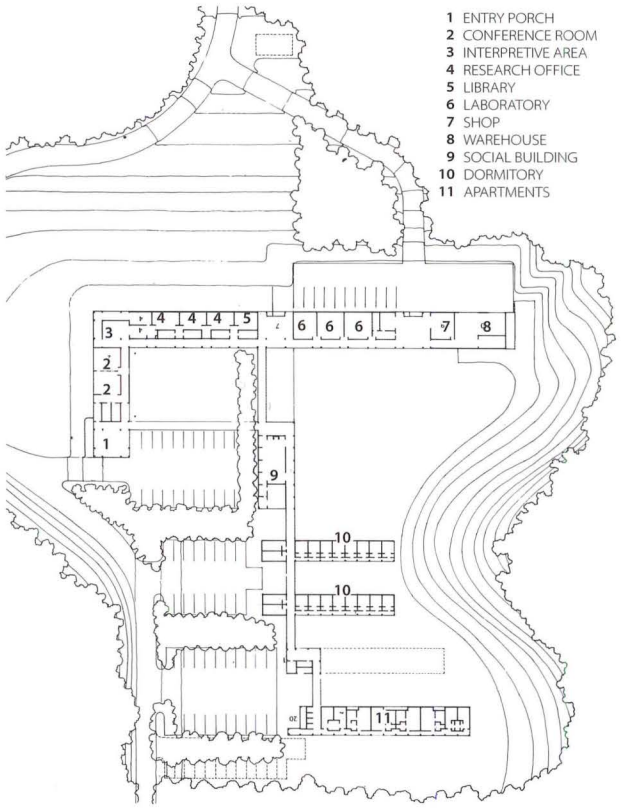
INNER COURTYARD

Timothy Hursley



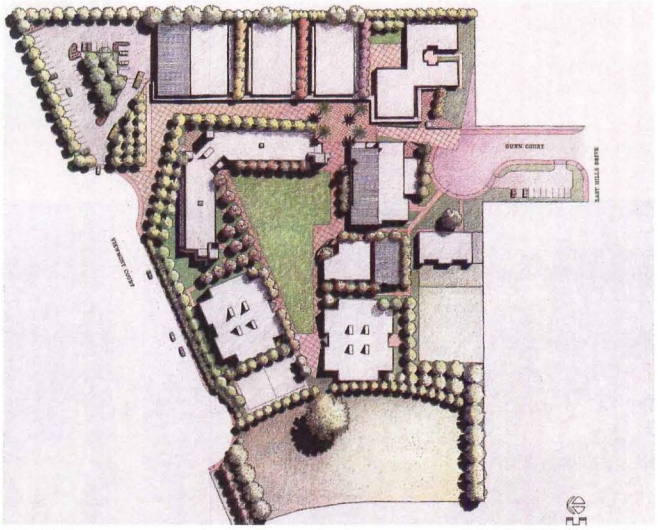
Let the Rains Come

In Forks, Washington, on the Olympic Peninsula, the University of Washington is building its Olympic Natural Resources Center to withstand periodic gale-force winds and 120 inches of rain a year. The center, used by scientists, educators, and economists, has been designed by Weinstein Copeland Architects, Seattle, with Street, Lundgren & Foster as a compound with a number of distinct outdoor spaces, including a public courtyard, a recreation field, and "rain courts" that separate the dormitories from one another. In this land of muddy boots, all circulation is placed along the buildings' exteriors. Roofs, which have uplift struts holding them in place, have generous overhangs and are low and sheltering on the windward side, high and open on the leeward side to let in daylight. Large porches furnish dry exterior activity space.



SITE/FLOOR PLAN

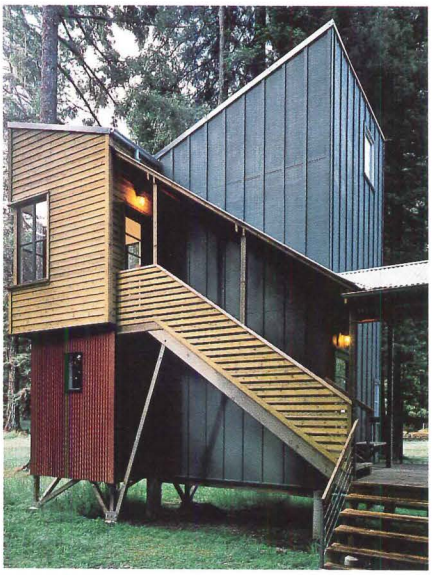
© Robb Miller



SITE PLAN

A Campus for Job Corps Students

The San Jose Job Corps Center in California, which involved the transformation of an existing elementary school, was designed by the Steinberg Group, a local firm, as a collection of distinct, but clearly related buildings. The buildings' playful forms and colorful finishes and the combination of campus streets and landscaped, open spaces create a sense of community for the low-income 16- to 24-year-olds who come to the center to train for job placement, college, or the military. The 120,775-square-foot project included the rehabilitation of two existing classroom wings; the expansion of existing facilities to house vocational training, administration, and medical and dental facilities; and the construction of three dormitories and a recreation center. The $8.9-million project was commissioned by the U.S. Department of Labor.



Richard Barnes

1 COLLECTIVE HOUSING, FERNAU & HARTMAN

© 1994 Richard Mandelkorn

2 PROCTOR ACADEMY LEARNING CENTER, SCHWARTZ/SILVER

Wood Design Award Winners

The American Wood Council has announced the winners of its 1994 Wood Design Awards, an annual program that recognizes outstanding examples of wood design and construction. The jurors included: Merrill L. Elam of Scogin Elam & Bray, Atlanta; Robert Harper of Centerbrook Architects, Centerbrook, Connecticut; and John Patkau of Patkau Architects, Vancouver, British Columbia.

The Honor Award winner is:

- residence, Northern California, by William Turnbull Associates, San Francisco (P/A, Feb. 1995, p. 41).

Merit Award winners are:

- garage addition with a rooftop garden, Savannah, Georgia, by Daniel E. Snyder, Savannah (P/A, Dec. 1994, p. 23);
- residence, Decatur Island, Washington, by Miller/Hull Partership, Seattle.

Citations were awarded to:

- remodeled farmhouse (4), South Carolina, by Robert M. Cain, Atlanta;
- Collective housing (1), Philo, California, by Fernau & Hartman Architects, Berkeley (P/A, Jan. 1994, p. 58);
- remodeled residence (3), Duluth, Minnesota, by David Salmela, Duluth;
- Proctor Academy Learning Center (2), Andover, New Hampshire, by Schwartz/Silver Architects, Boston;
- gardenhouse, Prout's Neck, Maine, by Carol A. Wilson, Portland.

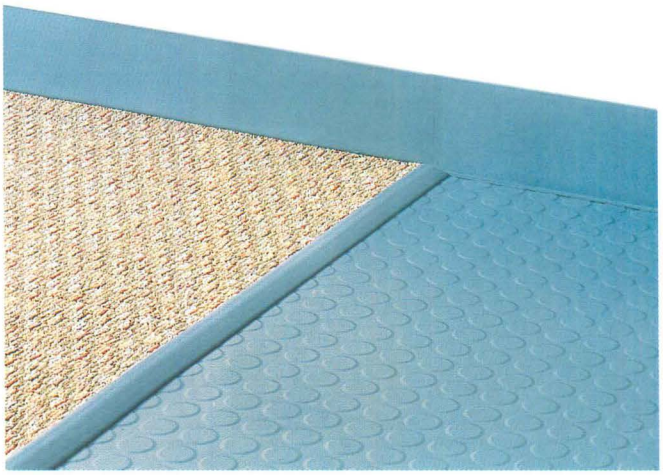
Peter Kerze

3 RESIDENCE, DAVID SALMELA

4 FARMHOUSE, ROBERT M. CAIN

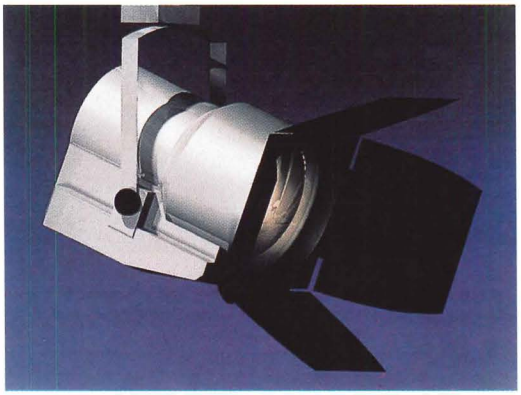
Moderately Priced Rubber Flooring

Noraplan Vario, a smooth-surfaced floor covering, is now available from Freudenberg Building Systems. The product can be used in a variety of high-traffic areas as well as for sanitary and wet-room applications. It is easy to maintain, offers wear and slip resistance, and comes in a variety of colors.
Circle **100** on reader service card



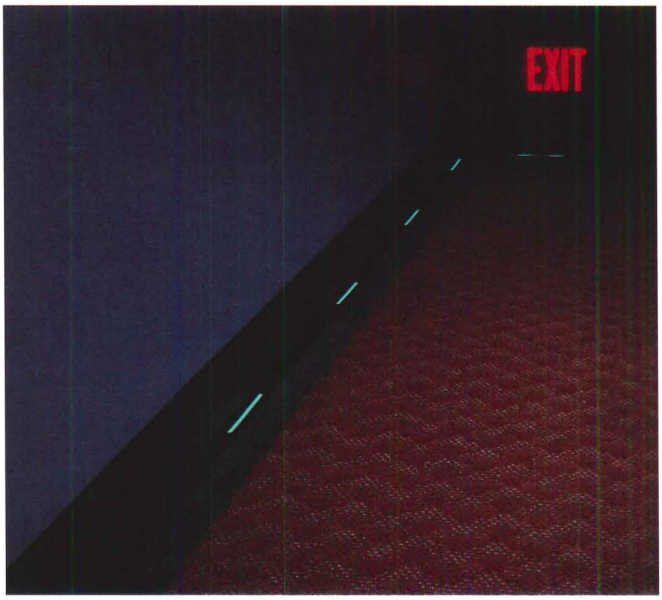
Resilient Wall Base System

The Tightlock™ Wall Base System by Johnsonite is now available for use with resilient flooring. It features a patented wedge shape designed to conceal imperfections of construction and to withstand normal wear and tear. It is available in a variety of sizes, finishes, and colors and is intended for use in areas where aesthetics are important. The product can be used for both new and retrofit projects.
Circle **101** on reader service card



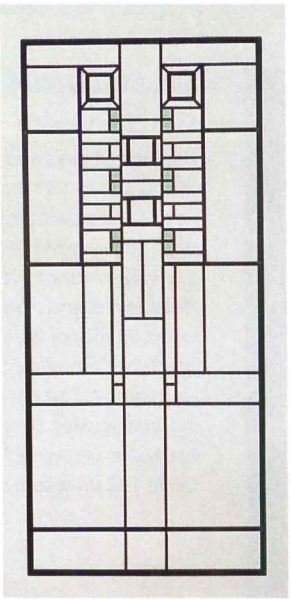
HID Fixture

The Comet HID fixture from Inlite Corporation gives specifiers a variety of options and accessories, and is available in custom colors. Two wattage ratings and seven mounting options are offered.
Circle **102** on reader service card



Emergency Exit Lighting

The new Life Way™ Path Marking System by Cooper Lighting is available for use in commercial, industrial, and institutional facilities. The system is designed to direct people safely to building exits during an emergency, while eliminating layout and installation problems. It meets all applicable codes and can be wall- or floor-mounted, providing required protection without compromising aesthetics.
Circle **103** on reader service card



Frank Lloyd Wright® Art Glass Series

Andersen Corporation has introduced a new line of Art Glass Series windows and products inspired by Frank Lloyd Wright designs under a licensing agreement with the Frank Lloyd Wright Foundation. The series includes four window designs based on repeating geometric patterns commonly used by Wright. (Shown above: a window inspired by the Avery Coonley House of 1907.)
Circle **104** on reader service card

Fiber Cement Roof Shakes

Louisiana-Pacific's Nature Guard® cement roof shakes combine the appearance of cedar shakes with the benefit of a Class A fire rating. The durable shakes contain an efflorescence preventative, which inhibits the unsightly leaching of salts. The shakes come in four lengths and three colors. Starter pieces and hip-and-ridge pieces are also available.
Circle **105** on reader service card

Mahogany Outdoor Furniture

Weatherend Estate Furniture now offers its entire collection of outdoor furniture in natural mahogany, giving specifiers a cost-effective alternative to teak and painted finishes. Mahogany, a decay-resistant hardwood, is durable and stable for outdoor use. An optional wood preservative is available to protect the wood from the elements and to bring out its grain.
Circle **106** on reader service card

Exterior Sheathing Panels

United States Gypsum Company introduces its Weatherock exterior sheathing panels for use in EIFS systems. The panels can be applied directly onto steel or wood framing and can withstand up to six months' exposure to the elements prior to enclosure with a cladding system. They provide better fastener holding and better bond strength, which improves long-term performance.
Circle **107** on reader service card

Seismic Bracing Systems Catalog

GS Metals' Globe Strut® Seismic Bracing Systems include components and accessories compatible with uses that meet the National Uniform Seismic Installation Guidelines (NUSIG®). The catalog includes information on channel framing, seismic brackets, continuous and concrete inserts, U-bolts, riser clamps, J-hangers, and other components.
Circle **108** on reader service card

Architectural Louver Catalog

Now available from the Airolite Company is a new general catalog featuring architectural louvers, grilles, sunshades, and related products using the All-Welded Assembly technique. The catalog includes an expanded line of louvers and grilles with color photography, technical data, and detail drawings of each product. The louvers are AMCA licensed and tested in accordance with AMCA Standard 500.
Circle **109** on reader service card

Modular Mosaic Tiles

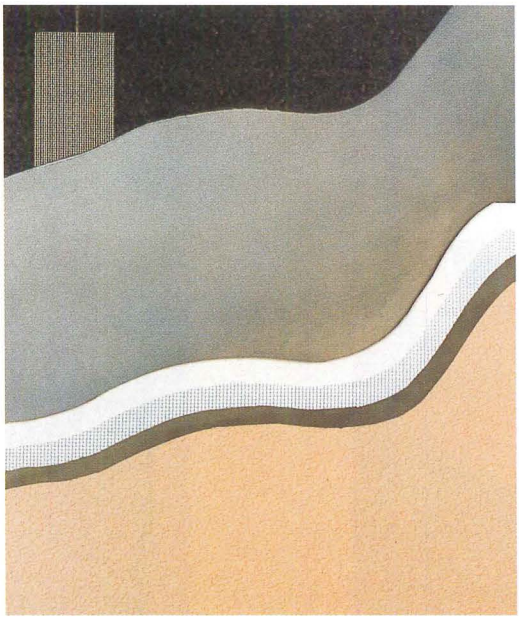
Folio Mosaics, a new company launched by architects Bill and Serpil Rosenfeld, has introduced modular marble mosaic tiles. There are 49 marble pieces in each four-inch-square tile; each piece is hand-placed, glued, and heat-cured to a mesh backing. The mosaics are designed to be installed either as a border along standard 12" marble or ceramic tiles or as a continuous field.
Circle **110** on reader service card

Curtain Wall Catalog

EFCO's new Architectural Reference Manual for curtain wall, entrance, and storefront products is a two-volume set organized with tabs and color codes. Product overviews, detail charts, and specifications are designed to be easily accessed.
Circle **111** on reader service card

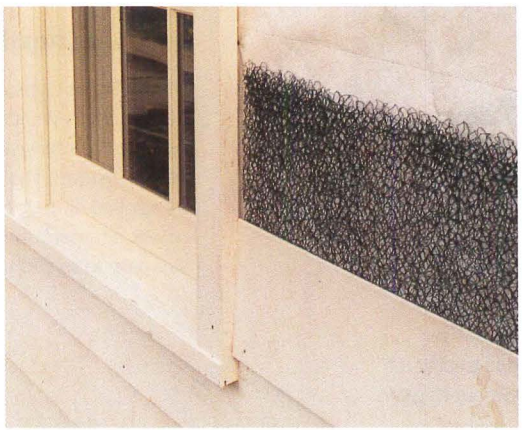
New Tilt Double-Hung Window

Peachtree Doors and Windows introduces its Westport tilt double-hung window with a patented removable sash liner and wider muntins. It is easy to clean, paint, and maintain. The wood interior of the window is paint- or stain-ready and its aluminum exterior is available in three finishes. Four types of hardware are available.
Circle **112** on reader service card



Air Barrier/ Watertight Membrane

Dryvit Systems has introduced Backstop™, a 100-percent-acrylic, monolithic coating designed to act as a watertight membrane and air barrier component option for the Dryvit Outsulation System. Trowel-applied to gypsum sheathing or an approved substrate, Backstop protects the substrate, provides a watertight seal around windows and other openings, and enhances heating and cooling performance.
Circle **113** on reader service card



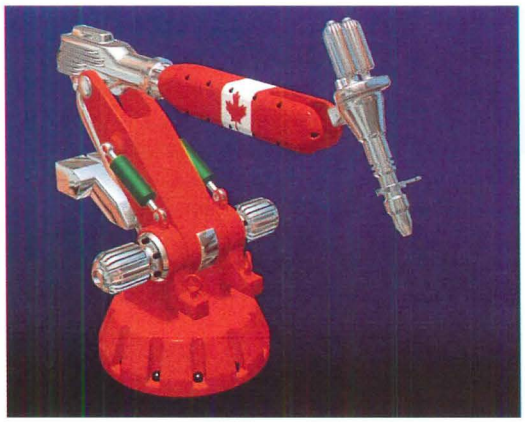
Breather for Cedar Siding

Installing Benjamin Obdyke's Cedar Breather™ Wood Product Underlayment between sheathing and wood siding or shingles creates a continuous air space, eliminating excess moisture and prolonging the life of the wood. The Cedar Breather is lightweight and easy to install.
Circle **114** on reader service card

Computer Products

Video Production System

Intergraph has developed an affordable (under $15,000 for the basic package) digital video production system, called Video Engine, that records computer animations, captures and edits video clips, and combines video with audio to produce professional-quality audio/visual presentations. It enables architects, for example, to insert animations of proposed projects into videos of the site, providing clients with highly realistic images of their buildings. The hardware includes a pair of 1 GB SCSI hard drives, one used for the Windows NT software and the other for application programs.
Circle **115** on reader service card



Rendering on Silicon Graphics Workstations

Autodesk has announced the availability of its 3D Studio® Renderer software for Silicon Graphics Workstations. Previously accessible only on Intel-based PCs, the software can now work in a mixed PC-and-Silicon Graphics network or as a stand-alone system. The Silicon Graphics platform makes this already fast rendering software even faster.
Circle **116** on reader service card

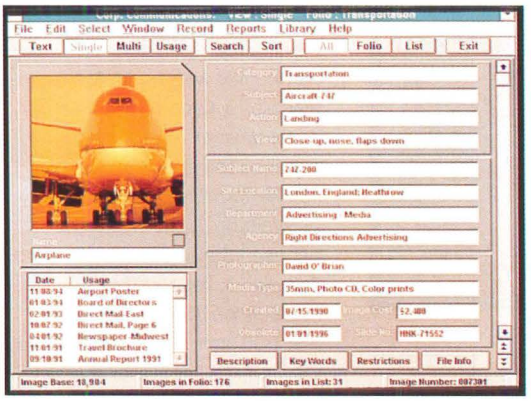


Image Management

CompassPoint is a Windows-based image-management system, developed by Northpoint Software, that can hold up to 100,000 scanned images – color photos, slides, illustrations. A tracking system shows where each image has been used, who has it, where it is filed, and so on. The software also has a security system to control access to images and a remote-access feature for downloading images.
Circle **117** on reader service card

Lasers for Models

LaserCAMM, produced by Scale Models Unlimited, is a sealed laser that cuts everything from plastics, wood, and cardboard to paper, fabric, and rubber, in sheets up to 24" x 36" in size. The laser, which is small enough to roll through a door, is controlled by menu-driven CAD software.
Circle **118** on reader service card

CM Software

Geac/Concord Management Systems offers an integrated line of management software for the construction industry. Including financial management, project management, and materials and equipment management, the software provides features tailored to building construction, such as job costing, progress billing, and lien waivers.
Circle **119** on reader service card

Facilities Software

Visual Resource Manager (VRM), from Link Systems, is a Macintosh-based facility and asset management system that lets managers walk through their properties as they create and oversee a graphical database. A customizable series of maps, plans, and diagrams also helps facility managers track and manage all fixed and movable assets. The system includes lease management and facility management modules.
Circle **120** on reader service card

2D/3D Software

Aimed at Windows-based AutoCAD users, XCAD Release 3.0 by Xitron Software, is a fully integrated 2D/3D software package offering free-form surface creation (NURBS) and variable light-source shading, with up to eight viewpoints, all for a modest cost. The new release offers such features as a customizable tool bar, an SDK programming interface, and support for an unlimited number of layers.
Circle **121** on reader service card

Computer Products

AutoCAD Guides

To help users with AutoCAD's Release 13 for Windows, Ventana Press has published two books, AutoCAD: A Concise Guide to Command and Features, Fourth Edition, and AutoCAD 3D Companion, Second Edition. The guide offers a detailed discussion of Release 13 and comes with a companion disk containing a library of drawing and editing exercises, menu files, and utility programs. The 3D companion provides tutorials, along with a disk containing a 3D toolkit and AutoLISP routines.
Circle **122** on reader service card

Animation Gradients

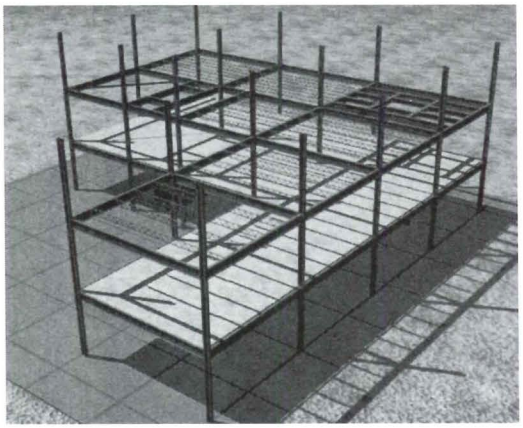
The Gradient Designer fx, by HSC Software, allows users to apply gradients and special effects to animated scenes, greatly increasing their realism. For users of 3D Studio, the software provides workstation-quality animations for desktop machines, enabling you to see the special effects as they are created.
Circle **123** on reader service card

Government Forms Software for Windows

Enlightened Software has developed software to help design professionals complete the 254 and 255 forms, using Windows 3.1 conventions. The software offers fully featured word processing with spell-checking and a dictionary, allows information from other applications to be pasted, and provides ways of customizing the forms.
Circle **124** on reader service card

Appraisal Software

FotoFree 2000 for Windows is a color-photo imaging system from á la mode. FotoFree allows users to take pictures of properties; store, manage, and print the image; and integrate it with appraisal data, merging photographic images into reports.
Circle **125** on reader service card

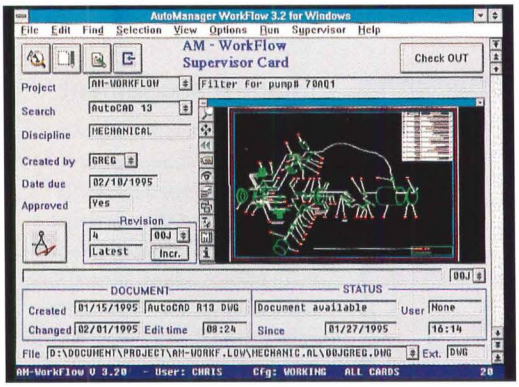


Structural Plans & Elevations

Structural Plans & Elevations, part of the new S7 software recently released by Softdesk, enables users to generate plans, elevations, sections, perspectives and construction drawings of structural systems. The software also provides project management capabilities, automatic previews, material retrieval from databases, a dialog box for editing information files, and easily definable material palettes.
Circle **126** on reader service card

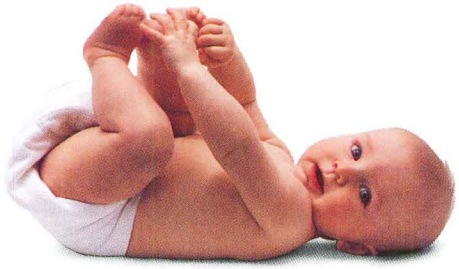
Large Document Plotter

The new JDL 4000E-II Engineering Document Plotter, from Japan Digital Laboratory, has a Hawk controller that delivers processing speeds up to ten times faster than its predecessor. The plotter can also output plots up to 19.5 feet long, almost five times longer than the previous model. There is an automatic stacking system that drapes an entire roll of finished plots on a removable stacking bar for unattended plotting.
Circle **127** on reader service card



Document Management Software

The first technical document management software compatible with AutoCAD Release 13, Cyco International's AutoManager WorkFlow 3.2 supports the viewing of up to 150 file formats and allows a bi-directional data exchange between the software and Release 13. The software is available on both the Windows and DOS platforms, the Advanced Viewing Module is available only in Windows.
Circle **128** on reader service card



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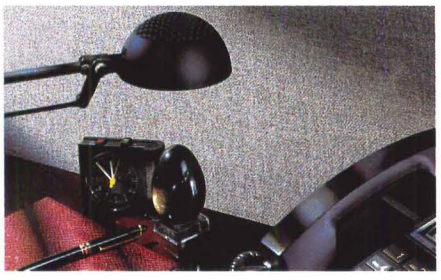

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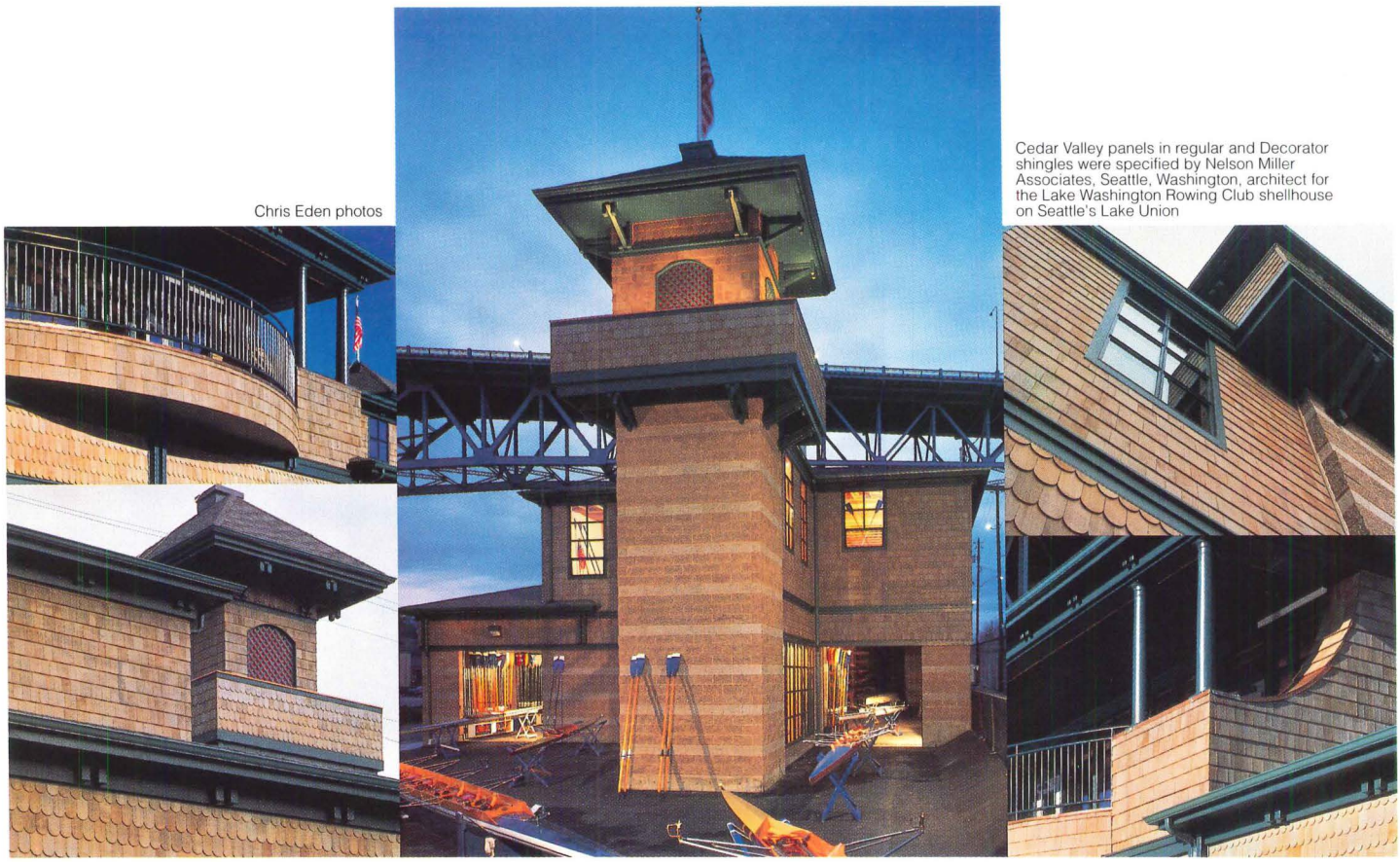

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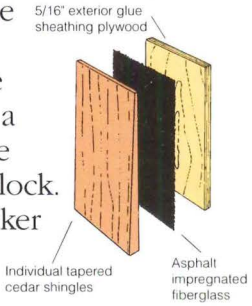

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Whole Lotta Shakin' Comin' On

Architecture students are helping California homeowners recover from the frightening 1994 earthquake – and gird for disasters to come.

by Richard D. Rush

Many buildings with inadequate shear resistance at their base were knocked off their foundations.

Photos: James Anderson

Segments of this precast concrete parking garage at California State University at Northridge fell over, partly because of the garage's long, thin shape and its lack of redundant structure such as interior walls.

Last year's Northridge earthquake was a major event for the students, faculty, and staff of Woodbury University in Burbank, California – as, indeed, it was for everyone within a 100-mile radius of Los Angeles. So it seemed both a valuable course offering and an emotional relief when Woodbury's Architecture Department, where I teach, decided to address the effects of the January 1994 earthquake and the threat of more in the future.

For us the damaged buildings of the Los Angeles area would be a kind of living laboratory. In the period following the quake, we visited scenes of destruction, photographing the broken buildings and trying to make sense of every crack and every crumbled column. After post-quake conferences at other universities and numerous field trips, we were able to replace earthquake anxiety with earthquake curiosity and even fascination.

Our partners in much of this endeavor were the Federal Emergency Management Agency (FEMA) and the California Office of Emergency Services (OES), which opened a dozen or more Earthquake Service Centers near the most heavily damaged areas. At a center we visited in Sherman Oaks, FEMA made it clear that full-size wood mockups and scale models would be enormously helpful for explaining to homeowners how damage could be dealt with. Quickly, class members set about building ten 30-inch-long wooden models, which, at 1:12-scale, depicted cross-sections through the corners of a typical stud-framed house. So well-received were these by homeowners and others that building contractors wanted to order models for themselves; the unexpected result was a good deal of freelance work for two of Woodbury's more skilled students. FEMA also used our earthquake slides and put one of our best students, James Anderson, to work for the summer.

Richard Rush, a former P/A editor, is associate professor of architecture at Woodbury University in Burbank, California.

Using Homeowners' Experiences

Seven months after the earthquake, FEMA – shifting its emphasis from reconstruction to prevention of future damage, especially for single-family homes – hit a snag. Although the earthquake service centers had the ability to dispense general information about how houses could be strengthened to survive the shaking that's sure to recur, government agencies found themselves prohibited from recommending particular construction companies or design professionals.

What was missing, we postulated, was a way for anxious homeowners to acquire an overview of the design, repair, and building process and to get advice on where to turn for professional services. In a situation like this, who would be a more trustworthy source than another homeowner? Our solution, therefore, was a public forum involving four case studies presented by the affected houses' owners, the professionals and tradespeople they employed, and others possessing expertise.

Other public institutions, such as fire departments, were eager to join in the program, since they saw themselves as having a stake in its success. Explained Deborah Shane of the Burbank Fire Department: "Sooner or later, all disasters in L.A. seem to end up as a fire."

Advice in Many Languages

For the resulting public sessions, the central item in the information packet was the "Earthquake Mitigation Checklist," a four-page illustrated document hot off the FEMA presses, including a list of questions about each house and its construction. FEMA has been conscious of communication difficulties, and some the literature has been published in Korean, Spanish, and Armenian as well as in English. A video about house-bolting carries Spanish subtitles.

Two illustrated booklets laid out earthquake mitigation techniques, which need to take into account the slightly different construction methods builders have used in addressing seismic concerns in each of the last seven or so decades. Stud-frame construction generally absorbs seis- *(continued on page 52)*

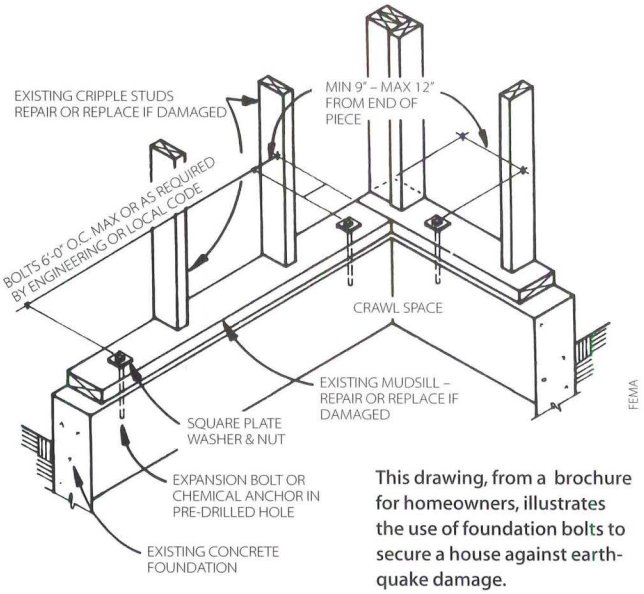
Earthquake Recovery *(continued from previous page)*

mic energy well, keeping the house intact, but the entire dwelling may be jolted off its foundation. Therefore the first line of defense is to bolt the house to its foundation; that operation, combined with strapping the hot-water heater in place and replacing rigid connections with flexible ones (to prevent fires), usually costs about $3,000, much of which may be reimbursed by FEMA.

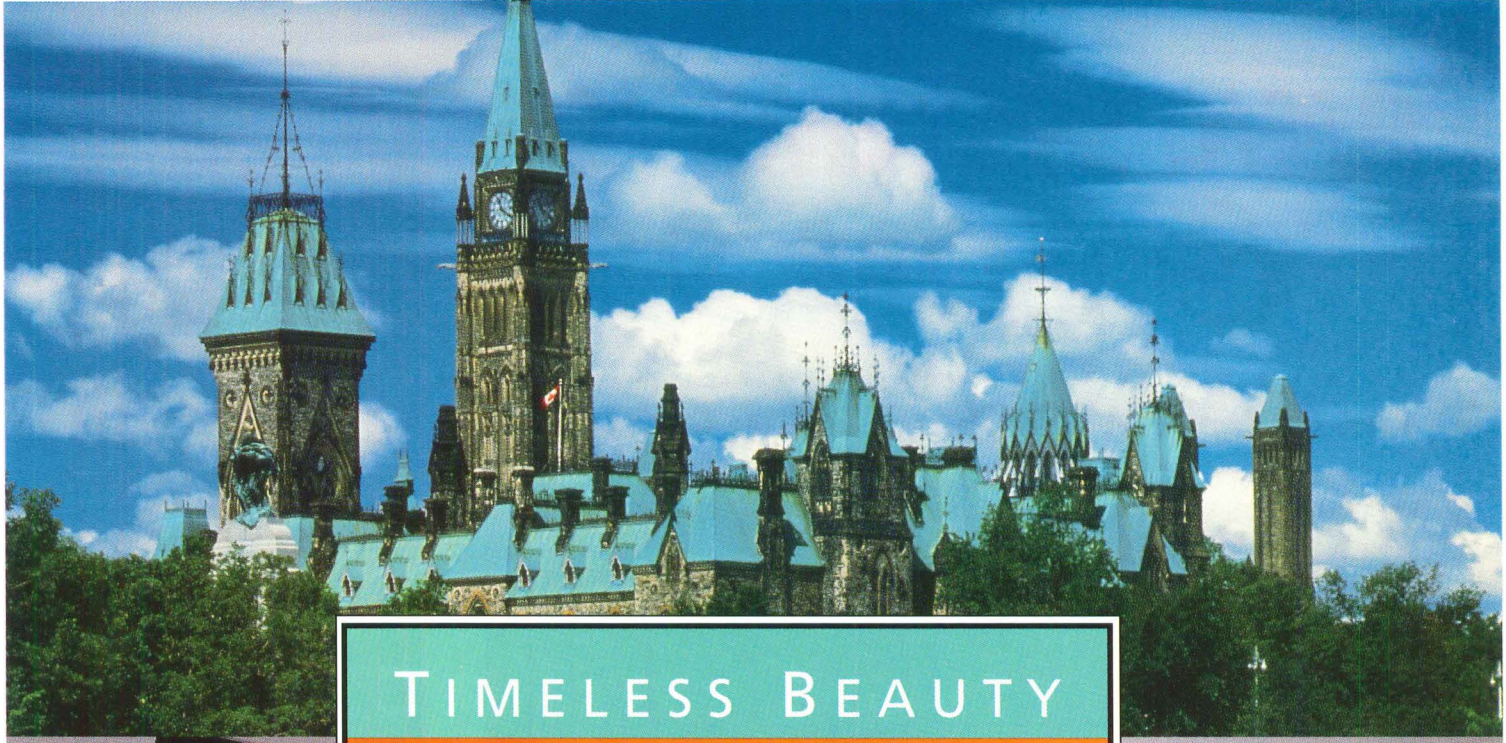
Another big problem is unreinforced masonry garden walls and chimneys. West Hollywood has neighborhoods in which every other house lost a chimney. Because replacing or rebuilding a chimney may cost $10,000, many homeowners have installed metal fireplaces with insulated flues where masonry used to stand. People who sustained some damage need little coaxing to upgrade their home's seismic safety. The biggest impediment is that homeowners who made it through the Northridge quake unscathed tend to be overconfident that their house will withstand the next one. Public response to our program suggests there is an acute need for the kind of knowledgeable guidance that architecture students and teachers can help orchestrate.

The experience of Woodbury points up a role that architecture schools could be playing in many localities – wherever natural disasters have occurred or are likely to strike. We can help people recover from calamities; equally important, we can help reduce the damage from disasters yet to come. Our educational expertise could go a long way toward furthering public education – while at the same time benefiting our students. Such efforts could balance the often theoretical bent of schooling and provide an anchor to reality.

Sixteen months after the Northridge quake, the connection between FEMA and Woodbury University continues. Our library now contains video tapes, slides, CD-ROMs, wall charts, and literature dealing with earthquake mitigation. FEMA and the Burbank Fire Department continue to have us build models and provide classroom space for presentations. Eventually Northridge will recede into memory, but disaster response will remain an ever-present necessity. Just yesterday one of my students, Carlos Penilla, was commissioned by FEMA to build eight new scale models, not for earthquake protection, but to demonstrate flood mitigation principles. Disaster here arrives in many forms. After all, this is L.A. □



This drawing, from a brochure for homeowners, illustrates the use of foundation bolts to secure a house against earthquake damage.



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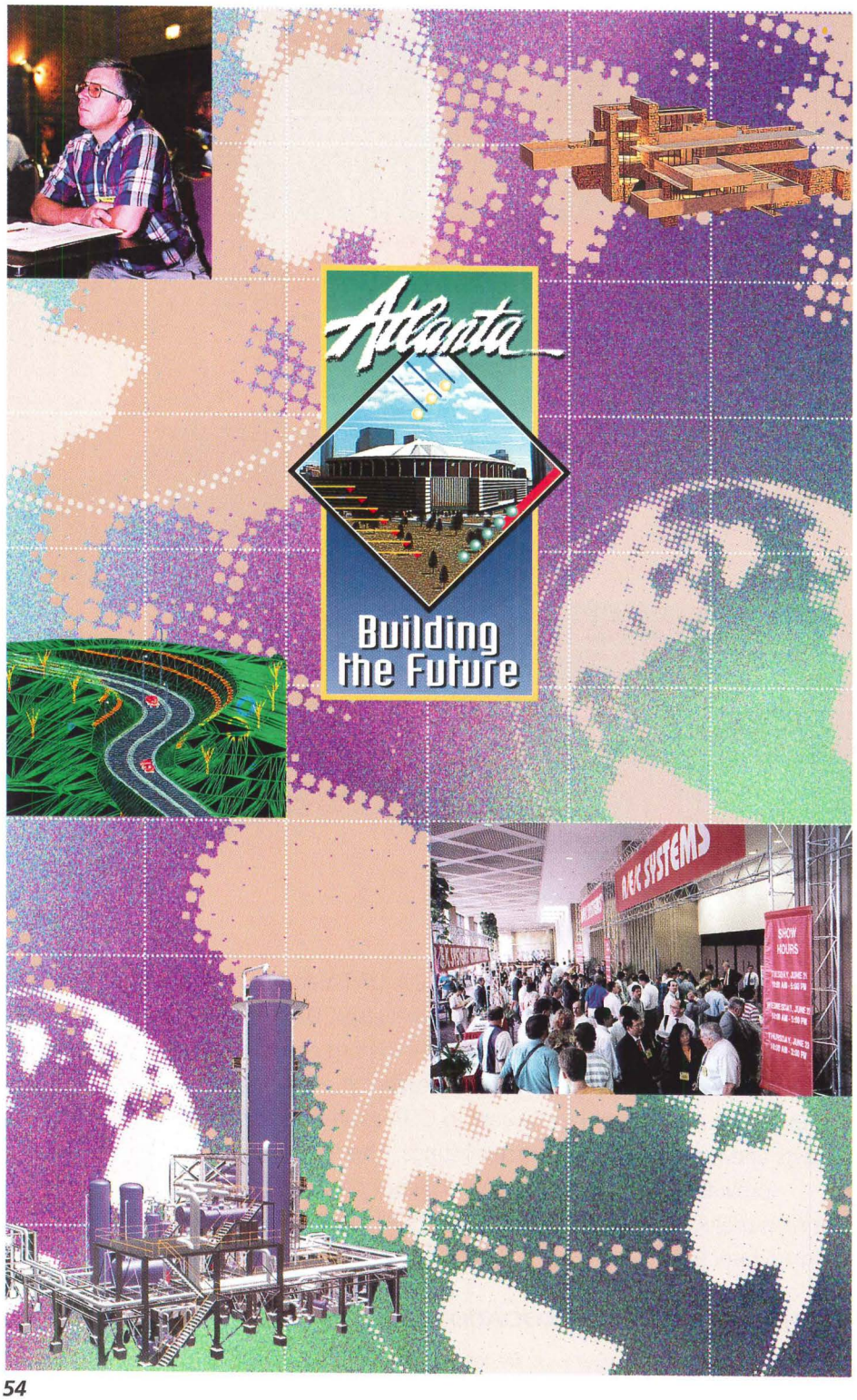

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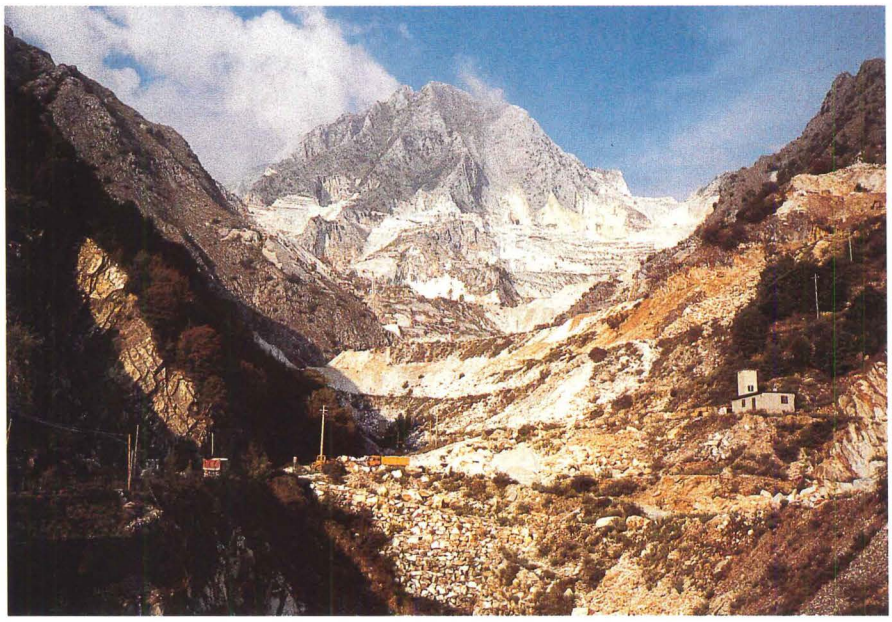
Carrara's Mountains of Marble

From the Roman Forum to the latest highrises, Carrara has supplied the world with snow-white marble on a staggering scale, through an evolution of quarry techniques.

by Michael J. Crosbie

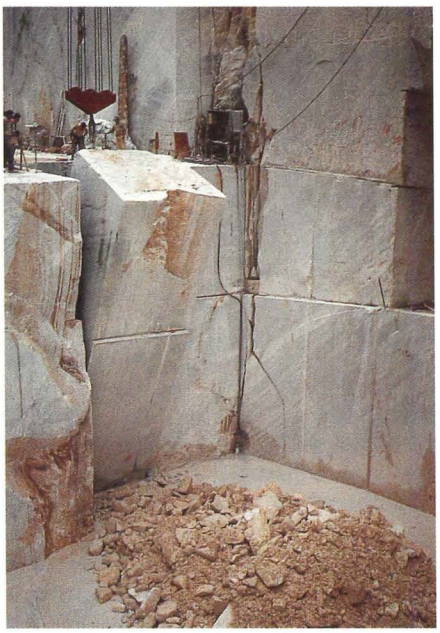


To visit the marble quarries of Carrara, Italy, is to behold one of architecture's fountainheads. From these white-capped mountains, some 65 miles southeast of Genoa, came the material to build the landmarks of ancient Rome and its empire. Michelangelo traveled to Carrara to select stone for his sculptures, and today Carrara remains the world's marble nexus.

Architects rarely have an opportunity to see materials in their raw form and to watch how they are transformed into the stuff of architecture. Last fall I was invited by the Italian Trade Commission, along with five other American architects and designers, to attend the world marble exposition in Verona, and to tour the quarries of Carrara. The show was impressive enough – several football fields' worth of marble from every corner of the globe, plus the machinery to cut and finish it to virtually any specification. One of the highlights of the show was the water-jet stone cutters run by CAD machines that can cut marble to a lacy filigree. But the latter half of the trip, devoted to Carrara, brought us to the quarries from which more than two millennia of architecture has come.

A Town Dedicated to Stone

Carrara is a one-industry town. Where the land meets the sea in this northern Tuscany city, the port is abuzz with cargo ships loading and unloading stone. Around Carrara and the neighboring town of Massa, scores of stone yards flourish. One of the biggest of them, RED Graniti, has several acres full of material from all over the world and serves as a global broker to stone suppliers. Beside stone from Finland, Africa, and Brazil, I found blocks quarried in Connecticut. Stone finishing factories dot this stone capital. At the Henraux plant, a dozen or more new gang saws were being installed to slice three-ton blocks, like huge loaves of bread, into wafers of stone that are then polished and trimmed for cladding.



Photos: Michael J. Crosbie

All of this industry – the stone yards, finishing plants, and shipping – is dwarfed by Carrara's mountains of marble. Gazing at the peaks from the window of a tour bus, you at first mistake their white caps and slopes for snow. But that whiteness is actually marble– Carrara's milky white lode. The spoils of the quarrier's work that cascade down the mountainside, known as *ravaneti*, are the result of thousands of years of excavation, according to Carrara historian Frederick Bradley.

(continued on page 56)

The peaks of Carrara (top) rise above the scores of quarries that dot the mountainside. Piston jacks are used to topple a 30-ton block of marble (above left) into a bed of rubble that cushions its fall. A stone from a pit quarry (above) is removed by a crane. Note the scale by the size of the front-loader near the center's photo.

Carrara Marble *(continued from previous page)*

Quarry Techniques

There are nearly 200 quarries here, more than half still active. The scale of the quarry work is staggering: the Apuan region produces nearly 1.5 million tons of marble annually. The earliest quarries date from more than 2,000 years ago. Archeologists have uncovered the remains of an ancient Roman town from which marble was shipped to the imperial city. The stone was quarried with hammer, chisel, and wedges to break the material loose, and the blocks were carefully lowered down the hillside with sleds made from tree trunks. Because transporting large pieces was difficult, the stone was often partially finished in the quarry. Carved columns, architraves, capitals, and figures are sometimes found deep in the old quarries, abandoned when they were damaged during fabrication.

According to Bradley, these labor-intensive methods remained common until the 18th Century, when gunpowder was used to blast the stone free from the mountainside. Unfortunately, this led to much waste, as the charges sometimes reduced the material to a pile of rubble.

A century ago the technique of cutting the stone with cables was introduced. A continuous strand of steel loops through six-inch-diameter shafts drilled into the quarry wall. The diamond-studded wire slices through the marble with horizontal and vertical cuts, freeing a block roughly the proportion of a half-stick of butter, four stories tall. The 30-ton block is then toppled by inserting piston jacks behind the cuts, or flat sheet-metal "pillows" that are then inflated. We spent an afternoon watching a block being gently nudged free, inch by inch, until it finally fell into a bed of marble rubble and mud that cushioned its landing. It would then be cut into smaller blocks, loaded onto trucks, and sent for finishing. These extraction techniques have given the quarries the appearance of amphitheaters for giants, with benches of marble cut into the hillsides.

Marble Varieties

There are actually six varieties of Carrara stone. Bianco is the most even in color, virtually unblemished by veining. Whiter stones, laced with varying degrees of veining, include Statuario (one of the most precious), Venato (in a local shop we found a full-sized, 1950s-era Cadillac sculpted of this material), and Arabescato (with veining similar to arabesque). Calacata crema is an ivory color, while Bardiglio has a gray cast.

Even with this variety, it is the legendary white Carrara that overwhelms one. With marble dust everywhere, the quarries appear shrouded as if in the aftermath of a blizzard. The marble's cast and quality has even spawned a local delicacy. On the last day of our visit, our geologist guide treated us to lunch at a hillside cafe. Sitting at marble tables on marble benches, we sampled *lardo*, a creamy white cold-cut guaranteed to block major arteries. Not only did *lardo* look like wafer-thin slices of marble, but we learned that it is special to Carrara, aged in the mountain air, and stored in jars of marble, from which it draws its unique taste.

Given the demand for Carrara's stone, improved quarry methods, and the scale of extraction, one questions whether the supply of Carrara will ever run out. According to Bradley, "geological studies seem to indicate that the 'white gold' reserves are still vast. We are tempted to say 'until the leveling off of the entire mountain,' and perhaps even more." □

THE SANTA MONICA SCHOOL

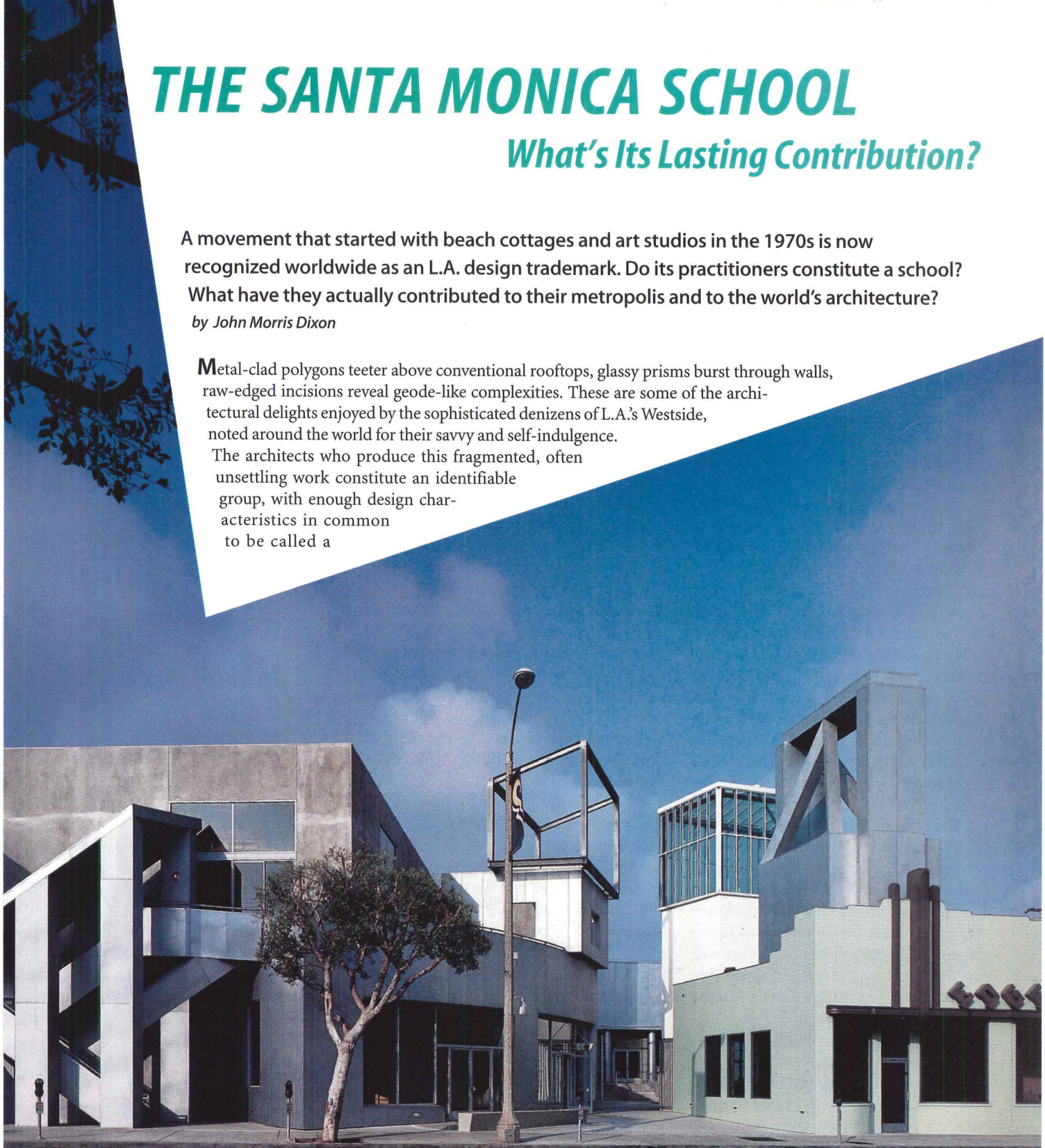
What's Its Lasting Contribution?

A movement that started with beach cottages and art studios in the 1970s is now recognized worldwide as an L.A. design trademark. Do its practitioners constitute a school? What have they actually contributed to their metropolis and to the world's architecture?

by John Morris Dixon

Metal-clad polygons teeter above conventional rooftops, glassy prisms burst through walls, raw-edged incisions reveal geode-like complexities. These are some of the architectural delights enjoyed by the sophisticated denizens of L.A.'s Westside, noted around the world for their savvy and self-indulgence.

The architects who produce this fragmented, often unsettling work constitute an identifiable group, with enough design characteristics in common to be called a



The Edgemar commercial development in Santa Monica by Frank O. Gehry & Associates, completed in 1989, sums up the school's design strategies. Part rehab and part new construction, the project embraces an amazing variety of forms, materials, and colors. Its shops and restaurants appear to be thriving. Photo: Tom Bonner

"school." In his 1993 book *Heteropolis* (Academy Edition/Ernst & Sohn) the perennial style-labeler Charles Jencks speaks of an "L.A. School," which he had identified in the 1980s, but the group's home ground is actually just a portion of L.A.'s Westside, now marked off as area code 310, centered on Santa Monica.

Of course, none of the leaders of the group – individualists all – see themselves as members of a school; there are, admittedly, no traditional master-disciple relationships, but there is a more contemporary role-model-and-peers arrangement, with Frank Gehry as the eldest, the trail blazer, the figure revered by all other members of the school, even if they pointedly distinguish their own work from his.

The group has attained sufficient visibility in the L.A. area, enough impact on students, and enough recognition worldwide to invite the question: what are they contributing to their city and to the community of architects? Are the buildings they produce durable, workable, and satisfying to users – even those who are not patron-clients? Since their influence extends far beyond the narrow area where most of their buildings stand, are they setting an example of value to the rest of the world? Are they showing the way toward a more responsive, responsible architecture?

The Place of Origin

To architects everywhere the locale where this work originated, the few square miles from Hollywood west to the Pacific, is known as a place where individualism is rampant, where image-conscious movie moguls and agents dazzle each other with the novelty of their ideas. It is also known as an area where a benign climate tolerates fragile, quirky building envelopes, where awkward gaps between self-expressive buildings can be quickly filled in with palm trees and bird-of-paradise flowers. To outsiders, this seems to be a locale where a self-indulgent architecture can flourish, supported by well-heeled patrons, with hardly a thought to the social and economic agonies that plague other parts of the L.A. region.

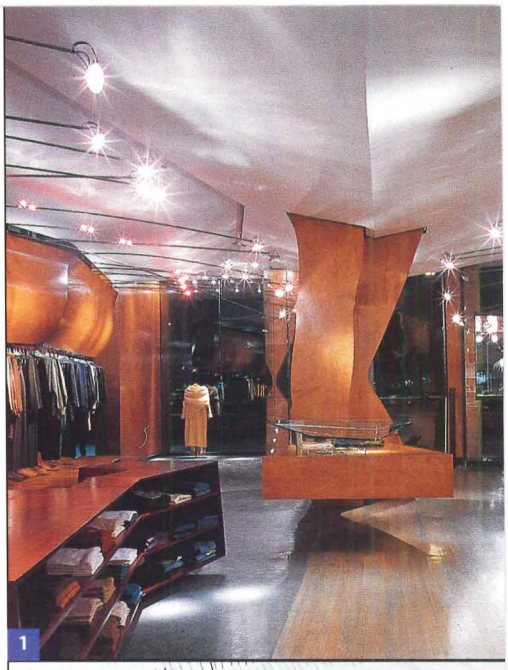
At the modest launching of this design approach, it was applied mainly to the artist's studios and beach cottages of a few art-oriented sophisticates; it was architecture-as-art for the low-budget collector. Like the arugula and the sashimi that were then becoming appreciated in the same circles, this edgy, iconoclastic architecture was definitely an acquired taste. Although this design approach has since become more widely accepted, it has nevertheless retained elements of willfulness and menacing aspects appreciated only by cognoscenti, thus linking it more closely to the world of contemporary art than to the reality of most architectural commissions.

The members of the school, of course, have been eager to produce more than playthings for the rich – many of whom prefer Neo-Nouveau in any case. Like avant-garde groups before them, they have not been quickly accepted for larger, more public commissions. And the cultural politics of the L.A. area have raised special obstacles: the Westside has for decades been set apart from L.A.'s Downtown power base, as a community open to unconventional ideas, to foreigners involved in the movies, and to intellectuals attached to U.C.L.A. This is the only part of town where the word "subversive" might be used approvingly for art or design. (The Westside's liberalism has its limitations, but it is the place where America's most successful African-American architect to date, Paul Revere Williams, did almost all his work, and it remains the home of the first black female Fellow of the AIA, Norma Sklarek.)

Their Westside identity has guaranteed the Santa Monica architects little chance to build Downtown or even at exalted institutions on their own turf, such as U.C.L.A. or the L.A. County Museum. Not until 1992 did the school's elder statesman, Frank Gehry, who had already collected a major share of the world's architectural prizes (Pritzker and others, see P/A, Oct. 1994) win his first downtown building commission, the prestigious Disney Concert Hall (P/A, Jan. 1993), construction of which is now indefinitely on hold. Younger colleagues such as Eric Moss, Thom Mayne, Michael Rotondi, and Frank Israel are still handicapped – as Gehry long was – by the impression that this fragmented, angular, variously surfaced work somehow won't travel far beyond the sound of the Santa Monica surf.

The Time of Origin

This school's emergence coincided with some important changes in L.A. as an environment for architects. Architect Ray Kappe, who founded the Southern California Institute of Architecture in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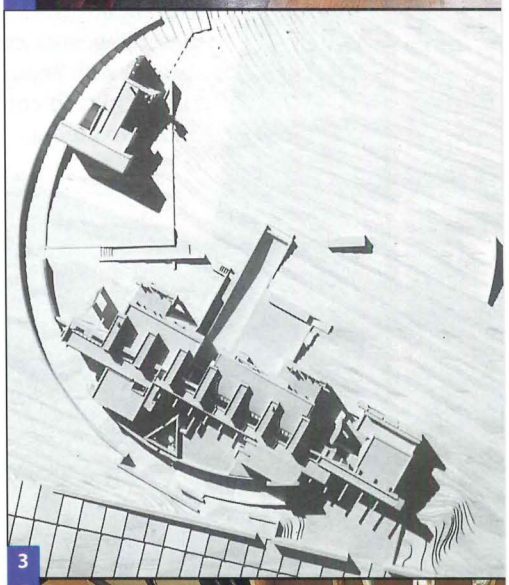
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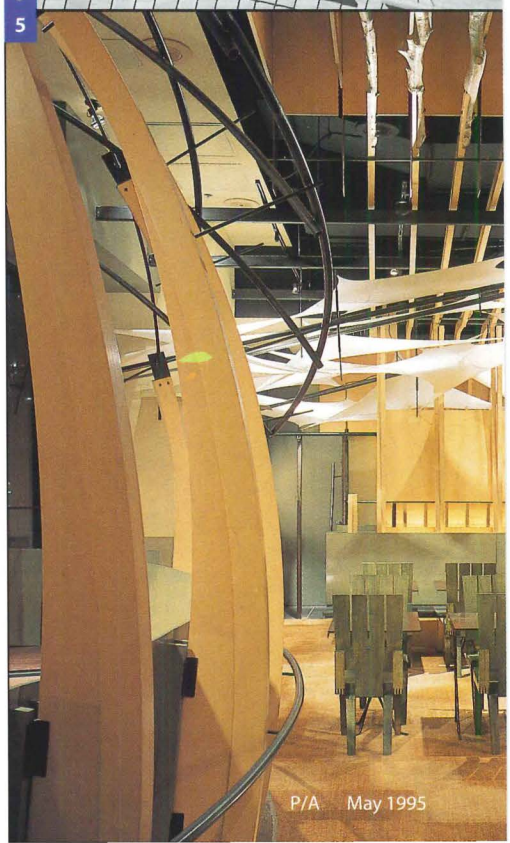
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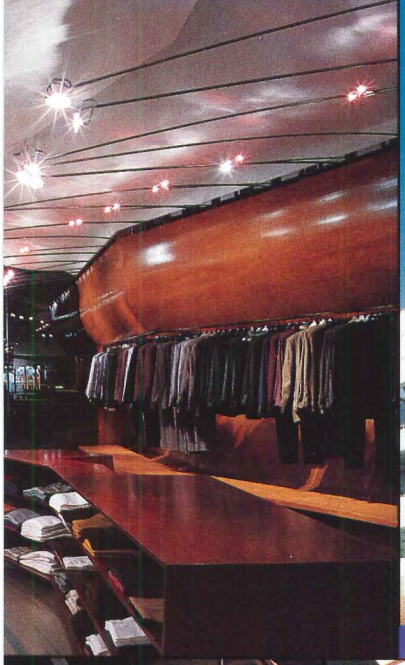

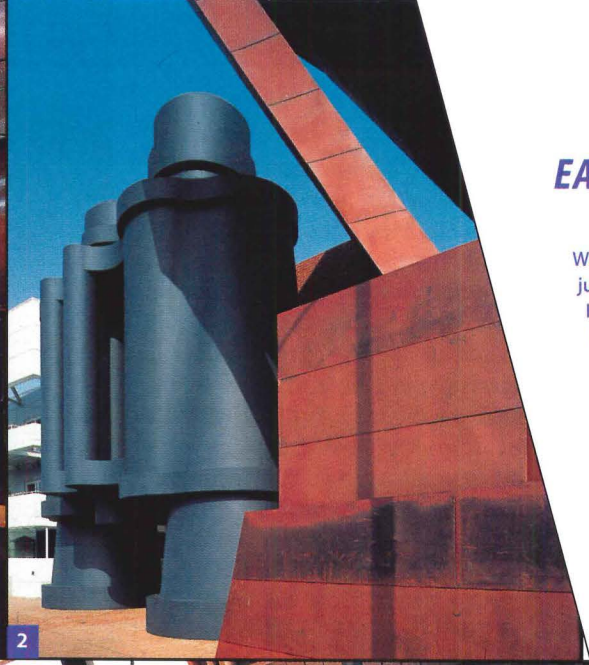

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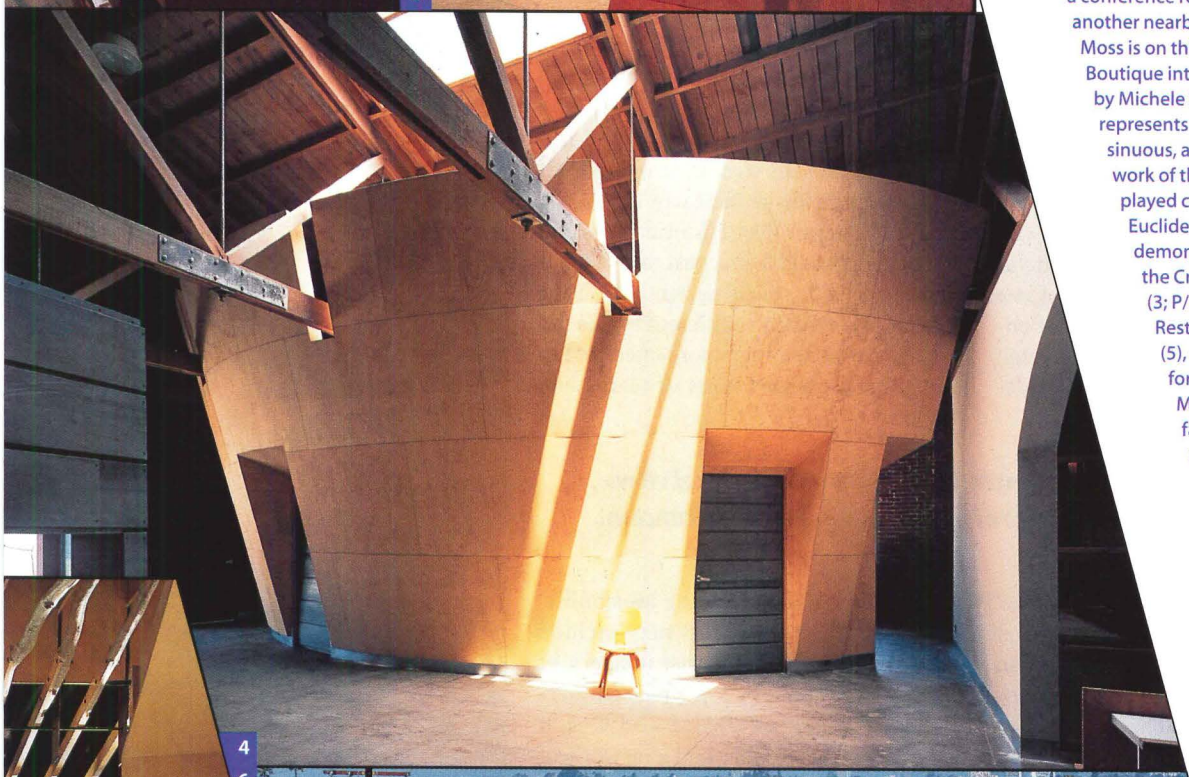

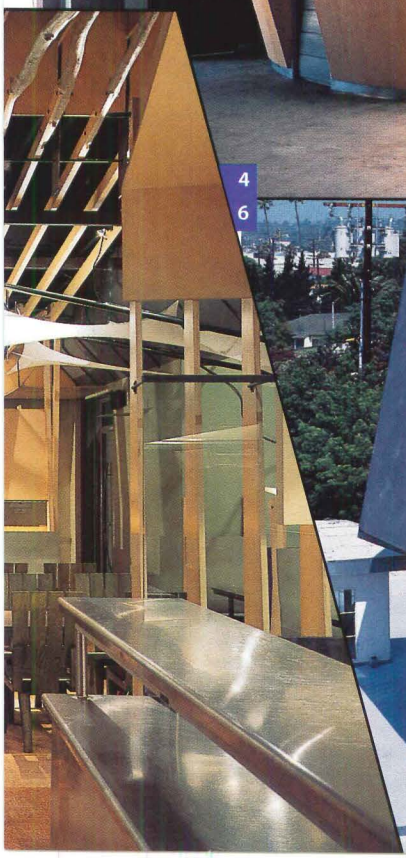

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EARMARKS OF THE SCHOOL

Willful sculptural forms, colliding or aggressively juxtaposed, are requisites for school membership. In Gehry's Chiat/Day/Mojo office building in Venice (2; P/A, March 1992), conference rooms occupy Pop binoculars (designed in collaboration with Claes Oldenburg and Coosje van Bruggen), which rise between two wings of radically different shape and cladding. In the Bright & Associates offices (4; P/A, Sept. 1990) by Frank Israel, nearby in Venice, a muffin-shaped conference room coexists with other object forms within an old industrial shell, a frequent setting for the school's efforts. On top of a rehabbed industrial building in Culver City (6), Eric Moss has recently completed "The Box," a conference room of twisted geometry; another nearby sculptural incident by Moss is on this issue's cover. The Ecru Boutique interior in Marina del Rey by Michele Saee (1; P/A, April 1990) represents the school's more intricate, sinuous, and sleek qualities. The work of the Morphosis firm has played complex games with Euclidean geometries, as demonstrated in the model for the Crawford house in Montecito (3; P/A, Nov. 1991). The Nicola Restaurant in downtown L.A. (5), completed in 1994 by former Morphosis partner Michael Rotondi, sets fanciful organic forms, all neutrally colored, within geometrical matrices.

Photos: 1 Marvin Rand; 2 Grant Mudford; 3 Tom Bonner; 4 Grant Mudford; 5 Assassi Productions; 6 Tom Bonner

Santa Monica in 1972, points out that the region's cutting-edge architecture up to about 1970 was almost always located up in the hills or in such bosky suburbs as Pacific Palisades. In the early 1970s, design-conscious clients began colonizing the "flats," the hitherto seedy Westside territories of West Hollywood, Santa Monica, Venice, and Culver City. The Santa Monica school made these areas its arena and hardly ever broke into the hillier terrain to the north, even though the affluent continued to build there. Doing much of their work on narrow infill sites or in existing industrial structures, they had little opportunity to develop those intimate building-landscape relationships that distinguish earlier L.A. Modernism. A certain brashness of form was also in order, compared to the horizontality and the harmony of color and texture that characterized even the more adventurous of the hillside houses.

It is also no accident that the emergence of this Santa Monica group coincided with the establishment of new schools of architecture in the L.A. area. Up to the late 1960s, L.A. did not have schools that encouraged design innovation with enough faculty openings to give cutting-edge designers an essential income base. The 1967 establishment of the architecture school at U.C.L.A., in the heart of Westside, and in 1969 at Cal Poly Pomona, in the metropolis's eastern extremity, changed everything. When the Pomona administration failed to support an innovative school program stressing community resources as well as academic requisites, dean Ray Kappe and other dissidents bravely established the Southern California Institute of Architecture, in Santa Monica, in 1972. At 23 years of age, SCIARC is now headed by one of its alumni, Michael Rotondi, and has become if anything too mainstream – a school that generates faculty positions and has sent hundreds of graduates into firms in L.A. and beyond.

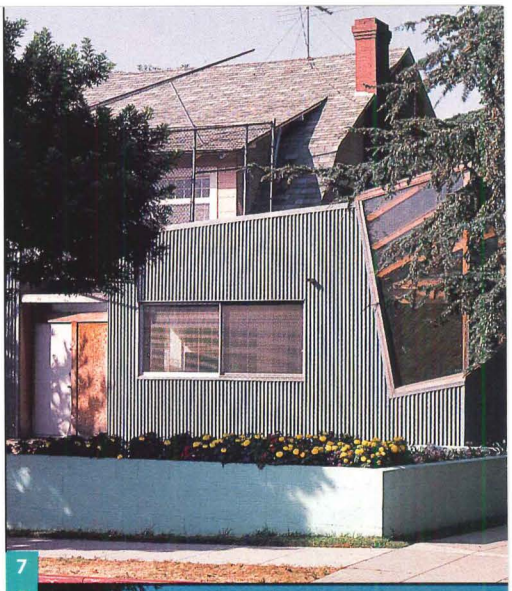
Identifying Characteristics

Assuming there is a Santa Monica School, what are its earmarks? Above all, it deals with fragmented, fractured, or folded forms, with abrupt slicing and juxtaposition. This alone wouldn't distinguish its products from fragmented forms generated in New York, London, or Rotterdam. But the Santa Monica work is largely intuitive and building-oriented, not abstract and theoretical. The school's buildings typically contain unmistakable references to vernacular building; construction details are likely to be strikingly exposed, not suppressed. In form, this work is typically additive in its composition, not based on transformations of an ideal form, and its components are usually strongly varied in material and color, as well as in geometry. There are exceptions: Eric Moss's recent work has involved subdividing spherical forms, as in his Lawson-Westen house (P/A, May 1993, p. 68).

One salient characteristic of this school is its virtually exclusive concern with the **present**. When Frank Gehry and a few younger colleagues were developing their design principles in the early 1970s, the issue of Modernism vs. Historical Allusion was being debated from coast to coast; but these architects, recalls design critic Pilar Viladas, were totally indifferent to this debate. Nor were they any more interested in the futuristic projections of teams like Archigram in London or the Metabolists in Tokyo. Their buildings may include some of the vaguely futurist imagery of buildings produced by L.A.'s big commercial firms, such as DMJM and Gruen Associates, where Gehry had long worked, but for members of the school these structures simply joined other contemporary L.A. buildings as material to be transformed by manipulations of geometry, texture, and color.

While members of this group are generally liberal in their political views, their built work shows little evidence of environmental or social concern.

The group's use of geometry and color was undoubtedly linked to examples in the world of art. Gehry has long maintained that he was influenced more by contemporary artists than by architects, and one obvious influence is the geometrical play, based on perceptual psychology, in paintings by Ron Davis, for whom Gehry designed a studio in 1972. Another art source is Russian Constructivist painting, for which Gehry designed a 1980 exhibition; this movement has appealed to rebels in every generation. *(continued on page 68)*



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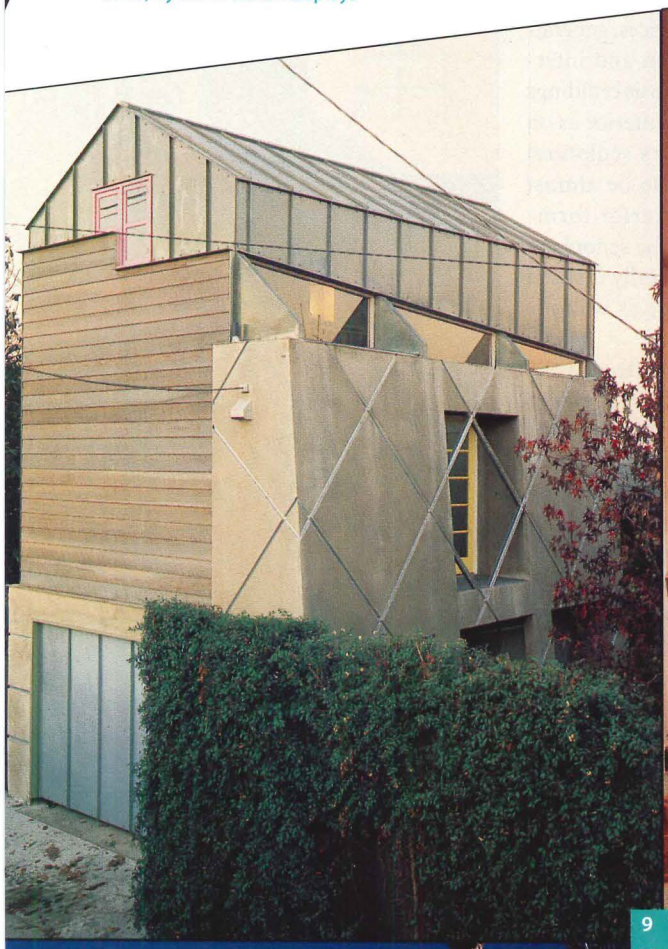
ORIGIN AND DIFFUSION

While not the oldest work of the school, Gehry's own house in Santa Monica (7; P/A, March 1980) has become its icon; it still typifies the school in its formal moves, but the use of commonplace components such as chainlink fencing and raw plywood is now much diminished. Eric Moss's 708 House in Pacific Palisades (8; P/A, March 1982) illustrates the more playful Pop imagery that he originally brought to the group. The Sedlak house in Venice by Morphosis (9; P/A, March 1982) shows much greater subtlety in its geometrical moves and its materials palette. Restaurant interiors were important commissions for most school members, and Fama in Santa Monica (10; P/A, Sept. 1989) by David Kellen displays characteristic forms executed in restrained materials. Josh Schweitzer, once in partnership with Kellen, applied bold colors to subtly modified cubic form in his 1989 desert house in Joshua Tree, California (12). Chicago architect Joseph Valerio won a competition for senior housing (11; P/A, Feb. 1992) in Colton, a distant L.A. suburb, demonstrating how skillfully the school's basic strategies could be applied by like-minded architects from elsewhere.

Photos: 7 Tim Street-Porter/Esto; 8, 9 Marvin Rand; 10 Tim Street-Porter; 11 Barbara Karant/Karant & Associates; 12 Timothy Hursley



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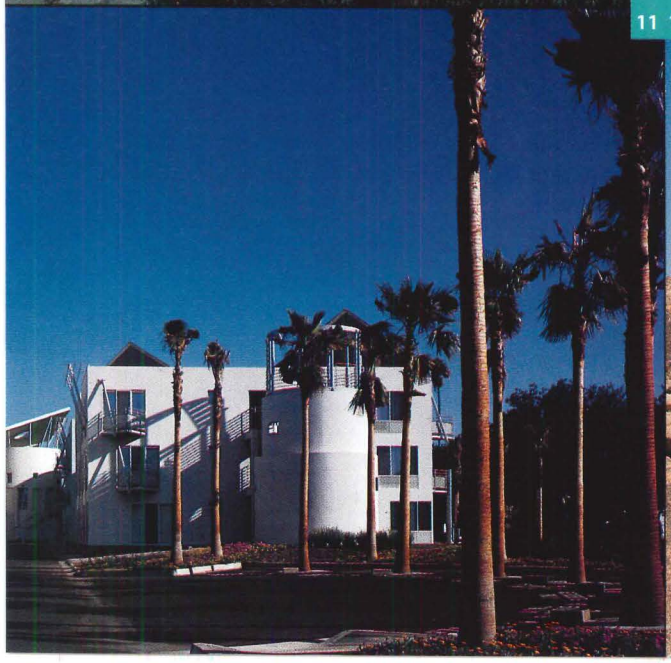

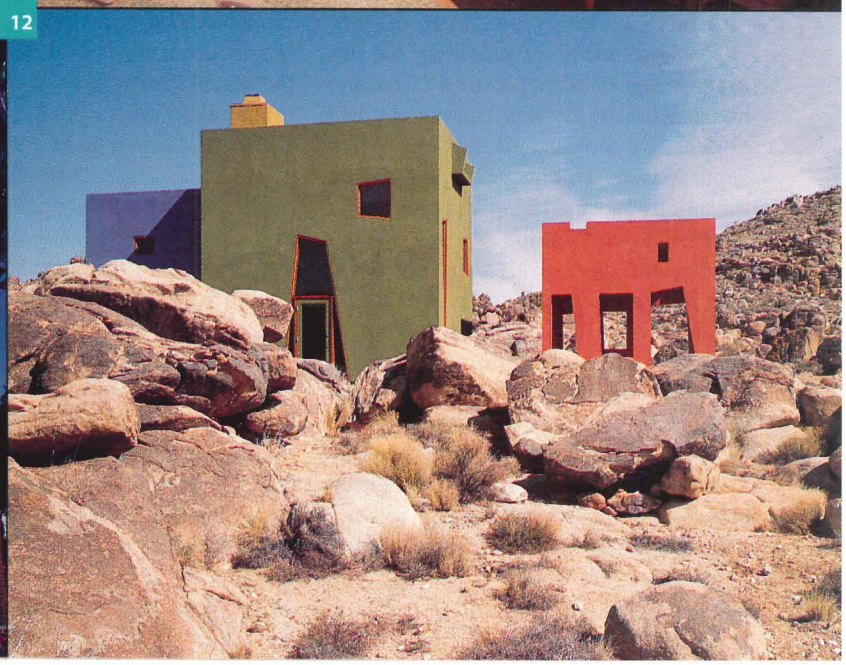

One characteristic that the Santa Monica School work shares with some of its forebears among Southern California Modernist architects is **lightness**. Like the work of Neutra and the Case Study architects – and the commercial mainstream of L.A. firms – this work has thin, buoyant, often transparent envelopes. While it is easy to relate this lightness to the minimal climatic demands of building in L.A. and to the local conviction that buildings are merely temporary, there has nevertheless always been an opposing group of L.A. architects who followed the thick-walled tradition of the Spanish Colonial, of Irving Gill, and of Frank Lloyd Wright's L.A. area buildings.

The competing new movement on L.A.'s Westside as this Santa Monica school emerged was the quintessential Post-Modernism of Charles Moore, who was architecture program head at U.C.L.A from 1978 to 1985, and his followers. Although Moore had developed his basic design strategies in other parts of the country, the L.A. area was fertile ground for them; he and his disciples wove together the local tradition of ersatz Spanish Colonial with elements of retail strip vernacular and Disneyland theming in projects that culminated in the ironically Baroque but obviously thin-skinned Beverly Hills Civic Center (P/A, April 1993, p. 98), where the open spaces are clearly the design objectives and the building solids mere backdrops. While the Moore school work suggests the transient monumentality of a Cecil B. DeMille movie set, the Santa Monica work recalls the backs of these sets, with their ragged edges, improvised bracing, and accidental spatial effects.

There have always been two faces to Hollywood's movie productions: the upbeat message of films that stress virtue and heroism and the *film noir* aspect embodied in detective movies and thrillers. When Santa Monica architects display abrupt transitions and menacing angles – not to mention a penchant for exposed metal – they are joining *film noir* visual devices to their back-of-the-movie-set imagery.

Critic Mike Davis, in his perceptive book on L.A., *City of Quartz*, links this image of toughness to a defensive posture assumed by affluent Westside L.A. against the poor, threatening population of nearby districts; while a siege mentality has been increasingly evident throughout this period, there is no indication that these architects and their clients feel any more defensive than those who design and live in buildings of mainstream Modern or Rococo inspiration.

The Distinctions Among Them

Of course, not all members of the school design alike. While Gehry's work tends to be intuitive and sculptural, the work of Morphosis, for instance, has always been based more on spatial order derived from grids or other geometrical devices, generating a play between repetition and interruption. The order in Morphosis buildings is at least as apparent on the interior as on the exterior, while in Gehry's sculptural forms, interiors may seem to be almost accidental outcomes of exterior form-shaping. Other members of the school are generally neither as geometrically focused as the Morphosis partners or as willfully sculptural as Gehry.

The group's design also differs in the degree to which it refers to vernacular buildings. The work of Thom Mayne or his former partner in Morphosis, Michael Rotondi, shows little reference to the vernacular, as does that of Morphosis alumnus Michele Saee. Frank Israel's work, too, deals mainly with abstract forms, but often as interpreted in Modernistic design that represented glamour in 1930s Hollywood. Eric Moss initially used a lot of Pop imagery – ironic gables, supergraphics – which he no longer does, but he still makes unconventional use of off-the-shelf window frames or other standardized parts. As Gehry's clients and budgets have changed he has largely stopped using chainlink fencing, exposed lath, corrugated cardboard and other pointedly commonplace materials, but the memory remains in unexpected use of materials by the school's members – and by architects thousands of miles from Santa Monica.

There is also a wide range within the group of intuitive *vs.* intellectual design methods. While Gehry presents his work as the product of an aw-shucks spontaneity, backed up with characteristically squiggly sketches, Mayne and Rotondi present theirs as the product of geometrical manipulations, stressing this through drawings with intricate overlays of regulating lines in plan and section. The intellectual in the group, however, is acknowledged to be Eric Moss, who ingenuously cites Joyce and Melville in conversation; in his work, Moss deals with Jungian essen-

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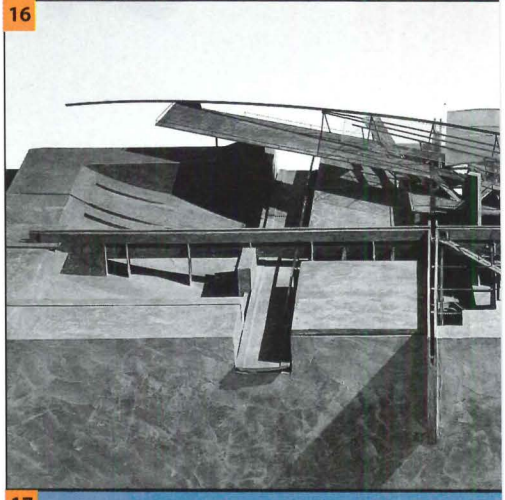

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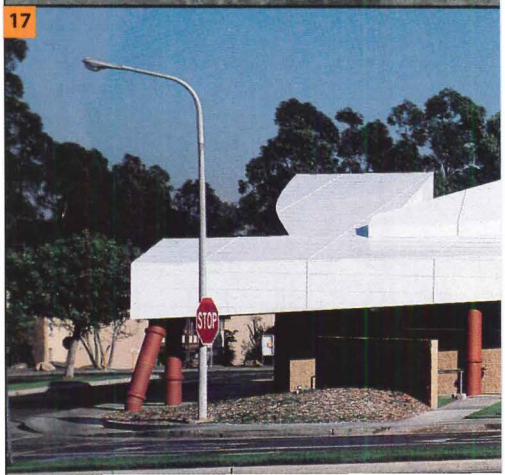


PUBLIC-ORIENTED WORK

Members of the Santa Monica School have found it hard to get public or institutional commissions, and even now their success with such projects is little recognized. Frank Gehry's Loyola Law School on the fringe of Downtown L.A. (13; P/A, Feb. 1985) combined remodeled academic buildings with inexpensive new buildings to create a lively intown campus, but one that closes out its troubled neighborhood; Gehry has continued to add buildings to the complex. Koning-Eizenberg made modest use of the school's design devices to enliven scattered-site public housing in Santa Monica (14; P/A, Oct. 1988). Morphosis designed ingeniously luminous spaces for the largely underground Comprehensive Cancer Center at Cedars Sinai Hospital in West Hollywood (15; P/A, July 1988); in this well-functioning facility, sculptural impulses were limited mainly to a few objects set in a context that is regular but not boring. Morphosis's proposed theater (16; P/A, Jan. 1990) was one of several components designed by the school's architects for the Arts Park complex proposed (and not executed) for the San Fernando Valley. Eric Moss designed the Central Housing Office for the University of California, Irvine (17; P/A, May 1989), where expansion in the late 1980s included works by Gehry and Moore.

Photos: 13 Tim Street-Porter/Esto; 14, 15 Grant Mudford; 16, 17 Tom Bonner

tials such as universal archetypes and the collective unconscious, whereas Gehry more often displays overtly Freudian symbolism, as in his recurrent fishlike forms.

Michael Rotondi, since his 1991 departure from the Morphosis firm, which Thom Mayne is maintaining, has been exploring improvisational design, decision-making on the site as the building goes up (see his CDLT 1, 2 House, P/A, Jan. 1992, p. 70). He is also increasingly involved in projects with a strong social or philosophical agenda, such as a school for a Native American group in South Dakota or a rustic arts camp in the California mountains (facing page); meanwhile, he is applying his ad hoc design procedures to the redevelopment of some industrial buildings near downtown L.A. for a patron-client somewhat comparable to the one who has kept Eric Moss busy revamping light industrial structures in Culver City. The on-going joint client-architect efforts of both architects suggest strategies for urban revitalization. Although these architects as a group are known for self-contained buildings with little urban connection, Moss's Culver City efforts, on-going for several years now, suggest a promising urban design strategy of sculptural incidents interspersed in an mundane physical fabric.

Younger practitioners whose work arguably places them in this school differ from their elders mainly in not seeing their work as art. Having executed relatively few jobs before the current recession hit, they're acutely aware that the market for freewheeling design experiment is limited. Such architects as David Kellen, Josh Schweitzer, Kate Diamond, and the partners Hank Koning and Julie Eizenberg all portray themselves as simply building buildings to suit the client and the situation. Careful design, yes; architecture as art, no. Koning Eizenberg are admittedly at the edge of the school's influence, with work that is relatively calm and disciplined, subtly manipulating vernacular design; only at a few points do they introduce angular juxtapositions and changes in color (the only variation some of their budgets permit). Kellen and Schweitzer usually get more playful with their forms, but typically rely on color and on unexpected angles to enliven otherwise homogeneous envelopes. Even Michele Saee, who generates a lot of formal activity within his typically small projects – all, he says, in the service of the client's public image – tends to use rather low-keyed and consistent palettes of materials.

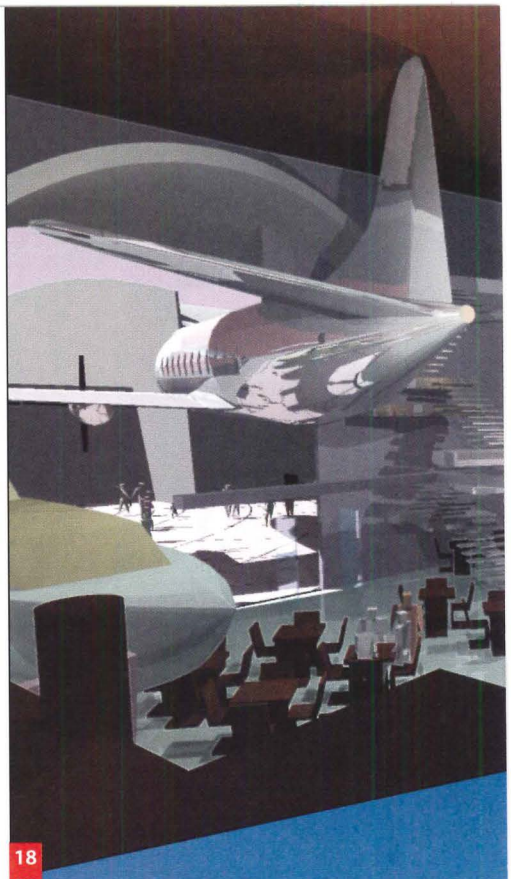
Of course, the formal earmarks of the Santa Monica school are related to design impulses that developed in many other places during the same period. The most obvious kinship is to the middle generation of San Diego architects – Rob Quigley, Tom Grondona, and others – and to some Bay Area firms, but many characteristics of this work are simply in the air almost all over the world. Often the formal relationship seems apparent, but the influences are hard to sort out, as in the housing development illustrated here by Joseph Valerio of Chicago; Valerio's work had already shown related characteristics before he won a design competition for some Southern California housing and executed a project (page 66) that rates honorary membership in the school. The partners of Coop Himmelblau, widely recognized for their meticulously crafted interpretation of the fragmentation aesthetic in Austria, have long maintained an L.A. area office, but the Malibu house that would have been their first American building (P/A, Jan. 1991, p. 85) hasn't been realized.

We don't necessarily want to carry on our lives inside tilted cones or angular crystalline forms.

What Lasting Contributions?

Why has the work of the Santa Monica school impressed critics and other architects? Why are the group's members in great demand to lecture and teach in architecture schools? Why do these architects continue to attract clients with exceptional design sophistication?

I think it is because they found a promising way to adapt Modernism to this post-dogma era. At a time when Post-Modernism was offering nostalgia tinged with irony, the Santa Monica group started with the premise that the present was actually okay. They drew on the abstract formal principles of Modernism and combined them with pragmatic local construction methods in work that is at once lively and unsettling – rather like an amusement park as depicted in a *(continued on page 112)*



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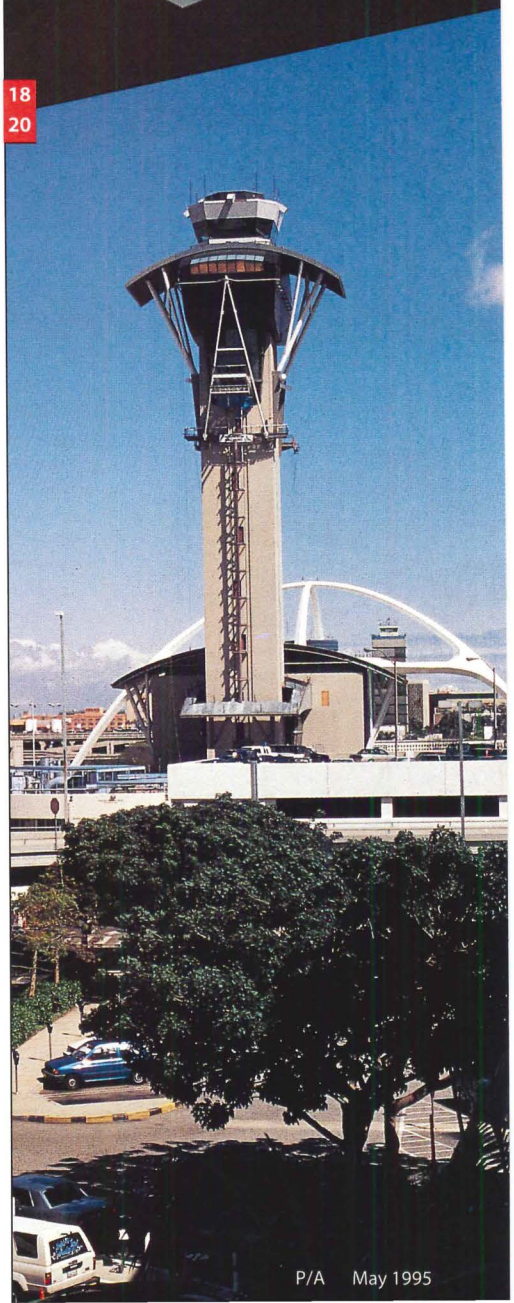

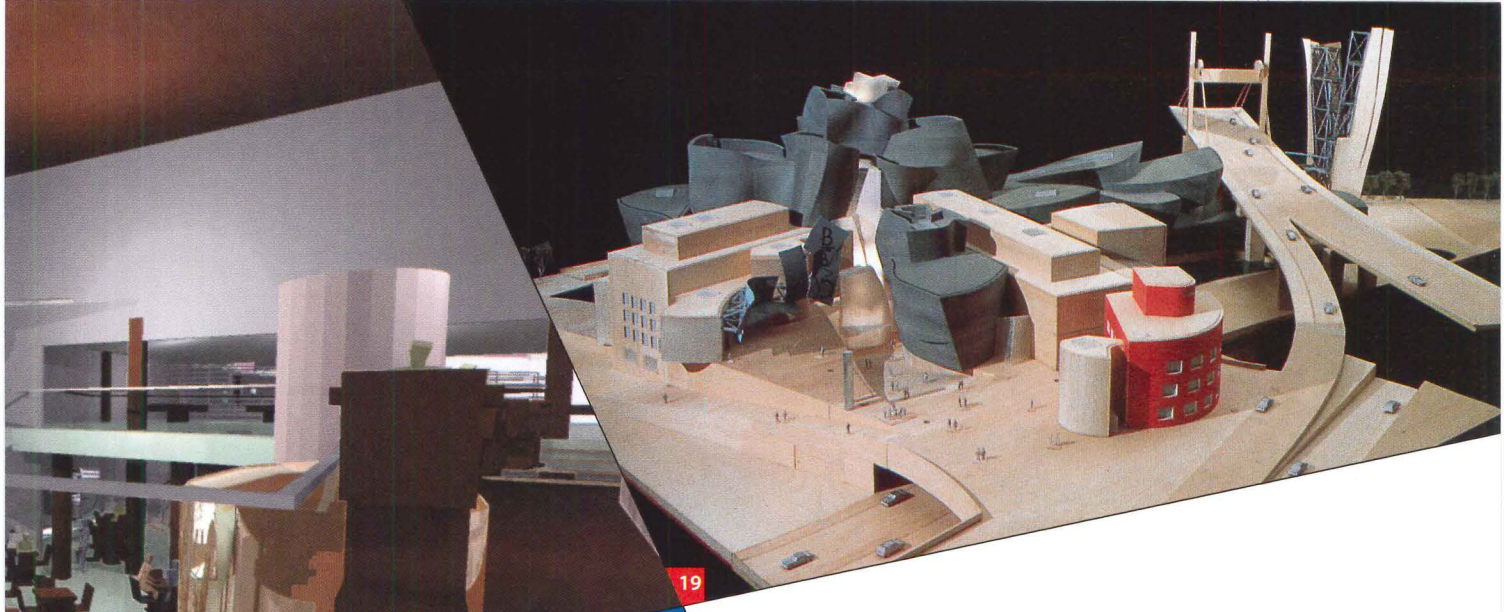

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FUTURE DIRECTIONS

Frank O. Gehry & Associates design for the Guggenheim Museum branch now under construction in Bilbao, Spain (19), shows the freewheeling sculptural approach the firm is still taking where the context does not impose strong constraints. Computer-aided design helps make such sculptural forms possible at large scale, and it is playing a key role for some other members of the school. David Kellen is applying advance CAD techniques to shape the exotic spaces of Star City (18), a themed entertainment complex in Singapore (designed with Jefferson Eliot Concept Design, Panatom, and Design Team PTE). Thom Mayne and his firm, Morphosis, are using CAD to generate the angular "Stealth" contours of the Diamond Ranch high school in Pomona, California (22; designed with William Blurock Associates of Newport Beach). Mayne's former partner, Michael Rotondi, is taking the very different approach of on-site design decision-making, with such projects as the Dorland Mountain Arts Colony (21). The influence of the Santa Monica School is evident in work by local architects who have not had direct affiliation with it: the prominent new control tower at L.A. International Airport by Siegel Diamond (20) displays a sharp articulation of parts, with overhangs, outriggers, and a variety of materials rarely found in such structures.

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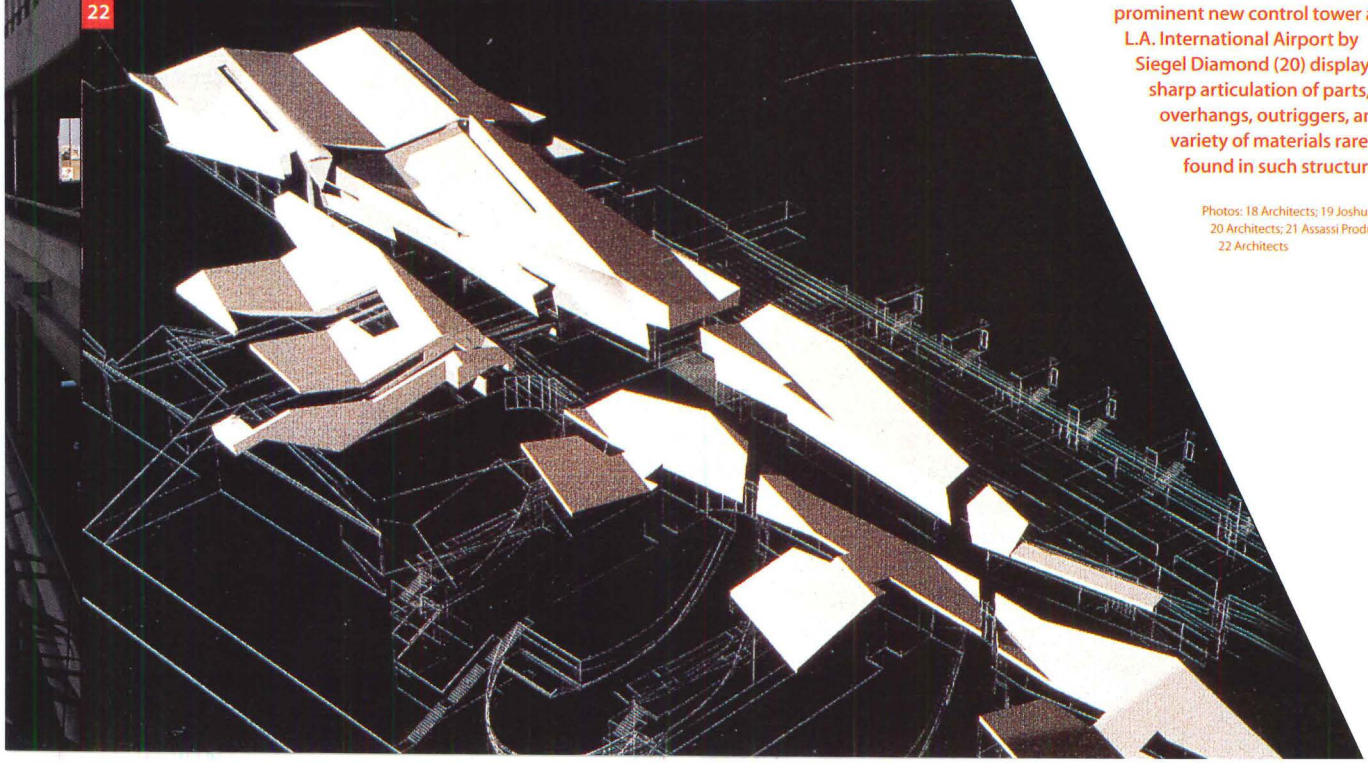

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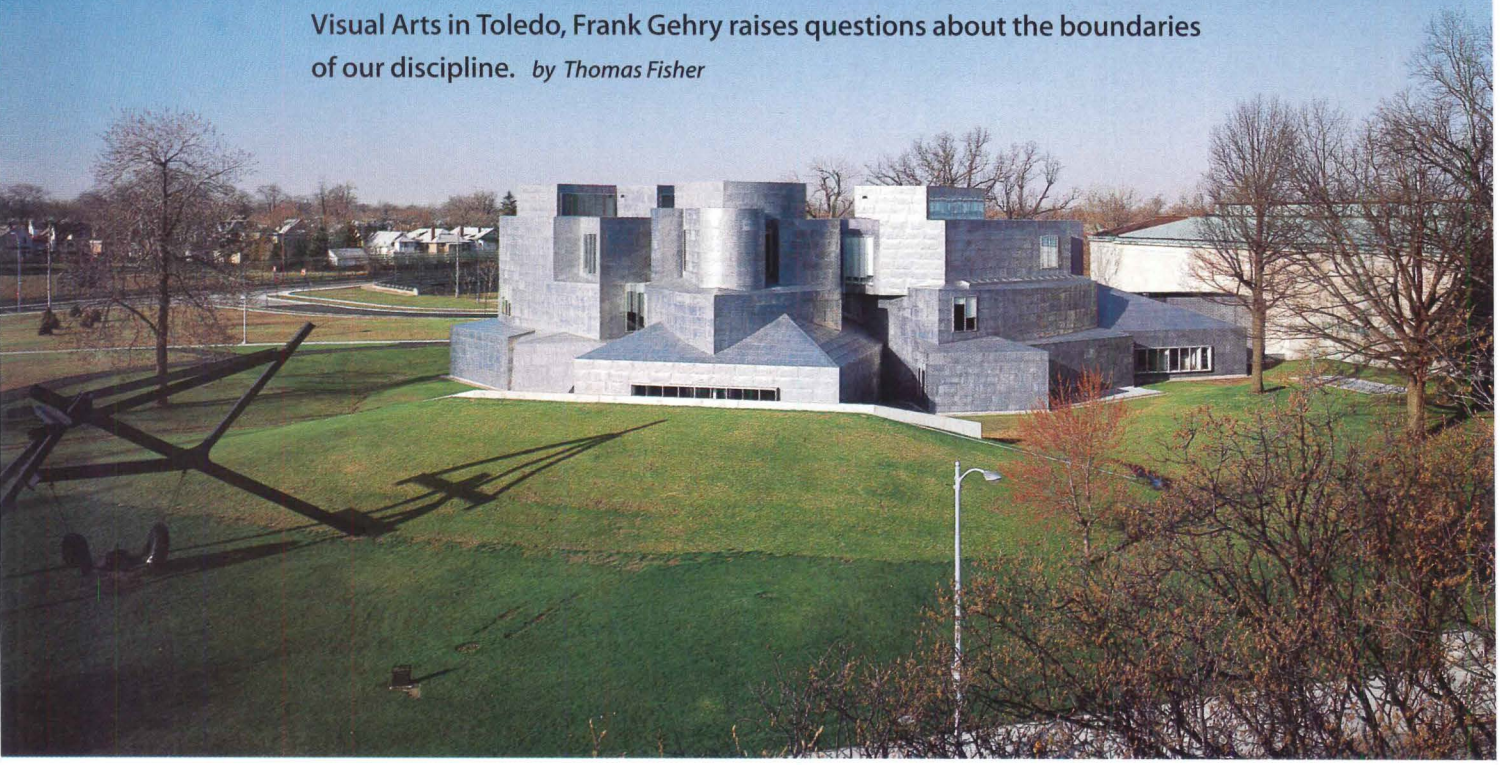
Photos: 18 Architects; 19 Joshua White; 20 Architects; 21 Assassi Productions; 22 Architects

Critique

Art as Architecture

Exploring the border between architecture and art in his Center for the Visual Arts in Toledo, Frank Gehry raises questions about the boundaries of our discipline. *by Thomas Fisher*



The University of Toledo's Center for the Visual Arts appears to rise out of a lawn, next to Toledo's Neo-Classical art museum. **The building looks like a large sculpture, with a number of curved and twisted boxes stacked up** and clad in lead-coated copper. The library's windows, barely visible in the photo, face a concrete wall and berm.

Timothy Hursley

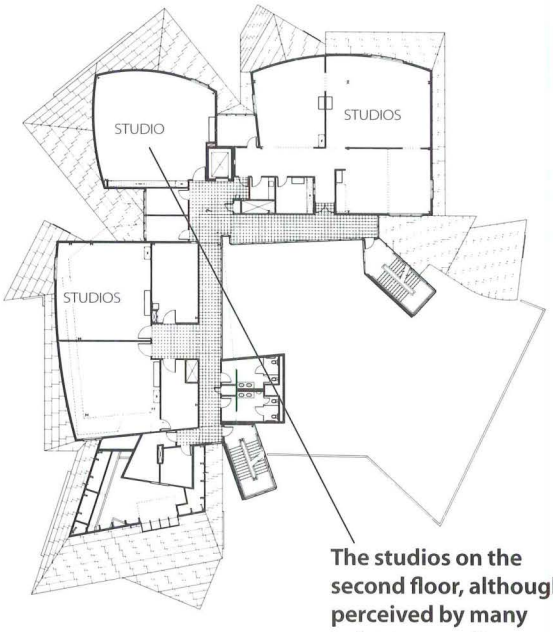
Architecture has always taken a back seat to the other arts. Although we deal with many of the same elements other artists deal with – form, space, light, color, sound – our need to address client demands, code requirements, and the like makes architecture seem more compromised than, say, painting or sculpture. Because of this, Hegel ranked ours last in his hierarchy of arts, while a growing number of architects have begun to wonder whether architecture is even an art at all, thinking of it, rather, as a craft.

In this context, the work of Frank Gehry represents a provocative and controversial counterthrust. Not only do his buildings assert the fundamentally artistic nature of architecture, but their forms draw almost literally from other arts, sculpture and theater especially. The implications of this, both for architecture and for art, are nowhere more evident than in the Center for the Visual Arts (CVA), an art school for the University of Toledo in Ohio, designed by Frank O. Gehry & Associates in conjunction with The Collaborative, a Toledo architecture firm. The structure, which is physically attached to the Toledo Museum of Art, was completed more than two years ago.

Viewing and Being Viewed

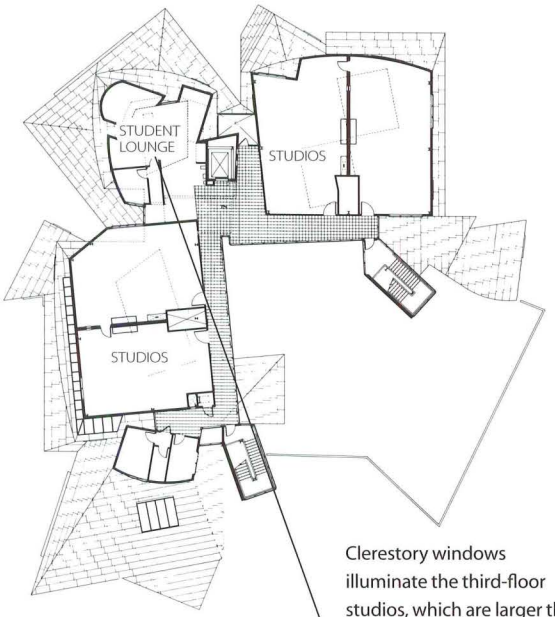
When you approach the CVA from downtown Toledo, you see it first as a sculpture standing next to the art museum and surrounded by a broad lawn. Clad in beautifully mottled lead-coated copper, the CVA consists of a series of boxlike forms twisted and stacked one upon the other – giving it an objectlike, even a toylike appearance. This is not accidental. The architects have clearly suppressed traditional scale-giving clues on this side of the building: the windows, for example, match the hue of the wall and are few in number and flush with the surface. Nor is the treatment of the building as sculpture without purpose. "The museum frequently refers to it," says Sally Vallongo, who writes about design for the *Toledo Blade*, "as its largest work of sculpture." As a CVA faculty member put it, "The building is a great advertisement for art."

This blurring of the boundaries between architecture and sculpture, however, can come at a price for those who must occupy the building. At the CVA, this is most apparent in the ground-floor library, whose bank of windows in the reading room would have a view of the lawn and street were it not blocked by a full-height con-



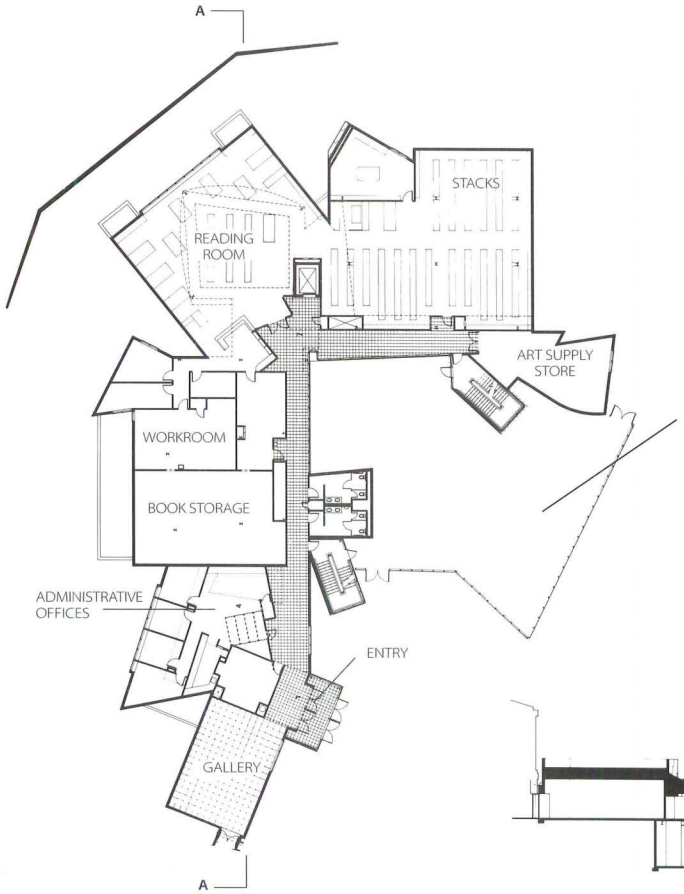
SECOND FLOOR PLAN

The studios on the second floor, although perceived by many to be too small, seem otherwise to be well liked by students. The corner studio above the library reading room **generates a lot of noise from stools and tables scraping on the concrete floors.**



THIRD FLOOR PLAN

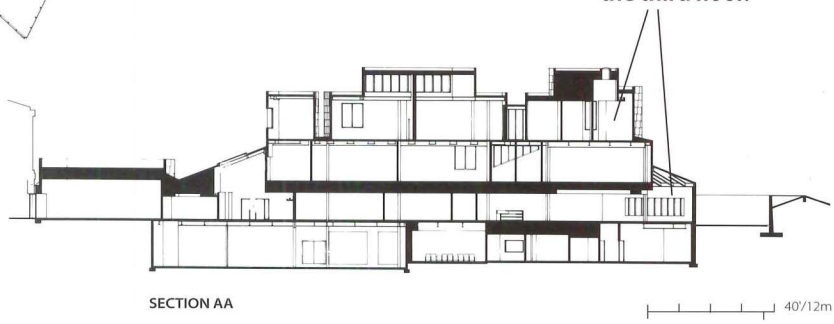
Clerestory windows illuminate the third-floor studios, which are larger than those below. **The corner student lounge is a spatial tour-de-force, although its plan is somewhat awkward to use.**



FIRST FLOOR PLAN

Entry to the CVA is via a one-story link between the art school and the museum; a fine little gallery – one of the few rectangular rooms in the new structure – connects the two buildings. The library forms an L, with an elevator at the inside corner, **obstructing visibility between the circulation desk and stack areas.** The sculpture yard, enclosed by the L of the building, is a nice space, although **students report that it is like a fish bowl.**

The section through the building shows the regularity of the studio floors behind the highly irregular exterior shell. **The spatial drama occurs in the high-ceilinged first-floor offices, and the studios and lounge on the third floor.**



SECTION AA

The extensive glazing at the back of the building provides glimpses of art work hanging in the halls and of students and faculty moving through the building. A glass screen also provides glimpses of the sculpture on display in the gravel-paved yard. **Students use the yard as a short-cut, but several said that they don't like exhibiting works there because of the unevenness of the stone surface.**

crete wall 20 feet from the glass. This wall supports a grassy berm, which the architects say buffers the library from the street and, more believably, gives the building a visual base. But it is disliked by virtually everyone I talked to in the building; one student said that the architects were simply being "rude." The architects, in turn, seem to shrug off such criticism. Paul Hollenbeck, the Toledo architect who worked closely with Gehry's office on the project, puts the onus on the students: "I'm surprised they haven't yet used it as a canvas." Such are some of the problems, however, that can arise when art forms intermingle, and architecture becomes too much like sculpture.

Gehry's work also relates quite closely to the arts of theater and dance. This becomes obvious when you drive around back, park, and walk toward the CVA's main entrance. Here, shear walls of glass slice through the building as if it were a stage set with one wall removed to let the audience see inside. This folded wall of green glass is luscious, and the frames around each vision panel, created by sandblasting the outer layer of glazing, create a theatrical scrim behind which there is a kind of dance – a coming in and out of focus – of people walking along the corridors of the building. But that wall also reveals some of the shortcomings of that old Modernist dream of using glass to make buildings transparent, to turn all the world into a stage. Because the glass faces south and west, and despite its tint and sandblasted surface to reduce heat gain and glare, the halls, I was told, get hot in the middle of the summer. Even on the mild, overcast winter day I was there, the glass-walled stair towers, which most people use to get from one floor to another, were uncomfortably warm.

Nor do people particularly like being on stage. A glass screen wall, consisting of sandblasted panels like those in the façade, encloses the CVA's sculpture yard within the space created by the L-shaped building. This glass wall gives passersby a great view of sculpture, but a couple of students told me that none of them likes to work there or even spend much time in the space. "It's like being in a fish bowl," said one. Where the sculpture students *do* like to work is another Gehry-designed building across the drive, a single-story rectangular garagelike space with a loggia, supported by telephone-pole columns, that overlooks a walled-in yard.

The glass-walled corridors and stair towers face west and south, the outer layer of glass has been sandblasted, in part to reduce heat gain and glare. **The resultant "windows" frame a series of views, although the corridors and stairs still get warm during certain times of the year.** The corridor windows, visible to the right of center in the photo, let light into the studios, but require the closing of blinds during life drawing classes.

On Stage and Off

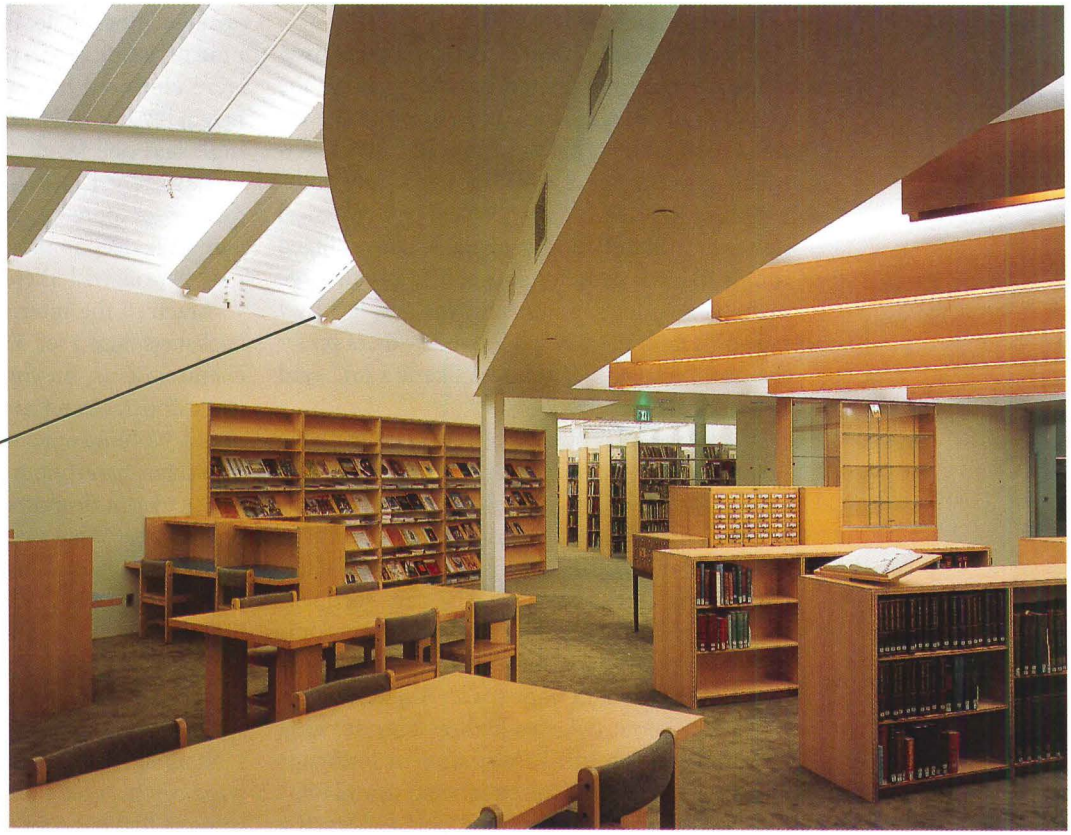
That modest concrete-and-steel structure, when contrasted to the main building, raises the question of what space is most appropriate for the making of art. Before it moved into its new building in the fall of 1992, the art school occupied the lower level of the adjacent Neo-Classical museum, which had rectangular, high-ceilinged rooms like the galleries above, along with large operable windows. Some students and faculty I talked to miss the old space, while others prefer the new building. "Visually, I like it a lot," said one student.

Visual appeal is obviously important in an art school. But, as I discovered, it does not entirely compensate, even among visually oriented people, for other problems, many of which seem to stem from the interior space's being at once like a stage set and like a backstage. The stage set qualities emerge in the sheer volume of some rooms in the building, especially when it is compared to the relatively tight floor space. Administrative offices are about twice as high as they are long or wide, and the third-floor student lounge is an incredible Piranesian space twisting and folding upward, but with a small and awkwardly arranged floor plate. Because of this ratio of volume to usable space, most of the offices I visited were cluttered but largely empty above head height. "We're still learning how to use the building," said one faculty member. And more than one student I talked to would give up cubic footage for more square footage. "We're piled two and three deep in the drawing classes," a student says. "We all wish there was more room."

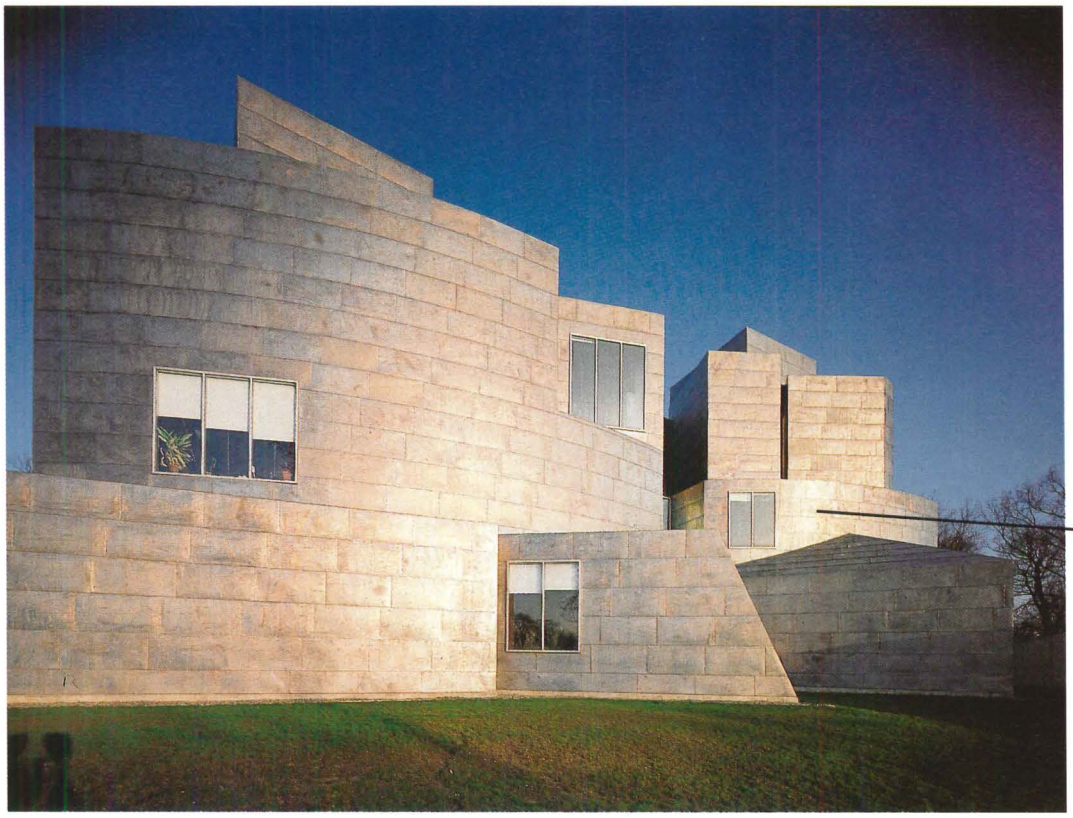
Much of the interior, though, is more like a backstage than a set. The concrete floors, the mechanical ducts, the fluorescent fixtures, the steel deck and framing are almost everywhere exposed. Nothing unusual in that: the characteristic backstage, bare-bones look has become almost a vernacular in dealing with low-budget loft space such as this. What makes the CVA noteworthy is the way Gehry and his colleagues tweak the vernacular. Steel purlins slide off at angles, decking dives into walls, fixtures hang off ceiling beams, mechanical ducts scoot between stairs, and concrete floors take paint drips well, like Jackson Pollock paintings.

But, as anyone who has acted knows, backstage can also be a noisy and chaotic place, and some of that has rubbed off on the CVA. Noise is

The painting studios on the third floor are among the largest, and their **large windows and clerestories make them pleasant and apparently effective places in which to work.** In one of the smaller second-floor studios, however, **tables and stools were packed so tight that it was hard to walk among them.**



The library has custom-designed shelving, case-goods, and fixtures, which **give an overall unity to the space, although some of the wood shelving has bowed and discolored, and the casegoods have not held up well under student use.** The library also reveals the building's idiosyncratic structure: here small segments of steel sections frame around the curved ceiling in the center of the room. **Such framing creates the sense of being inside a large sculpture or behind an elaborate set, supported by a lot of steel.**



For all the inconveniences mentioned by the building's users, the CVA remains a remarkable and beautifully crafted form, **its lead-coated copper cladding resembling mottled stone in some lights, appearing ephemeral in others.**

a problem mostly in the library, where the quiet is routinely broken by the sound of stools and tables scraping the concrete floor of the design studio above. "They could buy rubber bumpers for the stools," says architect Hollenbeck – a "plant-some-ivy" solution to the problem. Noise, too, arises from the exposed mechanical system, again most apparent in the library and in the small art supply store. Nevertheless, says Hollenbeck, "The mechanical system meets industry standards." The noise, in the end, may not be something to lay on the architects or engineers; it partly stems from a budget that demanded raw backstage space.

What can be laid on the architects, though, is a library layout that, according to the librarian, doesn't work well. "The elevator cuts off our view of the stacks from the circulation desk. When we challenged the configuration, we were told 'that is the design.' Fortunately, the loss rate of books has not been too high." Indeed, the library, located at the outside corner of the L-shaped structure seems to be spatially as well as figuratively the Achilles' heel of the building: the architect-designed wood shelving has bowed and discolored, the custom fir plywood carrels already show chips and gouges, and the work space is overcrowded. For all of that, however, the librarian admits that "usage is up."

The thermal, acoustical, and operational difficulties at the CVA seem to be more annoyances than fundamental problems: although many of the users of the building I talked to had complaints, almost all said that they liked it or at least admired the architects' effort. And the same is true of many people in the neighborhood, says Vallongo of the *Blade*. "Even those who don't like the building have come to appreciate it," she says. "It has been a catalyst for the community."

Gehry's work has been a catalyst for the architectural community as well. There are many architects who seem not to like his work, but I sense a growing, if somewhat grudging, respect for what it tries to do. Gehry has done as much as any architect, I think, to explore the boundaries between architecture and the other arts. And while that sometimes creates functional problems, his work demonstrates that there is still a public desire for and appreciation of architecture that aspires to art – this at a time when many in the profession have given that aspiration up for lost. □

Project: Center for the Visual Arts, University of Toledo, Toledo, Ohio.
Design Architect: Frank O. Gehry & Associates, Santa Monica, CA (Frank 0. Gehry, principal in charge; James Glymph, David Denton, project principals; Peter Locke, Randall Stout, project architects; C. Gregory Walsh, Michael Maltzan, project designers; Andrew Alper, Jon Drezner, Michael Resnic, Tami Wedekind, project team).
Executive Architect: The Collaborative, Toledo (Paul R. Hollenbeck, principal in charge; John Williams, Rich Livecchi, Ray Defrain, Cynthia Schlagheck, production team; Richard Meyers, Philip Enderle, landscape architects).
Consultants: Leonhardt, Kreps & Lefevre (structural); Dansard Grohnke Long Ltd. (civil); Rightmyer Johnson & Associates (mechanical); Nelson Gibson & Associates (electrical); Ruddolph/Libbe (construction management).
Photos: Tim Hursley.

All photos: KMCA

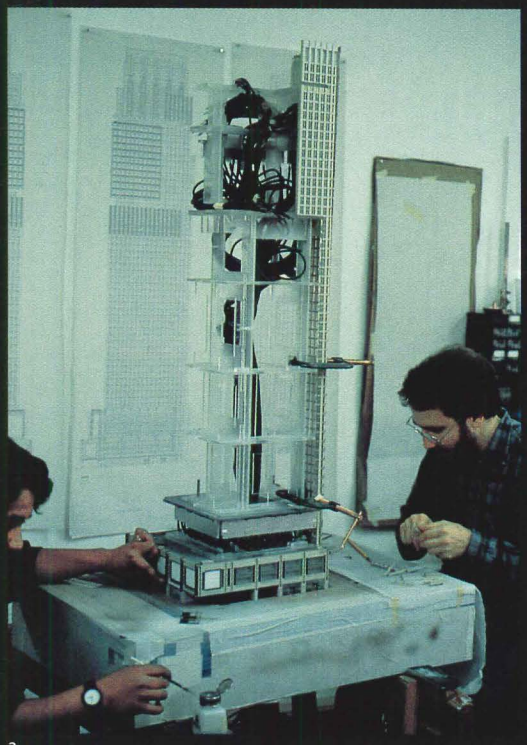
1

Model Making: A Model of Practice

The computer-aided design and manufacturing now used to make models may one day transform architectural practice. *by Thomas Fisher*

Off a back courtyard of an old industrial building in an out-of-the-way corner of New Haven, Connecticut, you will find one of the most technically advanced architectural model shops in the U.S.: Kenneth M. Champlin and Associates (KMCA). I went there to report on the current state of model making – its cutting edge, so to speak. But what I found revealed as much about the future of the architectural profession as it did about the making of models.

Champlin, who was never formally trained in architecture, began making models in architectural offices during summers in high school, and worked for years in Victor Gruen's office in Los Angeles, then with Cesar Pelli in New Haven, before opening his own shop. He began, he says, as a "bench-type model maker," building models by hand. But the pressure to produce things better, faster, and at a more competitive price drove him to embrace computer-aided design and manufacturing (CAD/CAM), using computer-controlled lasers and milling machinery to cut and shape his models. *(continued on page 80)*



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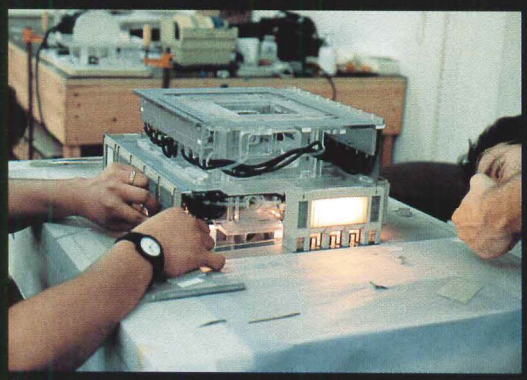

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Lighting and Photographing Models

KMCA builds most of its models out of acrylic, "because the models last longer and are more durable," says Champlin. In this model of Rockefeller Plaza West, designed by Kohn Pedersen Fox Associates (P/A, January 1989, pp. 90–92), KMCA designed an acrylic internal structure (2), through which were threaded fiber optics for lighting the interior and the top of the model (4). Laser-cut elevations, painted to match the limestone, stainless steel, and glass cladding, were applied over this framework. At the base of the model, fiber optics illuminate acrylic panels that simulate the billboards and backlighted displays planned for the base of the building (3). KMCA staff also hand-painted the panels above the ground floor (5). The degree of detail and precision in the model would never have been possible at this size using hand methods. Once the model is complete, it can be photographed against a blue-sky background or in a context model (1).

5

Implications for Practice

When you visit Champlin's shop, you see that CAD/CAM has implications for architecture that go far beyond the making of models. The technology, for example, tends to join architect and vendor into a team. One instance of this is "rapid prototyping," where massing models are quickly made from electronic files, allowing a firm to study a design or show it to a client. Many architects, of course, still use entry-level people to produce such models in-house, and Champlin admits that he can't compete with such low-cost labor. But CAD/CAM is so much faster and more precise than hand methods that some firms have begun to take advantage of this process. "Rapid prototyping," says Champlin "has been widely used by industrial designers, and it has begun to filter into architecture."

CAD/CAM also enables model shops to become extensions of a firm, helping when it is short-handed. One office in Boston, for example, needed Champlin to produce some 5,000 model parts for a model that the firm needed to finish the next day. The electronic files were delivered by modem, the pieces were cut by laser, and the parts were sent by overnight mail. Competing model shops can also become extensions of each other. "We still lose jobs to people working out of their houses," says Champlin, "but because of the speed and accuracy of our equipment, other model makers will contract with us to do all of their cutting."

Meanwhile CAD/CAM allows model makers to enter new markets and offer new services. In one project, Champlin's staff ended up producing not just the model of an elevator-cab ceiling panel, but the actual panels themselves, using a fire-retardant material in a vacuum-forming process that apparently no ceiling manufacturer could handle.

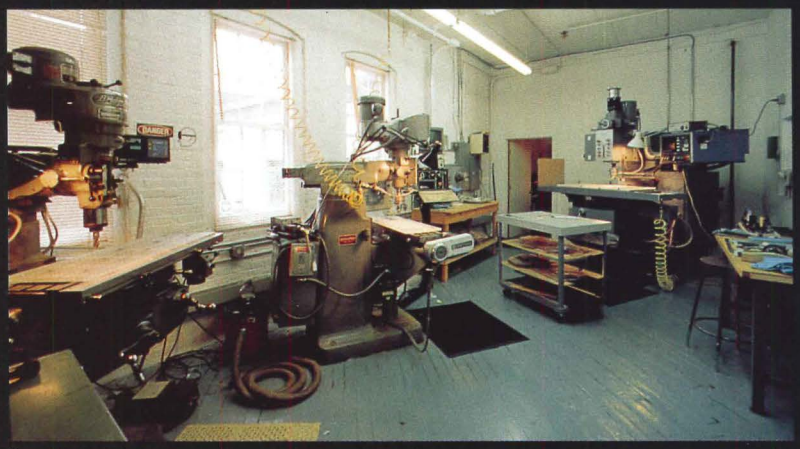
Virtual Reality

Underlying this use of CAD/CAM has been an exponential increase in the power of computer technology. Just as three-dimensional computer imaging and animation have heightened the realism possible in electronic models, so too has CAD/CAM begun to raise our expectations of physical models. The use of lasers, for instance, has provided a degree of precision and a dimensional exactness in models that are impossible to achieve by hand. Champlin acknowledges that not everyone wants or needs this level of realism, but he adds that it can be an effective way to win people over to a project. One fundraising model, he says, enabled the clients to "raise half the money they needed in two weeks."

This super realism, however, goes beyond just the use of lasers. CAD software can now adjust the dimensions of all the parts of a model to account for the thickness of the material being cut, whether acrylic or paper. Likewise, a shop such as Champlin's maintains an elaborate painting studio, with catalogs of materials and their matching paint colors, and inventories of furniture and trees that look unbelievably real.

The Impact on Design

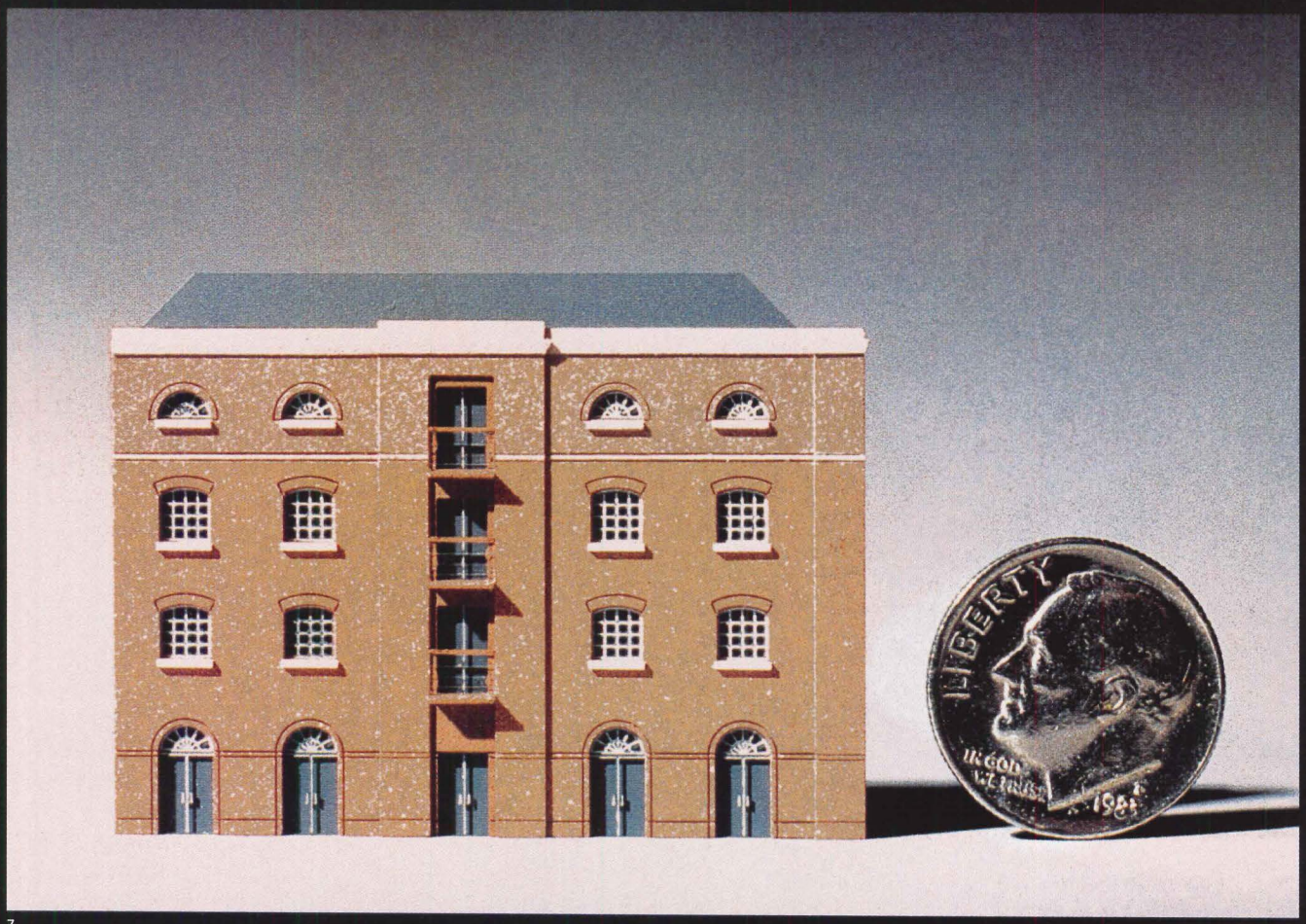
What may be most important about this modeling technology is how it affects our thinking about design. "Architects are developing more complicated geometries today," observes Champlin. The question, though, is whether our interest in these geometries drove our adoption of the modeling technology or whether the modeling technology allowed us to become interested in the geometry? The technology behind that question is the three-axial CNC machine, whose steel spindles can carve the most complex forms out of homogeneous materials, such as wood or urethane. This machine has long been used by industrial designers to form ergonomically shaped objects, but Champlin reports that it is



6

Computer-Controlled Equipment

The lasers and computer numerically controlled two- and three-axial milling machines occupy a space that is acoustically isolated and directly ventilated (6). The laser (left in the photo above) has a large cutting area with a gridded underlayment through which air is sucked in order to hold the material being cut – potentially everything from paper to sheet steel – flat against the surface. The milling machines (right and center in the photo) have high-speed steel spindles that can score flat materials (the two-axial machine) or that can shape moldable materials such as wood and urethane (the three-axial machine).



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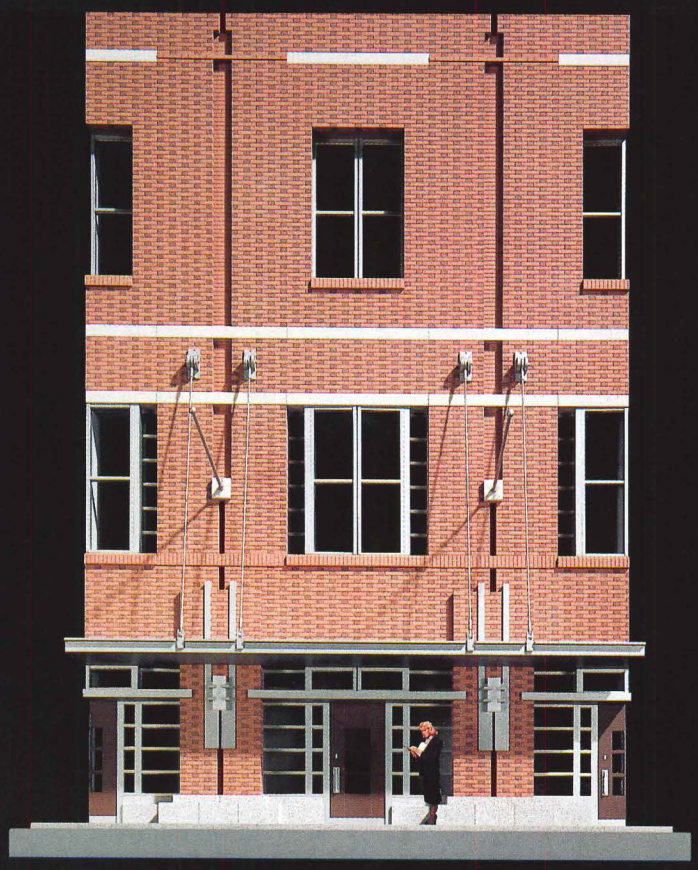
The Precision of the Laser

The preciseness of laser-cut models becomes evident when you see how small they can be (7). The laser itself is also a remarkably subtle machine, able to cut highly detailed patterns out of materials such as acrylic, cardboard, or paper (8). But precise cutting is only part of what goes into making models. Also needed is an almost obsessive attention to detail, as is apparent in this detail of a building design by Cesar Pelli & Associates (9), in which the staggered brick patterns, the cable-supported canopy, and the scale figure all contribute to a photo-realistic effect.



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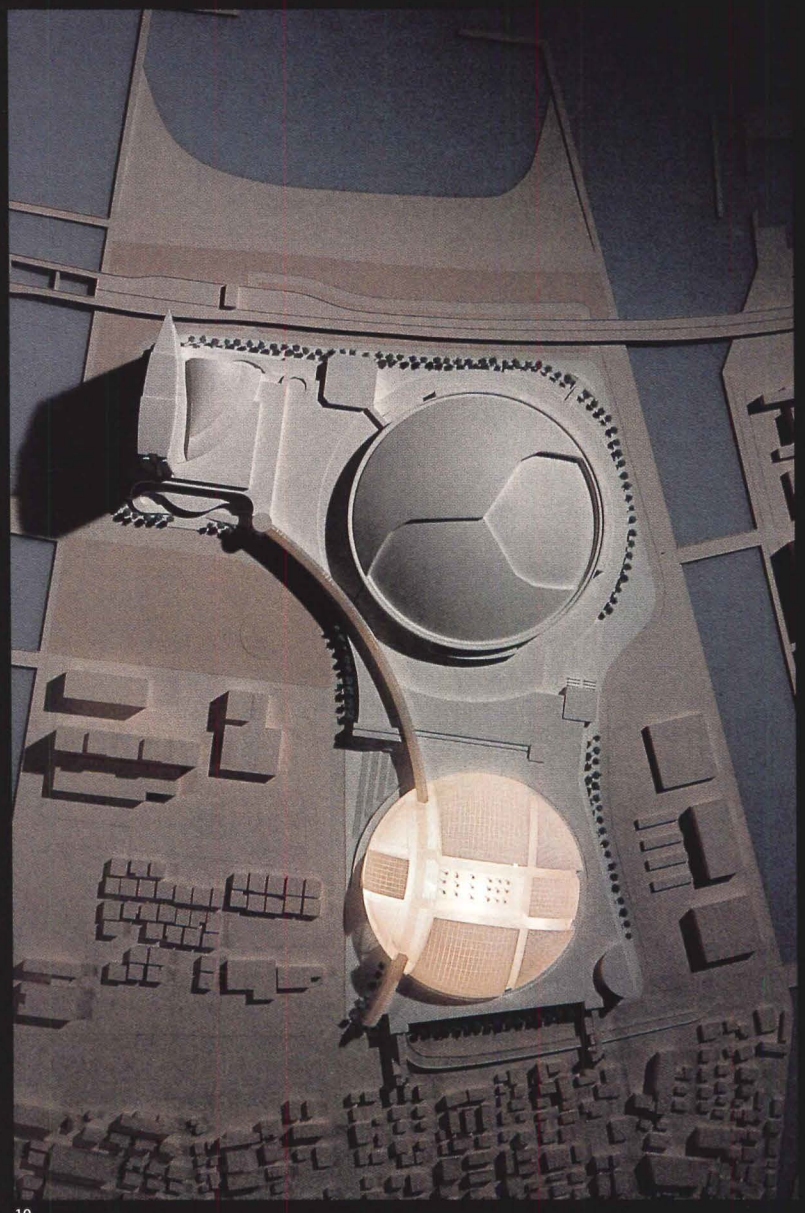
increasingly being used to model fluidly shaped buildings. Indeed, you begin to question the relevance of the old distinction between architecture and industrial design when you see models of everything from telephones to stadiums coming off the same machine.

Another design implication of CAD/CAM is its effect on the use of materials. Champlin's staff, for example, carefully arranges the parts of a model in their computers to make the cutting process most efficient, with the least amount of material waste. Because of the traditional separation between architects and contractors, designers rarely have a sense of whether certain configurations or dimensions will waste more materials than others. As CAD/CAM moves beyond model making into the construction of buildings, however, it can help us make such linkages, transforming design, contracting, and product manufacturing in the process.

Like everything, this technology has its costs. You sense, when talking to Champlin, that his sizable investment in equipment puts a certain pressure on him to keep it running. In his case, that has pushed him to be responsive and flexible in the services he provides. But the pressure remains. Also, the technology demands a greater attention to health and safety issues, which adds costs. Champlin has instituted a strict safety policy. "We wear respirators, masks, safety glasses. We ventilate each machine. We dispose of plastics and lacquers properly. But it is hard to compete against the guy who throws his lacquers down a drain," says Champlin. Still, that suggests that model making, once a trade, is becoming a profession, with the responsibility to do the right thing, even when it costs more.

Earlier in this century, Modern buildings began to look like the models that preceded them. Practices such as Champlin's suggest that we may now be entering a period in which architectural practice retraces the same route: when the way we design and construct buildings may begin to look like the methods by which we make models. □



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The Fluidity of Form

The three-axial milling machines, operated by numerical controls and linked to CAD stations, have been most often used in the making of industrial design models because of their ability to create curved and fluid shapes. They are being used more and more by architects, however, as building forms have become increasingly complicated. This massing model of the domes at Twin Dome City in Fukuoka, Japan, by Cesar Pelli & Associates (10), shows the kind of fluid shapes and complex curves possible with this technology.

God in the Details

Another advantage of CAD/CAM is its capacity to create highly detailed, realistic fabrications of people, furniture, architectural elements, and plant life. The interior model of the new National Airport in Washington, D.C., also by Pelli (11), features precise renditions, at a very small size, of standing figures, metal chairs and tables, and steel H-sections. The model of the Norton Museum of Art, designed by Center-brook (12), shows the variety and the convincing character of the trees and foliage that can be made.

11

12

Modernity Enriches History

Three works by Barcelona's Lapeña & Torres depict an inspirational Modernism that holds its own to complement a powerful historic context. With commentary by William J. R. Curtis.

Editor's Note: *The works in the following pages appeared in a monograph on José Antonio Martínez Lapeña – Elías Torres Tur Architects published by* El Croquis *(vol. 61, 1993), and are accompanied by portions of an essay by William J.R. Curtis, excerpted from the same issue.*

A historian and a critic, Curtis is the author of several books, notably: Le Corbusier: Ideas and Forms *(Phaidon Press, 1986);* Denys Lasdun: Architecture, City, Landscape *(Phaidon, 1994). The third edition of* Modern Architecture Since 1900 *(Phaidon, 1982, 2nd ed. 1987) is due out this year. He is currently assembling a book on recent Spanish and Portuguese architecture.*

All photos: Hisao Suzuki

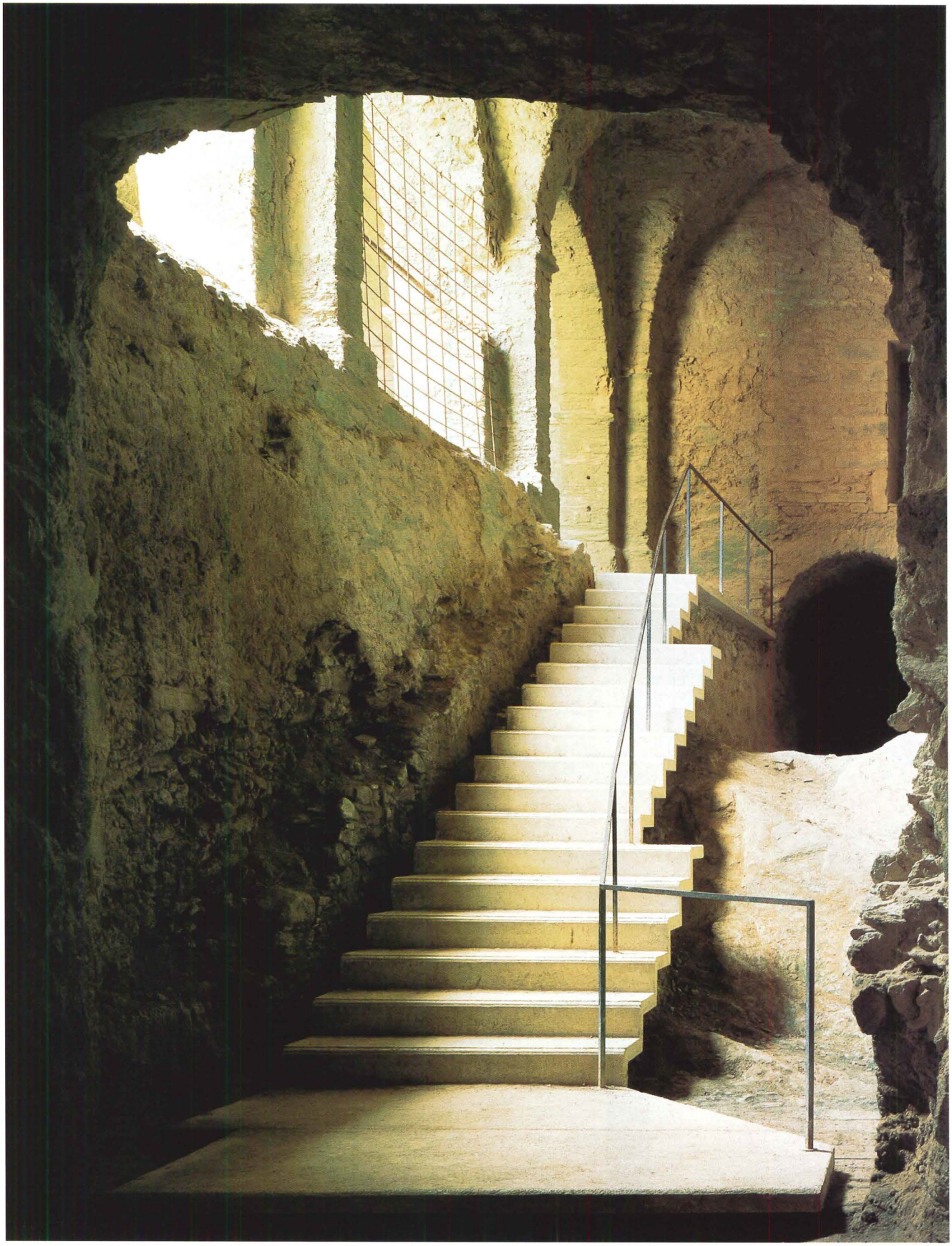
When one takes an overview of recent Spanish architecture, it is striking how much of the best work is concerned with matters of place and identity but without involving itself in overt regionalism or in the caricature that contextualism has now usually become. The work of Lapeña & Torres belongs in many senses to the Mediterranean edges and islands, though it partakes of an international artistic culture at the same time. It is an architecture that combines absorption of what already exists in countryside and city, with a spirit of free formal and metaphorical invention. It avoids ponderous dogma but is more consistent than at first appears. It oscillates perpetually between being earnest and being irreverent, and it finds nourishment in a wide range of stimuli outside as well as inside architecture, including painting, sculpture, literature, and natural forms. The work of Lapeña & Torres evades facile categorization and occupies a niche of its own in the field of recent Spanish production. ...

There is a larger question here about the Spanish architecture of the last decade, which is now being exported and sent around the world wrapped in a variety of mythological packages in several recent publications and exhibitions. The stress of these selections usually falls upon buildings which have an immediate image, or which are photogenic, and as a result there are many quieter architectures which are excluded, temporarily, from the architectural discourse. In the course of time a history of Spanish Modernism will have to be written that deals less with the "individualism" and more with the role of architectural invention and interpretation within the visible, and invisible, givens of a culture; such a study will need to come to terms with the interplay between technology, institutions, and the processes of modernization. ...

The involvement of Lapeña and Torres with vernacular traditions may be said to occur at an abstract level which engages with the pattern language and everyday wisdom of popular forms; the intention is to transform these substructures into a straightforward building system appropriate to the often rudimentary construction technologies of the present, where the stock-in-trade is the crude concrete frame, the simple brick wall, or pot-tile partition which can be plastered or painted. The preoccupation with Mediterranean memories or building conventions is not, of course, new. It belongs in a wider tradition which includes Coderch, Sert, and Siza. It needs saying that there is a deep vein of "Mediterraneanism" in the earlier modern movement, notably in the work of Le Corbusier. ...

Beyond specifically Spanish inspirations, each architect has ranged far and wide. In the sparse abstraction of some of [Torres and Lapeña's] buildings one senses debts to the Danish architect Arne Jacobsen; in the fragmentation of others, one feels echoes of Alvaro Siza, and, beyond him, of Alvar Aalto. Artists take what they need and interpret it as they see fit. ...

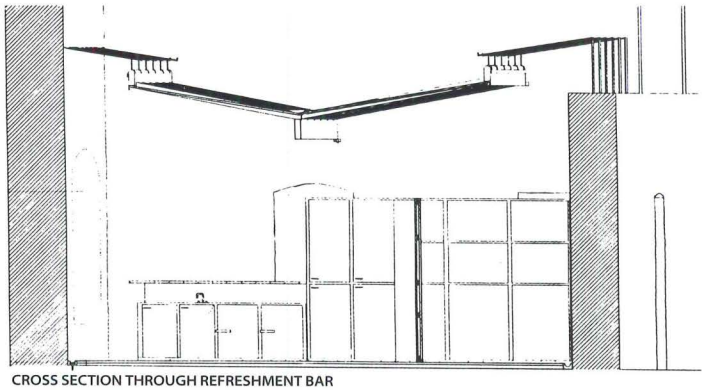
With Lapeña & Torres one might even hazard the guess that there is some remote connection to the Modern architecture of Southern California; indeed, if Barcelona has a natural cousin in the wider world it is surely Los Angeles, though that is not a hypothesis that can be developed further here. □



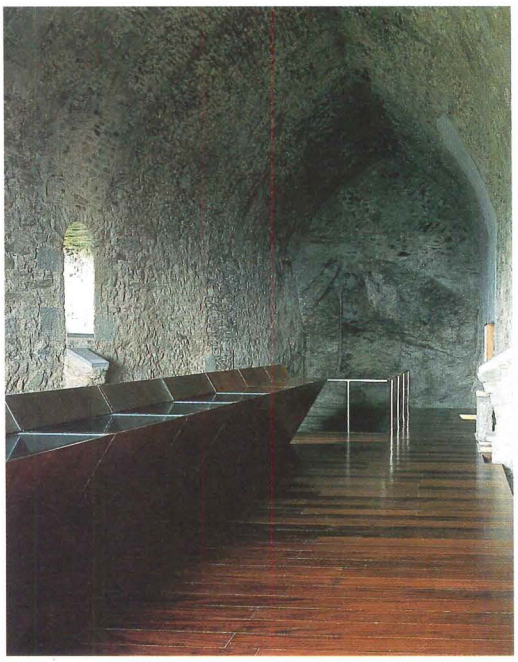
A new stair built over the old (above) at Sant Pere Monastery, Rhodes (facing page).

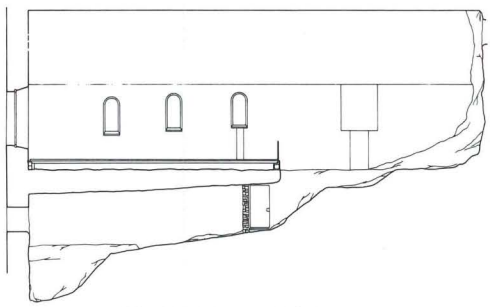
Sant Pere Monastery, Rhodes (1979–1993)

Lapeña & Torres aimed to convert the monastery complex into a museum by protecting and conserving its ruins. Copper sheets protect the roofs of the church nave, galilee, parapets, and the crowns of the walls. Visitor reception services were installed, including the entrance door (facing page) and refurbished restrooms (above). The section describes a new roof and clerestories, mounted on the original masonry walls, enclosing a refreshment bar adjacent to the entrance.

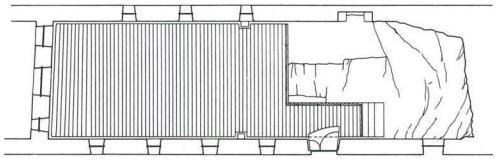


CROSS SECTION THROUGH REFRESHMENT BAR





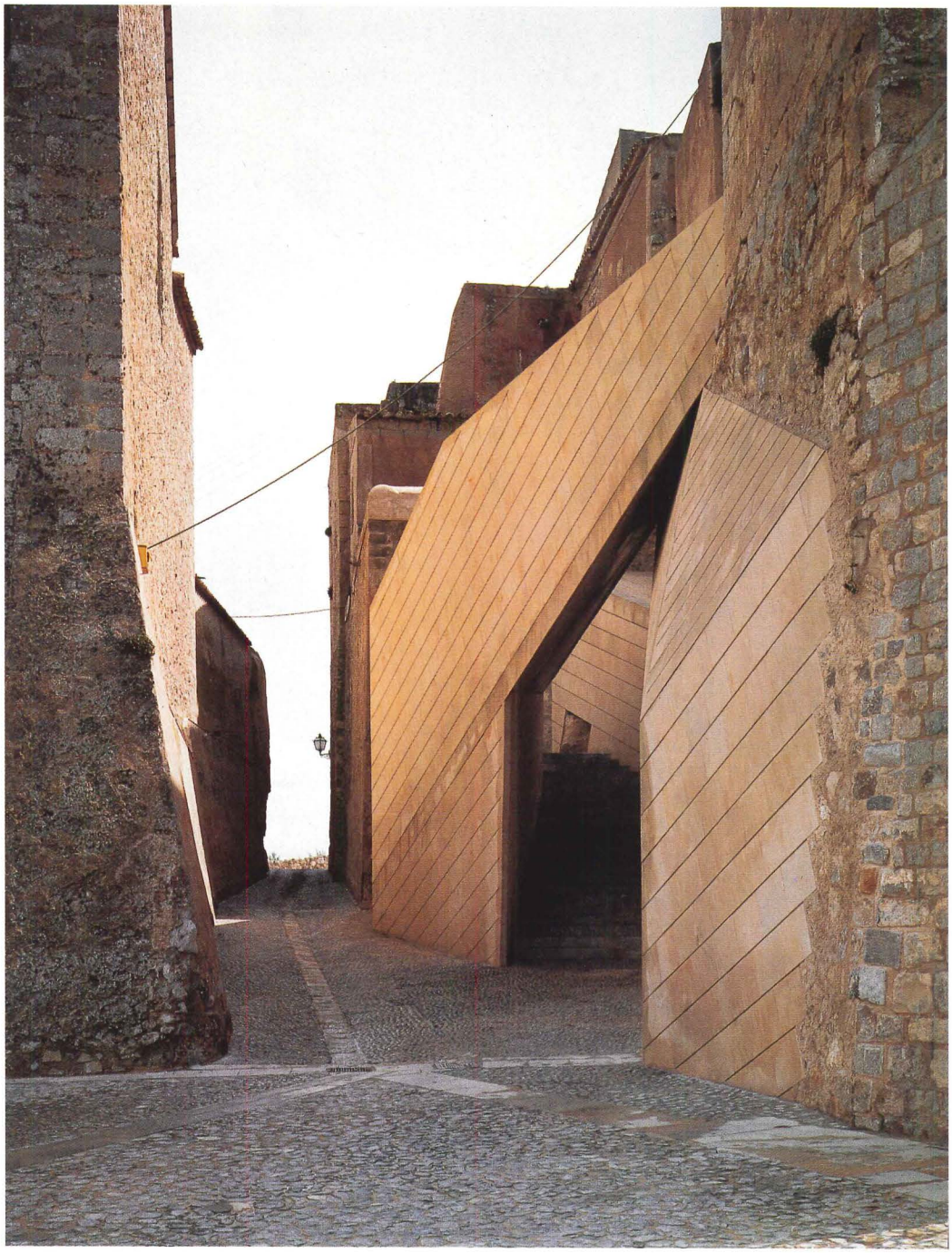
REFECTORY MUSEUM LONGITUDINAL SECTION

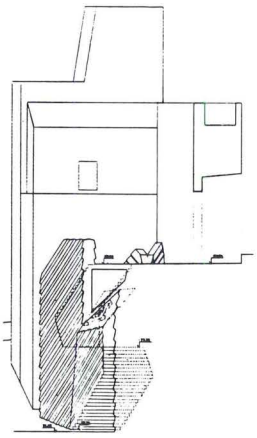


FLOOR PLAN

20'/6m

Historian William Curtis draws attention to Torres and Lapeña's strategies of "fragmentation, layering and erosion" that "set off the new against the old in a way that is intended to reveal new aspects of both." The "abstract counter theme of sliding planes in a masonry setting," evident at the Sant Pere Monastery, he notes, inevitably recalls Scarpa's museum insertions in Venice and Verona. At Sant Pere, the old refectory was converted into a small museum with a new wood and concrete floor and teak display cases. Concrete stairs allow access to a rock slope leading to an ancient subterranean space (section and plan, left). Similarly, a wood bridge supported on concrete fins (facing page) allows visitors to traverse the voids left by archaeological excavations.

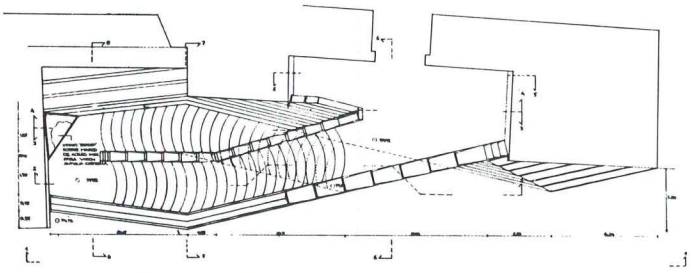




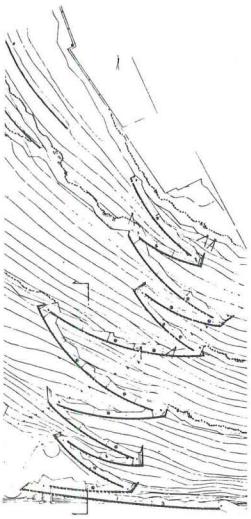
ACCESS STAIR CROSS SECTION

Ibiza Castle (1983–1993)

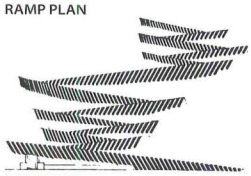
A new stairway of two flights (photo, plan, and section, this page) replaces an 18th-Century ramp leading to Ibiza Castle. Its angular walls and scissor configuration evoke the crevicelike compression and disappearing sightlines of the archaic fabric. Torres and Lapeña's new construction was clad with *marés* sandstone ashlar that will weather rapidly to resemble the aged stone of the Moorish wall to which it is attached.



IBIZA CASTLE ACCESS STAIR PLAN



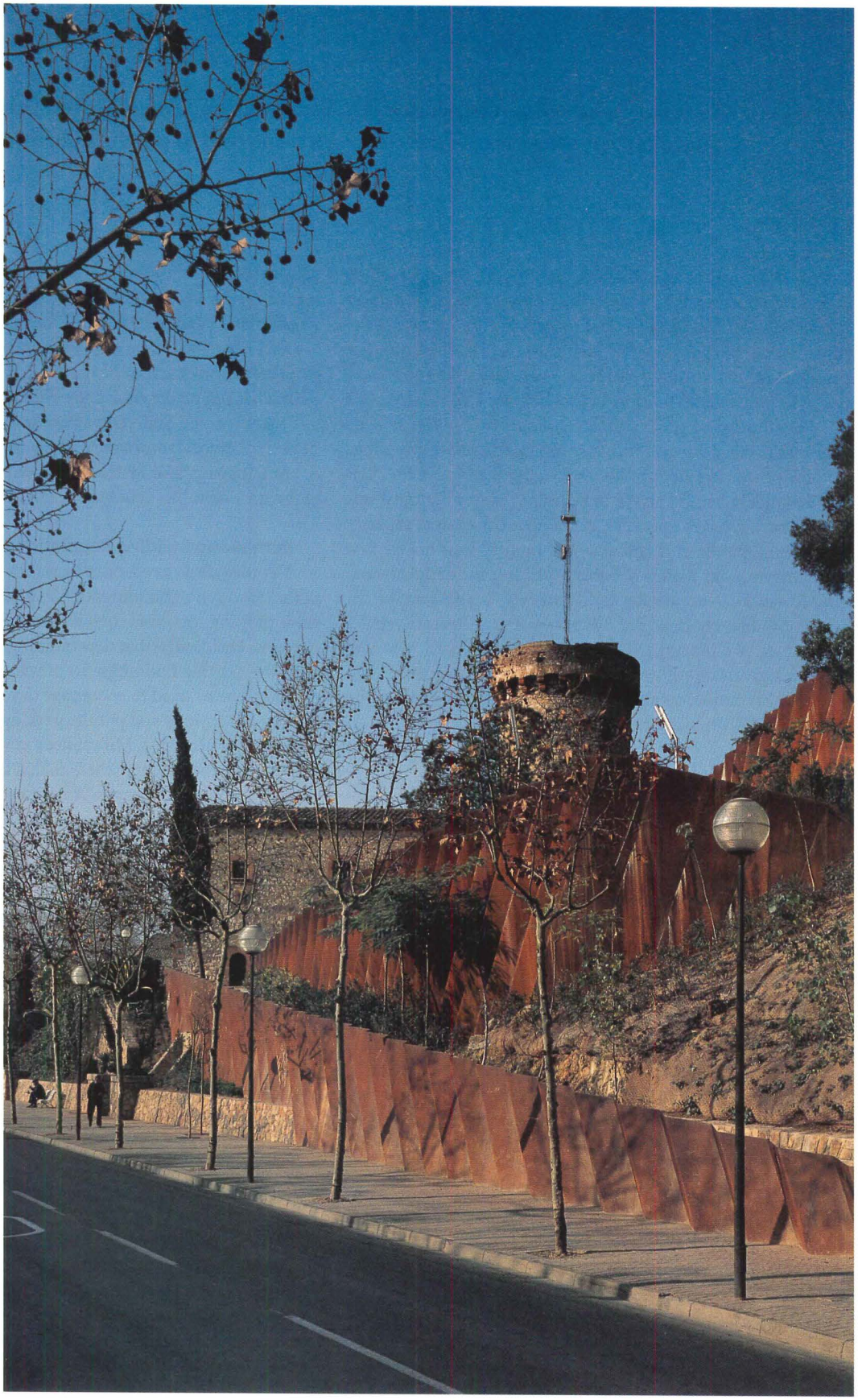
RAMP PLAN



ELEVATION

Castelldefells Castle Ramps, Barcelona (1987 to date)

To afford access to the castle from the center of town, Lapeña & Torres created a zigzagging ramp, over half a mile long, supported by retaining walls clad with folded Corten steel plate (photo, plan, and elevation, this page). As seen from the street, the canted surfaces of rusted metal create a compelling, dynamic contrast to the historic structures on the hillside.



The Mayor Who Preaches Design

Milwaukee's John Norquist, a disciple of both Tom Wolfe and the New Urbanism, fights highway engineers, exhorts architects, and tries to get the buildings in line.

by James Auer

There are those who suggest that because John O. Norquist stands six feet seven inches tall, he sees farther down the road. Whatever the advantages of being able to look over heads in the crowd, the rangy 45-year-old mayor, now well into his second four-year term, does have a strong vision of design and its importance. Though lacking formal training in architecture – his basic text is Tom Wolfe's popular gloss, *From Bauhaus to Our House* – he exudes enthusiasm for traditionally organized urban buildings and their power to improve life. When the Congress for New Urbanism met in San Francisco in February, Mayor Norquist was one of its best-received speakers, extolling architecture's capacity to inspire the public and enhance community well-being. Few big-city mayors can match Norquist's passion for design issues.

In Milwaukee, Norquist has fought freeways, talked up the delights of city life, championed adaptive reuse of historic structures, quoted Wolfe's anti-Modernist strictures to all who will listen, and given countless slide shows contrasting the cozy charms of his hometown's many neighborhoods against the barren profitability of suburbia's franchise rows.

Stirring Up Opinion-Makers

He has injected himself into building and infrastructure projects that earlier, less architecturally attuned chief executives of this city of 636,000 might have left to subordinates. Not long ago he sent photographs of the city's nearly forgotten Industrial Exposition Hall, a flamboyant wood-and-brick structure that burned to the ground in 1905, to local opinion-makers as a way of stimulating talk about the appearance of the soon-to-be-built Wisconsin Center, a $165-million convention facility. "Convention centers that have been built in the last 20 years are not a pretty sight; most of them are ugly," he said in an interview. "We want people to choose to come to Milwaukee, not only because of the variety of attractions the city has but because the convention center itself is an attraction." This spring, the center's design and engineering services were awarded to D4 Associates, a team made up of the local architecture firm Engberg Anderson; Thompson, Ventulett, Stainback & Associates of Atlanta; Affiliated Engineers of Madison, Wisconsin; and Graef, Anhalt, Schloemer & Associates of Milwaukee. KenKay Associates of San Francisco is urban design consultant.

Norquist combines ideas that some think contradictory. A liberal Democrat with a maverick streak, he has been actively involved, along with Wisconsin's equally independent-minded governor, Tommy Thompson, a Republican, in investigating welfare reform. Norquist can, in the same intense conversation, cite both socialist and libertarian economic doctrines. Though he is an unabashed homebody who has lived in the same modest South Side house for 35 years, he enjoys discussing the architecture of Amsterdam, Paris, Tel Aviv, and Toronto.

As a state senator, he led a long and ultimately successful fight to prevent construction of the Park East Freeway, which would have infringed on the city's Lake Michigan shoreline. As mayor, he has taken on the State Department of Transportation over the design of bridges, sometimes persuading engineers to forgo humdrum flat spans and instead build with more interesting arches and with sidewalks, detailing, and lighting scaled to pedestrians.

Rethinking Building Regulations

Norquist discovered, once he was in the mayor's chair, that one of the reasons new buildings often sat back from the street, behind drab parking lots, was the city's zoning code. So he instituted changes. He insisted that new buildings be encouraged to line up with the existing buildings. To prevent the blank look of corner parking lots, he tried to encourage developers to construct buildings on the corners and put the parking in less conspicuous locations. Under Norquist, Milwaukee's may be the only city building inspection department in the U.S. that takes responsibility for fostering coherent streetscapes. An example of the mayor's emphasis on having buildings maintain a consistent street edge, defining "urban rooms," is the Bay View branch library designed by Engberg Anderson. In accordance with the mayor's exhortations, the library was been built close to Kinnickinnic Avenue, a busy neighborhood commercial street. Its tallest volume, equivalent to two stories, fronts on the sidewalk to maximize its architectural presence, and a combination of large windows, buff-colored brickwork, and terra cotta accents picks up on characteristics of buildings nearby.

Norquist's role as a self-appointed architectural missionary is not universally applauded. Mention his abiding advocacy of people-friendly urban spaces and pollution-free mass transit, and some observers – including a number in the local news media – deride him as an ineffectual, meddling amateur. But he enjoys support from members of the Milwaukee Arts Board and from builders, architects, and designers who welcome the code changes he has spearheaded.

Milwaukee, like many American cities, is embroiled at the moment in a battle to reinvigorate its downtown business district, rescue its neighborhoods from decline, and shore up its industrial base. By recognizing the role played by architecture and urban planning in assuring the community's social and economic vitality, Norquist is helping to lay the groundwork for Milwaukee's long-term survival. In the shorter term, as an avid critic and proselytizer, he is putting his personal imprint on the town – and having a great time doing so. □

Milwaukee Department of City Development, David La Haye.

James Auer is the arts critic of the Milwaukee *Journal Sentinel.*

Milwaukee Mayor John Norquist, an exponent of the idea that "cities should delight people," tries to fit new buildings into pedestrian-scaled design. Behind him is the century-old City Hall.

Applying the "Picture Postcard Test"

Milwaukee Mayor John O. Norquist was interviewed recently by James Auer, arts critic of the Milwaukee *Journal Sentinel*. Here is the exchange:

James Auer How do you judge a building's success or failure?
John O. Norquist I have what I call the picture postcard test. If you can't find anything in a built landscape that could be put on a picture postcard – and it doesn't have to be individual buildings, but the ensemble of buildings – then the architect has failed. The architect has created a public scene that no one will love, that no one will celebrate.
Auer And designers often fail this test?
Norquist The biggest mistakes by architects in the last 50 years have been made when they didn't consider the context, they didn't consider the effect of what they were going to do on the things around it.
Auer Can you give me an example or two?

Fighting the Downtown Blues

Norquist The blue aluminum and glass federal office building at Fourth and Wisconsin, what I call the Milk of Magnesia building. It wasn't designed to fit into the setting it's in. It doesn't look like anything around it. So it hasn't been a building people have grown to love; it hasn't necessarily added value to the buildings around it. The idea was to have more office activity downtown, to concentrate offices there. Since then, the federal employees working there have tended to bleed back out of the building. Now the building always has space available, if you want to rent it.

Another example is the old convention center. Built in the 1960s, it has no windows on three sides, and white walls. Even the windows that are there are windows you can't see through. So it has a kind of sterile, blank, concrete block effect.
Auer Do you have any preconceptions about what the Wisconsin Center, Milwaukee's new convention center, may look like?
Norquist We want an interesting façade on three sides. There's one side where you can compromise a little on the beauty; you need a utility entrance for trucks. That's something you have to remember when you're trying to restore cities: cities have to work functionally. You have to have delivery space, things like that. But it doesn't have to be ugly.

A German Motif

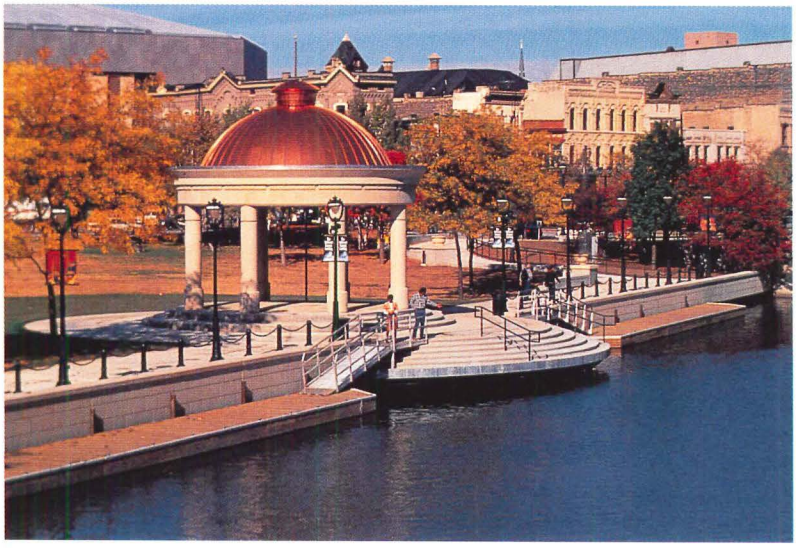
Auer How do context and the "picture postcard test" apply to other projects the city is pursuing?
Norquist In Père Marquette Park, Midwest Express Airlines wanted to do something for the community; they offered to build a band pavilion. A few of their original ideas didn't really fit into what was going on. So they looked around and found *kaiser-kopf* treatments [a dome with a projection on top, like a German helmet] on the old Germania building, and so they took the design and used the *kaiser-kopf*. It seems to me it will work really nicely. It's along the riverwalk.
Auer How significant is the riverwalk?
Norquist The riverwalk ties the downtown together. It will help the city turn its face back to the Milwaukee River. I predict, as the walk grows, that people will love it more and more.
Auer What is your approach to building and zoning codes?
Norquist We've had a problem with bad building and zoning codes. Codes that required setbacks, codes that required parking in front, codes that prohibited ornamentation on buildings. If you look at most suburban zoning codes, and for that matter most cities' building codes, they encourage strip malls, encourage ugliness, encourage landscapes where pedestrians aren't welcome. And they completely fail the picture postcard test. Now those codes are under attack, thank God.

Changing the Codes

Auer You intervened in specific cases, didn't you?
Norquist The Bay View library was contracted to be built set back on Kinnickinnic Avenue, an old business street on the southeast side. That wouldn't have helped that street. Most of the buildings on the street are right up tight to the sidewalk, intact. Kinnickinnic had all the elements of a good street, so I stuck my nose into that. Instead of tearing buildings down and having a setback library as was originally planned – it's on a state highway, and the code says set it back – we got a variance and put it in the right place. I realized finally, though, that intervening in specific cases wasn't good enough. What we needed to do was to change the code entirely. We've made a lot of progress on that. Now the code says new building setbacks should be consistent with whatever else is there. And then if you want to make it different, you have to get a variance.

The Freeway That Sprouted Apartments

Auer You've fought with the state transportation department.
Norquist I helped kill the Park East Freeway. I'm very proud of that. It would have been a horrible freeway. It would have undone a lot of the good that the Socialists did in protecting the lakefront. Fortunately the freeway died, but then we had to fill in the gap – with housing that looks like Milwaukee. It's urban-scaled four-story buildings.
Auer Does the resistance you've encountered in your fight for a light-rail system bother you?
Norquist Yes. The Marquette Freeway interchange in the middle of Milwaukee will cost $600 million to rebuild, and that's not even debated. Yet land under the interchange is rendered useless and pays no taxes. But if you want to build a $450-million light-rail system, then there's endless debate.
Auer Do you think some of these elevated roadways will be returned to grade eventually?
Norquist Yes, I think one of the great public works projects of the next century will be the deconstruction of freeways. You can see it already starting: the Embarcadero going down in San Francisco and property values springing up by 300 percent in the area where the freeway was; Portland putting a riverwalk where a freeway used to be. There's going to be a lot of that happening once economists apply themselves to the economics of transportation. This year thousands of Milwaukeeans are celebrating the 100th anniversary of our beautiful City Hall. Nobody will be celebrating interchange architecture 100 years after it's built. □



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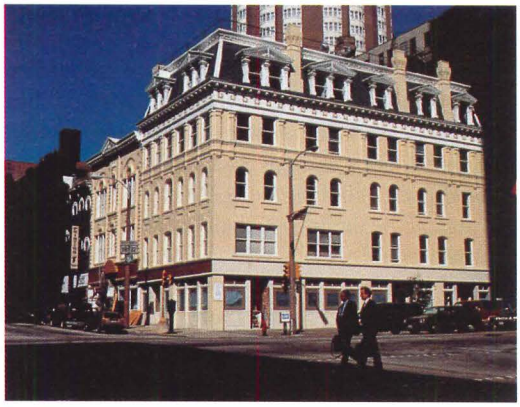
2

Among Milwaukee's recent accomplishments is the redesign of Père Marquette Park as part of the $10-million expansion of the riverwalk system. Anchoring the park is the pavilion (1), whose dome was designed to echo the dome on top of a historic office building nearby. Mayor Norquist brought in the San Francisco urban design firm KenKay Associates to help with the park's overall design. The mayor, a preservation advocate, was instrumental in renovating the vacant Esperanza Unida International Building from 1901 (3), which, had it been torn down, would have left a huge vacant lot, exposing a fragile low-income neigh-borhood to an adjacent freeway. In the heart of downtown, he helped restore the Curry/Pierce Building from 1866 (4), which had sat empty for several years. The Bay View Public Library by Engberg Anderson (2) reflects the mayor's insistence that new buildings in old neighborhoods form a consistent line along the street, creating well-defined "urban rooms." The mayor has goaded transportation engineers to create bridges that rise above the utilitarian; an example is the North Avenue Bridge (5).

3



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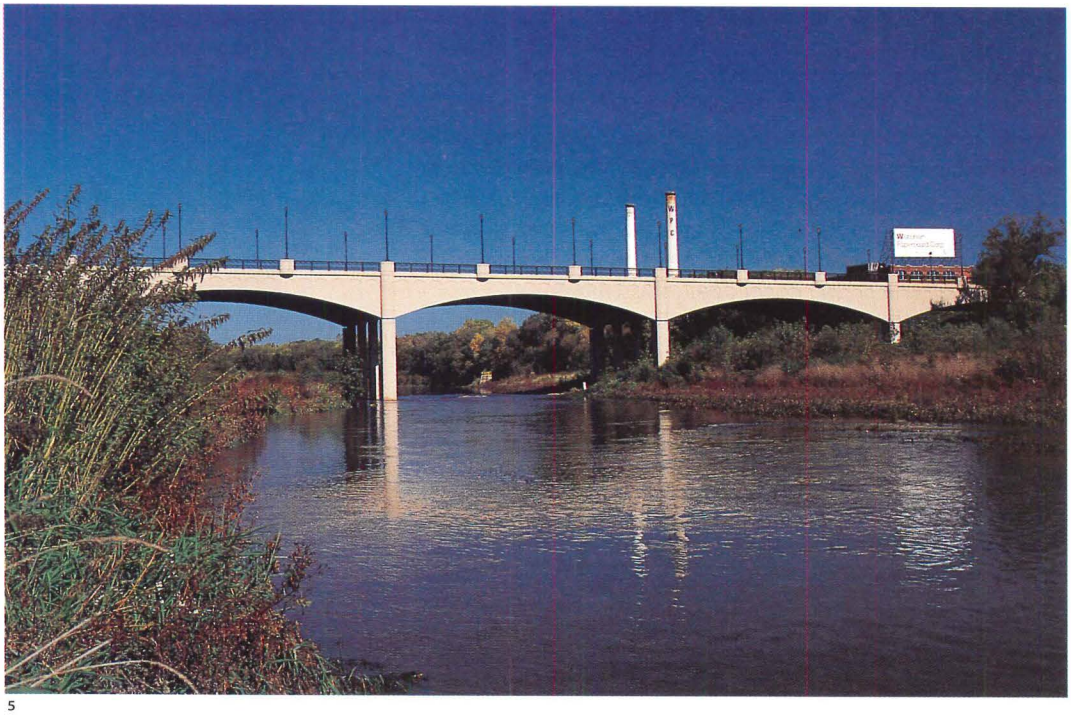

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Photos: (Bay View library) Joy Peot Shields (2); all other photos: Milwaukee Department of City Development, David La Haye

Process

Shakespeare on the Thames

The reconstruction of Shakespeare's Globe Theater involves architectural sleuthing and the revival of 16th-Century building technologies. *by Dan Cruickshank*

To build a theater for an audience of 1,500, using a 16th-Century plan-form and traditional timber framing, may seem more than a little eccentric. But this is precisely what is happening on the banks of the Thames in London. In the long and spirited campaign to recreate Shakespeare's Globe Theater in Bankside, 16th-Century building techniques had to be reconciled with current building codes and safety standards to create a structure that is authentic historically, safe for its audience, and functional for its performers.

First conceived almost 25 years ago, the theater is now three-quarters built with little compromise of its authenticity. The open-air theater is framed in green (unseasoned) oak, has a thatched roof, and will contain wooden amphitheater seating on three levels, as did the original. The driving forces behind the project were American actor Sam Wanamaker and British architect Theo Crosby. Sadly, both died last year, but momentum has been maintained by the International Shakespeare Globe Centre, the company established by Wanamaker to realize the project, and by timber repair and restoration specialist Peter McCurdy and architect Jon Greenfield of Pentagram, who worked on the project with Crosby. The Globe is part of a mixed-use development that will include housing, calculated to produce an income for the theater, and a replica of an indoor playhouse designed by Inigo Jones between 1617 and 1639, among other facilities.

In addition to its appeal as a curiosity, the project is significant because it demonstrates that traditional materials and construction methods remain relevant today. Green oak is an extremely strong, relatively cheap, malleable, and ecologically renewable material. Lime render laid over riven oak laths provides both good insulation and, with a little help from modern materials, offers exceptionally good fire resistance. As was most likely the case with the original Globe, the timber framing was prefabricated – a method that prefigures modern preassembly.

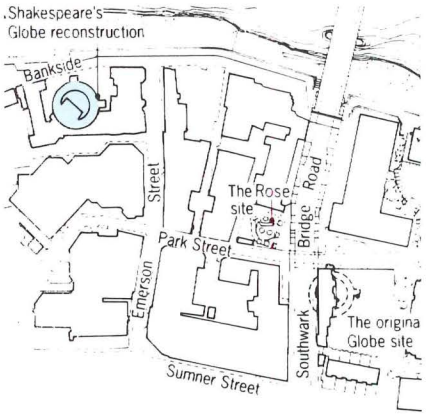
More difficult than meeting the demands of current building codes has been the task of deciding exactly what the Globe Theater looked like originally, how it was constructed, how it was organized internally, and how the auditorium and stage were detailed and decorated. To make matters more complicated, there were two Globes. The first Globe, constructed in 1599, burned down in 1613, but was quickly rebuilt. It is the first Globe that is now being reconstructed. The second Globe, believed to be closely modeled on the first, is recorded in several 17th-Century panoramas of London. This visual evidence, collected by historian John Orrell, combined with related information and limited findings from the excavation of a small part of the original Globe site (now buried beneath a landmark terrace) provided the basic information for the current reconstruction.

The Globe designed by Crosby and Greenfield is not the perfect "Wooden O" implied in Shakespeare's prologue to *Henry V*, but is in plan a faceted circle of 20 sides, each facet a reflection of a three-story, oak-framed bay. Research suggests that the geometry of the theater radiated from a central point and that the form and the number of bays were determined by radiating lines set 18 degrees apart. The position and projection of the new stage was established using the *Ad Quadratum* method, a sacred geometry

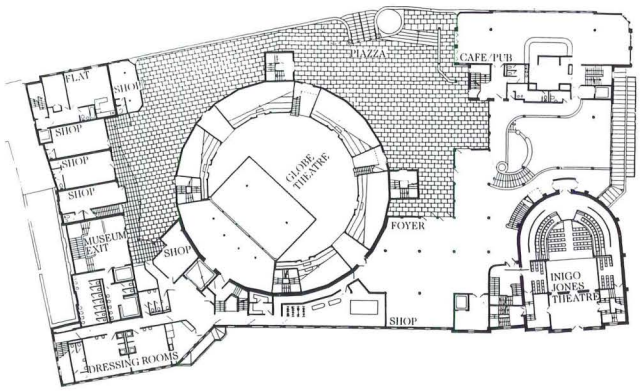
The centerpiece of a mixed-use development (shown, in a watercolor rendering by Dennis Bailey, facing page), the reconstruction of the open-air Globe Theater (facing page, top) in London is expected to be completed by next summer. Built on a massive concrete platform, each of the new theater's 20 timber-framed structural bays sits on a plinth constructed of Tudor-style brick and lime mortar.

The author, former history and features editor of The Architects' Journal *and* The Architectural Review, *is editor of the centenary edition of Sir Banister Fletcher's* History of World Architecture.

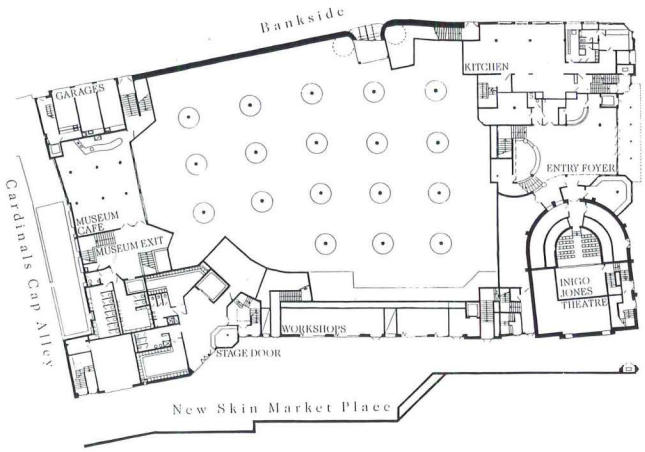
Photo: Richard Kalina; watercolor rendering: Dennis Bailey



SITE PLAN N 100'/30m



PIAZZA LEVEL PLAN OF INTERNATIONAL SHAKESPEARE GLOBE CENTER



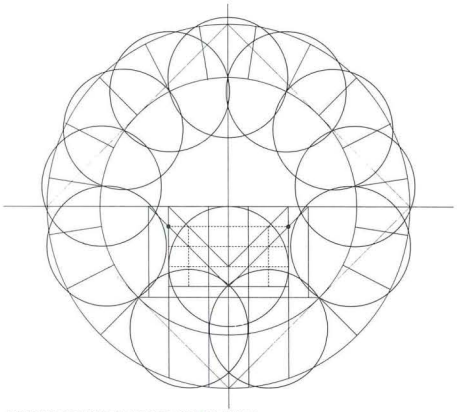
ENTRY LEVEL PLAN OF INTERNATIONAL SHAKESPEARE GLOBE CENTER N 40'/12m

that many Tudor designers favored.

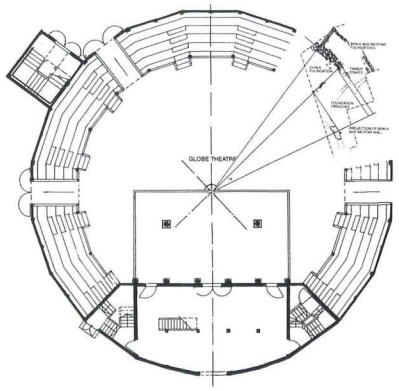
The decorative treatment of the interior of the theater has caused much discussion since there is no record of the appearance of the auditorium of the 1599 Globe and few illustrations of the interiors of any contemporary theaters. Crosby concluded that the interior of the Globe would have had a strong Classical veneer, reflecting the information found in influential books of the time, notably Sebastiano Serlio's *Tutte l'Opere d'Architettura* of 1550 and Andrea Palladio's *I Quattro Libri dell' Architettura* of 1570.

The theater has been constructed on a massive concrete platform that gives it great stability. The large-scaled oak members forming the theater's frame possess the required one-hour fire resistance. The panels between the frame (a sandwich of traditional and modern materials) surpass the required fire resistance. With the theater's central court open to the sky, smoke extraction is not a problem. Even the thatched roof meets code because its reeds are treated with a fire-retardant material, laid on fire-resistant boarding and outfitted with sprinklers (see Selected Detail, p. 121). Placed along the ridge of the roof, the sprinklers look a little incongruous, but are a relatively minor compromise.

The speed of the reconstruction has been paced to the speed with which funds have been raised, but completion is now scheduled for June 1996. Performances will be as authentic as possible – the pit filled with a standing audience of up to 500 people. There will be minimal artificial lighting, so plays will be scheduled during daylight hours and a large portion of the audience will have to be resigned to getting wet if it rains. The Globe's long-term success will depend on the combination of the power of its authenticity as a reconstruction and the quality of its performances. □

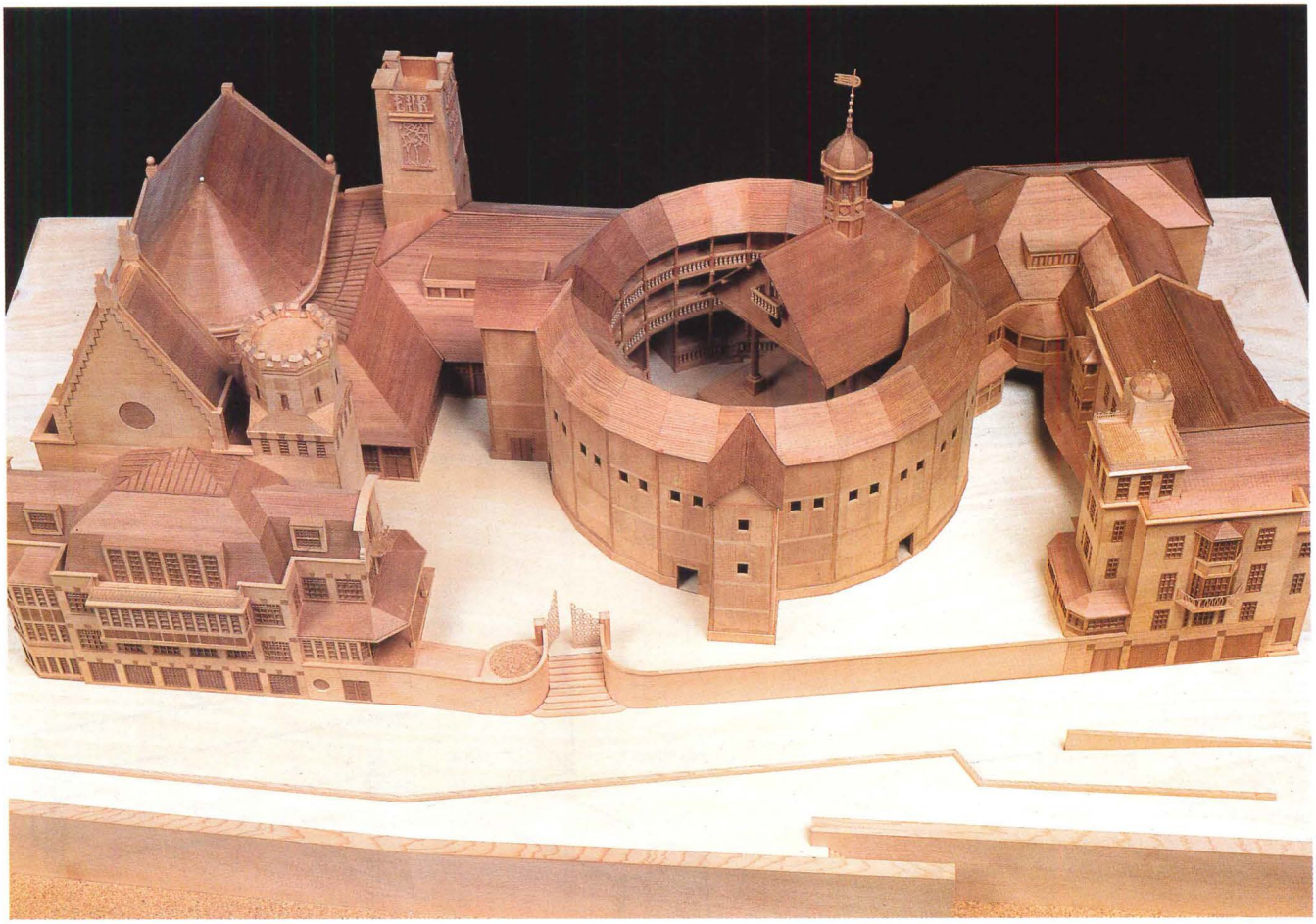


SETTING OUT DIAGRAM OF THEATER



GROUND FLOOR PLAN OF RECONSTRUCTED GLOBE (ARCHAEOLOGICAL REMAINS FROM ORIGINAL GLOBE ARE SUPERIMPOSED) N 20'/6m

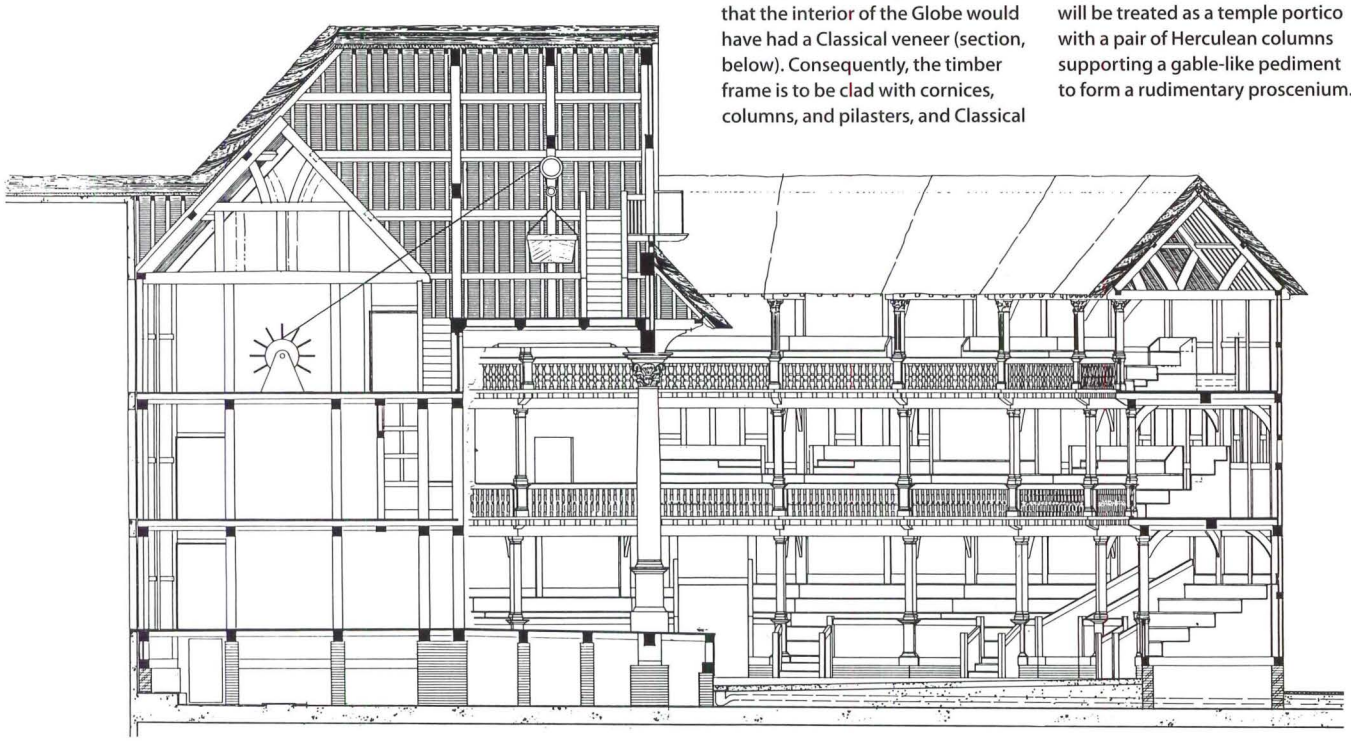
The Globe's site in Bankside, on the south bank of the Thames, is not the same as the first Globe's, which was slightly to the east and south (site plan, above, left); the original is buried beneath a landmark terrace. The site will eventually include a replica of a 17th-Century theater designed by Inigo Jones, a museum, a row of private houses, restaurants, and bars (model, facing page, top). The position and projection of the Globe's stage has been resolved using the traditional *Ad Quadratum* method, the sacred geometry favored by the Tudors (see setting out diagram, left). This method determines the strict geometric relationship between two concentric circles defined by a square drawn between them. These primary circles and the square can contain smaller, proportionally related circles and squares that overlap to define the focus of the internal space: the stage. Historic authenticity is the main goal of the project, but a few compromises have been made: the original Globe had two staircases and two escape routes from its ground floor pit, but to meet current safety codes, the new Globe has four staircases and four escape routes.



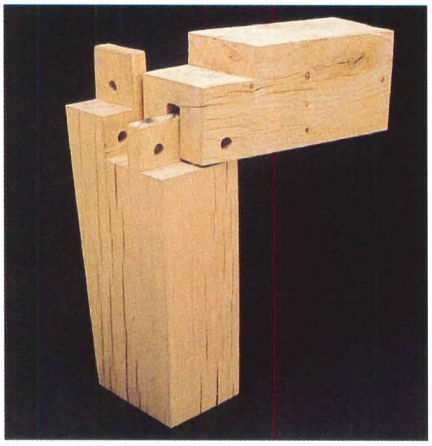
Andrew Fulgoni

MODEL VIEW FROM THE NORTH

Based on information found in books by 16th-Century architects Sebastiano Serlio and Andrea Palladio and other related sources, architect Theo Crosby concluded that the interior of the Globe would have had a Classical veneer (section, below). Consequently, the timber frame is to be clad with cornices, columns, and pilasters, and Classical balustrades will embellish the gallery fronts. The interior will be richly colored and textured with much marbling of the columns and the entablatures. The stage will be treated as a temple portico with a pair of Herculean columns supporting a gable-like pediment to form a rudimentary proscenium.

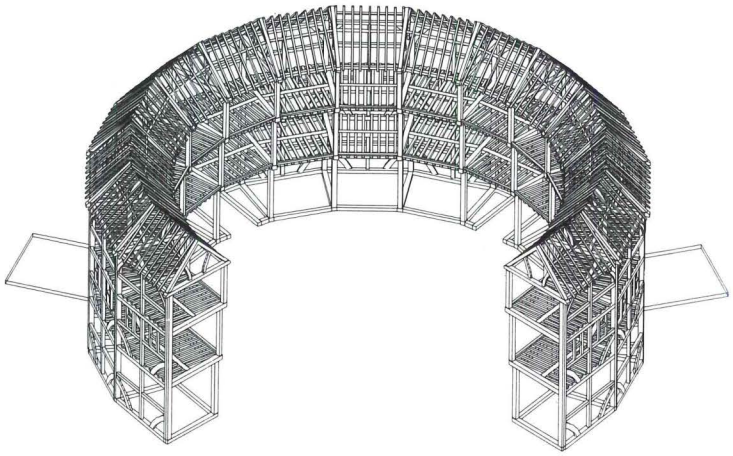


SECTION THROUGH STAGE



Nick Turner

MODEL OF MORTISE AND TENON JOINT



COMPUTER RENDERING OF THE AUDITORIUM'S 15 STRUCTURAL BAYS

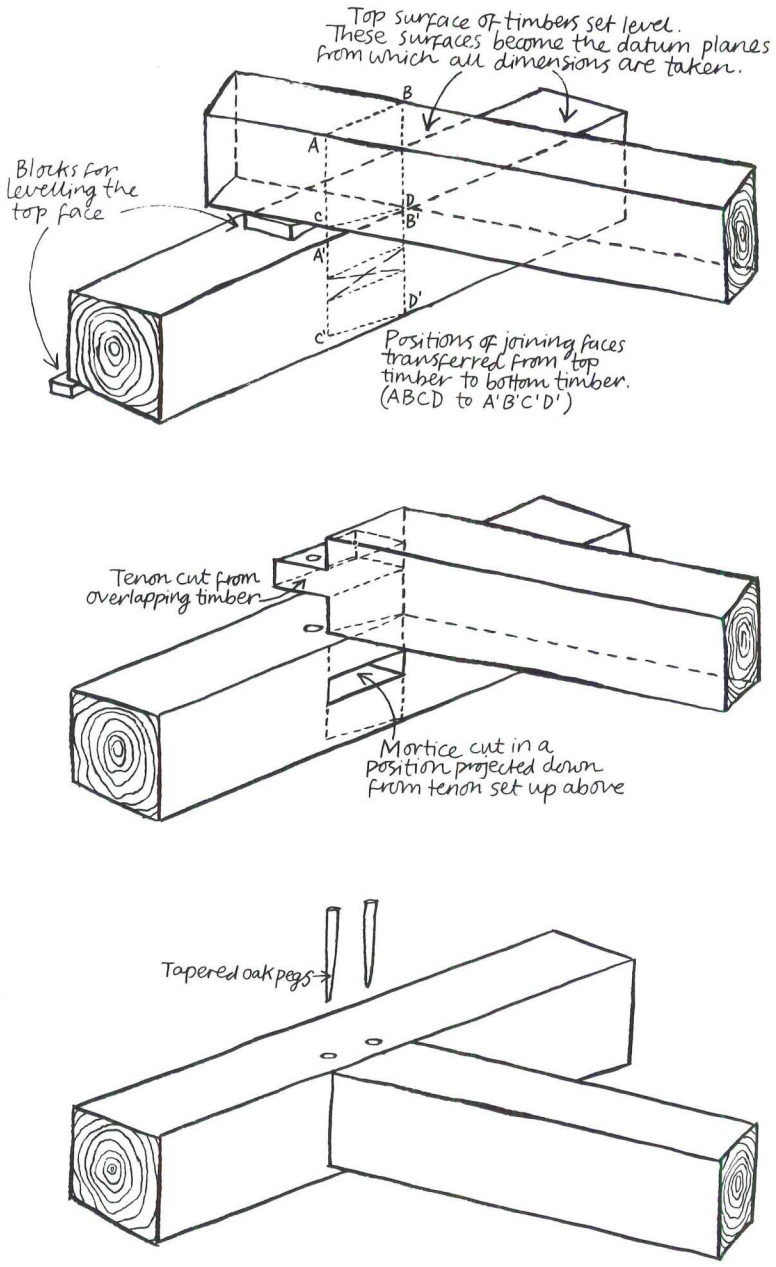
The Timber Frame: Making Ends Meet

Peter McCurdy of McCurdy & Company, a contractor specializing in traditional timber-frame construction, is one of the key figures in the historically authentic reconstruction of the Globe. He investigated the way that comparable 16th-Century polygonal structures were framed and joined, selected the oak used in the construction, and supervised fabrication in his building yard located about 50 miles west of London.

Taking a cue from 16th-Century traditions, McCurdy's crew worked with green oak, but could not cut square joints because the unseasoned timber gradually twists or warps. As McCurdy points out, "carpenters throughout time have had to evolve systems for setting out their buildings and for marking joints which take account of the fact that they are working with material which is not square." These joinery techniques take advantage of the wood's movement to form even stronger joints, and it is these essential techniques that McCurdy has used in the Globe project.

He has also used the traditional method of setting out and dimensioning the structure using "rods." This method, says McCurdy, is the one "least likely to cause errors ... which in a circular building could have accumulated into a disaster if both ends did not meet."

McCurdy also undertook the research into the composition and the use of lime mortar in the 16th Century. The final choice at the Globe is a mixture of lime from Derbyshire, sand aggregate, and goat hair to ensure a good key to the laths. No cement or setting agent has been used.



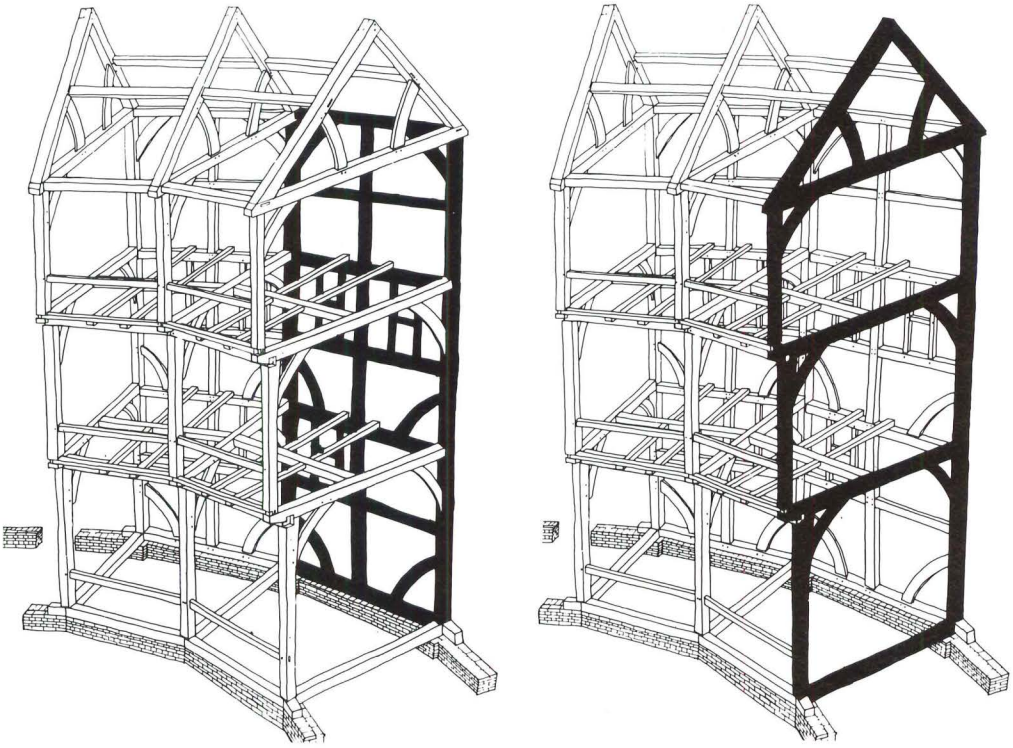
SCRIBING SEQUENCE (THE PROCESS OF MARKING OUT THE JOINTS FOR CUTTING)

Toby Glanville

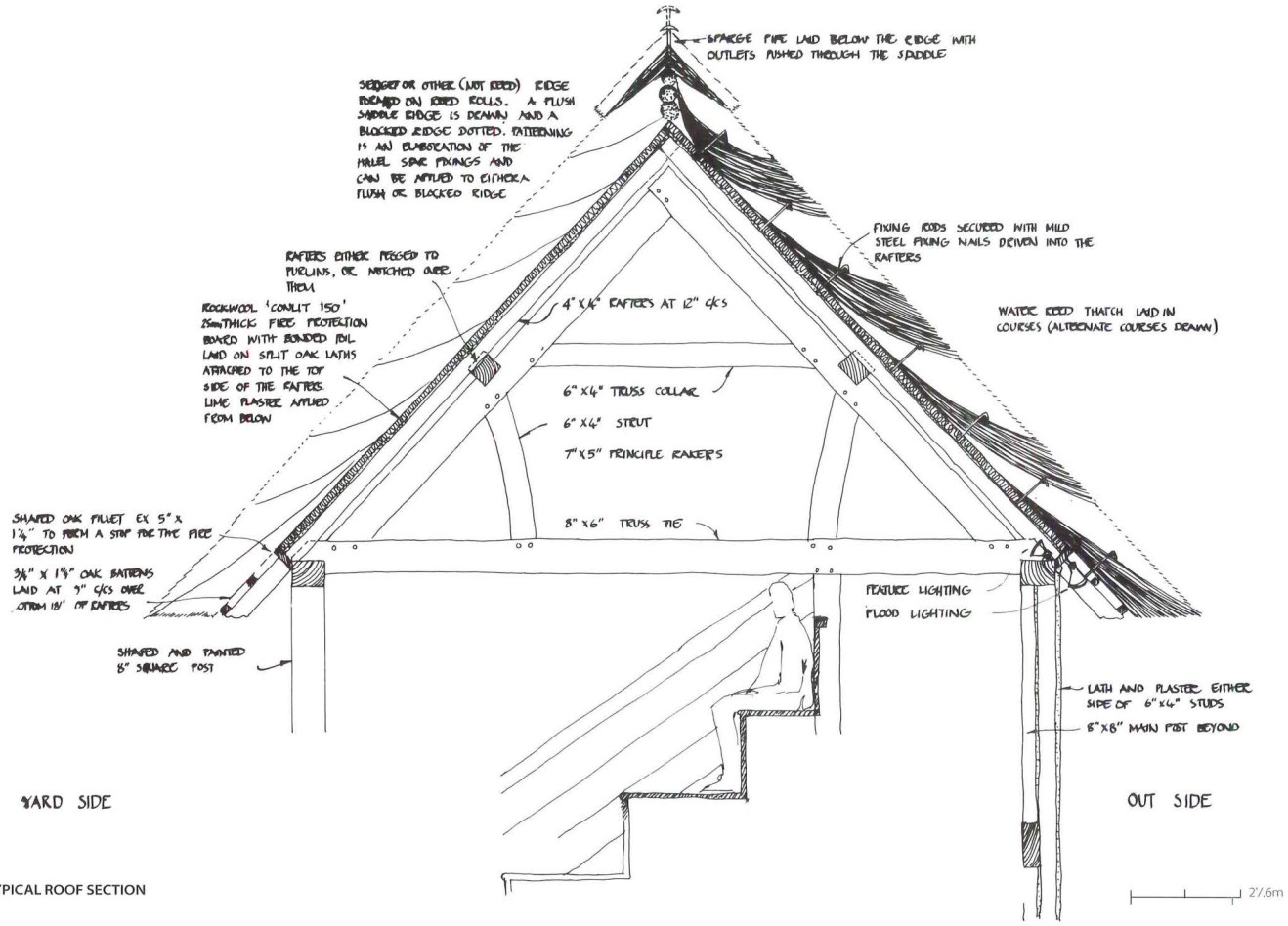
POST AND WINDOW ASSEMBLY BEING LOWERED INTO PLACE

VIEW OF TIMBER FRAMING WITH PARTIAL THATCHING

No information survives about the detailed construction of the Globe, so the process of fabrication and construction has been based on the characteristic practice of the period. Off-site, each section of green (unseasoned) oak was cut, shaped, and placed flat on the ground (see diagrams, right), where the joints were scribed (see scribing sequence, facing page), cut, and fitted. The joints are mostly mortise and tenon, but few of the joints are square because of the circular geometry of the building. After the joints were cut, the prefabricated frame was transported to the site, where each bay was raised, and the joints were secured with stout oak pegs. Allowances were made for modern technology, as in the use of a crane to raise the structural bays and lower preassembled pieces into place (above).



DIAGRAMS OF TIMBER BAYS (BLACKENED PORTIONS SHOW HOW THE THREE-DIMENSIONAL STRUCTURE CAN BE RATIONALIZED INTO TWO-DIMENSIONAL ELEMENTS THAT CAN BE FABRICATED LYING FLAT IN THE CARPENTER'S BUILDING YARD)



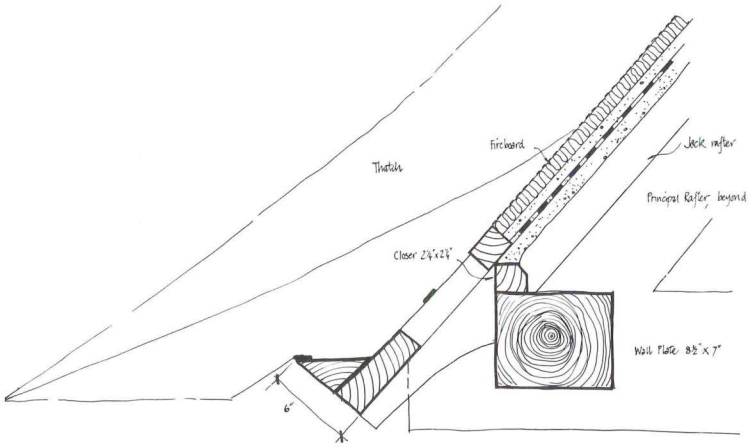
TYPICAL ROOF SECTION

Jon Greenfield

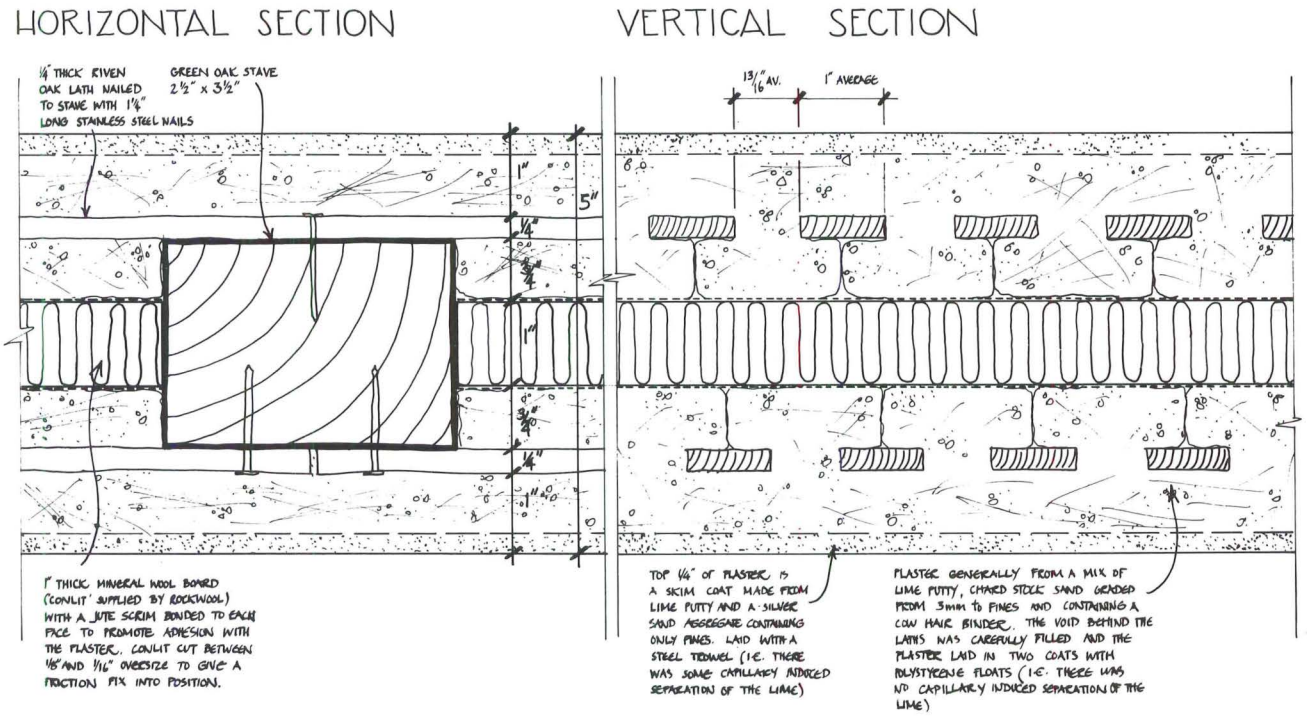
INSTALLATION OF THATCHED ROOF

Thatched Roof

Believed to be the first thatched roof applied on a building in London since the Great Fire of 1666, the Globe's roof (photo, lower left) meets and exceeds current fire-safety codes (see Selected Detail, p. 121) with little compromise of its historic authenticity. The oak structure of rafters, trusses, and struts (section, above) is infilled with split oak laths and lime plaster. Water reed thatch, 12 inches thick, is laid in alternating courses and secured with fixing rods attached to the rafters.



EAVE DETAIL

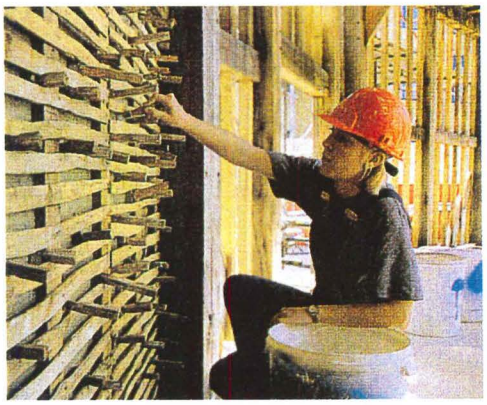


HORIZONTAL AND VERTICAL SECTIONS THROUGH LIME PLASTER WALL

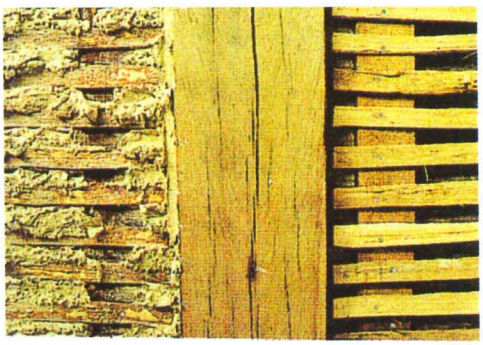
Lime Plaster Work

Lime plaster (photos, right) is used to infill the wall panels of the three-story theater and for the underside of the thatched roof. It is particularly suitable for use with unseasoned wood framing because it moves and breathes in the same way. The lime plaster in the reconstructed Globe combines traditional techniques with modern materials to meet required fire-safety codes (section, above). The area between the main oak members of the timber frame structure is filled with small oak staves. Fireproof mineral wool board covered on both sides with a jute scrim is fixed between the staves; riven oak laths are nailed to the staves and over the boarding. The area between the laths and the boarding is then filled with a lime-rich mortar and the staves themselves are rendered with a lime mortar of a traditional mix – three parts hard sand to one part lime. To deal with the inevitable shrinkage of the panels within the oak frame, the panels have been lime-washed, a process that will be repeated every few years as a way of filling any shrinkage gaps or cracks that may appear.

Project: International Shakespeare Globe Center, London.
Architect: Pentagram Design, London (Theo Crosby, *partner in charge*; Jon Greenfield, *project architect*; Ruth Johnson, Bruno Paolucci, Amy Husain, *team*).
Client: International Shakespeare Globe Center.
Program: Historically authentic reconstruction of the Globe Theater; meet current building code and fire safety standards; and provide seating for 1,000 people and standing room for 500.
Structural system: Timber framing on a brick plinth.
Major materials: Unseasoned oak, lime plaster, thatched roofing.
Consultants: Buro Happold, structural/services; Michael Holden & Associates, theater; Boyden & Co., quantity surveyors; Gem Consultants, sprinklers; Bruce Induni, historic plastering.
Contractors: McCurdy & Co, timber framing; Thatching Advisory Service, thatching; CJ O'Shea Ltd., concrete; Charbry Builders, Ltd., general building.



INSTALLATION OF TEMPORARY T-PEGS TO HOLD FIREBOARD IN PLACE DURING THE TUCK-POINTING OF THE PLASTER BEHIND THE OAK LATHS.



VIEW OF LIME PUTTY, A MIXTURE OF SLAKED LIME, SAND, AND GOATS' HAIR

Photos this page: Andrew Crowley

Collapse at L'Ambiance: What Went Wrong?

The catastrophic collapse of L'Ambiance Plaza virtually ended lift-slab construction. What caused the failure, is lift-slab technology dangerous, and how can such failures be avoided? *by David Peraza*

All photos courtesy Thornton-Tomasetti/Engineers

1 SITE OF L'AMBIANCE PLAZA COLLAPSE, WITH RESCUE OPERATION UNDER WAY

Abstract

The cause of the lift-slab collapse at L'Ambiance Plaza has remained at the center of debate. Various theories have been put forward and the author, who conducted one of the most comprehensive studies of the collapse, reveals its most probable cause. A study now being prepared by the American Society of Civil Engineers provides guidelines to using lift-slab technology.

In a matter of seconds, the 1987 collapse of L'Ambiance Plaza in Bridgeport, Connecticut, took the lives of 28 construction workers and caused serious injury to many others. The 16-story building was being constructed using the lift-slab method, where concrete floors are poured at ground level, lifted into place with jacks, and fixed in place on steel columns. In the aftermath of L'Ambiance, the use of lift-slab construction declined dramatically. A perceived lack of a consensus in the technical community regarding the cause of the collapse, and unfamiliarity with the proprietary lift-slab systems, have branded this technology too risky.

A Good Safety Record

Ironically, since its first use in the mid-1950s until L'Ambiance, lift-slab construction had experienced a good safety record compared to cast-in-place construction, with not a single attributable fatality. With the lift-slab method much of the work takes place at ground level, minimizing a construction worker's risk of a fall.

Lift-slab's bad rap also overshadows the fact that this method of construction offers clear advantages for certain types of construction (see sidebar, page 107). It uses a minimal amount of formwork, eliminates the need for shoring, minimizes the preparation of floors and ceilings to receive finishes, allows year-round construction, and provides crack-free slabs.

As the engineers called in by the City of Bridgeport to investigate the L'Ambiance collapse, we performed an in-depth analysis of the structure. We believe that the collapse was due to a gross error in the sizing of certain shearheads on the steel columns. The error, evident when the failed shearheads at L'Ambiance are compared with the designs of shearheads on previous lift-slab projects, is readily avoidable in future projects. Our findings challenge the widespread notion that lift-slab construction is dangerous.

Eyewitness to the Collapse

L'Ambiance Plaza was designed as two abutting, sixteen-story residential buildings with an attached parking deck. Each of the two buildings had a footprint of approximately 63 x 112 feet. The two buildings would be joined at each floor by a cast-in-place pour strip. The structure consisted of post-tensioned concrete floor slabs, steel columns, and reinforced concrete shear walls for lateral support.

On the morning of the collapse, a triple stack of slabs was lifted to a temporary position. Workers then began inserting steel wedges under the slabs at each column in order to release the load from the lifting jacks and to prepare for the next lift. By lunchtime, they had finished "wedging off" about half of the columns.

After lunch, workers attempted to plumb the building, which is a standard operation. However, the method used was nonstandard and improvisational. A hydraulic jack was inserted horizontally between the two buildings at the uppermost level and was expanded in an attempt to push the buildings apart. After the desired amount of movement was obtained the workers continued to install the wedges. At this point, the slabs had reached their halfway elevation.

At approximately 1:30 p.m., both buildings collapsed with breathtaking speed. As described by a workman who miraculously survived, he and his partner were finishing installing the wedges on one of the columns, when he heard a loud bang nearby followed by a crumbling sound. He saw the concrete slab, which was inches above his head, crack like ice. The slabs came down around him, driving him inside the cage of the rolling scaffold, which protected him from the collapse.

My firm, Thornton-Tomasetti/Engineers, was retained that day by the City of Bridgeport to investigate the failure. Dan Cuoco, a partner with the firm, received a call to meet with the Mayor that evening. The following day we had a full crew on site.

Forensics Amid Rescue

In many respects, the investigation of L'Ambiance Plaza was unparalleled and the most complex in recent history. The Hartford Coliseum disaster of 1978 involved the total collapse of a large structure. However, there was no rescue operation, so the debris could be studied carefully over a long period. The Kansas City Hyatt Regency walkways collapse was relatively simple. There were few components and it was immediately clear that the hanger connections had failed. Both of these structures were completed, so there were no uncertainties about construction activities to cloud the investigation.

The L'Ambiance site was unbelievable. Heavy steel columns were bent like pretzels; slabs were torn from their shearheads, pancaked and flipped upside down; shearwalls were toppled. As we watched, an army of laborers and cranes attacked the debris from every side, removing it piece by tangled piece, desperately seeking victims. Columns were cut into short lengths for transport to another site. The rescue operation continued around the clock for eight days and essentially cleared the site of all evidence. This made

The author is an engineer and an associate with Thornton-Tomasetti/Engineers in New York.

identification of the debris extremely difficult and impossible in some cases. In order to document the collapse debris and to preserve as much perishable evidence as possible, we were on the site during the entire rescue operation.

After completion of the rescue, we continued cataloging the debris, which enabled us to identify nearly all of the 500 scattered column segments. We developed numerous hypotheses for the collapse and began engineering analyses. As consultant to the City of Bridgeport, we had access to all project documentation, to the site, and to eyewitness statements.

A multitude of components and mechanisms had to be considered in reconstructing the collapse. Was it a snapped lifting rod, the jacks themselves, a failed shearhead, a missing wedge, or insufficient lateral bracing? In the early stages of the investigation, we had to entertain all of these as possibilities, and not prematurely dismiss one; otherwise the physical evidence might be impossible to obtain later. The investigation was also complicated by uncertainties about construction activities at the time of the collapse. Which column was the wedging crew at? What were they doing? How much load was applied to the structures moments before the collapse in an attempt to plumb them, and where was the jack located? How high were the shearwalls? The answers to these questions were crucial, but they were not always forthcoming.

The Rainbow Column

One striking feature of the collapse was the post-collapse condition of a certain column, which became known as the "rainbow" column. Every other column was severely distorted and generally pulled toward the building center. The rainbow column, which was located roughly at the building center, was smoothly curved over its entire length, with its top resting outside the building perimeter. This shape, and the shearheads stacked at the base, indicated that the upper slabs first lost support at this column, slid down it, and pulled the surrounding columns toward the center. The column then fell of its own weight over the debris into a rainbow shape.

Six months after the collapse, we had completed our field work and had done sufficient analysis to have developed a strong leading theory – the "wedge roll-out" theory. The most probable cause of the collapse was that a wedge at a shearhead rolled out of position (7), thereby allowing the slab to lose support at that location. The principal factor that allowed the wedge to roll out was an abnormally large amount of "play" between the shearhead and the column, because of improper sizing of the shearhead. This "play" allowed the shearhead to shift to one side of the column and forced the wedge to roll out. The unusual amount of play occurred at just two columns at L'Ambiance, one of which was the "rainbow" column. In addition, drawings for other lift-slab projects we studied confirm that an unusual amount of play existed.

Contributing factors in the collapse included the lagging of shearwall construction behind the lifting operation, eccentric installation of the wedges on the rainbow column, the presence of a large opening in the slab immediately adjacent to the shearhead, and the application of a horizontal load to the top of the building in an attempt to plumb it. These factors facilitated roll-out of a wedge, followed by loss of slab support. The mechanics of a wedge rolling out are complex and do not lend themselves to analytical study. Laboratory testing to confirm the theory could not be performed because of the city's limited budget for the investigation.

A Smorgasbord of Other Theories

At about the same time we formulated our conclusions, the Occupational Safety and Health Administration (OSHA) released the findings of its investigation. This was the first serious theory to be made public. OSHA asserted that the most likely cause of the collapse was that a lifting nut slipped out from a shearhead, thereby causing the slab to lose support at that location.

The theory was immediately challenged by many, including us. The criticisms included that OSHA had misidentified a key column segment and that the testing methods used by OSHA produced "worst case" results not representative of actual conditions. Tests performed by the contractor indicated that the lifting assemblies had much higher strengths. The contractor also argued that the same type of connection had been used 100,000 times previously without a problem. OSHA's collapse scenario depended on the assumption that the lifting nuts had been incorrectly installed. This was a possibility, but could not be proved.

Another hypothesis emerged: that a shearhead failed from improperly detailed and executed welding. The hypothesis depends on the abnormally large amount of "play" at certain columns we had identified. The theory was challenged on several counts: there is no explanation why the welds did not fail earlier during the lifting operation; the deformed shearhead that was identified as the one that failed could have been damaged during the collapse. The lifting nuts were also still in place at that shearhead, and they would have supported the slab if the weld failed.
(continued on page 108)

A view of L'Ambiance under construction (2) shows the poured slabs being lifted on the steel wide-flange columns, and then fixed in place with steel wedges. The wedges are welded to steel shearheads embedded in the concrete slabs. Stacked shearheads can be seen on the columns in the foreground. After the collapse, a view of L'Ambiance from approximately the same spot (3) shows the slabs stacked like pancakes. The "rainbow" column (4), which proved to be a key piece of evidence in analyzing the collapse, arched over the debris.

2 L'AMBIANCE UNDER CONSTRUCTION

3 FAILED SLABS STACKED LIKE PANCAKES

4 "RAINBOW" COLUMN ARCHES OVER DEBRIS

Why Lift-Slab?

Lift-slab construction offers certain advantages, primarily related to the cost and scheduling of the project. The casting of the slabs and the post-tensioning operations are performed at ground level. This results in construction efficiency and also worker safety, since falls are minimized.

Since the slabs are cast directly on top of one another, formwork is virtually eliminated except for the edge forms. Likewise, shoring and reshoring are eliminated. A rule-of-thumb in cast-in-place construction is that the formwork is half the total cost. Methods such as lift-slab that minimize the use of lumber are attractive.

Placing concrete on a lift-slab job can be performed through the winter months, since the concrete can be economically protected from the cold during curing. Since the slabs are post-tensioned, cracks are minimized or are nonexistent. In fact, lift-slab offers ideal conditions for post-tensioning This is especially important for structures exposed to the elements, such as parking decks.

In general, lift-slab construction lends itself well to apartments, hotels, parking structures, and office buildings. Lift-slab is most economical for buildings from two to eight stories, although buildings up to 23 stories have been constructed. Repetition of the slab outline from floor to floor is important to the method's economy.

Another theory for the collapse was based on deficiencies in the design and execution of the post-tensioning. There was an unusual splay of the tendons to avoid an elevator opening, an apparent disregard by the post-tensioning designer of the large slotted slab penetrations for the future shearwalls, and an inverted drape in the tendons in a certain area. Although these deficiencies in post-tensioning are serious from a design point of view, it is debatable whether they caused the collapse. These deficiencies were present for quite some time, and there is no explanation of why the collapse did not occur sooner.

Professional debate and the passage of time have narrowed the possibilities as to the cause of the collapse. The two most prominent surviving theories, "wedge roll-out" and "shearhead failure," agree roughly on the location where the collapse originated and that excessive "play" of the shearheads caused the failure.

Learning From Failure

A failure, no matter how tragic, should not result in the abandonment of a viable and innovative technology. Traditionally, failures have provided the impetus to study the technology further and to make appropriate modifications to ensure its safe use. With this in mind, the American Society of Civil Engineers (ASCE) formed the Task Committee On Lift-Slab Construction to study the method and to produce guidelines for its use. The task committee, on which I serve as chair, is comprised of an international group of engineers, industry leaders, and members of academia who are experienced with the lift-slab method of construction.

The goal of the study is to provide engineers, architects, and contractors with information on the specific aspects of the planning, design, and administration of a lift-slab project. The study will also consider historical background, lifting operations and systems, loading and structural behavior, seismic considerations, roles and responsibilities, research, and specifications.

One of the duties of the Task Committee is to define what constitutes good lifting practice. Although means and methods do not normally fall under the control of the design professional, the Task Committee feels that there are sufficient crucial engineering considerations involved with the lifting process to warrant comment. One of the questions being considered is what is an acceptable "factor of safety" for use during lifting, and what components should it be applied to? Also, how is lateral stability of the structure ensured during construction, especially during plumbing operations?

The roles and responsibilities of the various parties on a typical project are also being reviewed. Lift-slab construction is normally used on a design/build basis. Who is responsible for the design of components that are subjected to entirely different loading during construction than in the completed building? Is it the lift-slab engineer, or the architect? For example, it is clear that the lift-slab engineer is responsible for the design of the shearheads for the lifting condition. But these same shearheads will also become an integral component of the permanent construction, when they will be subjected to different loads. Is the engineer-of-record responsible to check the shearhead design for this condition? Similar issues arise with the columns, the footings, and the lateral-load-resisting system.

As with any building system where design responsibility is divided, it is crucial to define clearly the scope of responsibility of each of the various design professionals. What responsibility and communication issues are unique to a lift-slab project? Lines of communication must be clear, and items of information needed by each party to perform its work must be identified.

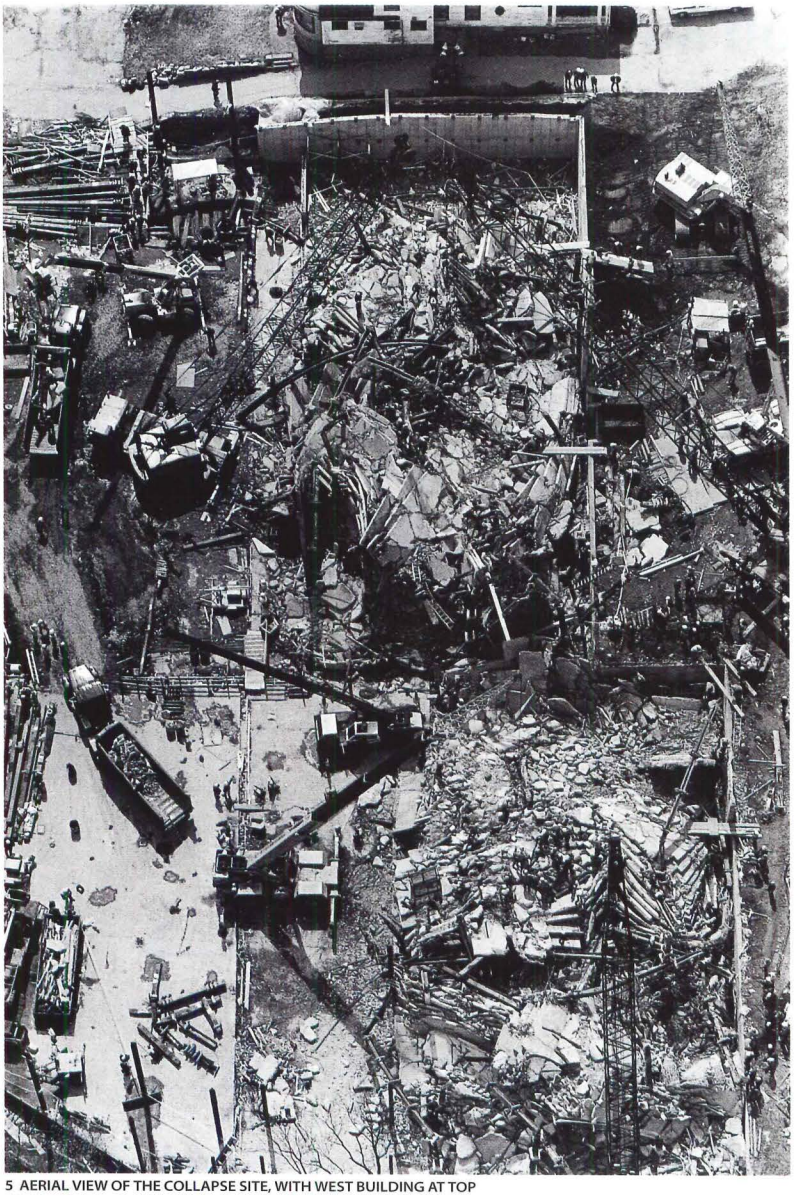
The Task Committee expects to publish its results in 1996, and welcomes input from design professionals who have had experience with lift-slab, or who would like to see a specific issue addressed. Correspondence should be addressed to David Peraza, Chairman, ASCE Lift-Slab Task Committee, Thornton-Tomasetti/Engineers, 641 Avenue of the Americas, New York, NY 10011.

Conclusion

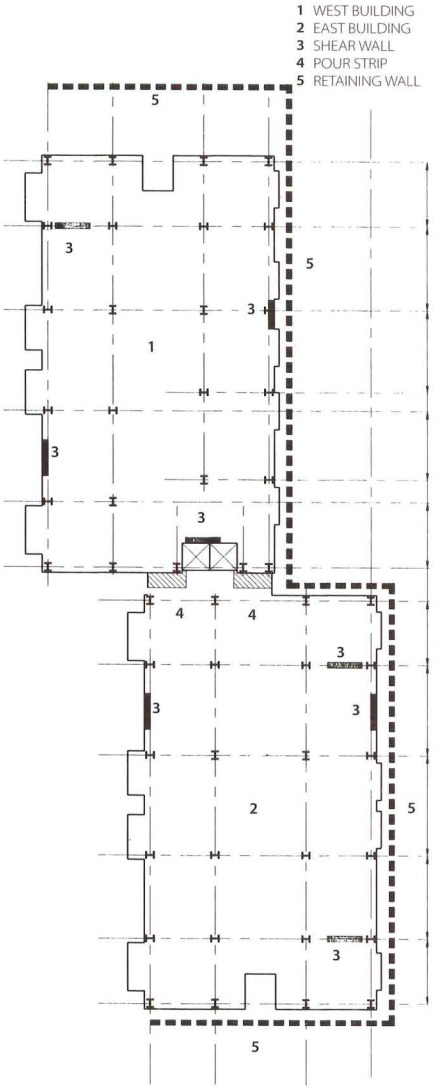
Will we ever know with absolute certainty the cause of the collapse of L'Ambiance Plaza? Probably not. There were too many unknowns, the analyses were extremely complex, and the physical evidence has long been buried. Do we know enough that, as design professionals, we can consider use of lift-slab on suitable projects? Definitely. Whether the collapse happened because of wedge roll-out or shearhead failure, either failure was prompted by a large amount of play between a shearhead and a column. If normal lift-slab engineering practices had been followed, the collapse would not have occurred.

The lift-slab method of construction is historically safe, it provides economies and advantages to owners and designers, and it is well suited for certain building types. The collapse of L'Ambiance Plaza was a single tragic event, precipitated by avoidable errors. Lift-slab construction does require more attention to structural details and better coordination between the various parties than cast-in-place construction. All of these are readily achievable. □

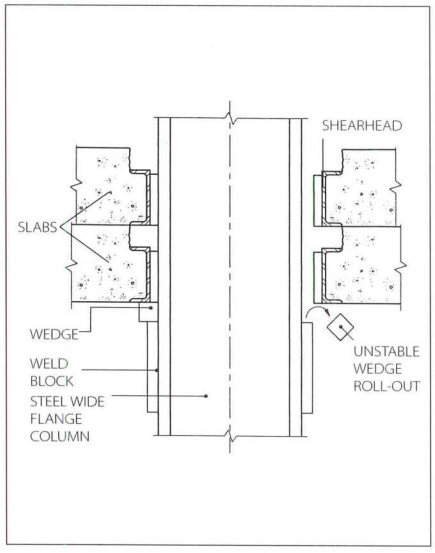
A view of the collapse site from directly overhead (5) reveals the configuration of the plan (6). The "rainbow" column can be seen at approximately the middle of the west building's rectangular plan. The collapse was most likely caused by the "roll out" of a wedge (7, 8) from under the shearhead of a slab. The amount of play between the column and the shearheads contributed to the wedge roll-out. Other theories of the collapse have focused on failure of the lifting nuts (9), an improperly welded shearhead, or deficiencies in slab post-tensioning.



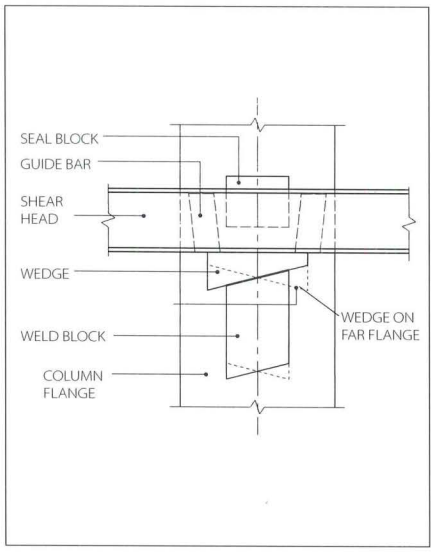
5 AERIAL VIEW OF THE COLLAPSE SITE, WITH WEST BUILDING AT TOP



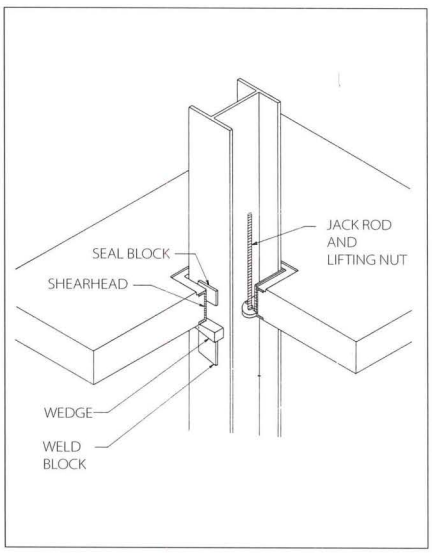
6 L'AMBIANCE PLAZA STRUCTURAL PLAN



7 SIDE VIEW OF WEDGE ROLL-OUT FROM UNDER SHEARHEAD



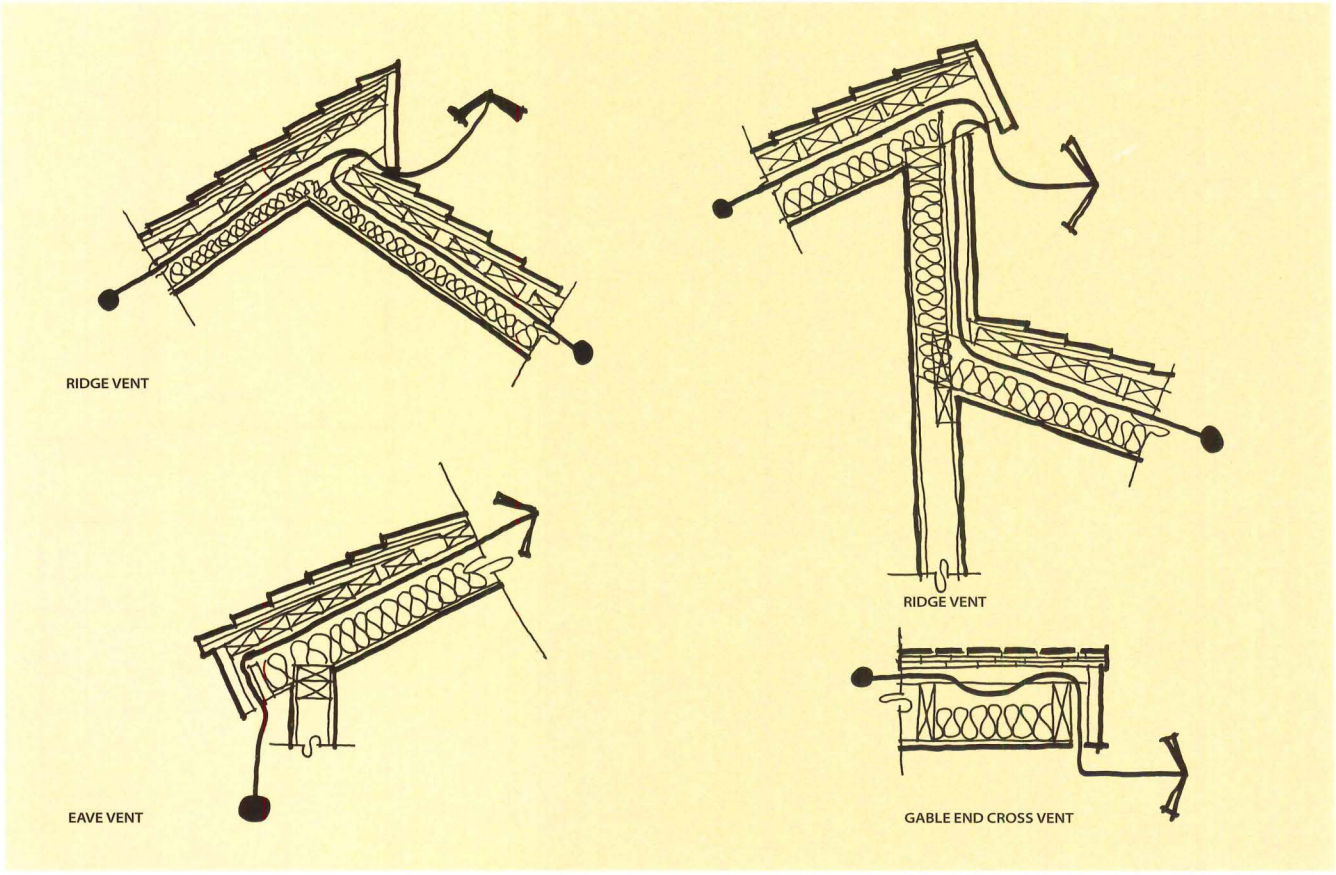
8 FRONT VIEW OF SLAB-TO-COLUMN CONNECTION



9 AXONOMETRIC OF SLAB-TO-COLUMN CONNECTION

Wood Roof Ventilation

CSI SECTION 07720



Q: Under what circumstances, and how, should I ventilate a wood-shingle roof?

Meryl Kramer
Pamela Holmes Pospisil
Architects
Southampton, NY

Readers are invited to submit their questions regarding technical issues. You can mail, phone, fax, or e-mail your questions to the attention of Michael J. Crosbie, Senior Editor, Technics. The answers are presented in good faith, but P/A does not warrant, and assumes no liability for, their accuracy, completeness, or fitness for any particular purpose.

A: Moisture is the chief cause of deterioration of wood-shingle roofs. Without positive drainage or evaporation, moisture can permeate the absorbent components of the roof. Excessive levels of moisture in this type of roof can cause moss or fungal growth within, below, or on top of the system, which may lead to decay of the wood components and corrosion of the metal fasteners.

The design of a wood-shingle roof system should incorporate means for proper ventilation. The minimum vent area recommended by the wood-shingle industry is expressed as a ratio of 1:150 (total net free ventilation area to the area of the attic). Where used, insect screening will reduce the available net free ventilation area.

For maximum ventilation the shingles should be attached to spaced 1x wood nailers that in turn are fastened directly to the top of wood rafters without any insulation, wood decking, or wallboard finishes. This system should be supplemented by gable, eave, and ridge perimeter vents (see details). Gable-end vents provide cross ventilation, while eave and ridge perimeter vents provide natural convection ventilation. Louvered vents, while offering the greatest amount of ventilation, are the least energy-efficient. If additional energy-efficiency is desired, you should consider a wood deck or wallboard finish attached to the underside of the the roof rafters supplemented by a layer of insulation.

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THE SANTA MONICA SCHOOL

(continued from page 70) Hollywood *film noir*. There is great appeal in their work's sense of liberation and abundance, spiked with elements of irrationality and instability.

One of the serious criticisms directed at this body of work is that its sculptural preoccupation takes precedence over the shaping of effective interior spaces. We don't necessarily want to carry on our lives inside tilted cones or angular crystalline forms. Like many other 20th-Century architects, these Santa Monica architects can miscalculate badly when it comes to interior proportions, daylighting, or any of the qualities that make a room pleasing to be in. Mayne, Rotondi, and their followers, as noted, design with more consciousness of interior volumes, but their geometrical order can generate inescapable cagelike effects. All of the leaders of the school, however, have produced some interior spaces that are both inspiring and well suited to their purposes – the dramatic, luminous galleries of Gehry's Vitra Museum, for instance (P/A, May 1990, p. 94), or the reassuring volumes of Morphosis's Cancer Center (p. 69).

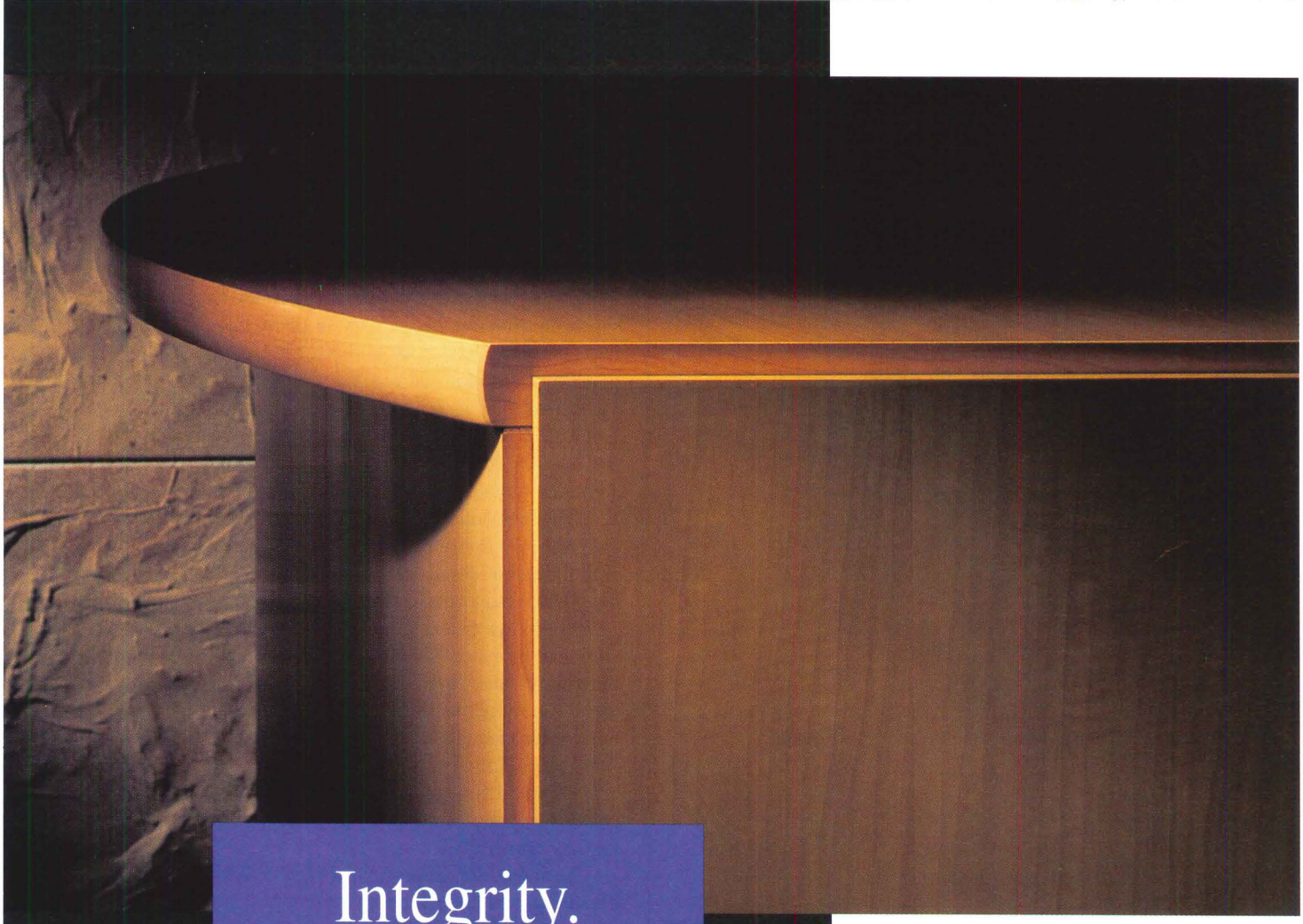
Another common and justified criticism of this group's work is that it is self-contained, with little apparent sympathy either for urban neighbors or for exurban landscapes. This general weakness is obviously related to the setting of the school's seminal works – along with their offices and their principal teaching posts – in the flat, haphazardly developed portions of L.A.'s Westside. And, rather than asserting their superiority to the retail strips and "dumbbell" apartments of this territory, their

Younger practicioners whose work arguably places them in this school differ from their elders mainly in not seeing their work as art.

works strove to maintain a kinship. In recent years, of course, Gehry has found himself working in some settings – notably in Paris (P/A, June 1994, p. 27) and in Prague, (P/A, Jan. 1995, p. 25) where uncurbed individualism just would not do – and he has developed some elegant contextual responses, without submerging his formal inventiveness; in other situations, he still finds sharp sculptural juxtapositions to be the answer (pages 71 and 72). Meanwhile Eric Moss, doing a series of interventions in an existing fabric has, as noted, worked out an instructive incident-in-context strategy (page 65 and cover).

The near indifference to landscape architecture among members of this group is cited by David Gebhard, the architectural historian who has repeatedly updated his definitive guide to L.A. Architecture. In contrast to a strong tradition of subtle indoor-outdoor relationships in the L.A. area – from Greene & Greene through Richard Neutra to the present – the Santa Monica stars give only routine treatment of the open space around their buildings, where there is any (in the larger houses or campus buildings by Gehry, for instance) with virtually no porches, courtyards, or any such mediating elements. In their recent work, however, both Mayne and Israel show substantial efforts to nestle their structures into the terrain in ways that members of this school have not previously tried.

While the members of this school are generally liberal in their political views, their built work shows little evidence of environmental or social concern. Energy *(continued on page 114)*



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THE SANTA MONICA SCHOOL

(continued from page 112) conservation is admittedly not critical in the balmy climate around Santa Monica – even less so than a few miles inland – but the modest amount of the school's work elsewhere exhibits the same kind of convoluted volumes. There is no question that fragmentation and exaggerated articulation of form are harder to justify in the harsher climate of, say, Minneapolis, where Gehry has done two substantial buildings (P/A, Dec. 1987, p. 60, and Feb. 1994, p. 24).

In the area of social concern, Frank Gehry expresses relief that he has finally landed a subsidized housing commission – in Frankfurt – but Koning Eizenberg have been applying some of the school's design principles to a social center, an SRO, and some fine housing (page 69). Other good housing architects, such as John Mutlow in the L.A area and Davids Killory in San Diego, show a free use of form and color that has some sympathy with the Santa Monica mode, and Midwesterner Joseph Valerio adapted related forms in a local housing complex (page 66).

Yet another criterion on which the validity of this school's work can be tested is the adaptability of their design approach to other regions. Shorn of their regional connections, his works look even more like overscaled sculpture than they do in L.A.; no wonder a faculty member of the Toledo Center for the Visual Arts (page 72) refers to the building as "a Gehry." In his Paris and Prague buildings, however, Gehry has wedded his design principles to local traditions so effectively as to set an example for the host country.

The Santa Monica group has been inconsistent about offering intellectual underpinning for its work. Gehry's plays on the psychology of perception have more to do with art that he appreciates than with written theory. Mayne and Rotondi make intellectual documents of their intricate drawings. Only Moss makes a point of relating his work to theoretical debates in the world beyond L.A. One could argue that some of the group's sado-masochistic imagery of iron hardware and corroded parts, which peaked around 1990, gave their work more gravity in academic circles. Now a formal device of subtle, obtuse-angled folding is seen in new projects by Mayne and Israel; both refer to this as "Stealth" imagery, as in the military aircraft, but on buildings these angles look more gentle than menacing.

Santa Monica Pros and Cons

How then to summarize the contributions of the Santa Monica school? Its drawbacks: it does little to address serious environmental, energy conservation, or social concerns; with some notable exceptions, its buildings are isolated from their context; it can produce some mean interior spaces. A qualified advantage: its principles can be adapted brilliantly to distant settings, but in very few instances so far – almost all by Gehry. Its clearcut advantages: the approach is adaptable to ordinary building techniques and to low-budget commissions.

And now for its outstanding contributions: the work of the school verifies that today's architects can still be inventive, that freedom from convention can be positive; its diverse forms and textures could be said to express the pluralism of our society – along with the dynamism and the liberation from hierarchy we would like it to have. Working in a period of doubt and nostalgia, these architects have encouraged all of us – architects, critics, and the public – to ponder the potential of innovative form-making to enrich our lives. □

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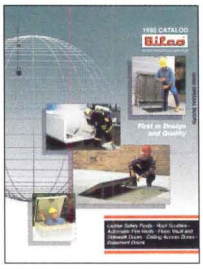

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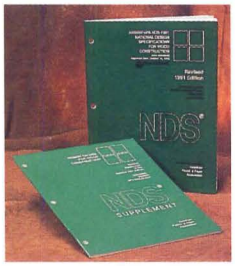

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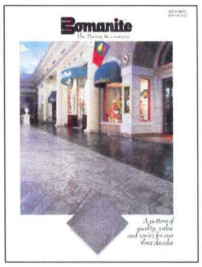

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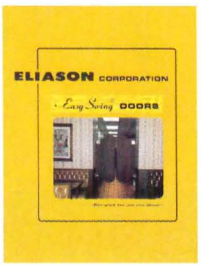
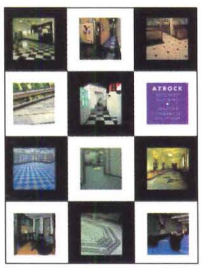
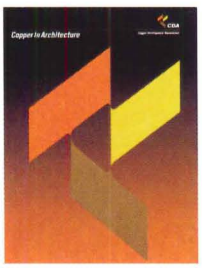


Available from Eliason Corp. is a new 1995 Easy Swing double-action door Price/Spec Catalog. Illustrated in full-color images with complete specifications and application data. The doors open with a slight nudge and close automatically after a slight time delay. They are sold direct and the bound catalog is sent free-of-charge.
Eliason Corp. Circle No. 362

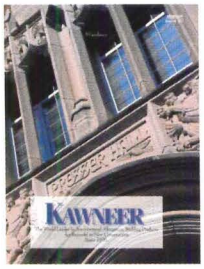


The Azrock Integrated Commercial Flooring System features a complete range of coordinating resilient flooring products for every commercial application. For Azrock product literature, please call (800) 558-2240.
Azrock Industries. Circle No. 357



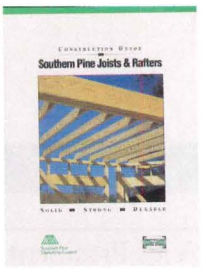
This eight-page folder describes recent and ongoing work by the Copper in Architecture Program to provide the architectural community with copper design details, specifications, and technical information; the folder contains both general and specific data on the use of copper.
Copper Development Assoc. Circle No. 360

To use the Italian Marble Center Fax-Line to request information, please dial (310) 203-0968 from your fax machine. Use the keyboard on your fax machine to make your selection from one of the two options offered. Press "Manual Receive" or "Start" when instructed to do so, and the requested information will be faxed to you while you wait.
Italian Marble Center.



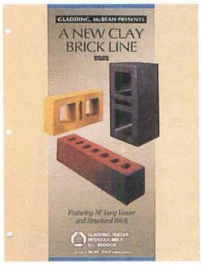
Kawneer Company's classic aluminum windows combine design flexibility, improved insulation, and lowered maintenance costs for renovation and new construction projects. A particular aesthetic can be achieved with exterior panning, interior trims, and applied or between-the-glass muntins. Thermal superiority stems from Kawneer's patented Isolock® thermal break, separating the frame's interior and exterior.
Kawneer Company, Inc. Circle No. 363

Marvin Windows & Doors now offers more than 650 standard round top sizes including arches, full rounds, half rounds, quarter rounds, and ovals. With the addition of hundreds of standard sizes, the company now offers one to match virtually all standard-sized windows and window configurations.
Marvin Windows & Doors. Circle No. 365



"Southern Pine Joists & Rafters – Construction Guide" is a fully detailed, 16-page manual that illustrates typical joists and rafter framing techniques. The booklet also includes load and span comparisons of various species. Code provisions, fire, and sound considerations are also explained.
Southern Pine Council. Circle No. 368

Strategy is a freestanding modular desk system that addresses team-oriented functions and today's changing office environments. Strategy is economical, dividing space effectively without the added cost of panels. With 36- and 48-inch widths, the base module of Strategy becomes the building block for adding overhead storage and vertical files for privacy as user needs change.
Kimball. Circle No. 364

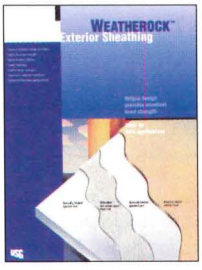


Gladding, McBean, sister company to Interstate Brick and H.C. Muddox and industry leader in terra cotta manufacturing over the past 118 years, announces a new clay brick line of 12- and 16-inch-long veneer and Atlas™ structural brick. The line meets ASTM C216 and C652, Grade SW (severe weather requirements). It is offered in a full spectrum of colors and in widths from 4- to 12-inches.
Pacific Coast Building Products/Gladding, McBean. Circle No. 366

The SummaJet 2 Series of ink plotters are priced as low as $2,299, making them the most affordable large-format ink jet plotters available. Special features include refillable ink cartridges and two interchangeable heads to minimize cost of ownership; a monochrome to color upgrade path, roll feed, and Ethernet options allow the plotter to grow with the customer.
Summagraphics Corporation. Circle No. 369

Louisiana-Pacific LPI™ Joists are engineered to start straight and stay straight and to resist shrinking, twisting, splitting, warping, and crowning. L-P offers residential and commercial series of LPI Joists that feature strong, stable oriented strand board webs and either LVL or MSR lumber flanges. L-P's Wood-E software system is available for accurate, in-house designs and DXF format installation details. For a free brochure, call (800) 299-0028, ext. 314.
Louisiana-Pacific.

This low-cost epoxy system for retrofits in concrete or masonry provides stronger anchoring than can be achieved with mechanical anchors. Epoxy-Tie™ bonds with surrounding concrete; the anchor is less prone to sideburst during close-interval installation. The system has a higher resistance to moisture and vibration than mechanical anchors.
Simpson Strong-Tie® Company, Inc. Circle No. 367



A new four-page brochure describing the performance characteristics of WEATHEROCK Exterior sheathing is now available from United States Gypsum Company. The brochure includes information on product specification and installation. It also provides performance comparisons with other commonly specified exterior sheathings. WEATHEROCK is designed for use with adhesively applied EIFS and other exterior finishes.
United States Gypsum Co. Circle No. 370

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Harvard University Graduate School of Design

Faculty Position in Architectural Drawing/Conventions of Descriptive Geometry

A part-time, possibly long-term faculty position is available for a person qualified to offer graduate-level instruction on methods of architectural projection, starting in the fall of 1995. The person holding this position will be responsible for teaching a required lecture/workshop course that traces the discipline of architectural drawing from its historical and theoretical origins in descriptive geometry as codified by Monge, Desargues, Taylor and others. Candidates should be qualified to demonstrate the technical application of orthographic, oblique, auxiliary, shadow, and perspective projection. Problems of instrumentation and the methodological translation of these paper-based drawing practices to electronic media may also be examined in the course. Preference will be given to candidates with teaching experience and a demonstrated achievement in research or practice of the aforementioned techniques. The teaching obligations, preferably in the fall term, would be for one three-hour class per week or, for an out-of-town instructor, two three-hour classes on successive days every other week. There is also the possibility of offering an advanced seminar, if desired by candidate. Weekly airfare and housing allowances available. Candidates should send or fax a resume and letter of interest to: **Mike McGrath, Director of Faculty Planning, Harvard University Graduate School of Design, 48 Quincy Street, Cambridge, MA 02138. Voice: 617-495-5409; FAX 617-496-5310.**

The University of Memphis

Department of Engineering Technology Announces Faculty Positions for Electronics Engineering Technology and/or Architectural Technology

The Department of Engineering Technology anticipates several tenure-track faculty positions in Electronics Engineering Technology and/or Architectural Technology starting in August 1995. An earned masters degree in architecture, engineering or engineering technology and three to five years of related industrial experience are required. A doctorate and full-time higher education level teaching experience are desired. Ideal candidates must be able to teach an array of subjects in the curriculum, engage in significant scholarly activity and participate in service and outreach. Resumes, unofficial transcripts, supporting materials and the names and addresses of five references should be directed to Engineering Technology, The University of Memphis, Memphis, TN 38152. Screening of appplications will begin April 15, 1995, and may continue until the positions are filled.

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For a forthcoming article, P/A welcomes your observations, on this form or a separate sheet, referring to the question numbers.

1. What should the profession expect of the schools in the education of architects?
   Should the schools be training students to become conventional practitioners or do the schools have a broader mission?

2. What should the schools expect of the profession in the education of architects?
   Should the schools expect practitioners to educate graduates in practice, or are such expectations unrealistic in today's marketplace?

3. What are the responsibilities of the schools and the profession to architecture students?
   What might both do to ease the transition from school to practice?

4. How would you change the profession to improve the education of architects?

5. How would you change the schools to improve the education of architects?

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Selected Detail

Fire-Resistant Thatched Roofing

CSI SECTION 07313

An all-wooden structure with a thatched roof in the middle of a city would seem a conflagration waiting to happen. But Pentagram, the architects of the reconstruction for the Globe Theater in London (see page 96), have used modern techniques to keep the city's newest old building from meeting the fate of the first Globe Theatre. The original structure, completed at the close of the 16th Century, burned to the ground in 1613, thanks to a spark from a stage cannon.

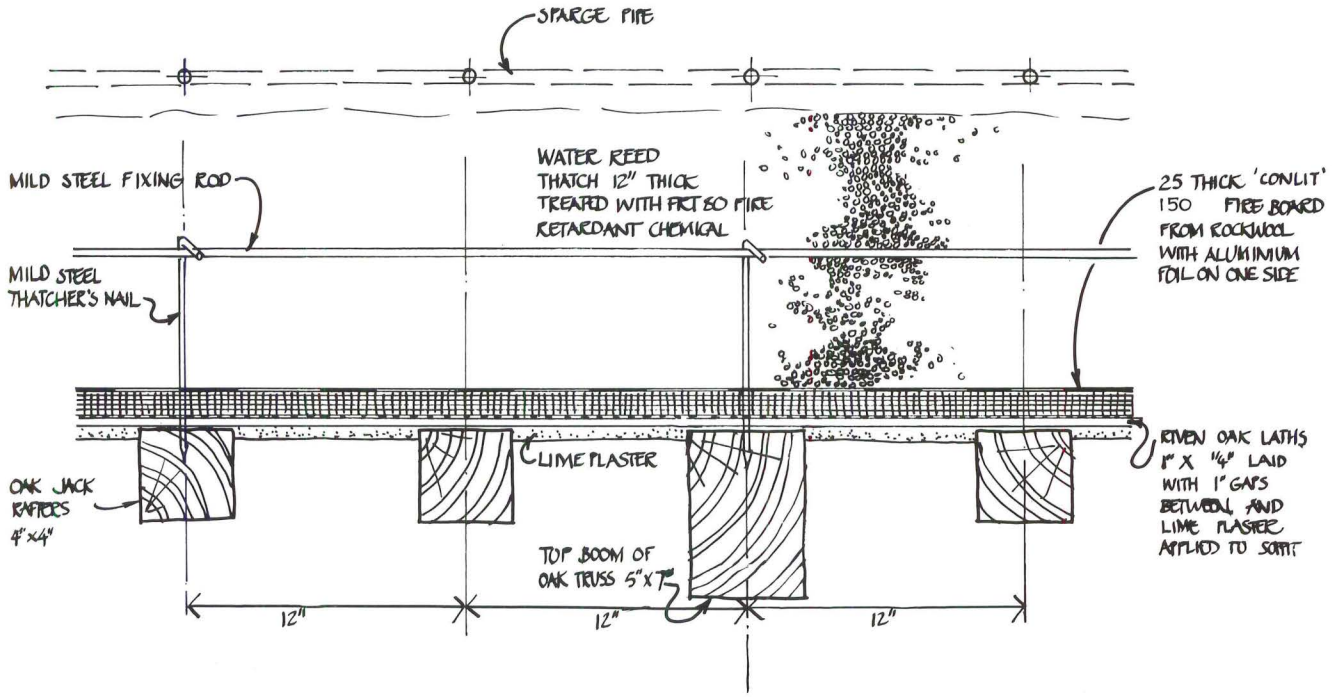
According to *Building* magazine, there hasn't been a thatched roof building erected in central London since the Great Fire of 1666, after which they were banned. Today's Globe, roofed with a material that also makes for good kindling (1), has to meet the fire regulations of contemporary London. The roof incorporates several fire-resistant features (2) that don't detract from its authentic appearance. The thatch is supported on a wooden structure of trusses and rafters, over which is placed 1 x 1/4-inch lath. On top of the lath is a 1-inch-thick fireboard made from mineral fiber, with aluminum foil on the rafter side. Twelve inches of water-reed thatch is placed on the fireboard. The thatch itself is treated with a fire-retardant chemical, FRT-80. Because the chemical leaches out of the bottom inch of thatch, leaving a layer of unprotected material, a sprinkler system has been discreetly placed at the roof ridge for added protection. The eaves are treated with a fireproofing varnish.

The roof construction has been assessed by the Loss Prevention Council, a laboratory that advises the British building industry, with a rating better than the one stated in existing codes for roofing materials.

Michael J. Crosbie

Pentagram

1 THATCH IS APPLIED TO THE WOODEN ROOF STRUCTURE



2 SECTION AT THATCHED ROOF EAVE

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