

75TH ANNIVERSARY YEAR

PIA

Progressive Architecture

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- Campus Museums
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ASIA BOUND

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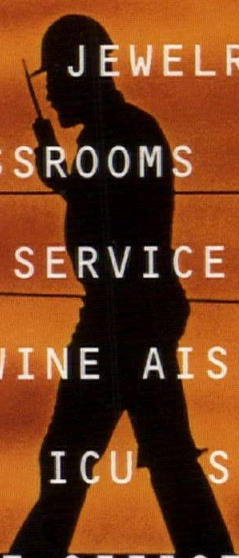
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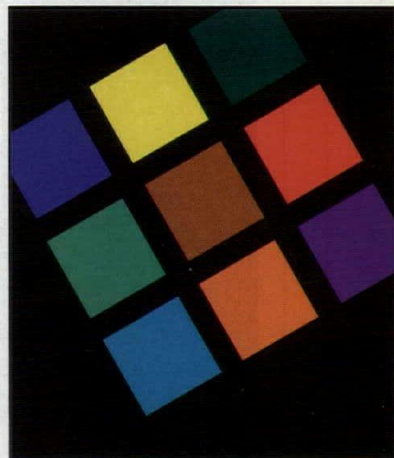
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
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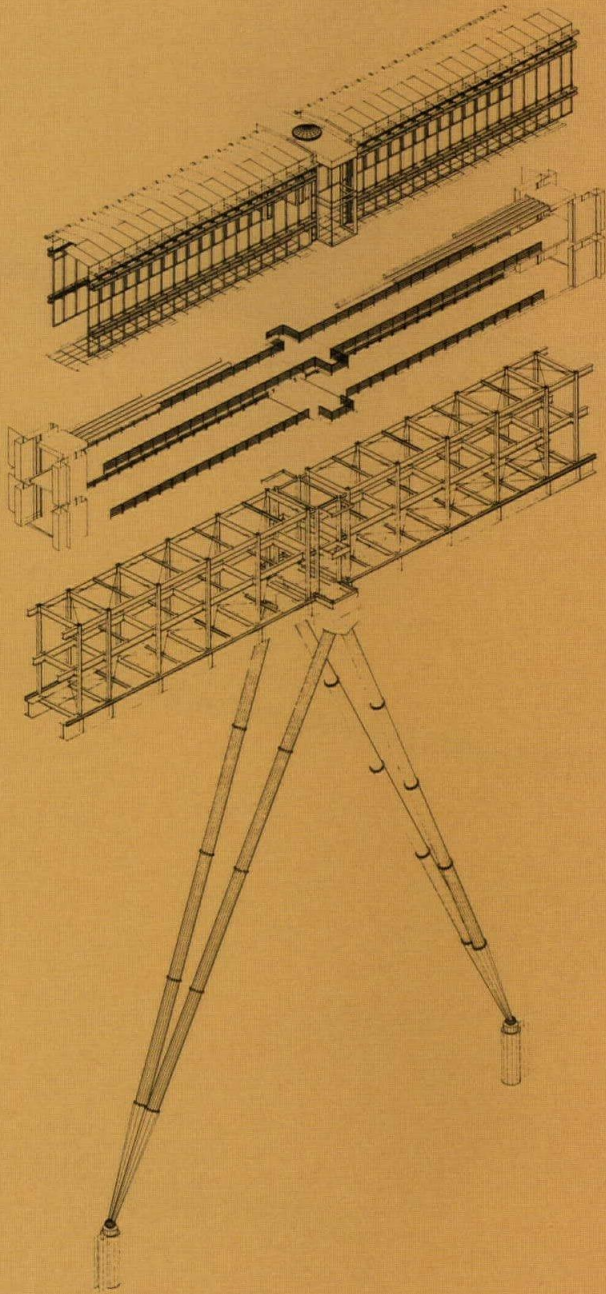
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Exploded axonometric drawing of bridge at Cesar Pelli's Petronas Towers in Kuala Lumpur (p. 47).

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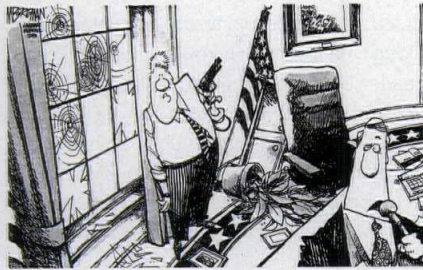
The cartoon on this page is the flip side of a grim reality: America is awash with guns and public space is literally under fire. Consider these statistics: In 1993, 37,502 Americans were killed by firearms (more than half the number killed in the entire Vietnam War) – a carnage rate of more than 100 people a day, 15 of them children. Murders by handgun grew by nearly 50 percent between 1989 and 1993. There are a million semi-automatic assault weapons in private hands, and Congressional leaders now want to reverse the ban on such weapons.

The tragic result of this firepower is nowhere more obvious than in our cities: drive-by shootings and gang feuds have made it unsafe in some neighborhoods to walk down a street or sit outdoors. Schools have become arsenals, with students passing through metal detectors on their way to class. Polls tell us that one of the top concerns of Americans is fear for their own safety. There is new flight from the city, as people seek a safe haven. But guns are everywhere.

As public spaces become increasingly unsafe, our public life is circumscribed. The current rage in planned communities is the guarded compound. Closed neighborhoods with security booths, gates, and resident IDs for admission are becoming more common. Even the most secured residence in America isn't safe; plans are now being considered to limit access to Pennsylvania Avenue in front of the White House so that passersby can be more easily monitored.

A threat to life in public space is not just an inconvenience. It strikes at the very heart of our democracy. "Given the inability of government in the United States to protect citizens from even the most basic forms of insecurity," observes John Gray in the *New York Times*, "is there not a danger that democracy in America will wither into insignificance, as citizens retreat from any kind of civic engagement?"

The claim that architecture is a noble calling must rest on the fact that architects create the spaces for civic engagement. We form the public stage on which ideas are exchanged and debate unfolds. As creators of public space, don't we also have the obligation to preserve its use? If so, then architects must



"THE PRESIDENT FIRED BACK AT HIS CRITICS TODAY...."

Guns and violence are stifling the civic life of public space.

As its creators, shouldn't architects help protect the public realm from this siege?

help reclaim the public realm.

One way to do this is to support legislation and community efforts to control guns. The American Institute of Architects does not have a position on gun control. Perhaps it should. The American Medical Association took such a stand, citing the proliferation of guns as a public health problem. Here's an opportunity for the AIA and the profession to gain national exposure by speaking out on an issue that affects the health, safety, and welfare of the American public. The profession should oppose Congressional efforts to relax the ban on assault weapons, and should work at state and local levels to support gun control.

Another way is to use our talents to help communities to cope with the assault on public space. The work of Zane

Yost, an architect in Bridgeport, Connecticut, is a good example. Yost is involved in the Phoenix Project, an attempt to revitalize Bridgeport's East Side, a drug-infested and dangerous neighborhood in one of the state's poorest cities. In 1992, murders in the ten-block-square East Side accounted for 18 percent of all the homicides in the state of Connecticut.

Community interaction and the civic dimension of life had broken down in the East Side. Residents no longer sat on their front porches or strolled along sidewalks to chat with their neighbors. Drive-by shootings and drug-trade violence made that impossible. The key to making the East Side safe again was to control the flow of vehicular drug traffic. Yost's design called for Jersey barriers to be installed diagonally across one-way streets. This "maze" limited the penetration of traffic, much of it generated by suburbanites driving into the neighborhood to buy drugs. The barriers, along with grassroots policing efforts, made a huge difference. Police report a decrease in gang violence and drug trafficking. Local banks estimate that property values have increased by an average of \$10,000.

Yost's design directly led to the regeneration of civic life in Bridgeport's East Side, and demonstrates how the profession can make a difference. Architects have a professional duty, beyond any position they may hold as citizens, to help get guns off the streets and to make our public spaces safer. □

Michael J. Crosbie

Michael J. Crosbie

P/A Contradictions

I admire your attempts to turn your attention to new issues confronting the architectural profession. However, your November issue brings to the fore a number of contradictions which are important for us to understand. I share with you your feature story's concern that despite remarkable increases in enrollment by females in architectural schools, the profession continues to be dominated by white males. While sexism remains a problem in the profession, the sexist spin you put on this article does little to enlighten us on more complex issues related to this topic.

One female alumnus (*sic*) wrote me about her frustration in being considered "outside the profession" even though she was using

"We urge architects to write appropriate specifications, vigorously police substitutions, and regain their position of leadership as trusted professionals." – Mark Louchheim, President, Bobrick

her architectural skills to provide valuable volunteer services to help develop master plans for her church and children's school while she raised a family. Perhaps we need to reconsider what it means to be inside vs. outside the profession.

The editorial by Tom Fisher chastises the profession for having too many firms which are too much alike, and he suggests that firms distinguish themselves by their artful approach to architecture. A few pages later we find Diane Ghirardo dumping on Peter Eisenman for being "bogus avant-garde." Diane would seem to be arguing the opposite of Tom and seems concerned that Peter's accompanying explanations of his buildings and design process are too "artful" and his position is too self-promotional. (This article, in my opinion, would have found a better home in *Vanity Fair* or *People Magazine* where celebrity bashing is a journalistic goal.)

Now that you've got our attention again, P/A, how about some articles that explore issues in some real depth, perhaps more like *Harper's* or *Atlantic Monthly* than the sound-byte prone glossies?

Robert M. Beckley, FAIA

*Dean, College of Architecture + Urban Planning
University of Michigan, Ann Arbor, Michigan*

P/A is committed to publishing divergent if not contradictory views. Besides, we don't equate establishing a distinctive identity with cynical self-promotion. As for doing professional work on a volunteer basis, such opportunities are rare and they raise the issue of exploitation, among others. – **Editor**

Solana, Another View

As a member of the Solana landscape design team, I would like to respond to Mark Branch's thoughtful critique (Dec., p. 74). First, a note on authorship. Mr. Branch incorrectly attributes the Solana landscape to a collaboration between Walker and Schwartz. As the April, 1989 P/A article articulated, Walker and Schwartz typically "pursue, in effect, parallel practices." The design team was: "Peter Walker, Doug Findlay, Tony Sinkosky, Lisa Roth, Tom Leader, David Meyer, David Walker, Rob Rombold" and, I wish to add, Sandra Reed.

Mr. Branch bases his critique on his own agenda, apparently disregarding IBM's objectives. He assumes that Solana should be a lively place, welcoming to visitors and a truly

pedestrian environment. In my view, we were designing a workplace in which security was of utmost importance. The computer industry is concerned with potential industrial espionage. We were not designing a public park.

The campus was designed for occasional, informal use, not the intensive use or public life Branch seeks. The spaces were intended for pedestrian circulation, jogging, lunch, informal conversation, or contemplation. Corporate downsizing may inhibit such leisure. Suburban office parks are indeed subject to recessions, restructuring of industries, and oversupply of office space, but these can exert deadening effects in cities as well.

With regard to pedestrian and vehicular circulation, Solana accepts the reality of the automobile in the suburban office park. But we restricted the auto's use to entering each compound, and clustered buildings tightly around pedestrian "streets" and courtyards. In this regard, perhaps Solana may still be considered innovative: uniting each campus through memorable landscapes. The advantage of building dense compounds was to create a landscape of contrasts: the surrounding terrain with native vegetation, the ordered precision of the auto courts, the abstract minimalism of the courtyards, and the in-between world of the parterre where order is perceived, but not fully comprehended. As a foil to the native context, we attempted to create a cerebral landscape with minimalist and surreal undercurrents. This may account for Branch's sense of "aching loneliness." Abstract asceticism throws the observer back upon his own resources.

Lisa K. Roth

*Landscape Architect
Malvern, Pennsylvania*

Classicism

I am delighted to see the articles that have recently appeared in several journals regarding the current movement of Classicism. Philip Langdon's "Reticent Revolutionaries" (P/A, Dec. 1994, p. 43) was excellent coverage of the conference and publication of the Institute of Classical Architecture. The only problem is the author's disappointment that the new Classicists do not imitate their Modernist forebears and contemporaries with fiery polemics. In a good deal of its practice, Classicism is a radical movement, but this does not require that it be promoted in a strident way. One of the underlying principles is decorum. Years of rigorous study are required to learn the paradigms and methods of practice encourage the firebrand. Although Classicists must not be timid or fearful, it is appropriate that new visions of Classicism are proclaimed with subtlety and firm resolve, not bombast.

Thomas Gordon Smith

Chairman, School of Architecture

University of Notre Dame, Notre Dame, Indiana

Specing "Equals"

Re your editorial, "Grumbling in the Field" (Dec. 1994, p. 7): Traditionally, North American architects have stood for design innovation, quality, and long-term value to the building owner. However, I have to agree that the practice of accepting inferior products (P/A Editorial, Dec. 1994, p. 7) has forced manufacturers into "dumbing down their line" to the lowest common denominator. The implication is a focus on cost versus value and, therefore, a reluctance for manufacturers to develop unique products.

The result, in my opinion, is that as an industry we are on the way to losing our present worldwide leadership, much as the Detroit automotive industry lost theirs. The "handwriting on the wall" can be seen in the innovative products of Europe and Japan.

We urge architects to write appropriate specifications, vigorously police substitutions, and regain their position of leadership as trusted professionals. It will otherwise be a sad day for us all.

Mark Louchheim

*President, Bobrick Washroom Equipment, Inc.
North Hollywood, California*

Perfect Competition

The November editorial, "Our Perfect Competition," serves the profession well by providing a forum on these pivotal issues. It also highlights the difficulties of applying traditional economic theory to an unorthodox industry like architecture.

If return on investment were the sole criterion for entry of interns into our profes-

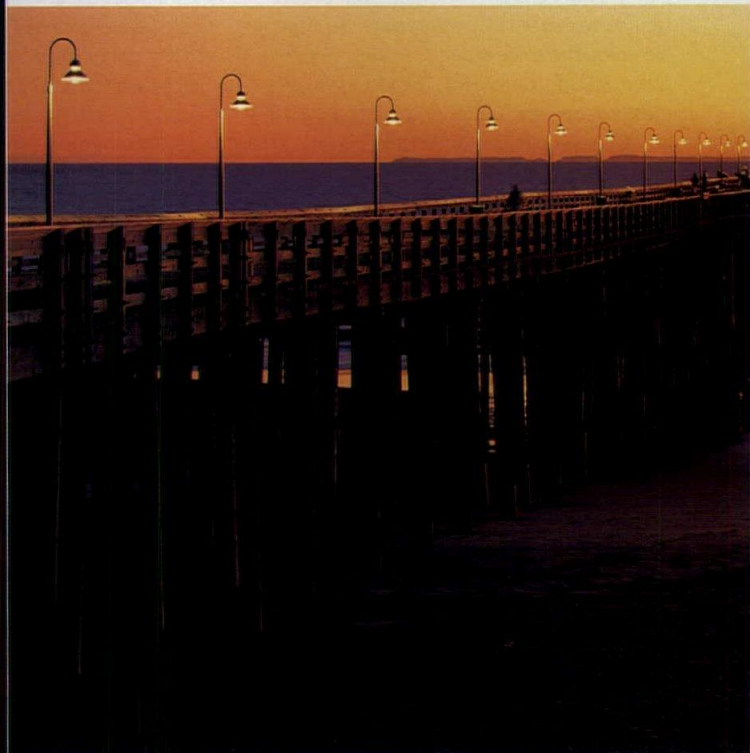
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sion, schools of architecture would not be proliferating. If maintaining a minimal level of profitability were critical for most architects to remain in practice, our near "perfectly competitive" environment would be unstable. Unfortunately, neither is true. People become and remain architects for other than economic reasons and, indeed, in spite of economic realities. We encourage ourselves to think of design innovation as our *raison d'être* – a non-linear process that makes it difficult to be simultaneously business oriented.

While differentiation among firms is clearly one step toward destabilizing this "perfect hell," I am convinced that a broader, coordinated approach is needed to improve our plight. Under current conditions, our clients cannot be expected to appreciate the intangible uniqueness of each firm as they might a box of laundry detergent. The values we offer must not only be customer-driven, but must be perceived by a customer base that, in many cases, doesn't know what it needs, what it is buying, or what it should pay for it. Carefully targeted and concerted educational advertising would go far toward both expanding the markets for architectural services and creating an atmosphere in which our newly educated clients might understand the differ-

ences we intend to cultivate. At that point, clients will be less likely to look for commodity pricing opportunities, and will, instead, focus on quality and value (increasing what economists call their "elasticity of demand" – greater flexibility in what they are prepared to pay for our services).

Few would argue that the Architectural Registration Exam is easy, or that the drafting drudgery and low pay of internships are attractive. Nevertheless, the profession continues to attract entrants in record numbers. For primarily selfish reasons, architecture schools perpetuate the mythical primacy of Design while glossing over (or flatly ignoring) the very practical yet mundane aspects of practice that separate good architects from those who would give us all a bad name. A more realistic and less romanticized approach to architectural education would translate into fewer and better-prepared graduates. If employers selected interns from only those schools with a broadened and more realistic curriculum, the marketplace would accomplish what appeals from alumni and local AIA chapters cannot.

Once each architectural firm discovers its own distinctive competence and educates its potential clients accordingly, the threat of substitute services within the profession di-

minishes. However, competition from engineers, design-builders, construction managers, interior designers, furniture suppliers, and others constitute an "extended rivalry" whose intensity varies with the protection afforded architects in each state. Licensing laws are only effective insofar as statutes restrict the scope of building design services to appropriately licensed professionals. Architects need to learn to use lobbying more effectively if we hope to retain existing territory.

I don't believe that less ambitious or piecemeal approaches will work. Attempts to treat only a part of the patient will not provide an effective or lasting cure. However, as with most complex issues involving large numbers of people, it is much easier to reach consensus on broad goals than on specific policies to implement those goals (the so-called Lindblom Theorem). Without the strong leadership of an AIA (or other, perhaps better-suited organization) empowered and motivated to take bold steps and to find ways of funding these initiatives, efforts by individuals will be uncoordinated, and life will remain a "perfect hell" for many of us.

*Eric J. Oliner, AIA
Oliner Combelic
Cheshire, Connecticut*

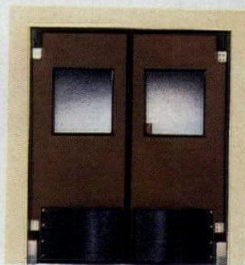
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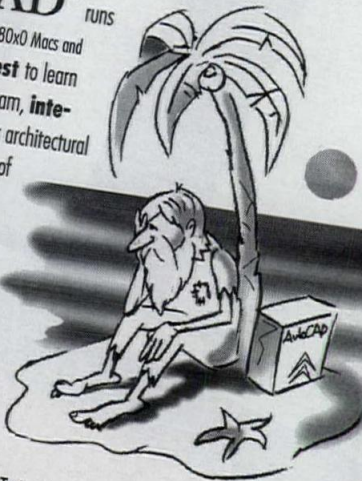
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Views

Phoenix

I enjoyed reading your article on Phoenix, "City or Supersuburb," in the December 1994 issue. However I was very surprised that you left out one of the main buildings that works towards creating a successful urban downtown and that attempts to nourish city life. That is the America West Arena, the one in the middle of your aerial photo. It seems to me that you have focused on the "star" designer buildings while ignoring this one, which has been highly successful in fostering precisely the sorts of civic life that your article wishes for.

Maybe the person you should be interviewing is not the architect but Jerry Colangelo, the Chairman of the Phoenix Suns. It seems to me that he is the one who had the vision and gumption to not do your typical arena: the isolated object in a sea of parking. Instead they chose to locate in the heart of the city and try to vitalize it. And it seems that they have been successful, from the reports I have seen on local television (I live a couple hours north of Phoenix) about all the restaurants and activity springing up around the arena.

What is needed now is maybe a focus on the connections, as you point out. And maybe Phoenix can learn from the planning of some of its neighboring "cities" (which are really part of one larger city) such as Tempe and its Mill Avenue and University development, or Scottsdale and its "Scottsdale Visioning" planning project.

Beyond all this it seems important to understand just what architects can and cannot do to create active public life. In a way, your whole issue emphasized this point, as the examples of Brasilia and Solana show. Even with a Medici-type person - like Terry Goddard or a Jerry Colangelo or a Robert Maguire - to actually make events happen, there are the larger social, economic, and cultural factors that will determine if a place is a center of life, not merely the design. Although the criticism of places of "aching loneliness" or "eerie quiet" may be justified sometimes, at others it is simply not fair. If people don't live around a place or have easy access to it how will it be lively?

The design might be fine, but you can't have a party without people. I suppose one could blame the designer for poor planning, but maybe there needs to be clearer understanding of what dynamics in our culture support such activity. Otherwise these centers of activity are not going to happen, no matter how visionary the design. To overcome this sort of hurdle, something that could really help architects and planners, I believe, is some sort of access to an information and a speakers' network that can show various case histories of the success - especially financial success - of various public places throughout the country, and **how the vision was implemented.**

Thank you for your articles and thank you for addressing so many issues. I particularly want to thank you for your openness. Give yourself a pat on the back and keep up the good work!

Charlie Knoblock
Sedona, Arizona

CORRECTIONS

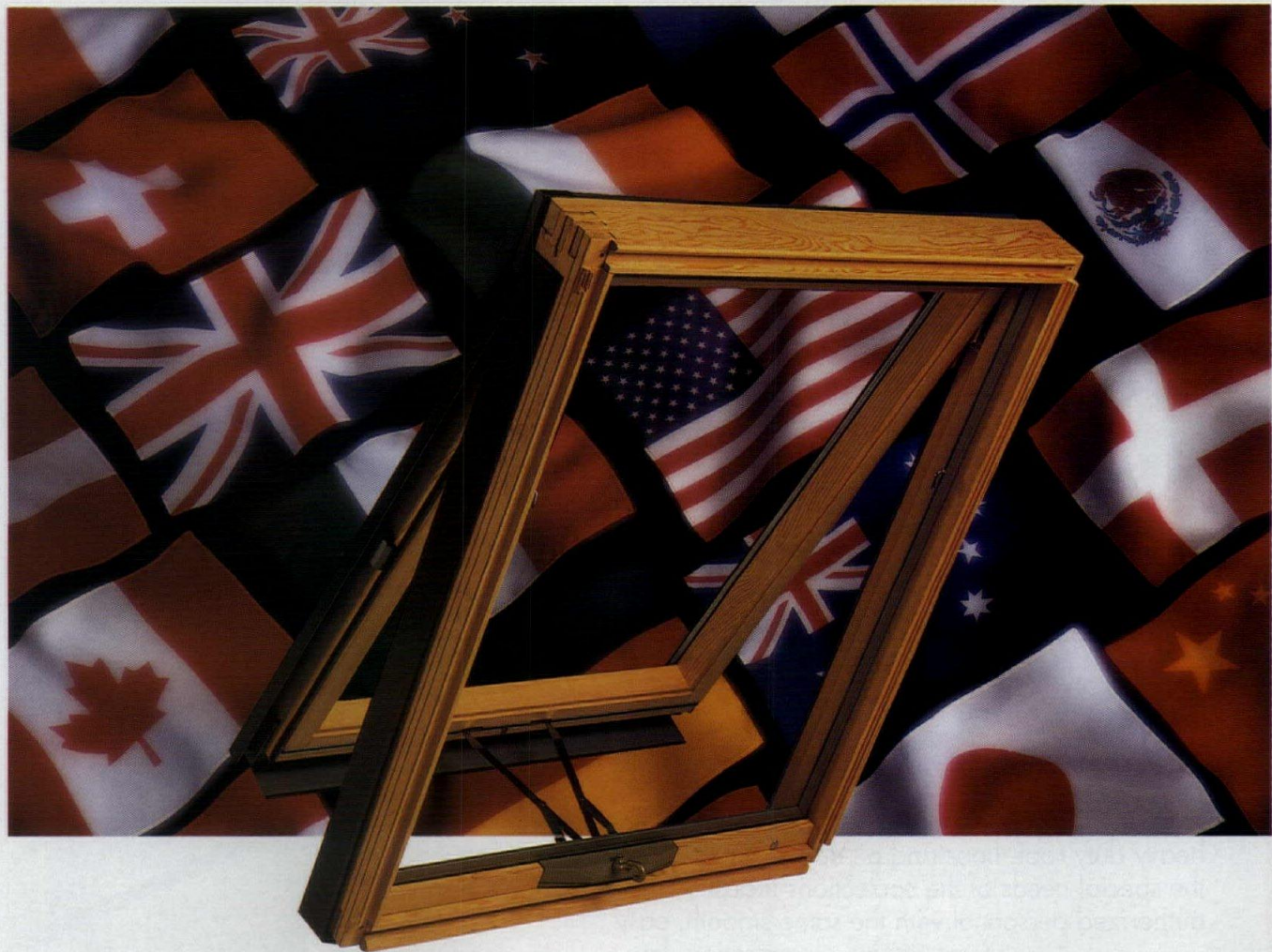
Youth Center Credits

Architects for the Robert White Youth Center in Boston (January, p. 46) are Leers Weinzapfel Associates in association with Chisholm Washington Architects. The credits published in P/A were incomplete.

Solana Credits

P/A's Critique of the Solana office park in Texas (December, p. 74) did not include credits for the master plan, which was by the team of: The Office of Peter Walker and Martha Schwartz; Mitchell/ Giurgola Architects; Barton Myers Associates; Ricardo Legoretta Arquitectos; Carter & Burgess.

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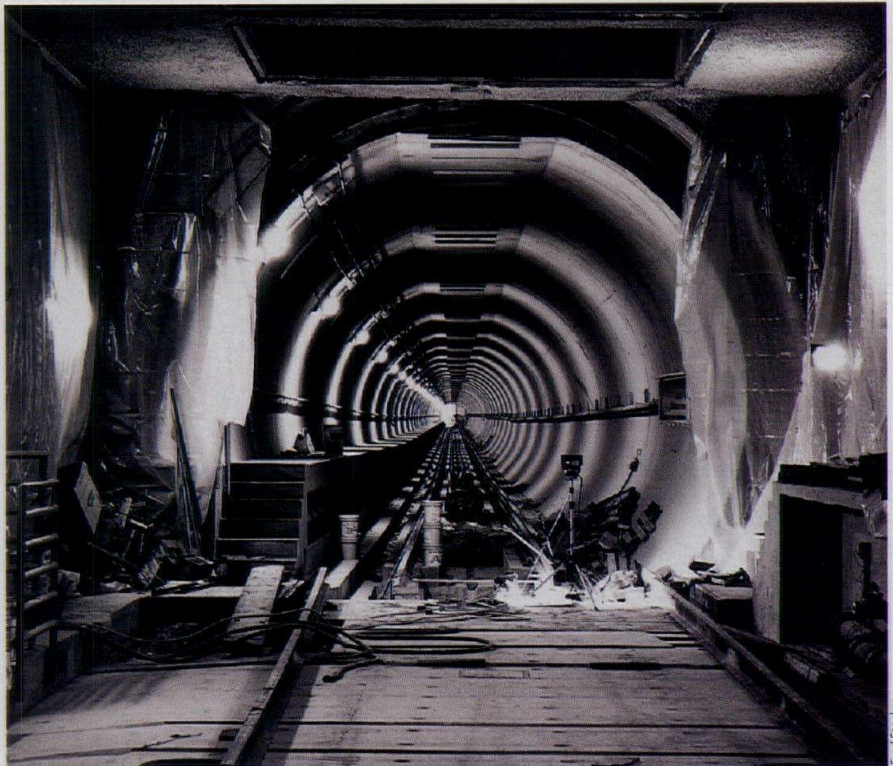
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LA Subway Digs into Problems

Choking on traffic, Los Angeles is reintroducing its population to mass transit via subway and light rail systems. Some \$5.7 billion are being spent on the subway, and already 4.4 miles of the system are transporting passengers from Downtown to MacArthur Park. However, approximately 6.7 miles of twin tunnels leading to and through the Hollywood area, a \$1.4-billion project, has experienced severe construction problems.

The ground along Hollywood Boulevard, over the Red Line tunnel, has sunk by as much as nine inches, and on August 18th, 1994, the tunnels were evacuated because of fear that a cave-in was imminent. In October, the federal government halted funding until the LA Metropolitan Transit Authority could control the quality of work. Some sections of the tunnel, for example, that were supposed to have been grouted had been filled instead with paper and plywood. Funding has resumed, but on February 8th, tunneling was halted again because the ground had sunk another 1 1/2" in some areas, requiring that more grouting be performed before the work continues. Despite this the construction manager and contractor remain on the job.

Business and property owners along the Red Line route have hired attorneys and



formed Hollywood Damage Control and Recovery Inc., which has filed an administrative claim against the MTA. Maureen Tamuri, an architect for the MTA, says that the claims against them will be taken care of in due time and construction will continue. But she also ad-

mits that the MTA has been battling the public's perception of safety. Problems with the tunneling "make our job even more difficult because we need to convince potential ridership that the subway is a safe, clean, and efficient means of transportation." **Lori Stocker** □

P/A Receives Editorial Award for AIA Story

Michael J. Crosbie and the editors of P/A have been awarded a certificate of merit for our April 1994 cover story on the AIA in the Jesse H. Neal Editorial Achievement Awards Competition, sponsored by the American Business Press. The certificate was given for investigative reporting, a category introduced with this year's competition. P/A has won twelve Neal awards or certificates of merit over the last fifteen years in this, the country's most important awards program for business and professional magazines. □

P/A Online

P/A has recently opened an account with America Online. Send your e-mail to PAeditor@aol.com. Subscription questions can be sent to PACirc@aol.com. □

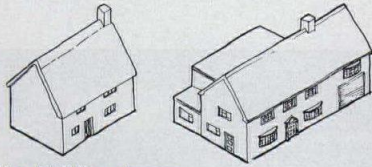


HOK Designs Bush Library

A United States presidency is like a comet, relatively short lived, but with a long paper trail behind it. Thus we build presidential libraries, the most recent of which, for George Bush, has been designed by HOK, Houston, on the Texas A&M campus. The \$42 million granite- and limestone-clad building contains a corner 50-foot-high rotunda, flanked by two perpendicular wings, a one-story exhibition space and a three-story archive. The monu-

mentality of the building is to be expected, given the imperial nature of a superpower presidency, but the scale of such libraries seem strikingly at odds with the down-home aura that all recent presidents – including Bush – have had to adopt to get elected. As the grand spaces and classicizing forms of this project suggest, we seem willing to confer the trappings of greatness on presidents only after they've been knocked down to size. □

Books

**How Buildings Learn:****What Happens After They're Built**

by Stewart Brand, Viking, New York, 1994, \$30.

Jane Jacobs has called this book "a classic ... probably a work of genius," and, as in so many other things, she is right. Stewart Brand, a writer and "inventor/designer" has written a painfully accurate analysis of why so much construction bypasses architects and an all-too-true account of how we have focused so much on innovative spaces that we have often neglected one of the most important aspects of buildings: how they fare over time. The book's diagnosis is clear and to the point, and its illustrations of how buildings change are both fascinating and instructive. This is, in short, one of the rare books that every architect should read. (Shown above: abbreviated account of the "Death of a Cottage.")

James Gamble Rogers and the Architecture of Pragmatism by Aaron Betsky, *Architectural History Foundation*, New York, MIT Press, Cambridge and London, 1994, \$45.

Critic Aaron Betsky attempts to connect the eclecticism of early 20th-Century architect James Gamble Rogers to the contemporary pragmatism of William James and John Dewey. But Rogers, not a particularly philosophical person, was a pragmatist in only the most general sense. He was brilliant, though, in fostering family and alumni connections to rich people and in creating buildings, such as those at Yale, that were equally rich in programmatic invention and historical detail.

Symbolic Space: French Enlightenment Architecture and Its Legacy by Richard A.

Etlin, *University of Chicago Press*, Chicago and London, 1995, \$40.

Richard Etlin argues that the 18th-Century Enlightenment redefined architecture as a series of simultaneous "spaces," related to scale (the "space of significance"), to health (the "space of hygiene"), to character (the "space of clarity"), and to inspiration (the "space of emulation"). He then shows how these conceptual "spaces" influenced the work of 20th-Century architects Paul Philippe Cret, Frank Lloyd Wright, and Louis I. Kahn. It's an interesting and ambitious book, although somewhat disjointed, because it comprises a series of papers delivered at conferences over many years.

Streets: Critical Perspectives on Public

Space edited by Zeynep Çelik, Diane Favro, and Richard Ingersoll, *University of California Press*, Berkeley and Los Angeles, 1994, \$40.

At a time when malls, mail order catalogs, shop-at-home television shows, and the Internet and are increasingly keeping us off the streets, this collection of case studies is a timely effort. Inspired by and dedicated to the late Spiro Kostof, urban historian and educator, and written by his former students and colleagues, the book focuses on particular streets in cities

around the world. The authors' analyses and critiques, like Kostof's, reflect a broad perspective of the street as an ongoing process influenced directly and indirectly by users of myriad social, political, economic, and ethnic differences. The book also includes "His Majesty the Pick: The Aesthetics of Demolition," an essay by Kostof that exemplifies his pursuit of a "panoramic conception of history," as the book's editors call it.

**Briefly Noted**

Acropolis Restoration: The CCAM

Interventions edited by Richard Economakis, *Academy Editions*, London, 1995, \$60.

Graphic and written documentation of the 20-year restoration by architects and archeologists. (Shown above: The east portico of the Propylaea from the southeast.)

Architectural Competitions by Cees de Jong and Erik Mattie, *Benedikt Taschen Verlag*, Germany, 1995, \$99.

Detailed overview of international architectural competitions from 1792 to the present; two-volume set.

Arts and Crafts Architecture by Peter Davey, *Phaidon*, San Francisco and London, 1995, \$60.

International Arts and Crafts architects, their lives, and theories, and the movement's parallels to our own time.

The Perfect City photographs by Bob Thall,

essay by Peter Bacon Hales, *John Hopkins University Press*, Baltimore, Maryland, 1994, \$50 cloth, \$29.95 paper.

Black-and-white photos taken between 1972 and 1991 of Chicago's changing character.

Reclaiming Our Past, Honoring Our

Ancestors edited by Edward Kaufman, *African Burial Ground Competition Coalition*, New York, 1994, \$19.95.

Memorial design proposals from an international competition to mark an 18th-century African Burial ground discovered during construction of a federal office tower in downtown Manhattan.

Unprecedented Realism: The Architecture of Machado & Silvetti by K. Michael Hayes, *Princeton Architectural Press*, New York, 1995, \$60 cloth, \$40 paper.

An analytical text, essays, and extensive project descriptions and documentation of nearly two decades of work by the Boston firm.

Merger Mania

As the construction recession ends and as globalization continues apace, some large firms are becoming even larger, each with different strategies in mind. The Hillier Group of Princeton, New Jersey, has merged with both the Eggers Group of New York and W.G. Reed Architecture of Washington D.C., pursuing a strategy of maintaining local offices, each with an expertise that is available throughout the firm. Likewise, Cannon of Grand Island, New York, has merged with Parkin Architects of Los Angeles; each entity brings to the new firm strengths that the other lacks. Meanwhile, the engineering/architecture firm Daniel, Mann, Johnson & Mendenhall (DMJM) has merged with Keating Mann Jernigan Rottet to form two new specialized firms in Los Angeles: DMJMKeating for architectural work and DMJM Rottet for interiors work. □

Our Republican Friends

The AIA has identified several Republican members of Congress as "strong allies" of architects. In the House are Jim Leach (R-IA), Bill Clinger, Jr. (R-PA), Bill Archer (R-TX), and Jan Meyers (R-KS); in the Senate, Alfonse D'Amato (R-NY), Strom Thurmond (R-SC), William Roth (R-DE), and John Chafee (R-RI). Terrence McDermott, CEO of the AIA, states, "The issues of professionals' competitiveness in a global marketplace, housing and community development, disaster mitigation, and historic preservation are neither Democratic nor Republican issues." That is true. But other issues of concern to at least some architects – such as public housing, support for cities, and investment in the public realm rather than in the military – have few Republican allies. With friends like these...? □

Ball Named to Fine Arts Commission

Rex M. Ball, FAIA, chairman emeritus of HTB, Inc., Oklahoma City, has been appointed by the White House to the architect's position on the seven-member U.S. Commission of Fine Arts, which reviews designs for national buildings, landmarks, sculptures, parks, and commemorative coins and advises the President and Congress on questions such as the competitive process for securing design services for the federal government and the authorization of memorials. Ball, who has practiced architecture, urban planning, and interior design for more than 37 years, lives in Oklahoma City and is a former resident of Washington, D.C. □

Obituaries

Walter McQuade 1922-1994

Walter McQuade, who died on December 26th from complications from pneumonia, was an editor at *Architectural Forum* from 1947 to 1964, the architecture and design critic for *The Nation* from 1959 to 1965, and a writer for *Fortune* magazine from 1964 to 1984. He also authored several books, including *Cities Fit to Live In* and *Architecture in the Real World, the Work of HOK*. A graduate of Cornell's architecture school, McQuade was a pioneer in his pursuit of an alternative career.

George Shimamoto 1905-1994

George Gentoku Shimamoto, a former senior partner of the Gruzen Partnership, died in New Jersey of pneumonia. He designed the Japan House in New York, a residence for Nelson Rockefeller, and a teahouse for Lawrence Rockefeller. During World War II, he and his family were interned in California and Utah.



Michael J. Crosbie

Pisa to Go, Hold the Lean

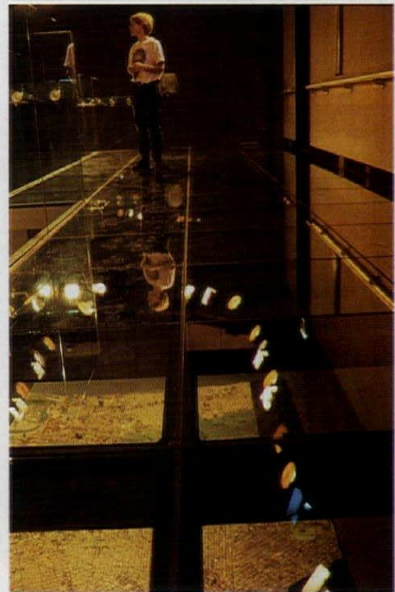
One of Italy's greatest landmarks may soon be tilted back from imminent collapse. The advancing list of the Leaning Tower of Pisa has been the subject of several studies over the building's 822-year history. The tower started to lean shortly after construction started in 1173. Today it is more than 15 feet out of vertical alignment at the tower top, tipping due south. In 1993 more than 600 tons of lead ingots were placed on the tower base on the north side, and the tower has since shifted back approximately one inch. Steel cables have also been strung around the tower's masonry walls, at the first level of columns, to avert collapse. Now techniques for correcting the tower's lean by three feet in alignment are being considered. One idea is to excavate soil beneath the foundation on the north side to cause the tower to settle in that direction. Another scheme would insert electrodes into the clay soil. A positive charge would draw out water molecules in the soil, causing it to compress. Anchors would then be added to prevent further listing of the structure. □



Pearl Rosen

800,000 Buildings in One Room

The huge model of New York that captivated visitors at the 1964 World's Fair has been refurbished and brought up to date by its original builder, Lester Associates, and is back on display at the Queens Museum of Art. Conceived by Robert Moses as an aid to city planning and municipal oversight, the 9,335-square-foot model has been completely updated for the first time in a quarter-century, using information from 5,000 maps, 109 aerial photographs, numerous field trips, and 147 models that architects donated to document their contributions to Manhattan's 1980s building boom. Viewing conditions have changed along with the model. Rafael Viñoly Architects has completed \$15 million worth of alterations to the museum, which occupies the New York City Building of the 1939 and 1964 World's Fairs, in Flushing Meadows Corona Park. The "Panorama of the City of New York," as the model is called, now is viewed from glass-floored balconies



Pearl Rosen

rather than from cars on tracks that simulated a helicopter flight around the city. Viñoly has also moved the building's main entrance back to its east façade, where it faces the park and the monumental Unisphere globe, the most prominent remnant of the 1964 fair. □

Architects and the Wounded City

Their city under siege, five members of the Bosnia-Herzegovina Association of Architects escaped last March with two crates of photos and drawings documenting the destruction of Sarajevo. The exhibition of these materials, entitled *Warchitecture - Sarajevo: A Wounded City*, has so far appeared in the U.S. in only one place, the small New York gallery, Storefront for Art and Architecture. (Parts of the exhibit also appear in the book *Mortal City* by the Princeton Architectural Press, New York.) But the small size and exposure of the exhibit are not commensurate with its

importance or power. Straightforward text about the history of the city and its architecture is accompanied by photos showing church domes punctured by rockets, masonry walls pockmarked by bullets, skyscrapers burned into blackened shells. Also shown are site plans annotated with symbols showing buildings that have taken direct hits and that have been partially or totally destroyed. Here, architecture serves as witness to the breakdown of civilized life and as a reminder that no longer is any city immune from isolated incidents of such terror. □

Calendar

COMPETITIONS

"Green Projects" Search

Deadline, submission: April 1
James Wines of SITE is looking for sustainable design projects for possible inclusion in a book he is writing on the subject. Contact James Wines, SITE, 632 Broadway, New York, NY 10012. Tel. (212) 254-8300, FAX (212) 353-3086.

Research/Study Award

Deadline, submission: April 15
Royal Oaks's biennial competition for a research grant involves an interdisciplinary exploration of architecture, landscape architecture, and interior design. Contact Royal Oak Foundation, 285 W. Broadway, Ste. 400, New York, NY 10013-2299. Tel. (212) 966-6565.

Mid-Career Research Grants

Deadline, application: May 1
Research grants are available to mid-career professionals in architecture, and related fields. Contact James Marston Fitch Charitable Trust, Beyer Blinder Belle, 41 E. 11th St., New York, NY 10003. Tel. (212) 777-7800.

National Awards for Transportation Design

Deadline, submission: May 15
The 1995 Design for Transportation Awards include categories such as architecture, historic preservation, and urban design. Contact Thomas Grooms, Federal Design Improvement, Design Program. Tel. (202) 682-5437.

EXHIBITIONS

Jefferson's Academical Village

Through April 16
The Octagon, Washington, DC.
More than 50 drawings of the University of Virginia by Thomas Jefferson are on view.



Ken Hedrich/Hedrich Blessing

Perceptions of Modernism

March 20–May 7
Arthur Ross Architecture Gallery, Columbia University, New York.
How the camera was used to shape our notion of Modern architecture will be explored in "Architecture Through Photography: Perceptions of Modernism." (Shown above: Fallingwater)

CONFERENCES

WestWeek 95

March 14–17
Los Angeles.
Ricardo Legorreta is the keynote speaker at this annual furniture show. Contact WestWeek 95 Registration, PDC, 8687 Melrose Ave., M-60, Los Angeles, CA 90069. Tel. (310) 657-0800.

Preserving the Recent Past

March 30–April 1
Chicago.
The evaluation, maintenance, and reuse of buildings, structures, and landscapes designed between 1920 and 1960 will be covered. Contact Tom Jester or Carol Gould, Preserving the Recent Past, PO Box 77160, Washington, DC 20013-7160. Tel. (202) 343-9578.

Public/Private Space

March 31–April 1
Philadelphia.
"Inherited Ideologies: A Re-Examination" is a "dialogue about public places and private space" with more than 30 women educators and practitioners. Contact Graduate School of Fine Arts, U. of Penn. Tel. (215) 898-3657.

Monterey Design Conference

March 31–April 2
Monterey, California.
The theme of this year's conference is "Seeing is Believing." Contact Donalee Hallenbeck. Tel. (800) 886-7714.

Milan Furniture Fair

April 7–11
Milan, Italy.
Members of the furniture industry will convene at the Milan Fairgrounds for a look at the next wave of chairs, etc. Contact Cosmit, Corso Magenta 96, 20123 Milano, Italy. Tel. 39 2 485921, FAX 39 2 4813580.

AIA Continental Europe

April 22–23
Dusseldorf, Germany.
Architects trained in the United States are invited to the general meeting of the AIA's European chapter. Contact AIAEurope, Boite Postale 208-Etoile, F-75770 Paris Cedex 16, France.

Laboratory Design

April 24–28
Boston.
"Guidelines for Laboratory Design: Health and Safety Considerations" will cover new construction and renovation issues. Contact Harvard School of Public Health, Continuing Education, 677 Huntington Ave., Boston, MA 02115-6023. Tel. (617) 432-1171, FAX (617) 432-1969.

Tile and Stone Show

April 26–29
Miami, Florida.
Ceramic tile and stone manufacturers will show their wares at this international show and seminar. Contact ITSE '95. Tel. (800) 881-9400/(407) 747-9400, FAX (407) 747-9466.

AIA National Convention

May 5–8
Atlanta, Georgia.
"Revisioning: Seeing Ourselves as Collaborative Leaders" is the theme of the 1995 AIA national convention and expo. Contact AIA, Convention Hotline (202) 626-7395.

Habitat and the High-Rise

May 14–19
Amsterdam, The Netherlands.
Rem Koolhaas and Richard Rogers are among the speakers at "Habitat and the High-Rise: Innovation and Tradition." Contact Council on Tall Buildings, Lehigh U., 13 E. Packer Ave., Bethlehem, PA 18015. FAX (610) 758-4522.

Practice Notes

Decline in Litigation

A recent survey by the Construction Industry Dispute Avoidance and Resolution Task Force (DART) shows that 52 percent of architects and engineers were "familiar" with mediation as a way to resolve construction disputes, 18 percent had been involved in it, and 71 percent thought that its use would increase. Says Russ Chaney of insurer DPIC, "The trend toward more and more litigation is finally reversing." For more information, contact DPIC at (800) 227-4284.

Challenge to Wage-Hour Law

Victor O. Schinnerer & Company reports in its Liability Update that the Labor Department will be holding hearings on the requirement that employees must be salaried to be exempt from the time-and-a-half payments for over 40 hours of work. At the same time, the House and Senate Labor Committees have promised major revisions to the Wage-Hour Law. To receive Liability Update, contact Victor O. Schinnerer & Company at (301) 961-9800.

Technics Notes

Breakthrough in Acoustical Testing

A new device manufactured by the Bose Corporation makes it possible to simulate the acoustical performance of a space before it is built. The acoustical simulator relies on a computer model of the space to analyze how sound reaches any listening position and it reproduces the sound through a speaker system. Not a commercial product, it will be used by Bose in consultation with architects.

PVC Ruled Unsafe in Austria

The Austrian Supreme Court recently upheld a ruling that polyvinylchloride (PVC) can be described as an "environmental poison." The court's decision was based on scientific evidence that PVC poses a threat to human health and the environment. Elsewhere in Europe, the Swedish parliament, based on the findings of a year-long study of PVC, called for a phase-out of the material by 2000.

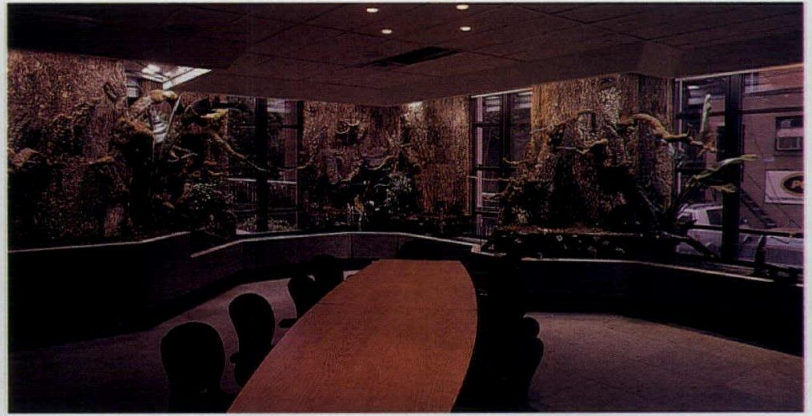
Accessibility Guidelines for Vision Impaired

ADA Accessibility Guidelines: Provisions for People with Impaired Vision is a 38-page booklet that covers such subjects as handrails, elevators, and transportation facilities. The \$10 booklet is available from Lighthouse Industries, 36-20 Northern Blvd., Long Island City, NY 11101.



An Urban District for 15,000

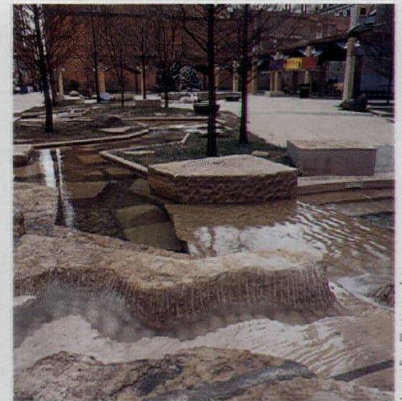
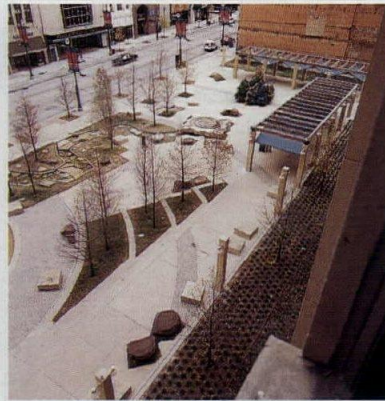
The Portland, Oregon, city council recently approved a \$113-million strategic financing plan for infrastructure improvements that will help convert 400 underused acres north of downtown into a bustling district where 15,000 people will live. Planning for the "River District," much of which consists of abandoned rail yards and declining light industries, has been gathering momentum since the Portland Development Commission purchased Union Station (shown above), centerpiece of the area, and began envisioning redevelopment of it and surrounding property. Parts of the station's upper areas are to become a hotel and conference center, above the Amtrak trains. A consortium of land owners pursuing redevelopment has the backing of major banks, the chamber of commerce, downtown business leaders, a utility, the Portland Development Commission, and the Port of Portland, which was looking at new uses for a sprawling terminal complex no longer needed for shipping. At the consortium's behest, in 1991 Zimmer Gunsul Frasca drew up a redevelopment concept calling for creation of 5,500 housing units through infill construction and renovation of warehouses and other existing buildings. That proposal – less a prescription for specific land uses than a framework within which individual developments could be planned in detail and executed – also envisioned retail and commercial facilities and the retention of some industries. The public sector is expected to provide the amenities, which would be concentrated mainly along a 2½-mile stretch of the Willamette River and would include a lagoon bringing the river into the heart of the district. Most of the individual projects would be undertaken by private developers, including consortium members, who own 70 percent of the land. Portland's celebrated downtown transit mall and the MAX light-rail system will be extended into the district, helping to tie the redeveloped area into the downtown, which expects to benefit substantially. □



An Indoor Ecosystem

A computer-controlled and monitored mini-ecosystem, stocked with about 8,000 plants, fish, snails, shrimp, frogs, and other tropical species in a hydroponic garden, has been installed in a 1,700-square-foot meeting room in the Canada Life Assurance Company annex, a new office building in downtown Toronto. It's part of a three-year University of Guelph (Ontario) experiment in biological air filtering, which it is hoped may hold a cure for "sick building syndrome." Horticultural scientists will measure the absorption of unhealthy compounds by the room's biomass, which may help them determine a

workable ratio of ecosystem to enclosed space. Positive pressurization allows air to be drawn through porous lava rock into a fiberglass plenum behind the wall and then to be recirculated by a separate mechanical system. Project director Thomas Tampold of Toronto's Shore Tilbe Irwin & Partners, the building's designers, observes that glass-covered ecosystems ultimately might be placed atop mechanical penthouses, introducing healthy air directly into the air-circulating system while at the same time helping to create rooftop gardens. Gentrion Systems designed the ecosystem. □

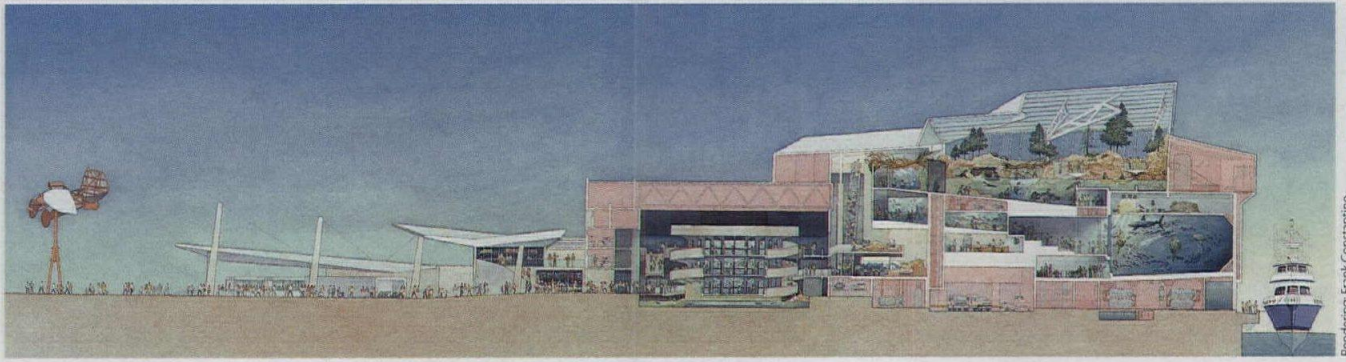


Janice Fox, Photographer

Two New Plazas in Dallas

Pedestrians in downtown Dallas have reason to cheer, with the dedication of two new plazas, but the pair of public spaces could hardly be less similar in quality and inspiration. The much-ballyhooed Pioneer Plaza, a \$9-million tourist attraction in front of the expanded Dallas Convention Center, is a green space with a kitschy set of more than 40 bronze figures depicting a cattle drive heading down an artificially constructed hillock toward a stage-set creek. Less splashy but far more interesting is Pegasus Plaza, pictured

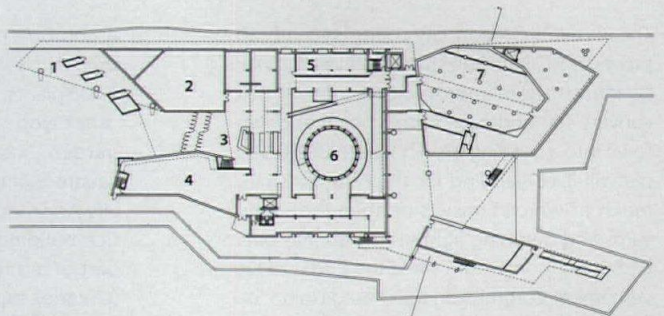
above, a paved space surrounded by tall buildings. Commissioned by the Dallas Institute of Humanities and Culture, sculptor Brad Goldberg's design is inspired by the myth of Pegasus, a Dallas favorite because of the much-loved "flying red horse" atop the Magnolia Building. Legend holds that Pegasus sprang forth from Medusa's head, stamped the earth, and created the Fountain of Muses. Accordingly, the centerpiece of the design is a fountain that taps into a natural spring beneath the Magnolia Building. □



Rendering: Frank Constantino

New England Aquarium to be Expanded

Completed in 1969, the New England Aquarium on Boston's Inner Harbor has survived a proposal for demolition and will instead be renovated and expanded by Schwartz/Silver, Boston. To accommodate its 1.3-million annual visitors, the original reinforced concrete box, with its 187,000-gallon cylindrical Coral Reef tank, will be extended to the east and west with an organic agglomeration of volumes clad in stainless steel panels and insulated glazing. Most of the new exhibition space will be located in the addition, where large expanses of glass will provide a visual connection to the waterfront. The flow of traffic is a crucial planning issue. The third floor of the complex will act as a pivotal point of circulation; curatorial offices will be housed below the third floor in the addition and above the third floor in the existing facility. Permanent exhibits in the addition will be stacked to create a primary one-way route for visitors. Construction is expected to begin early in 1996.



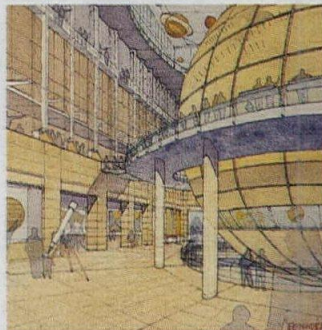
FIRST FLOOR PLAN

- 1 TICKETING BOOTHS
- 2 CHANGING EXHIBIT
- 3 LOWER LOBBY
- 4 GIFT SHOP
- 5 COASTAL DISCOVERY LAB
- 6 CORAL REEF TANK
- 7 LIFE SUPPORT

N ↑ 100'/30m

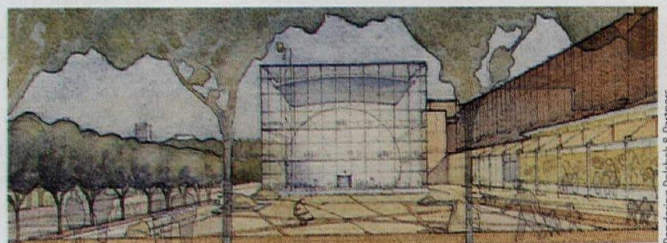
Natural History Museum Revamped and Wired

The American Museum of Natural History recently unveiled a design by James Stewart Polshek & Partners to overhaul its rambling 23-building complex on Manhattan's Upper West Side. The museum's goal is "to communicate the fundamental interrelationship of the history of the universe and the history of our planet." The Hayden Planetarium's existing dome, which is 80 feet in diameter, will be transformed into a complete sphere and enclosed within a glass box. A proposed Hall of Planet Earth will link the Planetarium to the museum both architecturally and intellectually. A major component of the overhaul will be interactive technology exhibits accessible to on-site visitors and electronically to schools and institutions across the country. Other elements are an educational resource center, a replacement parking garage with a public rooftop plaza, an entrance on Columbus Avenue, retail and restaurant spaces, and an enhancement of the park that shares the museum's four-block site. The price tag for the project may be as high as \$90-million, of which \$10.5-million has been raised. The project is to be completed before the year 2000.



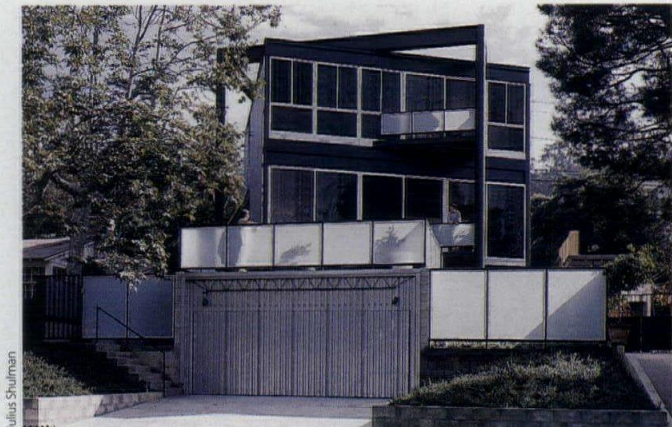
MODEL

Jock Pottle/Esto



CONCEPTUAL VIEWS OF HAYDEN PLANETARIUM: EXTERIOR (ABOVE) AND INTERIOR (ABOVE, LEFT)

Rendering: Polshek & Partners



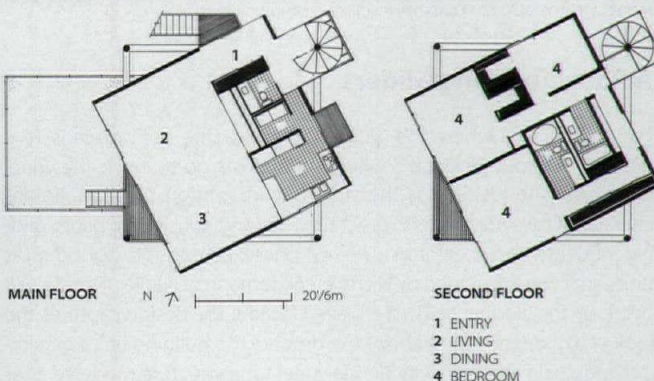
Julius Shulman



Julius Shulman

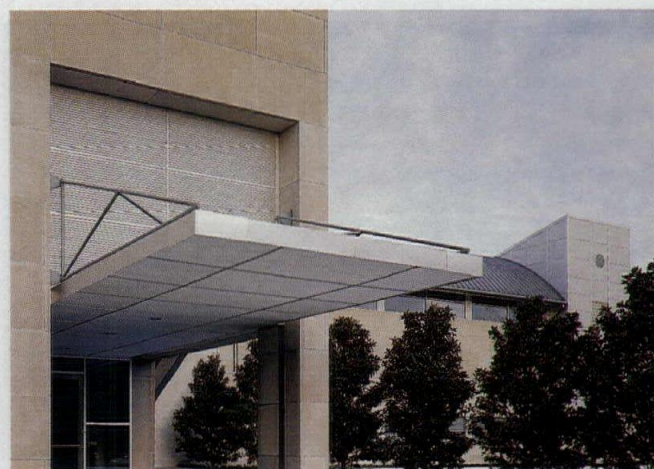
Pierre Koenig, Steel, and Los Angeles

The architect of two legendary *Case Study Houses* for *Arts & Architecture* magazine in the 1950s, Pierre Koenig (P/A, May 1993, p. 113) has just completed a house in Santa Monica. A living cube inside a structural cube, the Schwartz House employs exposed steel and large expanses of glass, which are protected by sun screens, to delineate its composition. Built on a small hillside site, the structural cube is parallel to the street and the inner cube is rotated 30 degrees off axis to take advantage of the view and the ocean breeze flowing up the street; the orientation also eliminates the need for artificial ventilation. To gain more outdoor space, the garage roof is used as a deck. Inside, the first floor is an open plan, with living, dining, and kitchen areas flowing one into another. Upstairs are three bedrooms and a bath. With this house, Koenig continues his 50-year investigation of industrialized components.

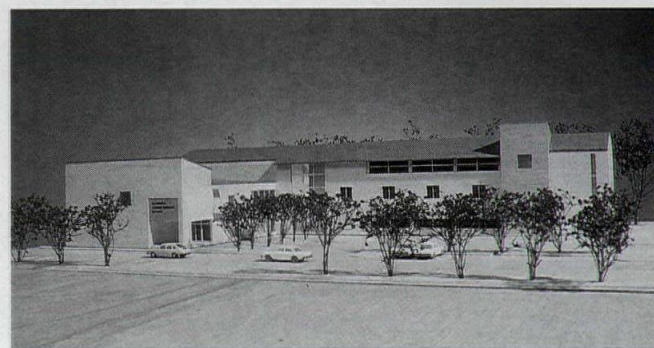
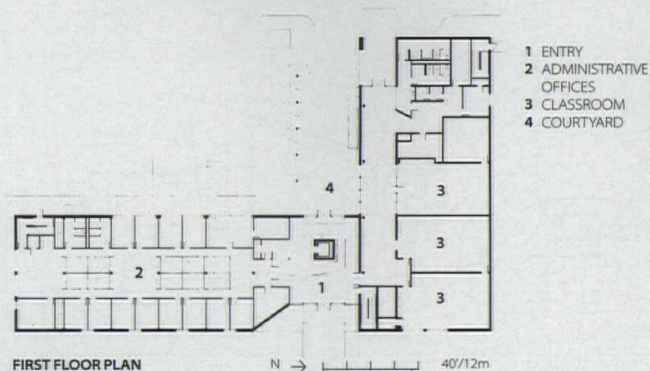


Addition to Houston Museum "Campus"

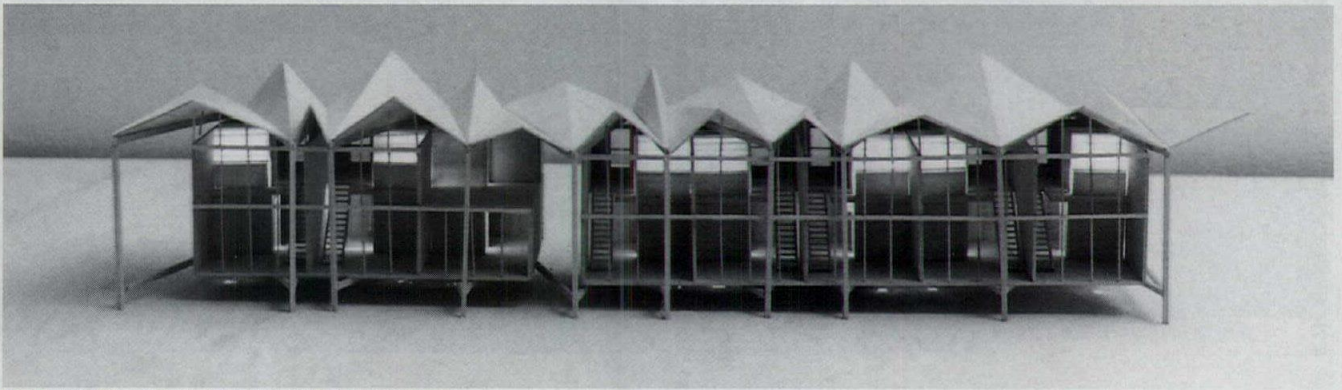
Houston's Museum of Fine Arts has been expanding for decades to form a "campus" loosely surrounding its sculpture garden. In keeping with Houston's laissez-faire development traditions, this campus is crossed by public streets and interrupted by non-museum buildings, and its structures show the individual stamp of five different architects, including Mies van der Rohe and Gunnar Birkerts. The new addition to this cluster is a hybrid Central Administration and Junior School Building that combines disparate functions in one L-shaped 58,000-square-foot building. It has been designed in severe, almost self-effacing, Modern style by the Houston designer Carlos Jimenez with Kendall/Heaton Associates, Architects. For this building, the largest to date by the 35-year-old Jimenez (P/A Young Architects issue, June 1987, p. 92), he has adopted the neutral hues of its campus, displaying his design virtuosity mainly in subtleties of proportion and in details such as entry canopies.



Lisa Carol & Paul Hecker



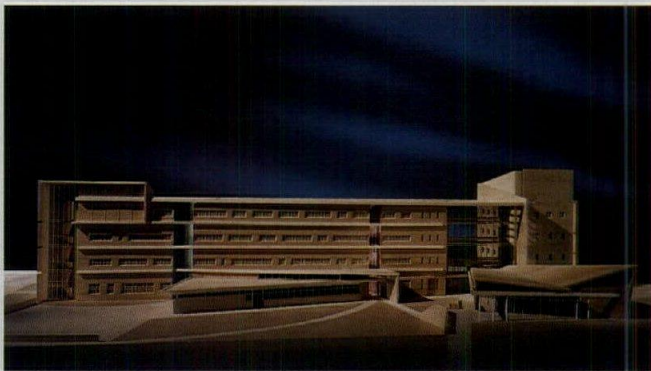
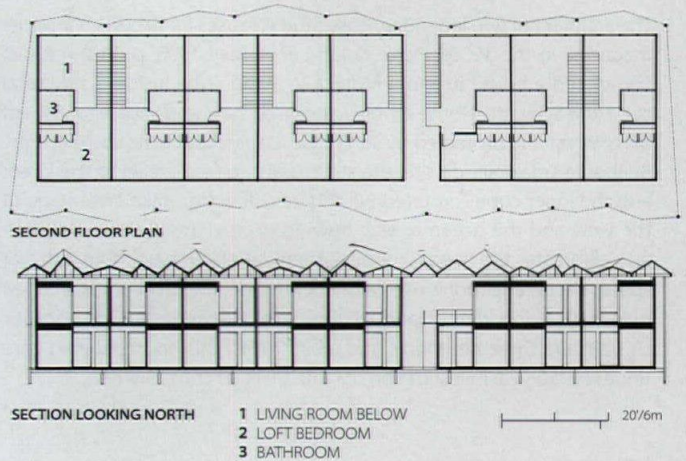
© Jud Haggard



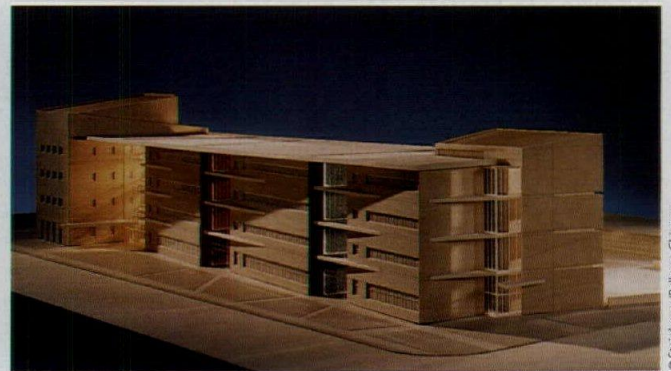
MODEL VIEW OF GLAZED FAÇADE OVERLOOKING LANDING FIELD

A Roost for Hang Gliders

Hang gliders go where the "launch" is good. One such place is Tennessee's Lookout Mountain, where enthusiasts go to catch the wind. On a rural site just across the state line in Trenton, Georgia, an aficionado of the sport plans to erect time-sharing housing for pilots, gliding students, and spectators. The first phase, comprising eight duplex units, that were designed by Nichole Wiedemann of Naples, Florida, will overlook the landing field via a glazed façade. The design captures the look of a glider hovering above the ground: the building has a gravity-defying quality thanks to its slender steel tube structure modeled after Japanese folding screens; a floor (supported by diagonal beams) that "levitates" about three feet off the ground; and a lightweight metal-sheathed roof, reminiscent of folded paper or glider wings.



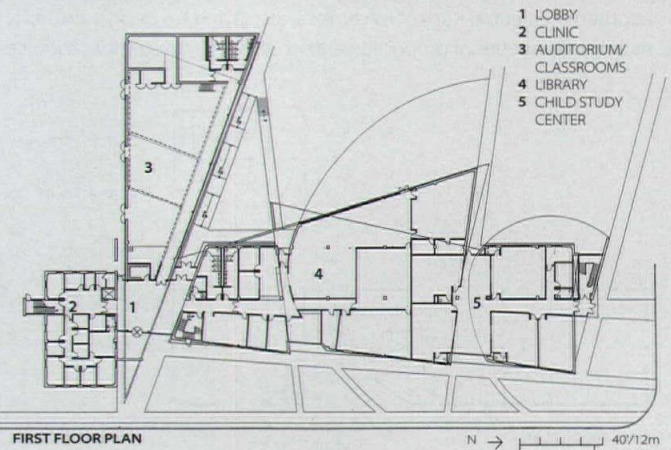
© Steinkamp/Ballogg Chicago



© Steinkamp/Ballogg Chicago

Modern Campus Gateway

Planned for the University of Youngstown, Ohio, is a new College of Education building that will act as a gateway between the campus and the city. Design architect for the 82,000-square-foot structure is Perkins & Will of Chicago and the architect of record is Olsavsky/Jaminet. The four-story bar-shaped building presents a formal, unified face to the city, while its campus side is modulated by two single-story structures, an auditorium and a library, extending from its base. The bar building, organized by a double-loaded corridor, is sliced longitudinally in two places to bring natural light into the building and to establish visual access to the campus and the city. A four-story, glass-enclosed lobby marks the entry on both sides of the building. Materials include stucco, aluminum-panel cladding, and insulated clear and tinted glass.



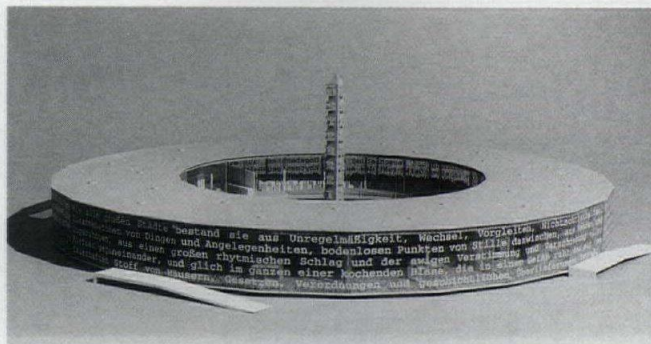


© Timothy Hurstley

MEETING SPACE ON "MAIN STREET"

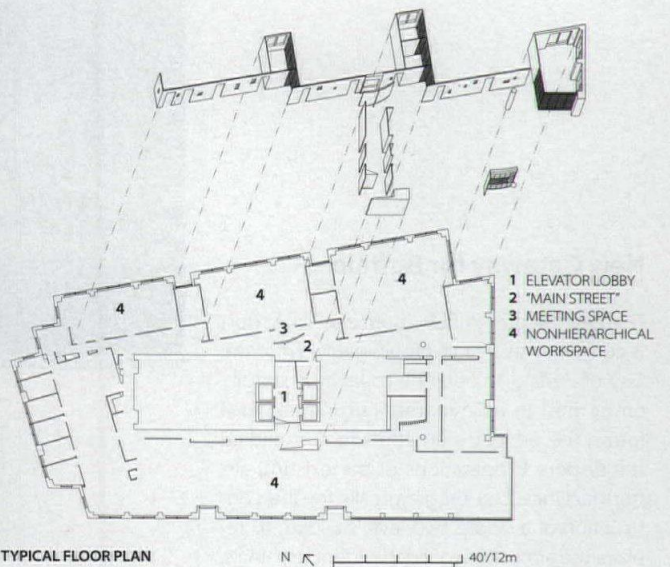
A Nonterritorial Interior

The increasingly nonhierarchical, flexible corporations of today have begun to commission unconventional workplaces, such as these offices for NYNEX, designed by ADD Inc., for 12 floors of a Boston highrise. Visually, the offices have a cool minimalist aesthetic, but what is noteworthy about them are their plans. Recalling the organization of a city, the offices are arranged in blocks and neighborhoods, with identically sized workspaces for executives and secretaries alike. "Main Streets" run



A Bookshop Wrapped in Words

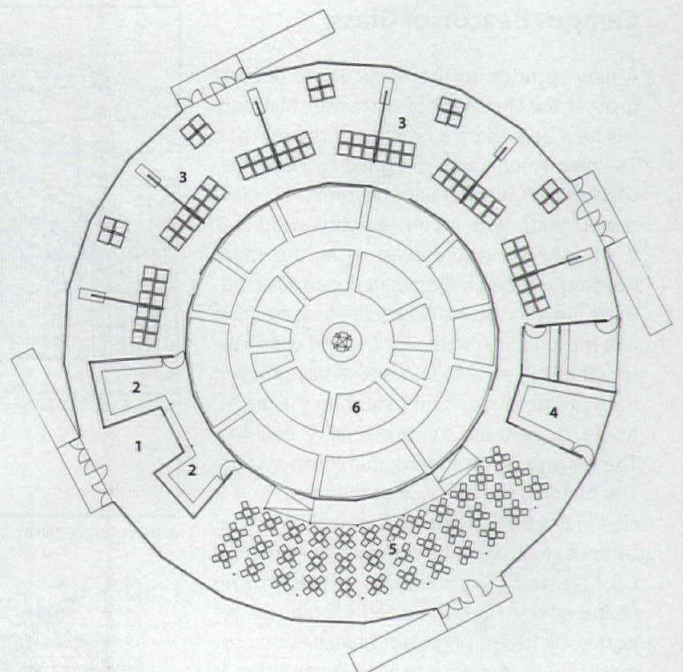
Adolf Krischanitz, an architect in Vienna, has developed an unusual expertise: the design of temporary, reusable structures. And one of his most recent projects of this kind promises to be among his best. The Austrian pavilion for this year's Frankfurt Book Fair, a competition-winning design, is a lightweight steel-framed circular structure containing a café, an office, and book and video displays. At the center of the doughnut-shaped plan is a garden and an obelisk that doubles as a sign. Clear glass encloses the inside wall of the pavilion, while the outside wall features glass panels engraved with words. Whether it is playing on the transparency of language or reminding us that we will increasingly read from the glass screens of computers, this pavilion indicates that behind Krischanitz's lightweight structures lies some solid thinking.



TYPICAL FLOOR PLAN

N ↑ 40/12m

beside the elevator core, with libraries and meeting spaces located along them. The offices' public realm – the corridors and open spaces – define the blocks and occupy the areas along the perimeter windows. This has resulted in a workplace that promotes communication and interaction and allows for the rapid rearrangement of people into work groups. These NYNEX offices may not look futuristic, but they very much look to the future.



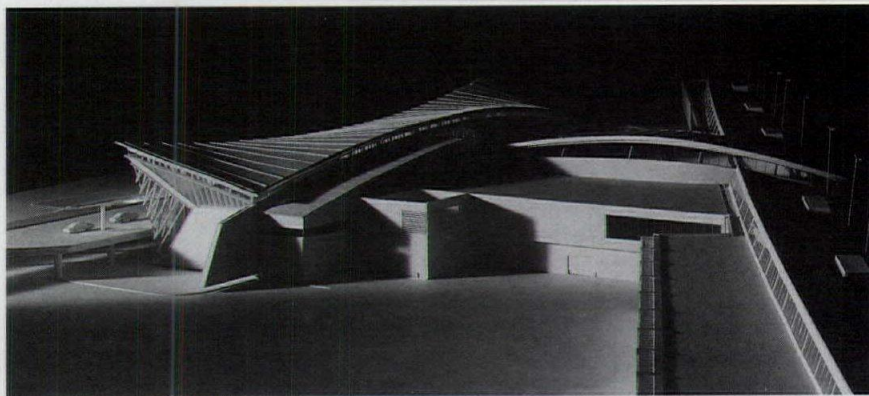
FLOOR PLAN

N ↑ 20/6m

- 1 RECEPTION
- 2 OFFICE
- 3 BOOK STALLS
- 4 KITCHEN
- 5 CAFÉ
- 6 EXISTING PLAZA WITH OBELISK

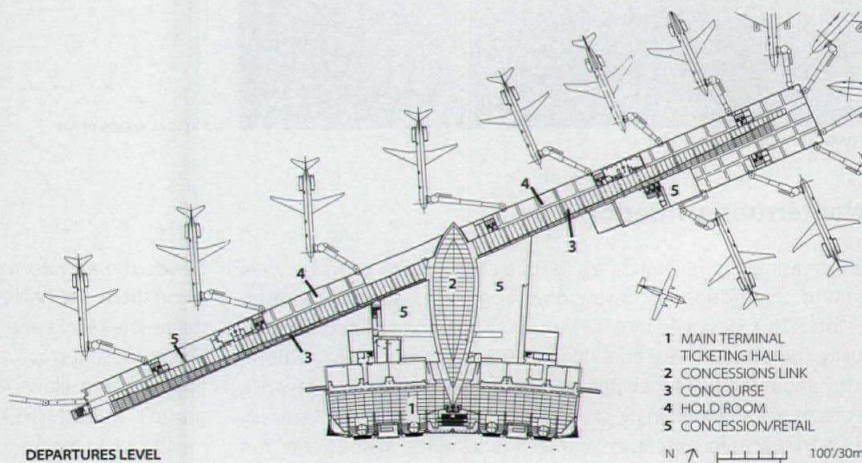
New Gateway for Buffalo

The new Greater Buffalo International Airport is conceived as a high-profile gateway for the City of Buffalo. In addition to its civic stature, embodied in its dynamic curvilinear roof forms, the project is an effort to consolidate the dispersed operations of the existing airport facilities. The program calls for the construction of a single, two-level building to replace the airport's two independent terminals, eliminating the inconvenience of inter-terminal transfers and increasing the number of gates from 15 to 40. Designed in plan and section to suggest "the process of spatial compaction and expansion inherent to travel," the 290,000-square-foot terminal is by the Greater Buffalo International Design Group, a joint venture of Cannon, Kohn Pedersen Fox Associates, and William Nicholas Bodouva & Associates. Construction is to begin this summer, with completion expected in two years.



VIEW OF MODEL LOOKING SOUTH

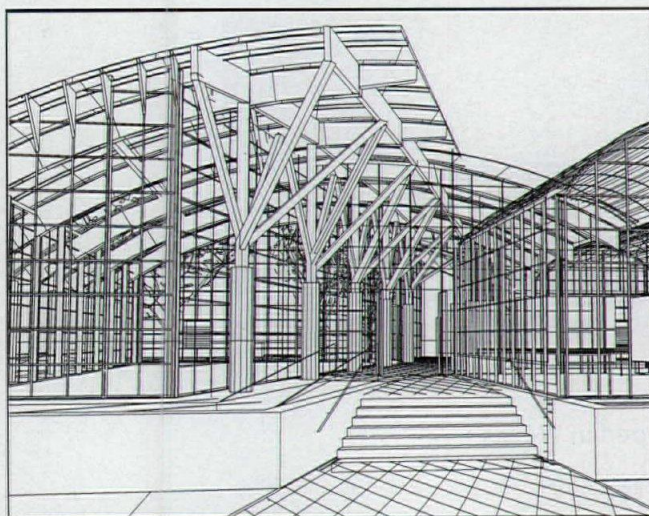
JACK POTTLE/ESTO



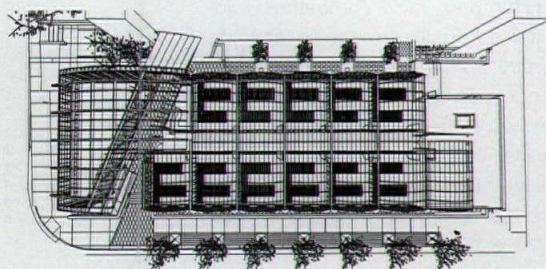
DEPARTURES LEVEL

Campus Beacon of Glass

A new addition to the horticulture department at the University of Wisconsin, Madison, will be a beacon on a prominent campus site. The new greenhouse, designed by Flad & Associates of Madison, takes the form of six glass barrel vaults, with a conservatory located at the building's north end. At night, the entire building will be an illuminated campus landmark. Entry to the 20,000-square-foot addition is at the juncture of greenhouse and conservatory through an arcade. Visitors may proceed north to the conservatory, south to the greenhouse, or east into the horticulture building. The glazing is a standard aluminum system. The building's headhouse at the south end is clad in red brick similar to that used on other campus structures. The conservatory structure is of treated glulam beams, curved to the shape of the barrel-vaulted roof, and supported by "trees" of glulam branches that extend from a concrete trunk. Construction is scheduled for completion this fall.



PERSPECTIVE OF ENTRY



PERSPECTIVAL SITE PLAN

Four Houses in a Circle

Increasing density is not always incompatible with the conservation of open space, as this project for four houses in an affluent section of Mexico City shows. The round, hilly lot was zoned for two houses, but the developer was granted permission to double that density if all of the major trees on the site were maintained. Albin Vasconcelos Elizondo Architects resolved the problem by treating the four houses as compact cubes, with curved extensions that form a kind of thick garden wall around the lot. Built of brick bearing walls and concrete slabs, the houses have garages at street level, living spaces at garden level, and bedrooms above that. Each house differs in expression, however, with flat or butterfly roofs and symmetrical or asymmetrical compositions. The project demonstrates that, through careful design, the creation of community space and the maintenance of open space are possible in a suburb of single-family houses.

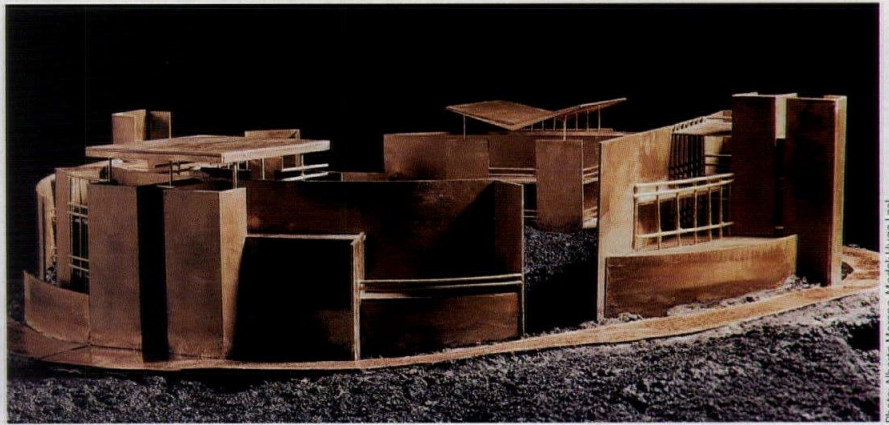
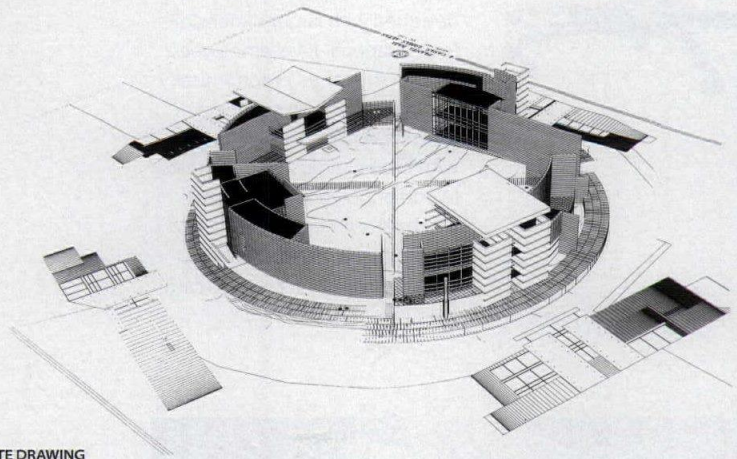


Photo: Alberto Moreno, Model: Hugo Leal

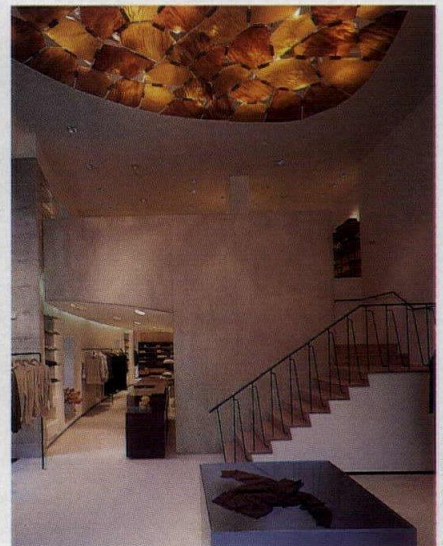
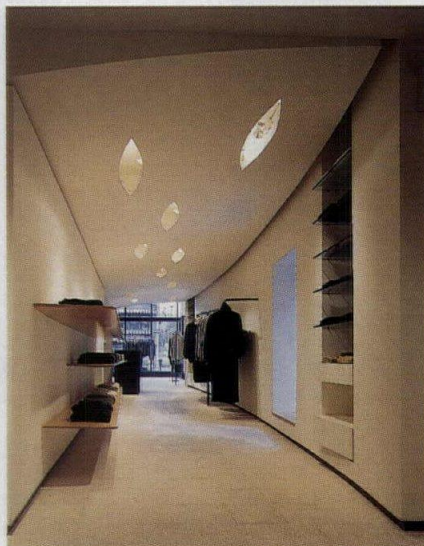
MODEL



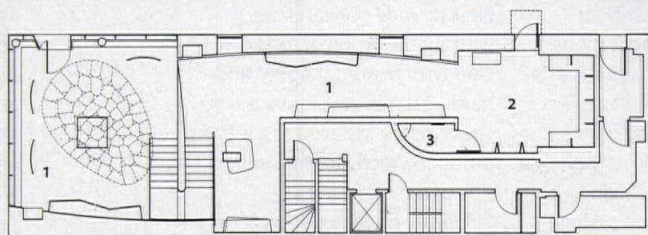
COMPOSITE DRAWING

An Elegant Store for Cashmere

Masters of a minimal aesthetic, David Piscuskas and Juergen Riehm of 1100 Architect, New York, have designed TSE, a shop for cashmere clothing in Manhattan that is an essay in elegant detailing. Its two-story corner display space features a hanging colored-glass chandelier that hovers above the room like a UFO. Trailing off from this space on two floors are more clothing display areas that seem equally ethereal. The floor and ceiling, for example, are pulled away slightly from the exterior wall, and the reveal is illuminated by concealed strip lighting, making the slab appear to float. Likewise, wood shelves and bent-steel racks emerge from the walls without evident support, and a first-floor plaster ceiling bows down, with back-lighted lozenge-shaped cutouts, making it appear paper-thin. This is one store where the aesthetic doesn't upstage the merchandise, demonstrating that in the right hands, less is anything but a bore.



Photos: © Paul Werchof



PLAN

N ↑ 20'/6m

- 1 WOMEN'S DEPARTMENT
- 2 MEN'S DEPARTMENT
- 3 FITTING ROOM



A Bigger Office Chair

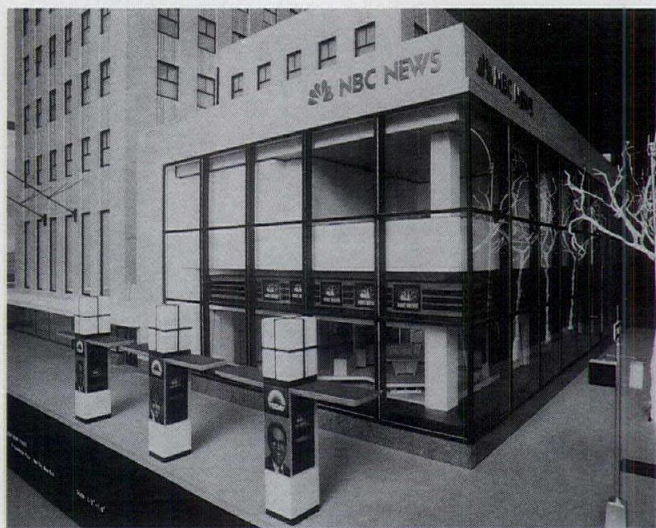
Girsberger's Pronto seating series will now include Pronto 2, a chair designed with larger dimensions for managerial-level employees. As with the other "ergonomically designed" chairs in the series, the new version is available with fixed or adjustable armrests (wood or polyurethane foam) and backrest height and hard or soft dual wheel casters. Circle 100 on reader service card



Flooring by Amie Gross

Architect Amie Gross of New York has designed the Chroma Collection, a group of 12 patterned commercial floor tiles, for Allstate Rubber. With the highest rubber content (55 percent) of any flooring product currently on the market, according to the manufacturer, the flooring is said to reduce leg strain and to help dampen sound. For high-traffic, low-maintenance areas, the flooring is available in four designs: Stardust, Streamers, Confetti, and Cosmos.

Circle 101 on reader service card

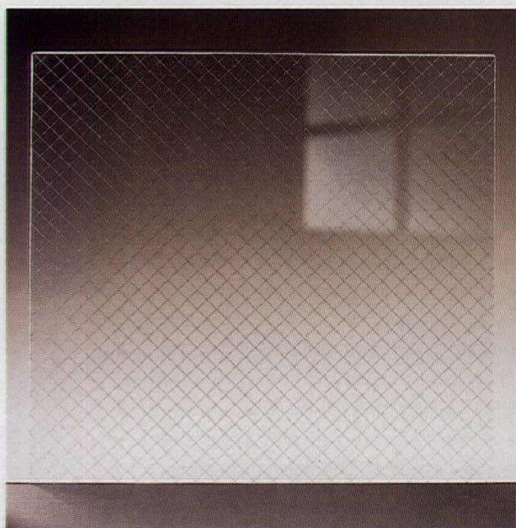


Security Window Film

A new line of safety and security window film has been introduced by Courtaulds Performance Films. Designed primarily for use in commercial applications, LLumar Magnum® is also suitable for residential use in areas subject to natural disasters and high traffic. A laminated film of polyester and metallized coatings bonded by an adhesive system, the new product "can drastically

reduce damage and injury from broken window glass." Available in three thicknesses, the window films provide optical clarity without distortion or a yellow, cloudy, or frosted shadow, and have a scratch-resistant surface. The films are installed as a retrofit product directly to the interior side of the glass.

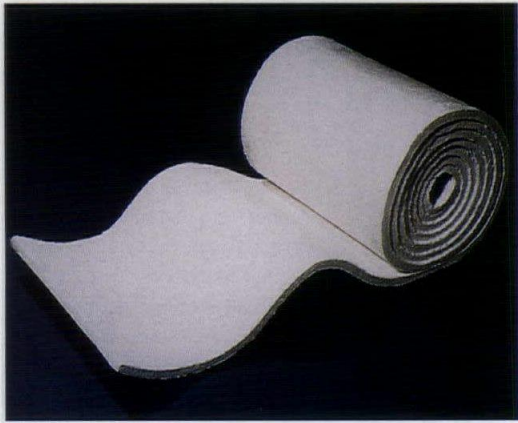
Circle 102 on reader service card



Fire-, Impact-Resistant Wired Glass

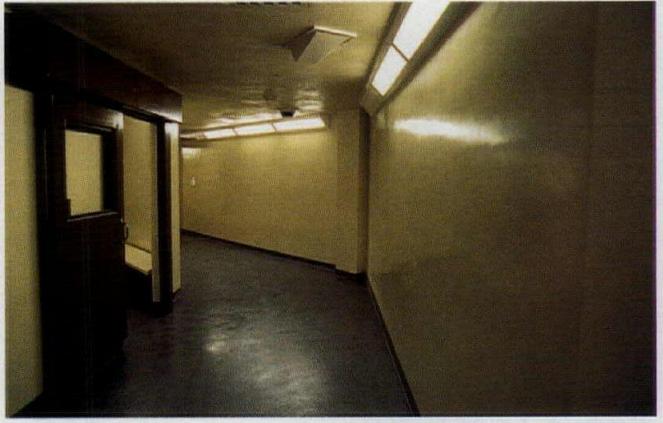
Polished Diamond Wired Glass from Pilkington Glass is suitable for applications requiring 45-minute fire resistance together with a level of impact safety. The product recently met the ANSI Z97-1 impact test at 12-inch drop height and ASTM E-163, the industry benchmarks for impact and fire safety performance, and it conforms with the ASTM C1036-90 standard specification for flat glass. It is said to provide an effective barrier to smoke, hot gases, and flames after it has been fractured and to retain its integrity when heated and sprayed with water.

Circle 103 on reader service card



Insulating Blanket for Fire Protection

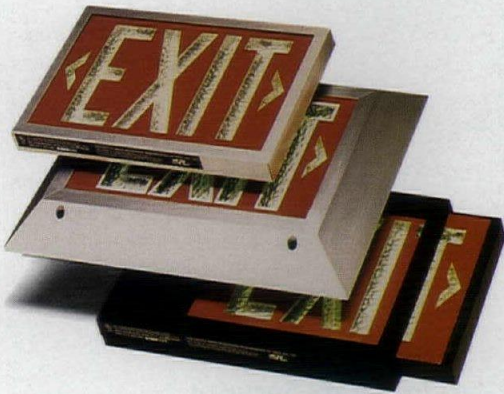
FireMaster® Blanket from 3M Fire Protection Products is a new insulating blanket material for the fire protection of structural components. The inorganic, UL-classified material can be used to isolate cables, structural steel, plastic pipe, exhaust ducts, construction joints, storage tanks, and other surfaces from the heat of fire. Available in blanket form or with a laminated foil facing, FireMaster® has an R-Value of 4.15 at 70 degrees Fahrenheit and a rated service range of -280 degrees to 2,300 degrees Fahrenheit. Circle 104 on reader service card



Security Wall System

The Structocore Security Wall Systems from United States Gypsum is offered as a lightweight, space-saving alternative to concrete masonry walls. For use in correctional facilities, banks, and other institutions where security and abuse-resistance are priorities, the system includes specially formed steel sheets that provide continu-

ous reinforcement for monolithic, high-strength, fire-resistant plaster finish applications. The steel sheets (available in 12-, 14-, 16-, and 18-gauge galvanized steel panels) receive a spray-applied Structo-Base Gypsum Basecoat Plaster and an abuse-resistant Imperial Finish Plaster. Circle 105 on reader service card



Self-Luminous Exit Signs

Omni-Glo™ Series 700 exit signs from Self-Powered Lighting require no batteries, electrical connections, or wires. Each sign has a sealed, fiberglass-reinforced, polyester housing with an acrylic window that can be wall- or ceiling-mounted. The self-luminous signs have a system of phosphor-coated tubes filled with tritium gas that reacts with the phosphor coating to emit a visible light. The company says it has developed a closed loop production cycle for recovery of the tritium gas from the exit sign units at the end of their effective life; most of the sign's components are also recycled. Circle 106 on reader service card



Acoustical Panels for Walls

The Fabri-Tough™ Wall Panel System products from Tectum are abuse-resistant, sound-absorbing, fabric-wrapped panels with a tackable surface and are suitable for gymnasiums, civic arenas, conference rooms, classrooms, and other applications. The panels have a flame spread

of 25 or less under the ASTM E84 test and meet the requirements of the room corner fire test (UBC 42-2 or the equivalent). The panels are one inch thick and two feet wide and may be ordered in a variety of lengths. Circle 107 on reader service card

Reglets from Thermoplastic Resin

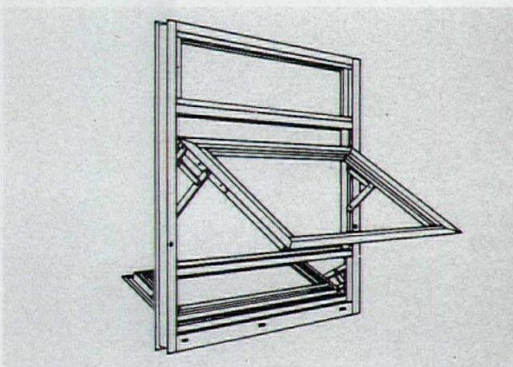
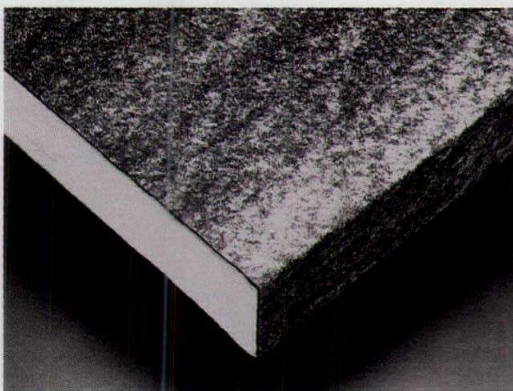
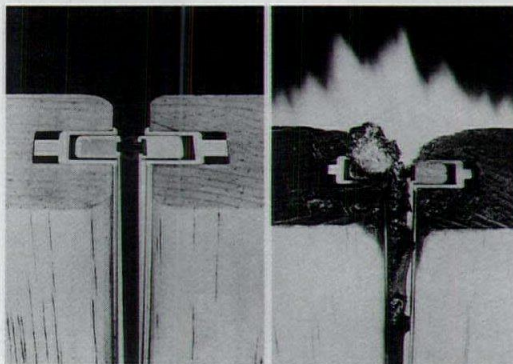
O'Keefe's has introduced a water-tight termination system called The Terminator made of a new thermoplastic resin called Noryl®. The high-impact resin is seen as an alternative material for reglets and flashing systems that traditionally have been made from aluminum, copper, steel, and other metals. Available in a wide variety of colors, the new reglet is UV-stable and incorporates removable EPDM gasket and flashing options to match or complement the roof design. Circle 108 on reader service card

Building Products Catalog

Georgia-Pacific has published its 1995 *Building Products Catalog*. The 189-page publication is divided into 11 product categories including decorative panels, engineered board products, gypsum, hardwood plywood, insulation, lumber, metal products, millwork, roofing, siding, and structural panels. New products include 1/4" Dens-Deck® gypsum roof board, 1/4" Dens-Shield® tile backer, Details™ Architectural Millwork, Stadium™ paneling, and Village® Team NFL™ borders. Circle 109 on reader service card

Estimator's Reference in Metric

The 25th edition of *Walker's Building Estimator's Reference Book*, an encyclopedic reference of cost data and technology, includes building construction information in both English and metric units. This revised edition includes more than 2,000 illustrations and nearly 1,500 pages of text with up-to-date materials costs, construction methods and practices, and design charts for concrete, masonry, metals, and carpentry. Chapters and sections are organized in the CSI format. Circle 110 on reader service card



Liquid Intumescent for Fire-Rated Doors

Zero International has announced the availability of a new pourable intumescent material that can be used to fill any cavity or channel for fire-rated door construction. The FS6886 intumescent material foams and expands gradually as the heat of fire rises, forming a heat-resistant barrier. Circle 111 on reader service card

Fiber Glass Roof Insulation

Schuller Roofing Systems' new Fiber Glass™ insulation is designed to provide thermal insulation and a substrate for built-up and modified bitumen roofing membranes in roofing, reroofing, and recover applications. It may be used over flat or low-sloping available, non-ailable, and metal roof decks. Circle 112 on reader service card

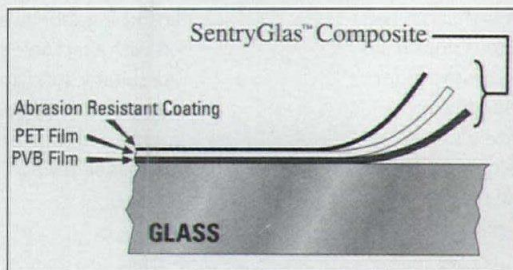
Pressure-Equalized Window System

The 2000 Series Windows from Vistawall Architectural Products are double weather-stripped with triple compound foam compression seals, making the interior and exterior vent cavities pressure-equalized to eliminate moisture penetration; in addition, all vent joints are sealed. Circle 113 on reader service card

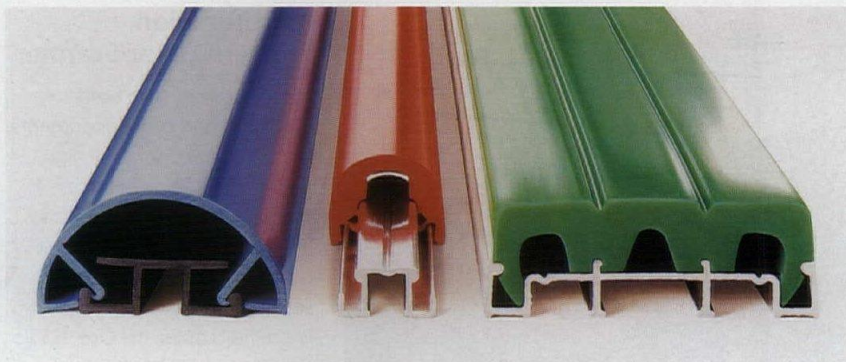
Laminated Glass for Safety, Security

DuPont's SentryGlas™ Composite "virtually eliminates" the danger of flying shards of glass when residential glazing is broken by

wind-driven objects or other external-force impacts. Designed to fit into standard window frames without adding significant weight or thickness, the product comprises a single sheet of glass factory-laminated to a bi-layer composite of Butacite® polyvinyl butyral interlayer and a strong polyester film with abrasion-resistant coating. SentryGlas™ is also suitable for commercial applications. Circle 114 on reader service card



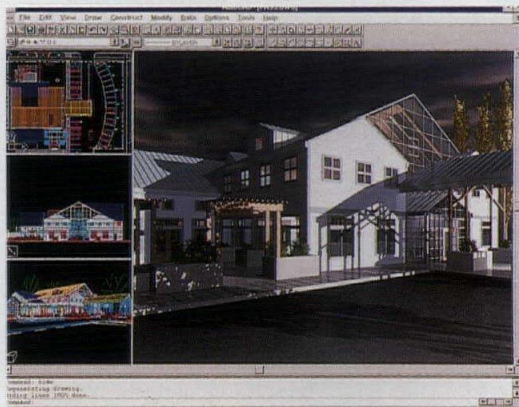
Computer Products



CAD Bumper Details

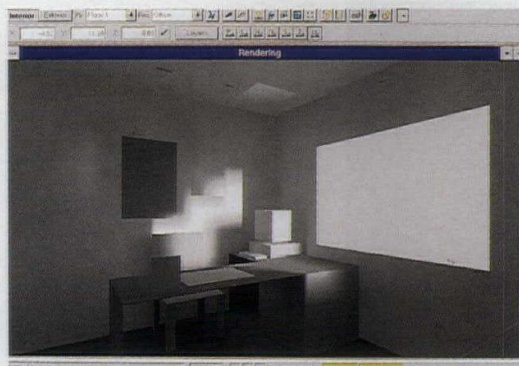
Boston Retail Products, manufacturer of flexible vinyl bumpers for retail, commercial, industrial, and healthcare applications, now offers CAD details of its products for AutoCAD Release 12. Complete drawings of the seven bumper

profiles, ends, and corners are available on 3 1/2- and 5 1/4-inch disks. The bumpers' 18 standard colors and array of custom colors are assured through a computer-aided color matching system. Circle 115 on reader service card



Rendering and Animation Software

Robert McNeel & Associates has begun shipping AccuRender 2.1, ray-trace rendering and animation software for AutoCAD Release 12 and 13. The software, says company president Bob McNeel, "works the same way in AutoCAD 12 or 13, in Windows, or in DOS." In Release 13 for Windows, the software's Runtime Extension (ARX) makes it up to ten times faster than its competitors. Circle 116 on reader service card



Lighting Design Software

To aid in the design and specification of lighting systems, Cooper Lighting has developed Windows-based software, called Luxicon™, that covers the full spectrum of indoor and outdoor lighting systems. Developed in conjunction with Lighting Technologies, Luxicon™ can calculate light distribution, construct room and site layouts, and produce light-accurate renderings, modeling complex geometries and a variety of luminaires. Circle 117 on reader service card

Energy Analysis Software

Developed by the University of Oregon's Energy Studies in Buildings Laboratory and currently in use in 68 different architecture schools, Energy Scheming 2.0 uses graphic inputs to help designers create energy-efficient buildings. It is fast, easy to use, and requires little technical data for input. The software evaluates schematic designs of all types of buildings, with all sorts of conservation strategies, including passive solar heating, daylighting, ventilation, shading, and thermal mass. The recommended configuration for the software is an Apple Macintosh II series with 2.5 mb of RAM using System 6 or 7. A special student price is available.

Circle 118 on reader service card

Design and Drafting Software for Windows

Visual CADD 1.2, by Numera Software, is a new version of the company's design and drafting software for Windows. Aimed at the "ultra-value" market, the software is "a customizable, programmable Windows CAD product for under \$1,000" says company president Kevin Cable. Enhancements over Release 1.0 include completely open architecture, improved performance, and a variety of customization features.

Circle 119 on reader service card

Design Software for Windows

Ashlar Incorporated has released version 2.7 of Vellum™ for Windows, a 2D and 3D design and drafting package that automates frequently used functions, increases customization, and enhances graphics capabilities. New tools, such as Dimension Editor, Line Pattern Editor, Pen Weight Editor, and Layer Groups have also been added to the new release.

Circle 120 on reader service card

3D Instructional Software

Schemers Inc. has released 3DScheme for Windows, software intended to help computer users adapt to the transition from 2D CAD to 3D modeling. The software uses Scheme, an educational programming language that has so few rules that even computer novices can focus on the creation of 3D models. Scheme is a derivative of LISP and so its underlying concepts are familiar to most CAD users.

Circle 121 on reader service card

Animation on the Macintosh

Electric Image is shipping its ElectricImage Animation System Power Macintosh Version 2.1, an animation software that puts into the hands of designers software used by the film industry. Able to render images from three to eight times faster than Version 2.0, the new release also provides sync sound animation, deformations, motion blurring, shaded viewing, and various special-effects plug-ins. The software requires a Power Macintosh 6100 or better, with a minimum 20 MB of RAM, 24 bit display adapter, high-capacity disk, and System 7.5 or later.

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Variable Dot Color Printer

The SummaColor™ Pro Series Models 1311 and 1317, by Summagraphics, are enhanced versions of the company's line of desktop color printers. They are, according to Summagraphics, "the only small format, color digital printer to incorporate a precise ink dot size control technology," automatically configuring optimum ink-dot-size for every print and thus enhancing the crispness of color copies.

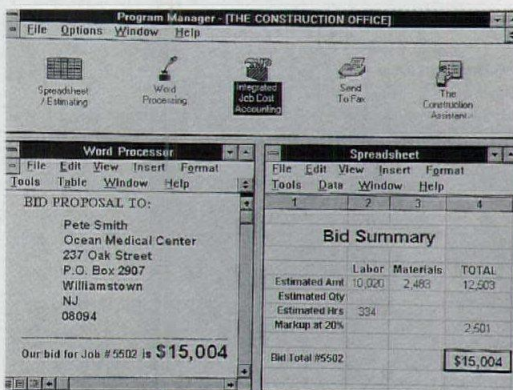
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Multifunction Plotter/Copier/Scanner

Ideal for offices with both electronic and paper documents, the new 9500-S series of high-volume "E"-size plain-paper digital plotters and copiers by Océ-Bruning can handle most output, reproduction, and scanning needs. The Océ 9535 is a digital copier, the Océ 9555-S a plotter, and the Océ 9575-S a digital copier/plotter/scanner. The scan-to-file option allows users to copy, scan, store, retrieve, view, edit, and print documents.

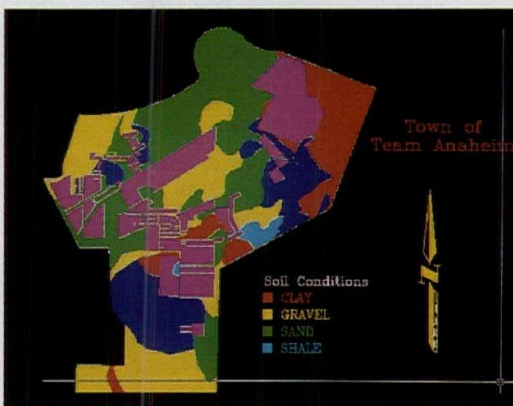
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Automated Construction Office

Shotware Shop Systems has released The Construction Office (TCO), Version 1.0, Windows-based software that allows estimators and contractors to share data among job-cost accounting, spreadsheets, and word processing. The software also includes a new version of The Construction Manager, which allows easy cut-and-paste between accounting screens, fax software, and other Windows programs.

Circle 125 on reader service card



Design Productivity Tools

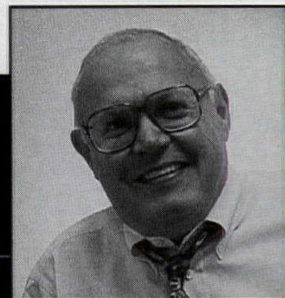
Softdesk has released Softdesk 7 (S7), an enhancement to its software that includes full support of computer networks, easier drawing management, a consistent user interface, and integration with the company's other software. For the Productivity Tools software, for example, S7 allows users to attach data to AutoCAD drawings, have direct access to drawings for cost estimates, and create animations with sequences of perspectives.

Circle 126 of reader service card

The New P/A: THE PROFESSION RESPONDS

"For the first time in memory, we have an architectural periodical addressing the needs and concerns of the practicing architect. The profession was in desperate need of a reality check. The picture books are nice and probably still needed. However, our world is changing rapidly and the choice for architects is to change or disappear. Starting with Tom Fisher's watershed article, 'Can this Profession be Saved?', Progressive Architecture has continued to publish articles reflecting this new 'real world' editorial direction. From P/A, we're learning that design is still important, but management, leadership, technical competence, and marketing are also important. George Hellmuth, founder of HOK, once said, 'Architecture has a million faces.' I, for one, am delighted that P/A has decided to show us several of those faces, so keep it up."

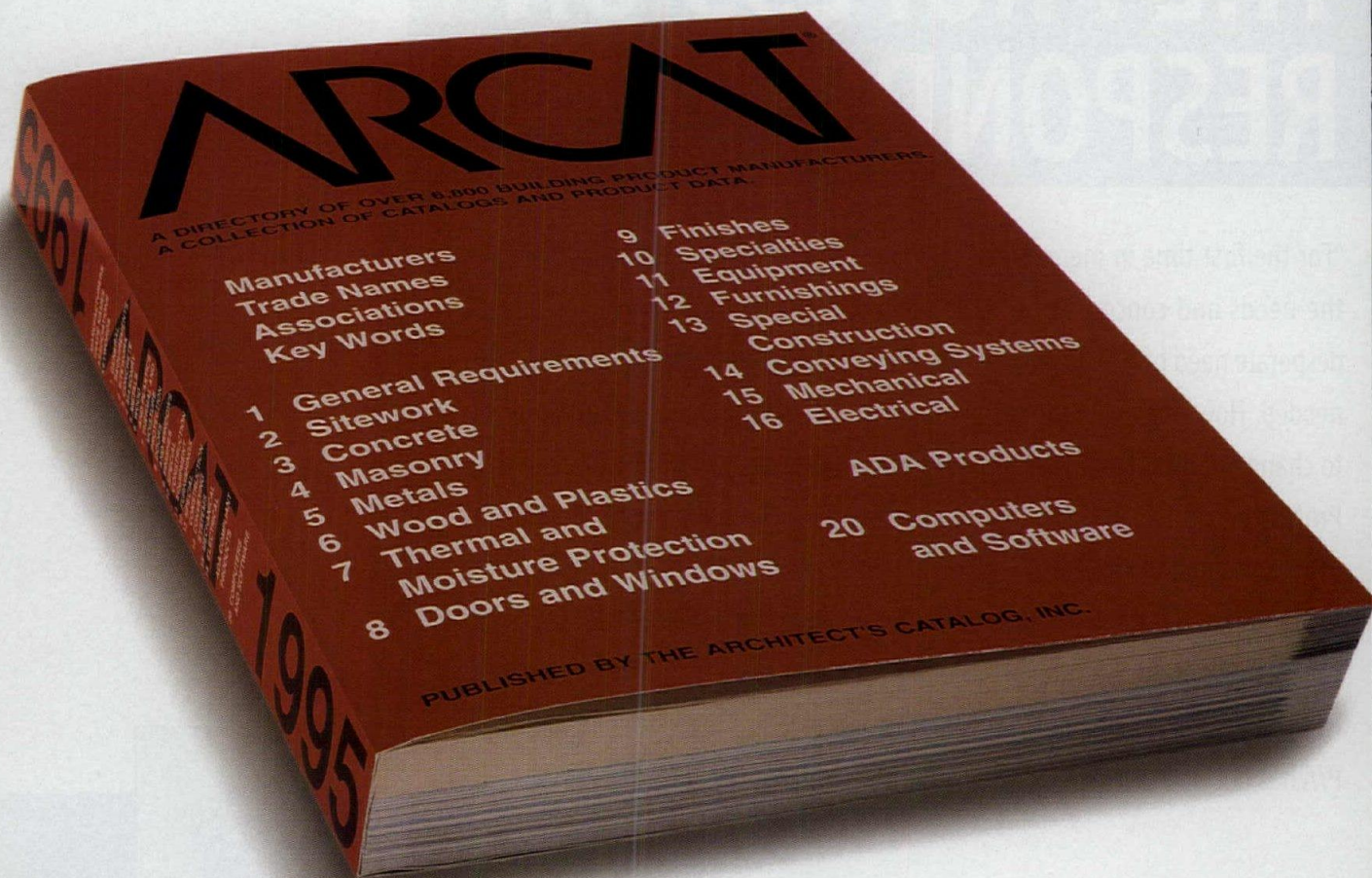
Jamie Cannon, President
Jamie Cannon Associates, Inc.



Jamie Cannon has 35 years of experience with both small and large architectural firms. In 1984 he established JCA in St. Louis, Missouri. He directs an architectural practice specializing in research and technical facilities for corporations and institutions, and community interface planning for oil refineries and chemical plants.



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Shanghai: Home of the Handmade Highrise

In Shanghai, hundreds of tall buildings are under construction, some designed by Western architects. But unlike those in the West, Shanghai's highrises involve a lot of slow hand work.

by Richard D. Rush

The symbol of the modern city is the tall building, and the symbol of the tall building is the modern crane. The Shanghai skyline traces hundreds of them, but a modern commercial contractor would have heart failure witnessing their inactivity. The reason: high-rise construction here involves slow hand work, long since mechanized or systematized in the U.S.

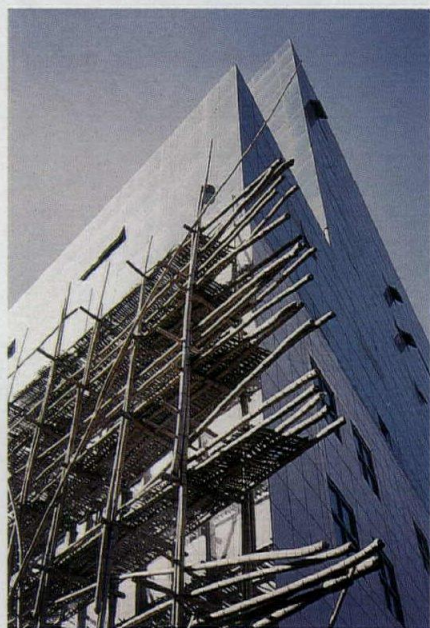
Most of the buildings in Shanghai are of cast-in-place concrete construction, with column reinforcing hand-tied on site. As each floor is poured and is curing, a set of laborers goes to work preparing reinforcing for the next pour. If, as in the U.S., the rebars were tied in a remote location, then shipped to the site, a whole level of column "cages" could be placed in a fraction of the time it takes in Shanghai. In the buildings I saw, column rebars look like bouquets of crab grass sticking out of the floors. Because the workers can't use jigs, tying the reinforcing is more like basket weaving than construction work. The horizontal ties start at the base and work up; spiral ties, preferred in the U.S. for seismic loads, are out of the question.

Traffic considerations also affect the speed with which tall buildings are constructed. In this city of 13 million, of whom more than one million are construction workers, there is only one automobile for every 700 people, but bicycles and buses feed workers in and out of the center of the city in one unrelenting rush hour. Because of Shanghai's traffic, there are none of the long lines of concrete trucks that we see in the U.S. A tall building site includes mounds of coarse aggregate. When the concrete mixing truck arrives, it may be followed by a flatbed truck laden with sacks of cement. Laborers then fill the mixer at the site. This may

The author, formerly a Senior Editor of P/A, is Associate Professor of Architecture at Woodbury University, Burbank, California.



1



2



3

The amount of new construction in Shanghai (1) is remarkable. But equally remarkable are the inefficiencies, such as hand-tied bamboo scaffolding (2), hand-tied reinforcing (3), and site-mixed concrete.

relieve a traffic problem, but it creates potential concrete quality problems. At sites where pumps are used to place the concrete, and post-tensioning tendons are evident, the on-site mixing seems particularly anachronistic.

The concrete formwork is designed to be minimal. In low-rise buildings, crude hand-laid brick infill walls are built before the concrete structural frame, leaving space for the columns to be poured. Exposed rebar rises through the voids; formwork is thus needed on only two sides of the column, instead of four. Even tall

buildings use brick infill walls, adding weight to the structure all the way down through the foundations. This infill system is so prevalent in low-rise construction in Shanghai that I suspect it is used out of convention as much as anything else in tall buildings. "Stud" construction, plywood, and sheet products are conspicuously absent.

Such inefficiencies are also evident in the staging of buildings. Reusable welded steel forms supported by mazes of steel scaffolding are common. Acrobatic workers wear wicker

Photos: Richard D. Rush

Shanghai (continued from previous page)

"hardhats" and navigate the webs of bars like spiders. The floor level under construction is always apparent, however, because of the layer of bamboo scaffolding shielding it. Workers use bamboo everywhere for scaffolding and ladders. Bamboo members up to four inches in diameter are used. For heavier loads, steel pipe replaces bamboo.

The Shanghai climate is mild. The temperature never rises much above 90° F or falls below freezing, and window units are frequently operable. However, because typhoons and wind-driven rain are common threats, concrete or brick surfaces must be sealed or concealed. Almost every conceivable wall surface is visible on the streets of Shanghai: glass, tile, and stone cladding. Tile, again, is placed by hand.

The absence of steel frame construction is surprising. For a city in such a hurry to build, steel would be an appropriate solution. The newcomer on the horizon, S.O.M.'s 88-story Jin Mao Building (p. 43), will use a concrete-encased steel frame. A frame lighter than required for ultimate strength will be erected first, then will receive a cast-in-place concrete "case" permitting steel-concrete composite action.

When completed in 1997, the Jin Mao building will be the tallest in China and will serve as a flagship for the Pudong New Area, located across the river from the current commercial core, where use of the land is free. The municipal government will negotiate a contract that permits a building at a specific place for an agreed-upon period, say 50 years, and there is no upfront cost for land. Otherwise the cost of high-rise construction is no less than in Japan, for example.

There is no question that tall buildings are being used in Shanghai to boost its position as an economic center and to add a façade of high-tech stature to the city. The new income is designed to raise the standard of living. But the new buildings are most certainly not contributing to the richness of the environment for the average Shanghai man or woman. It is sad that an artistic culture as mature as China's has not found an appropriate high-rise vocabulary in which its heritage could be both preserved and expressed. One can only wonder what a city such as Shanghai would look like if designed appropriately and constructed with the same dogged determination with which it is now being built. □

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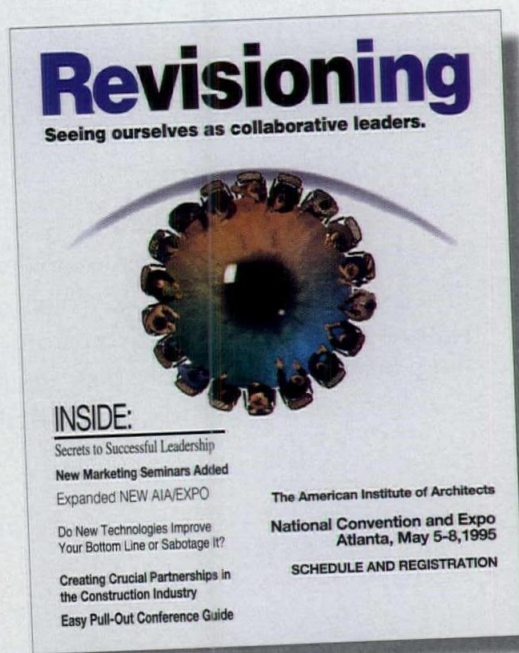
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Filling the Void in Public Works

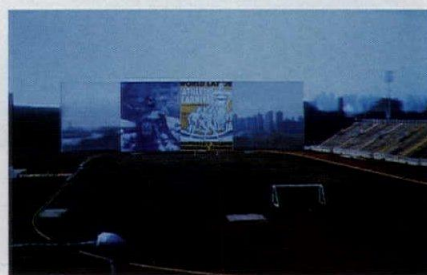
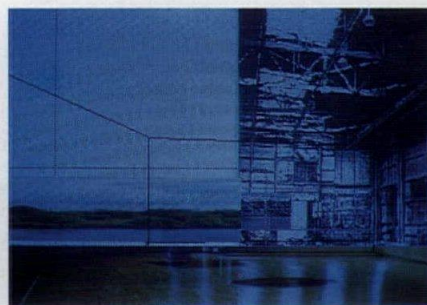
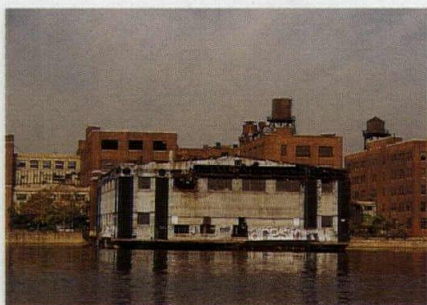
The new Center for Public Architecture aims to improve architectural training and at the same time to upgrade the quality of civic projects.

by Roberta Brandes Gratz

In New York, proposals for high-impact civic projects too often reach the public review process without much input from the public they are ostensibly meant to serve. Concepts are set. Designs are drawn. Official support is mobilized. When at last the public process begins, there is rarely room for much more than tinkering.

Something different is being tried, however, that may alter this long-established pattern and introduce a new standard. The Center for Public Architecture, a recent creation of the National Institute for Architectural Education, has begun sponsoring an annual series of six-week workshops in which design professionals and students work with government agencies on potential large-scale public works projects at the earliest stage of their conceptualization. A team of three senior design fellows, five project interns, and three student interns identifies issues, raises questions, highlights problems, and solicits ideas from the public and users – long before the first pencil is put to a drawing board.

Last year, as its first undertaking, the Center chose an assignment that epitomizes the difficulties of public works projects: a preliminary design analysis of uses for Randall's and Ward's Islands, 406 acres in the heart of New York. The two islands, in the East River between Manhattan, The Bronx, and Queens, receive minimal attention in most architectural guidebooks and have remained unexplored by the great majority of New Yorkers. Public transportation to the islands is minimal. Pedestrian access is poor. Nonetheless, the two islands, which were joined together decades ago with landfill from construction of the Triborough Bridge, present rich possibilities. Located under the Triborough and Hell Gate bridges, the islands



The vacant wire factory (top left) and a composite view created by the design workshop (top right), showing a vista toward Randall's Island and an interior redone as an athletic facility. Downing Stadium (above left) and a proposal for a graphics device screening the view toward Kirby Psychiatric Center (above right)

contain an awesome mixture of sports facilities (including 27 ball fields, tennis courts, and a golf driving range), parks, highways, bridges, and sanitation and social service facilities. The islands' athletic facilities attract heavy use from private and public schools; they are considered a major resource by nearby Harlem and Bronx neighborhoods. Some parts of the islands offer an almost bucolic experience and, at the same time, panoramic views of the rivers and the Manhattan skyline.

Reconciling Conflicting Desires

A tangle of city and state agencies handling such diverse matters as water resources, mental health, homelessness, drug treatment, and recreation all claim pieces of the islands. Schools starved for facilities would like to expand there. Advocates of parks would like to attract more of the public to the islands to alleviate overuse of other, better-known parks. Agencies dealing with maintenance and social problems see prospects for expanding their facilities on Ward's and Randall's. Promoters of New York as the site of future Olympics and other major competitions eye the islands for games. In the view of sports enthusiasts, the islands could supply privately sponsored activities and training grounds for future professional athletes. The potential disagreements

are mind-boggling. In the face of these challenges, the Center's workshop collaborated with the Department of Parks and Recreation and the Randall's Island Sports Foundation, a private nonprofit entity raising money to improve maintenance and refurbish facilities, to study alternatives that could resolve conflicting desires. The products of last fall's efforts by the students and design professionals were a site analysis, historical research, community surveys, and a model, all of which are proving useful for city planning.

On Randall's and Ward's Islands, vestiges of mid-19th-Century landscape – remnants of the forest that once covered the city – surround former municipal institutions. Sports greats like Jesse Owens and Carl Lewis and musical figures like Duke Ellington and Jimi Hendrix left their mark on the island's largest facility, the historic 22,000-seat Downing Stadium. Downing is still in use for summer sports and entertainment events and was a site of 1994 Gay Games and the Lollapalooza music festival. The stadium, built by the Works Progress Administration, opened the same day in 1936 that the Triborough Bridge opened. Olympic trials were part of the opening day events, and it was on that day that Jesse Owens set his first track record. The city's first sewage treatment plant is also there, an intact,

Photos: Center for Public Architecture, NIAE.

Roberta Brandes Gratz is a New York writer on urban development and design issues and author of *The Living City* (The Preservation Press, 1994).

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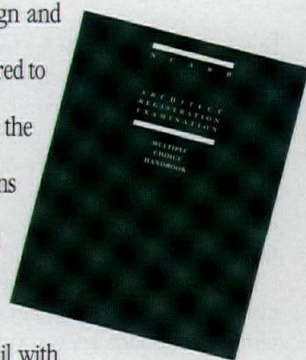
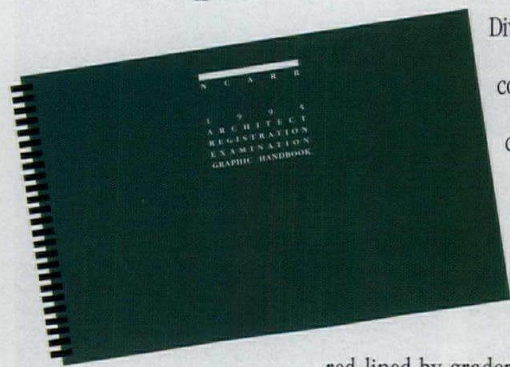
Division B: Site Design Graphic. You'll want to get a head start with this book since it contains current information about the exam. The *1995 A.R.E. Graphic Handbook* contains sample vignettes from last June's exam for Site Design and Building Design. Vignettes for both divisions have been structured to give you one complete graphic exam for each division. Solve the sample vignettes and then look at actual candidate solutions

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Public Works (continued from page 39)

functioning WPA structure. With its Classically detailed pavilion, it reflects industrial architecture of the period.

One of the most interesting relics on the islands, and a hidden treasure of the city, is a 1,000-foot steel-arch bridge by Othmar H. Amman, the eminent bridge engineer who designed the George Washington Bridge and many others. The Parks Department wants to incorporate the historic bridge in the master plan, but city transportation officials have contracted to demolish it, since its original purpose of connecting two separate islands no longer exists. The workshop urged that the bridge be preserved. This appealing artifact offers wonderful possibilities for reuse, from a bike or pedestrian path to a parklike setting with tables and chairs and, perhaps, food carts. Historic bridges in many communities around the country are being preserved for just such public uses.

A Surprise Discovery

The team brought to the attention of the Parks Department a resource the department's personnel – and most New Yorkers – were unaware of. In East Harlem, across from Ward's and Randall's Islands, sit three blocks of vacant late-19th-Century brick buildings,

now owned by the city. The complex of buildings, formerly a wire factory with 2,000 employees, bridges the East River Drive and comes to the river's edge. The workshop recommended that the site be developed into a major sports facility, one accessible to the adjacent neighborhood and the larger city, with a potential ferry link to Randall's Island. "We wanted new facilities without clogging the island with more buildings," said Kevin Wolfe, the Parks Department project architect. "This idea provides both new facilities and stronger links to communities."

The N.I.A.E., founded in 1894 as the Society of Beaux-Arts Architects, has through most of its history sponsored design competitions. In its centennial year, the N.I.A.E. established the Center for Public Architecture as a way of both raising aesthetic and intellectual standards for the city's public architecture and bringing a new civic perspective to architectural practice. Andrea Woodner, a Columbia- and Harvard-trained architect with experience in real estate management, became director of the Center early last year and identified the islands project as the Center's first undertaking after interviewing assorted public agencies. The Center, Woodner said, addresses the "gulf between the public and the profession." The workshop process is meant

to be "activist and educationally rich," she said, and "to lead to a change in the design process." She left the Center last month, but said the workshops will continue. An exhibit on the islands project is on view weekdays through March 31 at the Center's office in Manhattan.

By any measure, the Center's project has already accomplished a great deal. It has given design professionals and students experience on a public project they might never have been involved in. Young architects and students have been injected into the public process in a "hands-on" way. The workshop program has raised issues and offered design ideas that should influence what is potentially the most interesting public works project in New York in a long time. It has presented the parks agency with issues and possible design directions that might otherwise not have surfaced until very late in the process, if at all. "We wanted the workshop to make us a more informed and better client," Wolfe said. Most significant, the program has demonstrated how much is to be gained for public works projects when meaningful attempts are made to reach the affected communities, who may not know the intricacies of design but who know best the kinds of activities and functions that design should serve. □

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Want To Shoot An Eagle or Two ?

By Mike Hensen

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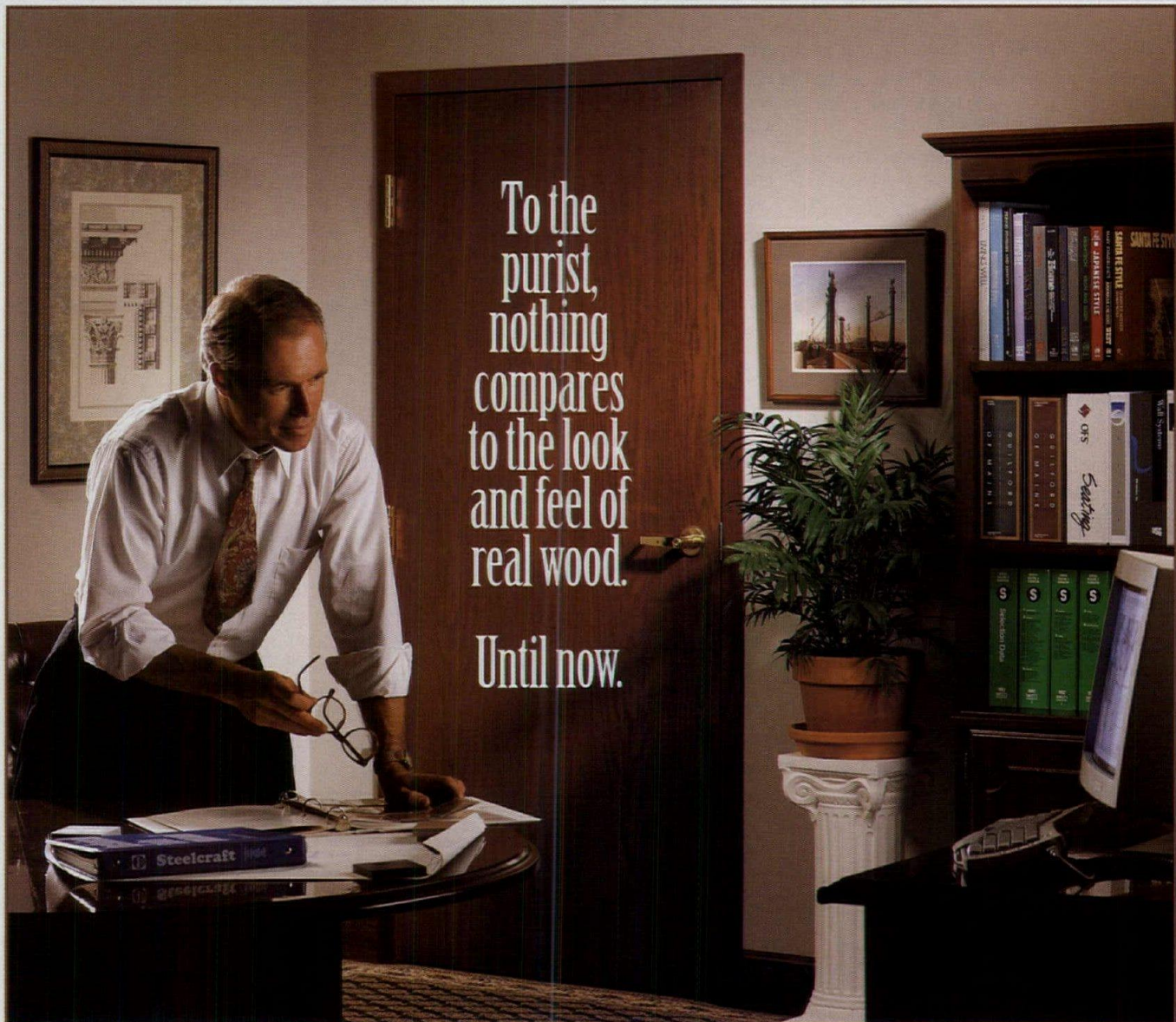
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What are American Architects' Responsibilities in Developing Countries?

Asia Bound

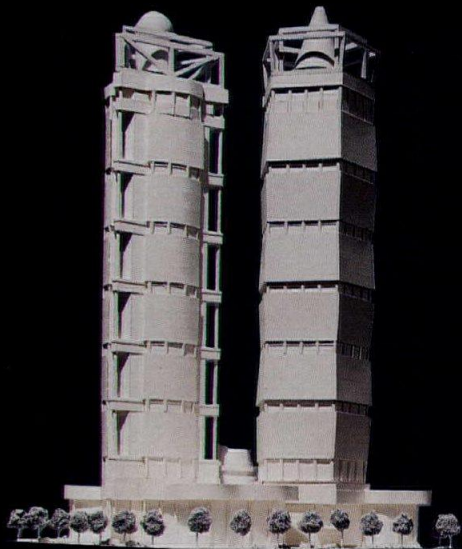
In the modernizing countries of Asia, U.S. architects are creating buildings of often enormous size and exaggerated style, unconstrained by city planning. What should designers do when their clients want the wrong thing?

by Philip Langdon

China's future buildings include Kohn Pedersen Fox's Nanjing Xi Lu towers in Shanghai (below), S.O.M. Chicago's Jin Mao Tower in Shanghai (right), and Loebel Schlossman and Hackl's Luo-Hu Commercial Center in Shenzhen (far right).



Loebel Schlossman and Hackl (left); ©SteinKamp/Ballogg Chicago (center and right)



© Stemkamp/Ballogg Chicago (facing page, left); J. Stehr (facing page, right)

Across East and Southeast Asia, the conscience of the architectural profession faces a momentous challenge. Asia is riding a widespread economic boom, one so potent that *The Economist* says the modernization of Asia is likely to be the most earth-shaking public event in the lifetime of those living today. Countries such as Indonesia, Malaysia, and above all the People's Republic of China are hungry for monuments to their fast-rising prosperity. Galloping toward industrialization at a pace that makes Western economies look practically indolent, the modernizing nations of the East are providing plentiful work for American architects. But the buildings being produced raise nettlesome questions about the responsibilities architects should bear when they take their advanced technical skills into societies that have had little experience with the problems that big, Modern, Western-style development brings.

Even a cursory inspection suggests that something is going very wrong. A great many buildings planned or constructed in the emerging Asia are glaringly slick. The horizons of East Asia and Southeast Asia increasingly are punctuated by brightly lighted towers of reflective glass and shiny metal, in shapes that shout novelty above all else. Some Asian towers, especially in mainland China, are so flashy they make Houston seem a paragon of restraint.

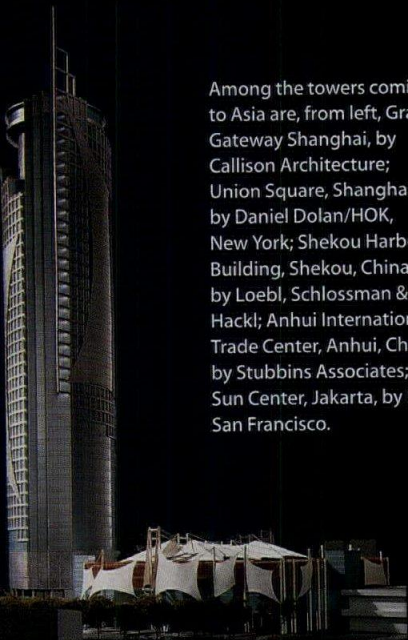
The Sky's The Limit

Projects involving American architects frequently rank among the most ambitious things these countries have ever built. In Jakarta, the Sun Center designed by HOK's San Francisco office will have nine high-rise buildings containing more than 3,000 apartments and more than 4 million square feet of office space. In Kuala Lumpur, Malaysia, the Sogo Pernas Centre designed by HOK will combine a 75-story office tower, a 515-room hotel, a department store, an air terminal, a 3,000-

car garage, and a cultural museum. In Shanghai, the largest and most cosmopolitan city in China, construction cranes are raising towers by numerous Western architects – behemoths that dwarf the treasured Neoclassical and Art Deco buildings erected by European banks and traders in the 1920s and 1930s. A frenetic contest has broken out for the title of tallest building in China. As of Autumn 1998, that distinction will be claimed by the 88-story Jin Mao tower, designed by Skidmore, Owings & Merrill's Chicago office and now going up in a vast redeveloping district of Shanghai called Pudong New Area (see report on p. 35). There is talk of towers that may rise higher still in the south China boomtown of Shenzhen (P/A, Sept. 1994, p. 49) and in the inland city of Chongqing, although in China it's never easy to know how seriously such proposals should be taken.

The highest building in the world is rising in Malaysia, a resource-rich country of 19 million that gained its independence 38 years ago. The structure of Cesar Pelli's Petronas Towers, two identical office structures 1,476 feet high on a former racetrack in the capital, Kuala Lumpur, is 35 percent complete. When the towers are finished, it will be the first time since at least 1891 that the tallest building on earth will be outside North America – indeed, outside the domain of what Americans are used to calling the “developed” world. A shift of historic proportions is taking place, and architecture is the premier symbol of that transformation.

It is silly, if not downright repugnant, to accuse American architects of “carpetbagging in Asia,” as one American architectural editor did a few months ago. The economy is increasingly marked by global competition and global alliances, and architects have every right to hunt for jobs overseas, particularly at a time when opportunities in the United States have left some 15 to 20 percent of this country's architects unemployed or underemployed. Pursuing openings overseas is a way to grow during a



Among the towers coming to Asia are, from left, Grand Gateway Shanghai, by Callison Architecture; Union Square, Shanghai, by Daniel Dolan/HOK, New York; Shekou Harbor Building, Shekou, China, by Loeb, Schlossman & Hackl; Anhui International Trade Center, Anhui, China, by Stubbins Associates; and Sun Center, Jakarta, by HOK San Francisco.



period when the American market for offices, shopping centers, and hotels is still hobbled by overbuilding in the 1980s. RTKL reports that 30 percent of its work is outside the U.S., half of it in Asia. Kohn Pedersen Fox gets 35 percent of its commissions in Asia. Other firms busy in Asia also include Brennan Beer Gorman; Callison Architecture; Fox & Fowle; HLW; Kaplan McLaughlin Diaz; Loeb Schlossman and Hackl; John Portman & Associates; and the Stubbins Associates, to name a few. Jobs there are being pursued by individual practitioners as well. One example is Steven Lombardi of San Diego, a P/A Young Architect in 1987, who recently established a partnership in Hong Kong with Frank Desenyi to work on projects ranging from utilities buildings at the Hong Kong airport to transit facilities in Bangkok and Manila.

Opportunities Unavailable in the U.S.

"You can do things over there that you would never get to do back home," says Christopher Choa, who leads HLW's design work in Asia. "In the U.S., if you go after a research lab, you're asked how many research labs you've done in the past six months. In China, it's assumed that if you're an American firm, you're qualified to do all kinds of work." This is a powerful incentive, one that reinvigorates American firms and expands their skills. Carpetbagging indeed!

Large American firms are hired, in part, because they have a reputation for handling projects that the modernizing parts of Asia have had limited experience in producing. "The tall building is a specialty of ours," says Jon Pickard, a senior associate at Cesar Pelli & Associates. "Because we have so much experience with all the complex issues involved in tall buildings, we can design them efficiently and with an artistic intention."

Large mixed-use buildings, common in the U.S., are just beginning to be built in substantial numbers in some parts of Asia.

RTKL plays on its mixed-use expertise to get such projects in the Far East. These in turn sometimes allow designers to try new things and master greater challenges. In Manila, for instance, RTKL is working on the Paramount retail center, a two-million-square-foot "entertainment-driven" project that will have a major attraction on each of its five levels to lure shoppers through the complex. The Paramount will incorporate a 12,000-seat cinema complex, a 2,000-seat food court, and an extraordinary array of amusements (including, if all goes well, "human pinball machines" – bumper cars that take their occupants on a ride across a tilted floor, bouncing from point to point while the activity is shown on a huge screen for the mall crowds to enjoy).

In East and Southeast Asia, a mixed-use project may contain a podium of three to seven stories devoted primarily to retailing, with one or more other uses, such as offices, hotels, or apartments, placed above. Where such mixed-use developments have been built in the U.S., they have contained 1.5 to 2.5 million square feet. In Asia, they swell to 2 to 4 million square feet, according to David Brotman, vice chairman of RTKL. Americans also make good candidates for Asian work because of expertise in resorts, theme parks, suburban housing and urban design, all of which will become more important as Asian prosperity grows. Golf course and waterfront projects are underway in countries such as Malaysia and Indonesia.

America's reputation for trendsetting further aids U.S. firms. "In China today, they're in love with everything Western, everything they see on TV," Brotman says. Don Hackl, president of Loeb Schlossman and Hackl in Chicago, observes, "The Chinese have the perception that Americans are at the leading edge of form-giving." This is an advantage for Americans in getting work, but it can also be an invitation to superficial design. *(continued on next page)*

What They Want in Asia

The way China is developing amazes American architects. The government has designated five coastal areas as "special economic zones," liberating them from many of the restrictions that apply elsewhere. Investment and entrepreneurial talent, not to mention good old capitalistic greed, have surged in, directed principally by ethnic Chinese developers based in Hong Kong and Taiwan. The peculiar partnership of an authoritarian Communist regime, non-national or inexperienced local capitalists, and passport-carrying designers has had the effect of inflating development plans and exaggerating their architectural expression. Government officials want as much development as they can get, and in the absence of the discipline imposed by a

"The preoccupation with Western-style architecture has resulted in an architectural Chernobyl – an uncontrolled fallout of conflicting building styles and contradictory land uses." – Nelson Chen

true market economy, they encourage capitalists to promise what seem, to outside observers, absurdly high concentrations of development. The architects then sketch giddy visions of these tomorrowlands of tall towers, complemented, in some cases, by enough searchlights to illuminate a football stadium.

The city of Chongqing, not in a special economic zone but hungry for investment, told a developer he could acquire a site in the city's center, but only if he put up a building at least 100 stories high. HLW actually produced a design for a 114-story tower, which received a number of required approvals and then stalled, as many Chinese projects do. Guarantees of seeing a job completed, and of not being replaced by another firm, are elusive. "China," Hackl cautions, "is no place for the faint-hearted or the undercapitalized."

Notions of what a building will be used for can be surprisingly vague. Sometimes architects are asked to sketch a tower that might end up containing offices or apartments or hotel rooms or all three. The fact that some mainland-based developers have never built anything before (they've made their money in some unrelated field) exacerbates the uncertainty. "The dialogue we have with the client is more about the imagery: what looks good, what satisfies their egotistical and corporate requirements," says Bruce Fowle of New York's Fox & Fowle. "We don't discuss the net-and-gross issue. We have yet to have a dialogue on interior design. Space planning is all new to them."

Chinese clients do have preferences about form and style. With notable exceptions such as Beijing, which favors relatively low, monumental buildings, the Chinese, as well as many other Asians, tend to want buildings as tall as possible and in as ostentatiously Modern a style as can be found. "Why are these countries building?" A. Eugene Kohn, the marketing partner for Kohn Pedersen Fox, asks. "One reason is to catch up with the West. They don't think of themselves as Third World. They've chosen the tower for its skyline image, which immediately puts them in the First World." When American architects are hired, usually teaming up with a design institute based at a Chinese university, it's more or less expected that the Americans will be

bold stylists. As Hackl puts it, "There are no quiet buildings in China." Yu-Heng Shang, an American-educated Taiwanese who works as a marketing specialist for HLW in China, is often told by potential clients: "Show me something I've never seen before." In such an environment, it should be no surprise that buildings sprout astonishing tops and arbitrary-looking walls.

The Question of Context

For China, which never seems to make its mistakes on a less than gargantuan scale, rampant development is the latest trouble in a tragic land. Nelson K. Chen, an American-born, Harvard-educated architect who is the design partner for Wong Chen Architects in Hong Kong, says, "It's amazing how quickly hundreds or even thousands of years of environmental compatibility can get wiped out." In Harvard's *GSD News*, Chen lamented, "The preoccupation with Western-style architecture has resulted in an architectural Chernobyl – an uncontrolled fallout of conflicting building styles and contradictory land uses." The problem is not just the buildings' looks; it's how they fit into the form of the city. Though many Asian clients want the newest architectural forms, they tend to combine them with flawed, older planning ideas. "The idea of a tall central tower on open land is an *idée fixe* in China right now," says Choa. The socialist planners of China, like their discredited mentors in Russia, have made a habit of erecting hulking apartment buildings on big stretches of land; it is a kind of bureaucratic reflex that leads naturally to the positioning of today's flamboyant towers on superblocks and megablocks. Because of Asian cities' tremendous densities, it's possible that some of the plazas surrounding the towers will be well-populated. But if Western experience teaches anything, it's that the tower-in-the-park concept ought to be used sparingly. It should not be the standard approach to city planning.

A second urbanistic problem is that some of these projects embrace the idea, increasingly resisted in the U.S., of separation of uses. Old Asian cities are lively and interesting because they mix offices, apartments, shops, and markets tightly together. Many new developments have apartment buildings in one area, office buildings in another area, and so on. This simplifies planning, financing, and management, but it may do a disservice to the inhabitants. Where housing, shops, and other aspects of living are not closely tied together, there is a danger that the new places will be dull – or worse.

A third problem is that Asian cities do not necessarily have systems of utilities, roads, and public transit satisfactorily linking the new projects to areas already built up. It remains to be seen whether big Asian projects now going forward will aggravate difficulties. Cities like Bangkok and Jakarta are notorious for their choking traffic. One compensation for bogged-down transportation systems is that mixed-use projects may stand a better chance of being built. They offer relief from an inadequate infrastructure, Brotman says, since "you can live, work, shop, and find entertainment in one place."

Searching for Responsible Design

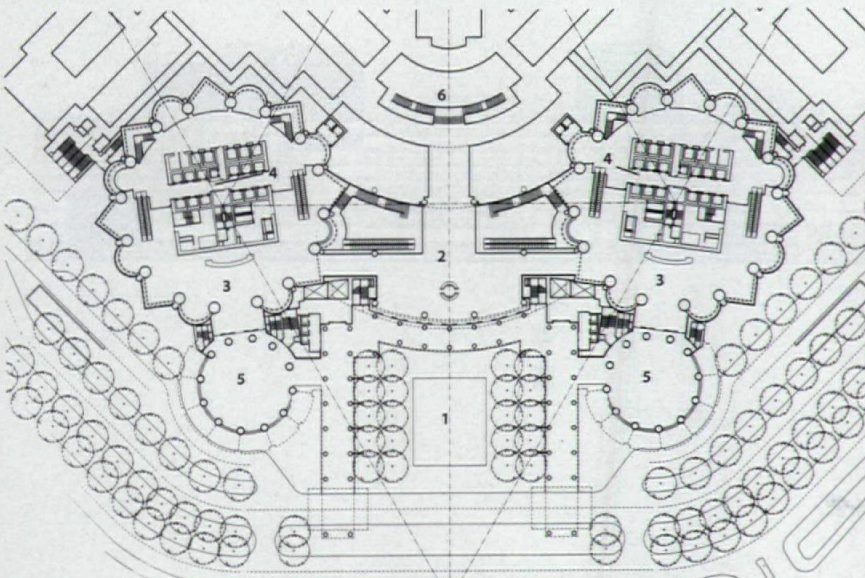
If Asian cities are to be distinctive, coherent places, globally commuting designers – and the individuals and institutions they work for – will have to adopt a more (*continued on page 86*)

Mammoth, Modern, and Malaysian



Rendered: Lee Dunette

RENDERING



GROUND FLOOR PLAN

- | | | |
|------------------|-------------|-----------------|
| 1 FORECOURT | 3 LOBBY | 5 ROTUNDA |
| 2 RECEPTION HALL | 4 ELEVATORS | 6 RETAIL CENTER |

N 40/12m

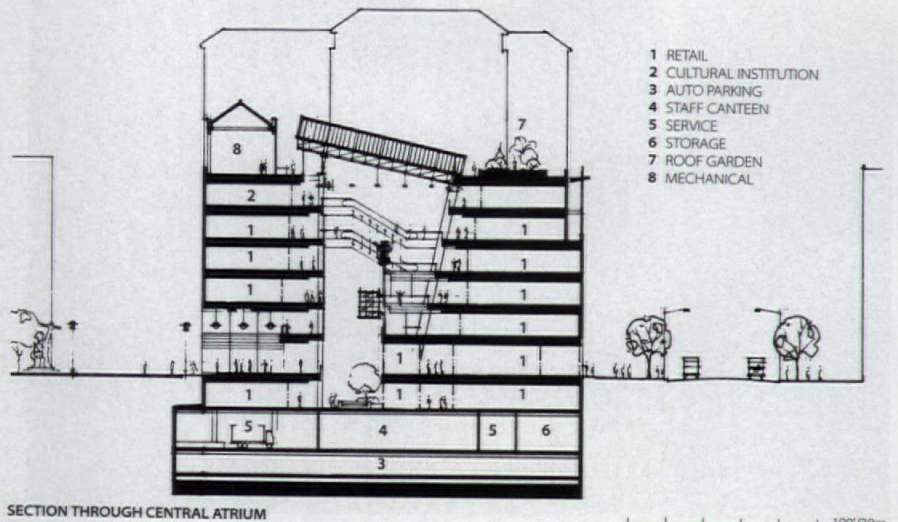
Cesar Pelli's Petronas Towers for Kuala Lumpur brilliantly synthesize a number of remarkably divergent buildings. To those who have just the slightest familiarity with Malaysia, they suggest, with their faceted, tapered silhouettes, the graceful Kek Lok Si, the country's, and Southeast Asia's, largest Buddhist temple. To those who know of Pelli's consultations with the Petronas national petroleum company and Malaysian government officials, the buildings are Islamic in inspiration, taking the Moslem propensity for interlocking squares as a source of their geometry. Yet at the same time, the 88-story towers, with their stainless steel cladding, are resolutely Modern, befitting their function as super-high-profile office space for occupancy by mainly the oil company. In a tropical region where many recent buildings depend on mirror-glass to keep out the fierce sun, Pelli is using a more artful climate-control device, horizontal bars, teardrop-shaped in section, which will block 50 to 60 percent of the solar gain and at the same time give a sense of protection to workers stationed near the windows. At the 42nd story is a bridge that, together with its angled supports, forms what Pelli calls "a portal to the sky," a void he says is more important than the shapes of the buildings themselves. On the interior, geometrically patterned floors, wooden screens on the lobby windows, and a frieze pattern based on traditional songkets — handwoven silk fabrics with gold threads pulled through them — all accentuate the complex's imaginatively Malaysian character.

A Market in the Heart of Beijing

Redevelopment of the Dong An Market in Beijing is one of the many Asian mixed-use projects providing work for Americans – in this case the Los Angeles office of RTKL. A podium containing 1.5 million square feet of retailing, with six stories of offices above, is under construction on the site of what began in 1903 as an open-air market. Located where 200,000 to 500,000 people a day pass by, the retail center will include department stores, a night club, a bowling alley, and a food court in a five-story base and one of the floors below grade. David Brotman of RTKL says municipal officials and the client, a joint venture of the local Dong An Group and Sun Hung Kai Properties of Hong Kong, “felt it shouldn’t be a copy of ancient Chinese architecture, but they also didn’t want slick contemporary buildings, which would be out of context in this capital city. They felt it should be a contemporary interpretation of classic Chinese architecture.” In designing the project, in association with Wong Tung & Partners of Hong Kong, the Americans studied photos of an early generation of the market, razed in the 1940s, and elements of classic Chinese architecture, particularly proportions, fenestration, hierarchy, and façade treatments. Brotman says the project satisfies such unusual requirements as having an air raid shelter, a pathway through the center of the building strong enough to carry a fire truck, and a huge area to accommodate an electrical substation for the Wang Fu Jing District.

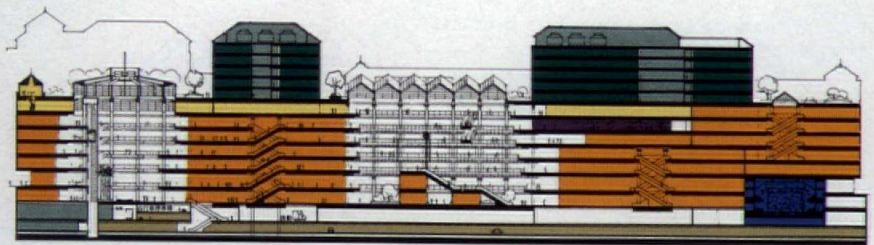


MODEL



SECTION THROUGH CENTRAL ATRIUM

100/30m



SECTION

- RETAIL
- OFFICE
- RECREATION
- PARKING
- THEATER
- MECHANICAL
- FOOD COURT

100/30m

A Chinese Town for Agricultural Technology

Some American firms are garnering large Asian master-planning jobs, one of the most striking of which is Kohn Pedersen Fox's design for Ceres, a new town south of Beijing, dedicated to agricultural research and technology. The irregular 519-acre site is tied together by a sweeping arc of a road, along which will be situated 24 factories and 18 research buildings. Other buildings, each of distinctive design, will sit in a patchwork of small fields; they will be assigned to exhibitors such as foreign agricultural companies, which can use their plots to demonstrate newly developed agricultural products or processes. The town's 8,000 inhabitants will live mainly in five-story apartment buildings arranged in U-shaped configurations, with generous light, air, and landscaping. What stands out most about the town, however, is the world's-fair-style architecture of its centerpiece buildings: a globe-shaped museum and four pyramidal structures containing administrative offices, a light-rail station, a greenhouse, and an observation tower. The town is envisioned as a kind of Chinese EPCOT where farmers, who account for well over half of China's population, will come to get an introduction to agricultural progress and a vision of what the developer, the Chinese company Sanju, intends as a representation of "a natural way of life in a new world." Money to build the town is now being raised.



© Jack Pottler/Esto

MODEL OF TOWN



Renderer: Labbeus Woods

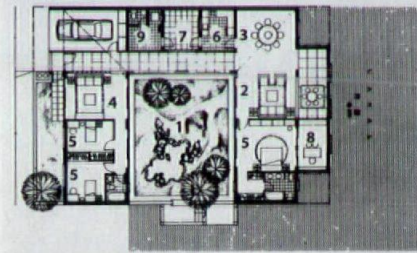
RENDERING OF ADMINISTRATIVE BUILDING (LEFT) AND OBSERVATION TOWER

Villas in a Historic Chinese City

Suzhou, a city 50 miles west of Shanghai, is renowned for the beauty of its gardens and canals, and for that reason development is treading more carefully there than in many other parts of China. In the Suzhou Garden Villas mixed-use development, Nelson K. Chen of Wong Chen Architects in Hong Kong designed 88 houses using the gray tile roofs, white walls, geometric openings, and other elements of traditional Suzhou houses. The houses, now under construction by a Hong Kong developer in a joint venture with the municipal government, contain 2,900 to 3,300 square feet and overlook a network of canals and gardens. Principal rooms face south, as Chinese tradition dictates.



MODEL

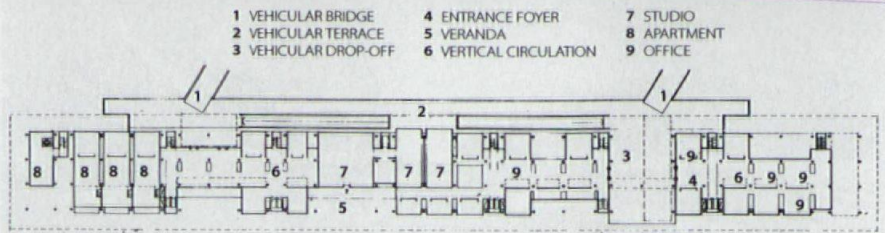


- 1 GARDEN
- 2 LIVING
- 3 DINING
- 4 FAMILY
- 5 BEDROOM
- 6 KITCHEN
- 7 SERVICE COURT
- 8 STUDY
- 9 UTILITY

FIRST FLOOR PLAN N → 40/12m

An Ancient Form Adapted to Telecommunications

Late last year HLW of New York entered a competition to design the Asia Broadcast Center, a new satellite TV distribution facility in Kuala Lumpur, Malaysia. For its form, the designers, led by Christopher Choa, turned to the longhouse, which traditionally was used by Dayak tribes in East Malaysia to house entire villages. The abstracted longhouse they proposed has a curving steel truss-rib roof under which breezes can circulate. Air also passes beneath the building (where cars can park in the shade) and through other openings. There is a continuous sequence of open-air atriums, verandas, bridges, and stairs. Though HLW did not win the competition – in the end, the commission was awarded to a local entry – HLW demonstrated it was possible to fuse regional customs and Modern design.

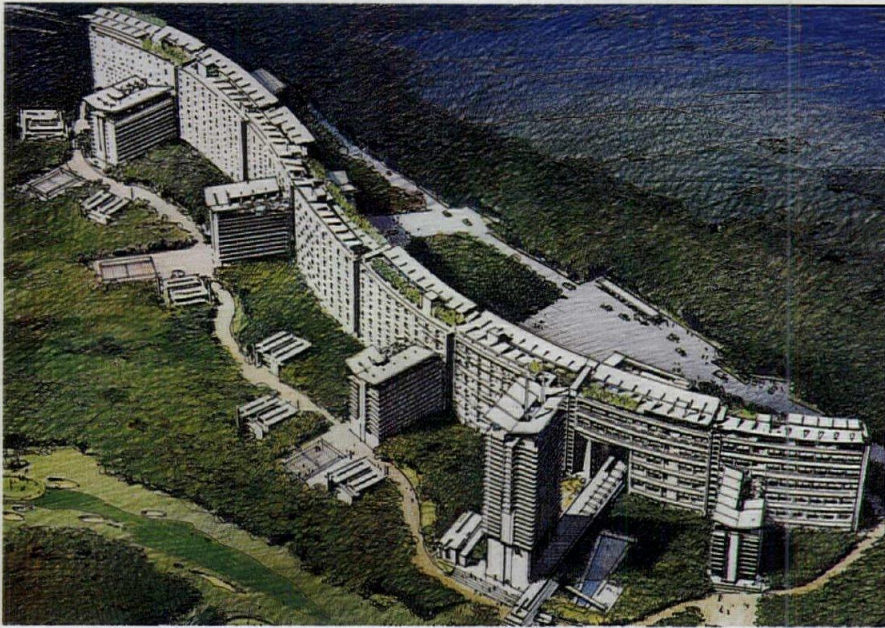


- 1 VEHICULAR BRIDGE
- 2 VEHICULAR TERRACE
- 3 VEHICULAR DROP-OFF
- 4 ENTRANCE FOYER
- 5 VERANDA
- 6 VERTICAL CIRCULATION
- 7 STUDIO
- 8 APARTMENT
- 9 OFFICE

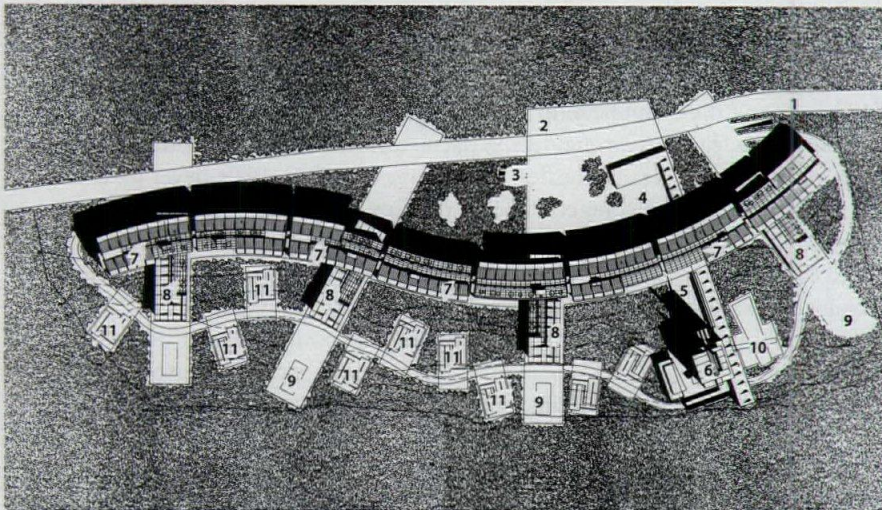
FIRST FLOOR PLAN

100/30m

Corbusian Resort on a Chinese Island



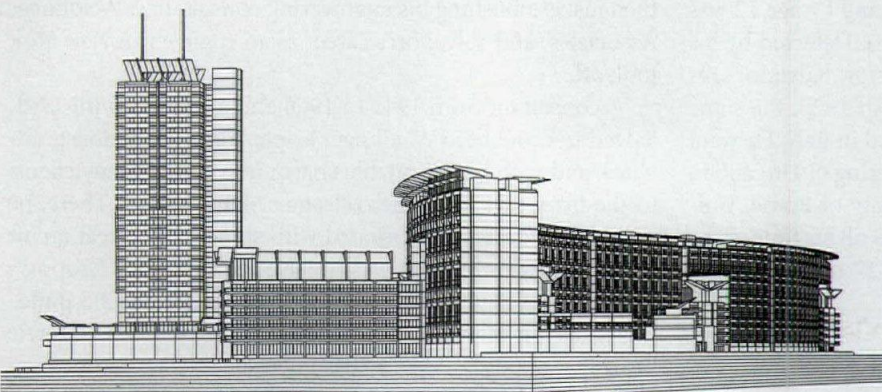
AERIAL PERSPECTIVE



SITE PLAN

- | | |
|------------------------|-----------------------------|
| 1 ACCESS ROAD | 7 DUPLEX CONDOMINIUMS |
| 2 PUBLIC DROP-OFF AREA | 8 SINGLE-LEVEL CONDOMINIUMS |
| 3 PARKING ENTRY | 9 TENNIS/ATHLETIC COURTS |
| 4 ENTRY COURT | 10 POOL |
| 5 RETAIL ARCADE | 11 VILLAS |
| 6 HOTEL | |

N ↑ 300/100m



PARTIAL ELEVATION

As China opens up to foreign investment, resort developments for the affluent are likely to proliferate. HLW of New York won a commission from the Asia Pacific Corporation of Hong Kong to design the Hainan Royal Garden Development, a 2-million-square-foot condominium and hotel complex on the southern island of Hainan. The condos are organized in a serpentine ten-story structure of concrete, each unit commanding a view of an adjoining golf course. Elevators stop at every third floor to serve an apartment layout based on Le Corbusier's Unité block section from the 1950s. All the apartments – simplexes, duplexes, and penthouses – extend clear though, giving them natural ventilation. At the southern bend of the complex, a monumental 79-foot-high gateway invites visitors to pass from the paved roads and walkway into the tranquil landscape on the golf course side. The complex is segmented into eight blocks for phased construction. HLW worked with Hsu & Partners of Taiwan and the Hainan branch of the Xan Xie Design Institute on the project, which calls for a high-rise hotel and an underground parking garage for 1,200 cars. HLW also designed three resort villas, called the Miami, the Dallas, and the Malibu, each of which would have an office suite including small conferencing facilities for business people. Prospects for building the villas are slim, but the first segment of condos is now under construction.

Legendary engineer and educator Mario Salvadori, who turns 88 this month, is a life-long revolutionary, and the revolution is far from over. *by Abby Bussel*

Super Mario

Mario Salvadori is a man on a mission. In contrast to our more popular heroes – basketball players who slam-dunk at the Garden and movie stars who swagger across the Big Screen for million-dollar paychecks – he takes wooden building blocks, string, and paper into urban classrooms to teach kids in Nikes about the built environment and the opportunities it offers. The big pay-off for Salvadori is when a seventh-grader shouts out “buckling” in answer to a question about column failure.

Trained as an engineer, Salvadori has made an indelible mark professionally and has powerfully influenced the education of architects and engineers worldwide with books like *Structural Design in Architecture*. He has revolutionized the way his subjects are taught, chipping away at the gap between architecture and engineering. The author of 18 books and the recipient of countless awards and honors, Salvadori has a legendary ability to translate the daunting principles of structures into accessible concepts for architecture students. And his charisma is undeniable. “He’s a real trip,” says one colleague.

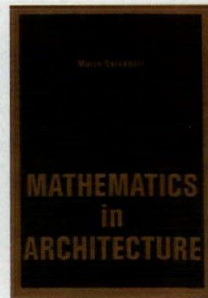
When most people would have eased into retirement, Salvadori embarked on a second career. And since the mid-1970s, he has cultivated an extraordinary curriculum for teaching science and math to children of the inner-city through the concrete examples of the constructed world. In 1987, his curriculum was formalized into the Salvadori Educational Center on the Built Environment (SECBE).

Never a Dull Moment

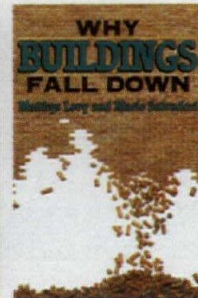
Salvadori was born in Rome on March 19, 1907. His family soon moved to Genoa, where his father worked as the city engineer, and then to Spain, where the elder Salvadori worked for a French company. By age seven, the engineer’s son was fluent in French, Italian, and Spanish. Though his father taught him mathematics, and the young Salvadori wanted to become an engineer, he turned his attention to music, and by age 12 was able to play Beethoven sonatas on the piano. Deterred by his parents from becoming a concert conductor, Salvadori received his undergraduate degree in Rome in 1925, the same year he established the first student jazz band in Italy. He went on to earn doctorate degrees in civil engineering (1930) and in pure mathematics (1933) from the University of Rome. University studies and music were not enough to fill his time, so he did a bit of mountain climbing, opening 27 new routes, of which three were to virgin peaks in the Alps.

From Fascist Italy to Lionel Trains

It was during a year-long stint in London, researching photo-elasticity at University College, that the true nature of



1



2

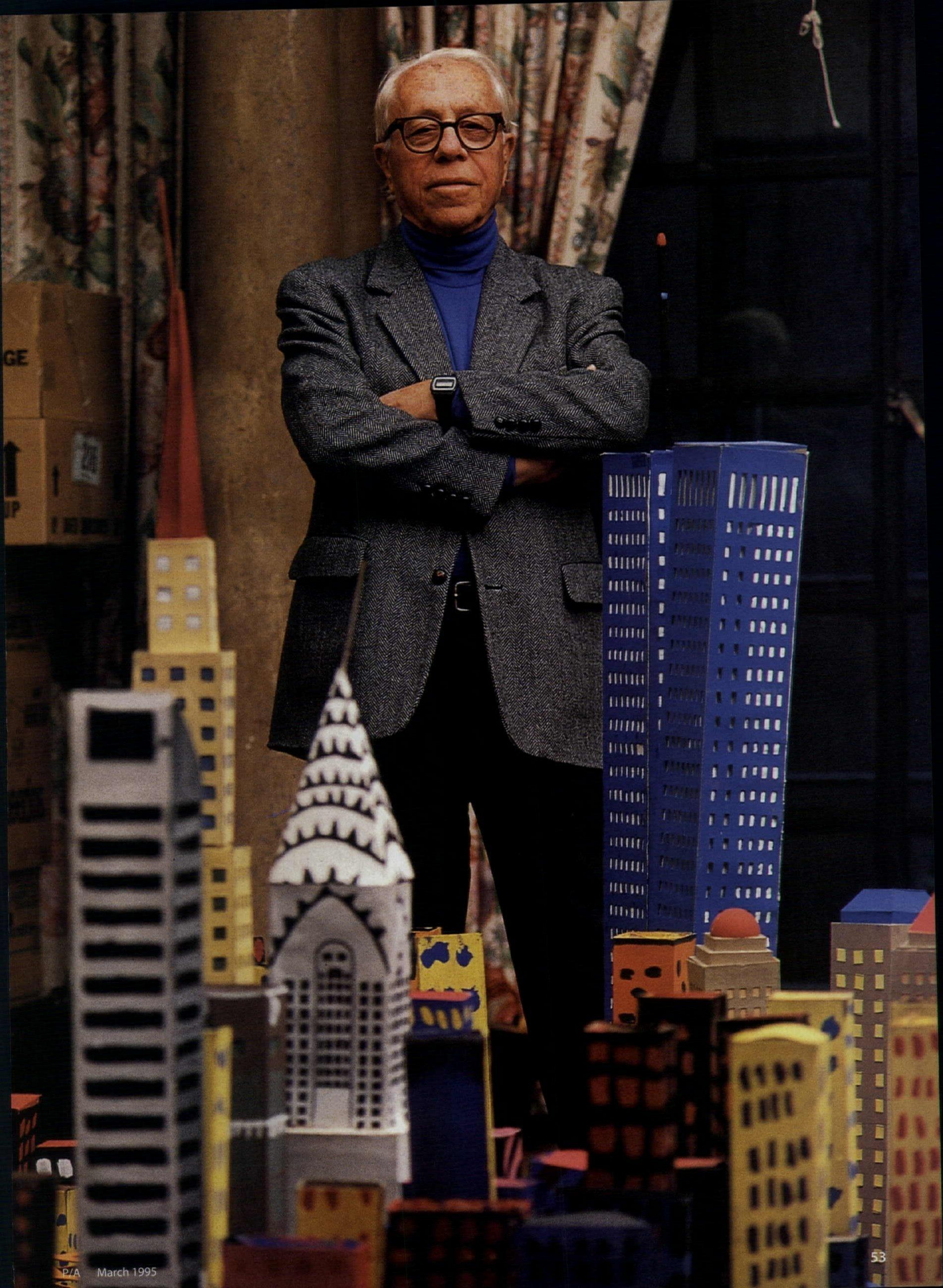
Mario Salvadori (3) stands with the Model of Manhattan designed and built to scale by students at a school in the Bronx; the model includes 265 buildings and was completed in 1988. Among his many books are *Mathematics in Architecture* (1) written in 1968 and *Why Buildings Fall Down* (2), coauthored by Matthys Levy in 1992.

Benito Mussolini’s activities in Italy became clear to Salvadori. But he returned to Italy for a few more years to teach and work as an engineer. A pacifist and an outspoken critic of the Fascist leader, he fled to the United States in 1939, never to turn back. A contact established by his parents landed Salvadori a job as a time-and-motion engineer at Lionel Trains in Irvington, New Jersey. He soon headed the department and not long after was offered a deal to become the toy trainmaker’s CEO. “I was born lucky,” he says, explaining that Lionel’s owner offered him the position plus \$15-million worth of company stock. A lifetime of toy trains, however, did not appeal to the young engineer.

A Multifaceted Engineer

Salvadori quit his job at Lionel right after he turned down the offer and took a temporary teaching position at Columbia, which would turn into a 50-year association with the university. Meanwhile, he began working for the government – it was wartime, after all – and from 1942 to 1945 he acted as a consultant to the Manhattan Project; like others of the day, he was not told that his work involved the makings of the Bomb. Cutting his ties with the Feds, he soon met Paul Weidlinger, who was then just establishing his engineering consultancy, Weidlinger Associates, and Salvadori’s career as an engineer in New York took off.

A consultant from 1945 to 1960 and a partner until 1991, Salvadori brought to Weidlinger bright young Columbia graduates, and with his inimitable charm introduced many clients to the firm, says longtime colleague Matthys Levy. There, he and his coworkers collaborated with some of the great architects of the century. He was involved with Walter Gropius’s University of Baghdad (1957) and Eero Saarinen’s CBS Building (1965) in Manhattan, one of the first reinforced-concrete bearing wall towers. He also designed shell structures for a variety of building types and worked as a forensic engineer, investigating building failures and their causes – from design



GE

↑

IP

and construction errors to earthquakes. Salvadori makes it clear, however, that his work was always part of a team effort.

Both architects and engineers offer the highest praise for the man and the engineer. A. Eugene Kohn, partner at Kohn Pedersen Fox Associates, New York, who worked with him on several projects, stresses Salvadori's ability to make structural engineering and architecture a seamless art. "His main concern was that great architecture be achieved," says Kohn, who thinks of Salvadori more as an architect than an engineer. "Some engineers say you can't do this or that, but Mario never did. He'd find a way. In my view, he's on a par with Louis Kahn and Paul Rudolph."

Now Honorary Chair of Weidlinger Associates, Salvadori maintains an office to conduct his work for SECBE, but is no longer active at the firm.

Born to Educate

During his half-century (1940 to 1990) as a professor of engineering and architecture at Columbia, Salvadori instituted a fundamental change in the way his subjects were taught. "One of the great teachers of structures, Mario was always able to make the most complex theories digestible in ways no one else could," says James Stewart Polshek, who was Dean of Columbia's School of Architecture during the latter part of Salvadori's tenure. Salvadori's textbooks, among them *Structures in Architecture* (1963), with R.A. Heller, *Structural Design in Architecture* (1967), cowritten by Matthys Levy, *Why Buildings Stand Up* (1980), and *Why Buildings Fall Down* (1992), also with Levy, have influenced students worldwide. His efforts were honored most recently with the 1993 AIA/ACSA Topaz Medalion for Excellence in Architectural Education; he is the first engineer to receive the award.

Tony Webster, currently the Director of Building Technologies at Columbia's Graduate School of Architecture, believes that Salvadori's greatest academic contribution was to initiate a paradigm shift. "He was the visionary," says Webster, "who established the framework for teaching qualitatively the subject of engineering to architects."

Now James Renwick Professor Emeritus of Engineering and Professor Emeritus of Architecture at Columbia, Salvadori no longer teaches at the university level, but still has much to say about the education of architects and engineers. His advice for alleviating what he calls "a reciprocal ignorance" is for architects to become engineers and engineers to become architects.

City Kids and the Built Environment

Responding to a request made by the New York Academy of Science for volunteers to help improve the quality of math and science education in the city's public schools, Salvadori taught his first junior high school class in 1975 in East Harlem. Of his initial success with the kids, he said, "It's extremely useful not to know that something can't be done." As at the university level, Salvadori has his own ideas about how to teach abstract concepts to sixth- and seventh-graders, encouraging the kids to explore concrete examples (the design and construction of a model bridge or building, for example) to figure out for themselves the laws that govern mathematics and the sciences. Compression and tension, for example, are communicated to the

children through their own experiments and explained by Salvadori as examples of pushing and pulling.

It is estimated that more than 100,000 minority students in New York City have been exposed to his hands-on methods. Educational materials (teaching manuals, videos, books, model building kits) developed by Salvadori and SECBE, the nonprofit organization he founded eight years ago, have been distributed to schools in 42 states and in several foreign countries. Among its ongoing programs are the Salvadori Middle School program, which provides staff development, curriculum materials, and on-site assistance, and the Specialist-on-Site Program which currently includes 25 schools that are using the Salvadori method and materials guided by on-site "resource specialists." In addition, SECBE has trained more than 300 educators in the Salvadori method.

Expanding on the idea that kids learn through their physical environment, SECBE has organized several projects in the field. Last year, for example, architects and engineers who volunteered their time worked with groups of students to develop a tower of the future, exploring political, social, and visual implications in a program called "Tower 2000." The professionals transformed the kids' ideas into completed drawings, which were auctioned off to raise money for SECBE.

The success of the tower program will be followed up this year with "Education 2000" in celebration of the twentieth anniversary of Salvadori's first session in an inner-city classroom. Practitioners will meet with students this winter, and a silent auction will be held May 18 at a construction site in Manhattan under the auspices of Lehrer McGovern Bovis.

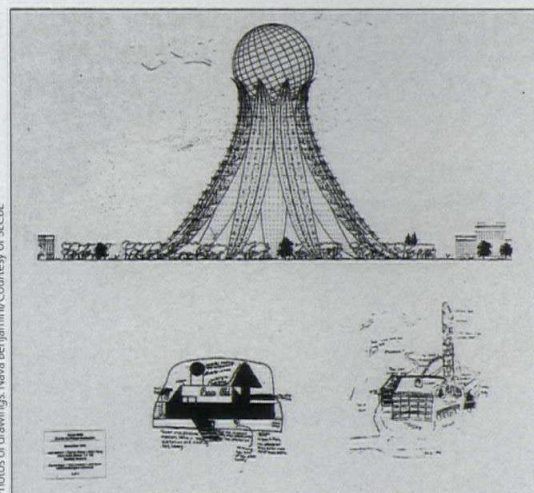
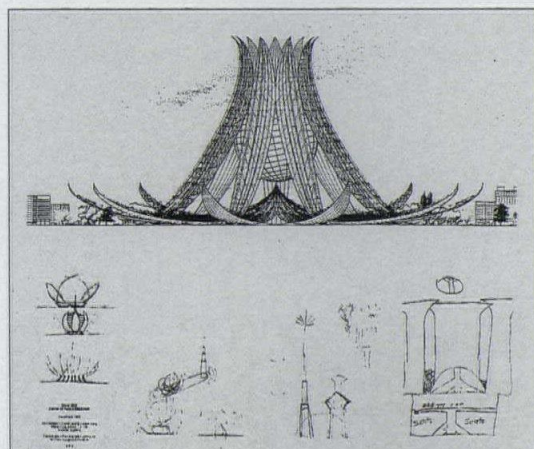
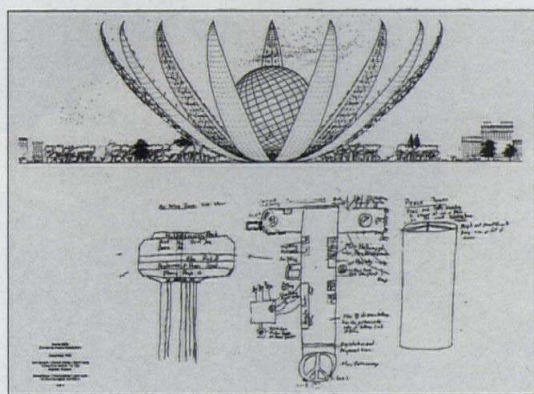
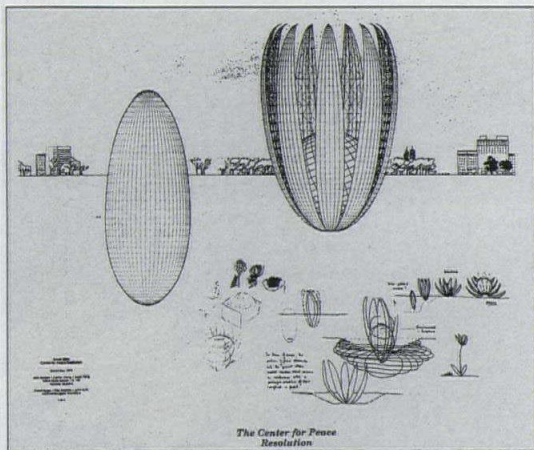
With the special projects and ongoing programs, "we now have a blueprint for affecting schools," says SECBE Executive Director Lorraine Whitman, who holds a doctorate in physics. She is confident that, with the institutionalization of Salvadori's programs, SECBE will carry on for years to come. Whitman left her position in the applied sciences division of Weidlinger Associates, which she held for nearly two decades, to come to the nonprofit about one year ago. Like Salvadori, she is using her expertise to advance educational reform and is currently awaiting word on a grant proposal for the Salvadori Educational Center Multimedia Environment for Learning. It is an ambitious project that would allow SECBE, in collaboration with Polytechnic University and Teachers College of Columbia University, to develop a new generation of educational software.

Whitman is herself an essential component in SECBE's vibrancy. But as she says, "Mario is the heart and soul" of the organization.

And the Mission Continues

Salvadori now devotes his full attention to SECBE, teaching, lecturing, and bringing new teachers, mentors, and role models into the fray. He is also working on two new books, *Why the Earth Quakes*, to come out in August (Levy is coauthor), and for kids, a math textbook.

A recent issue of *New York* magazine featured a cover story called "The 100 Smartest New Yorkers." Salvadori, a resident of the city since 1939, didn't make the cut, but Madonna did. Despite such vagaries, the mission continues. □



Photos of drawings: Nava Benjimini/Courtesy of SECBE



5

J.R. Bale



6

Courtesy of Cooper-Hewitt Museum

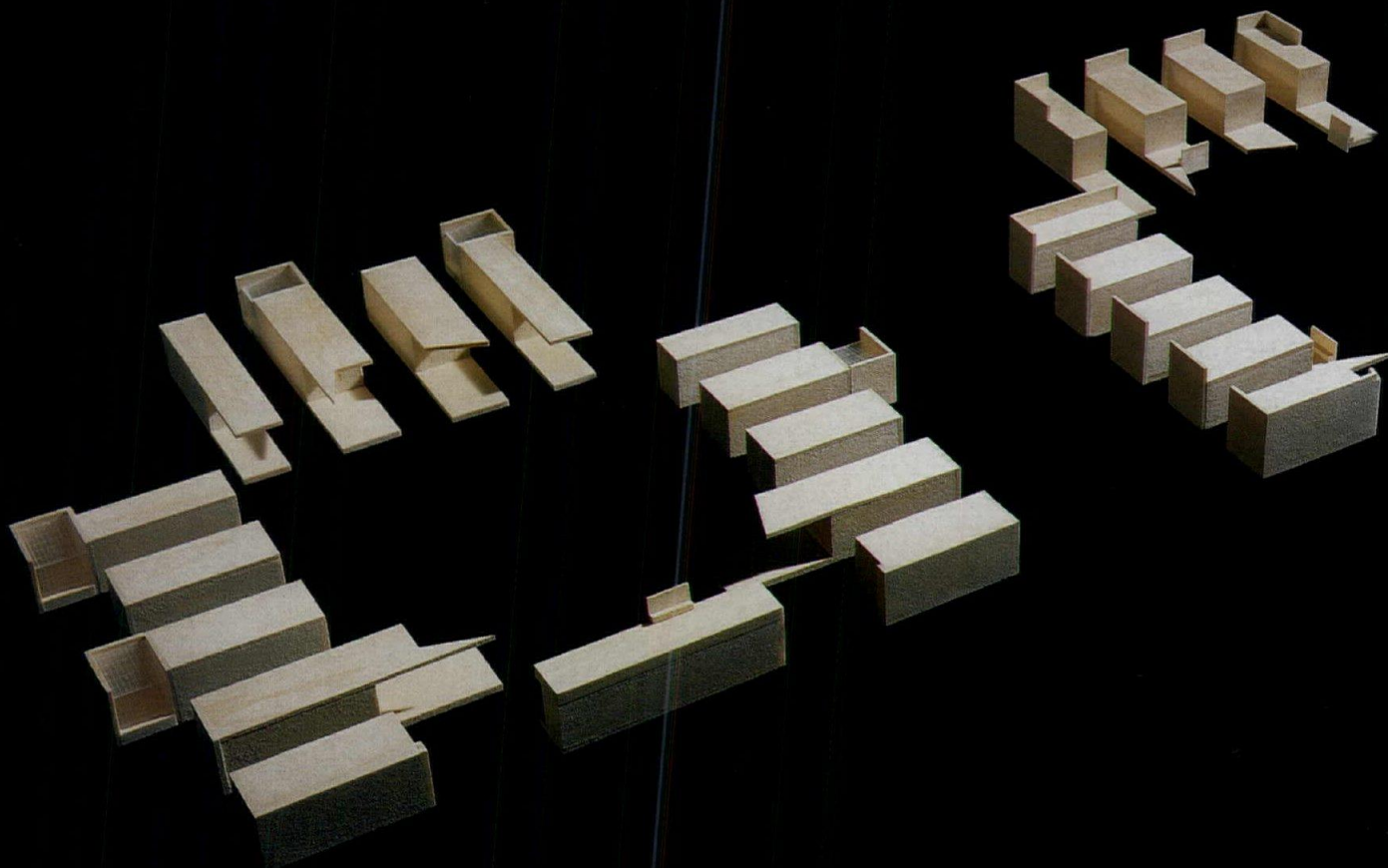
SECBE's "Tower 2000" program brought together architects and engineers and groups of middle school students to design a tower of the future. One of the teams designed The Center for Peace Resolution (4) and offered this proposal: "In times of crisis, the structure will descend into the ground where mediators remain in conference until a peaceful resolution to their conflict is found. As prospects brighten, the building will rise and open like a flower, revealing an ideal biosphere, a microcosm of our hopes for the

Earth." The drawings are by Paul Broches of Mitchell/Giurgola Architects and the sketches are by students April Sandell, Kairin Yang, and Carren Wang of Marie Curie M.S. 158 in Queens. Another program, "A Bridge to Learning" (6), involved the construction of a 36-foot-long suspension bridge in the garden of the Cooper-Hewitt Museum in 1991. SECBE offers a teacher training workshop taught by Salvadori (5) and his colleagues at City College of New York, where the organization has its office.

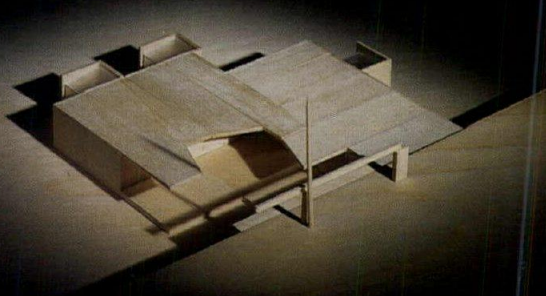
Joint Effort

Preassembled building technology, coupled with lease-purchase financing, rescues a public project from limbo, and casts the architects in a different role.

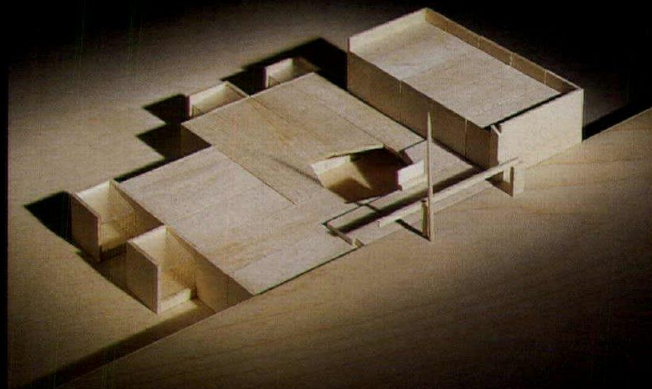
by Ziva Freiman



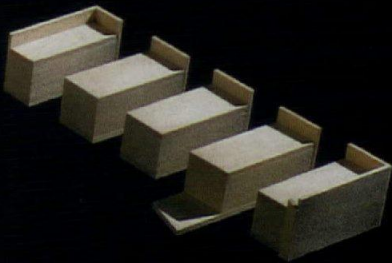
MODULE INVENTORY



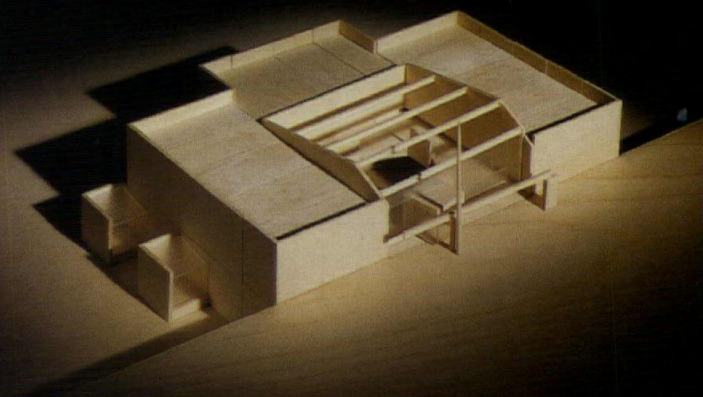
CONSTRUCTION SEQUENCE



Jack Pontle/Esto



The configuration of factory-built modules for the Child Development Center was determined by the 13'6" by 46' dimensions of the flatbed trucks used to transport them to the site. The models show the "inventory" of elements, (above), and a construction sequence, (below).



Any architect who has worked for a cash-poor public client is familiar with this scenario: you develop a project from feasibility study to full-blown design, only to have it languish for years waiting for approvals and financing. In the case of the Child Development Center (CDC), designed by Margaret Helfand Architects of New York for the Bronx Community College, the predictable chain of events took a surprising turn when the CDC director heard of an innovative construction/financing strategy: factory-built buildings, available on lease-purchase.

With the director's decision to convert the project to pre-assembled construction, Helfand's design, which had been on the boards since the mid-1980s, literally got a new lease on life. No doubt, the economics were mighty attractive to the public client. Besides the savings inherent in an accelerated construction process (with site work and factory assembly occurring simultaneously), the building delivery scheme circumvents bond issues: third-party investment banks, working in conjunction with the building fabricators, finance the building at the outset. Following a five-year lease, a balloon payment transfers ownership to the tenant. Efficient construction management provides another powerful incentive: in many states, preassembled buildings are exempt from legislation requiring contracts to be divided among several contractors, thus eliminating bureaucratic snarl-ups and costly coordination.

In modular construction the building parts, including all electrical and mechanical systems, are assembled in the factory, with all finishes applied. The modules are transported by flatbed trucks to the site, where foundation work, joints between the building parts, and system linkups are done. A steel-frame structure with steel decks and drywall infill is the predominant technology. "Quality is high," reports project architect Marti Cowan. "The tradespeople build these things like cabinetmakers."

The combination of public client and preassembled construction required Helfand to operate differently with respect to her design role. As public work, the CDC contract must go out to bid, even though Helfand and Cowan had learned the ins and outs of the technique from Kullman Industries, a New Jersey fabricator. Helfand's design will be issued as an RFP for a design-build contract, and the selected manufacturer will be responsible for the construction documents.

Given this role in the project, Helfand explains, she and Cowan decided to concentrate their efforts on defining the building systems with a mind to "reflecting the building technology, and to controlling the visual end product as much as possible." The key to both objectives, as they saw it, lay in treating the field-built seams connecting the preassembled structures as special design features. When the joinery is ignored in such construction, there's a danger that shoddy *in situ* work (or simply joints with insufficient tolerance) will defeat the quality of the factory-built components.

The increased quality and efficiency of preassembled construction, coupled with financing offered by banks across the country (see sidebar, p. 58), make this technology a likely candidate for more widespread use in the public sector, on small- to medium-scale projects such as schools, daycare centers, housing, clinics, and prisons. Helfand's client stumbled on it serendipitously. Other architects would do well to inform their clients of this promising alternative.



Courtesy: Kullman Industries

VIEW OF TYPICAL FACTORY ASSEMBLY AT KULLMAN INDUSTRIES

On the Road Again: Factory-Built Construction in the U.S

Preassembled building has been around since the 1920s but it has changed and diversified a good deal since then. Today modular building fabricators are scattered across the country, producing a broad range of building types such as offices, housing, prisons, roadside services, schools, and healthcare facilities. There are 138 members in the Modular Building Institute (MBI). Certain companies run the gamut of services, while others specialize. Fabricators as a rule operate regionally to keep freight costs down.

There has been substantial improvement in the quality and durability of factory-built construction, reports Judy Smith, executive director of the MBI. Generally, the structural requirements for preassembled buildings are more stringent than those applied to static buildings, in order to enable them to withstand transportation. Steel frame construction is predominant for commercial and public uses; wood frame construction is available where allowed.

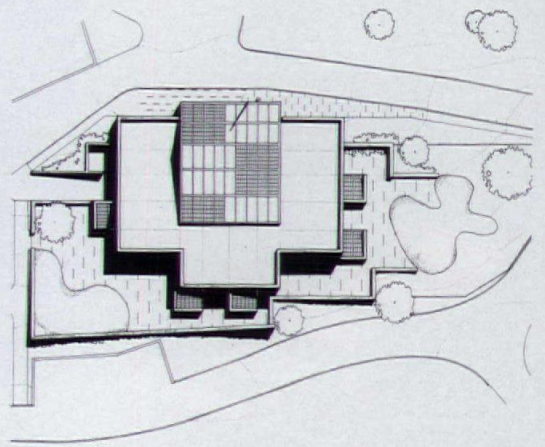
The scale of factory-built projects is not restricted per se, explains Chuck Savage, vice president of marketing for Kullman Industries, a New Jersey fabricator. But there is a limit to the number of stories that can be erected economically,

chiefly because of the structural duplication of floors and ceilings between stacked modules. The height of modules is also limited, dictated by the 14'6" clearance on commercial roads. ("Telescoping" modules partly overcome this restriction.)

Factory-built construction is particularly attractive to public clients eligible for low "municipal leasing" interest rates; third-party investment banks set up the leases, relieving fabricators of the financial burden in the lease-purchase schemes.

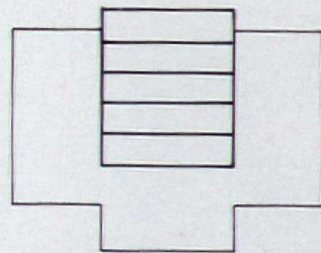
Less "down time" for weather, and the possibility of scheduling site development separately from factory assembly makes modular construction popular with clients. Other advantages have distinct appeal for architects: many fabricators are capable of delivering a range of styles and materials while shouldering the responsibility for providing all structural and mechanical systems. "We don't take away the architects' creativity," Savage says, "but we assume the risk; we take away architects' liability."

For more information, contact the Modular Building Institute, 414 East Market Street, Charlottesville VA 22902-5202. Tel: (804) 296 3288 Fax: (804) 296 3361.

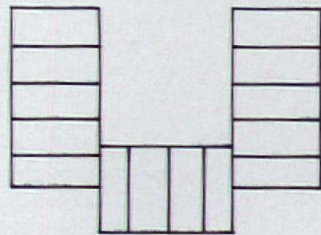


SITE/ROOF PLAN

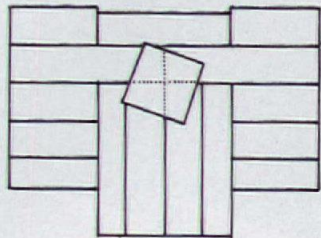
N ← 40/12m



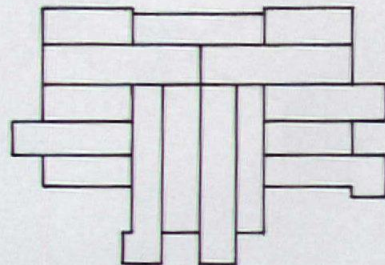
FIELD-BUILT PARAPET/SKYLIGHT



ENTRY LEVEL CEILING

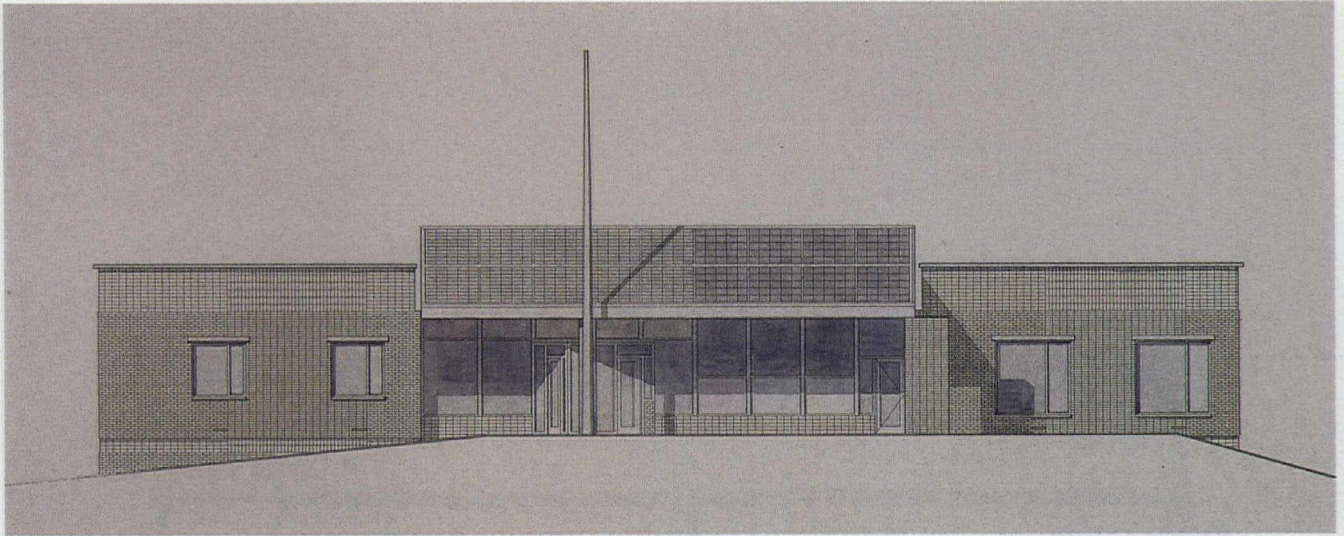


LOWER LEVEL CEILING/ ENTRY LEVEL FLOOR



LOWER LEVEL FLOOR

MODULE DIAGRAMS

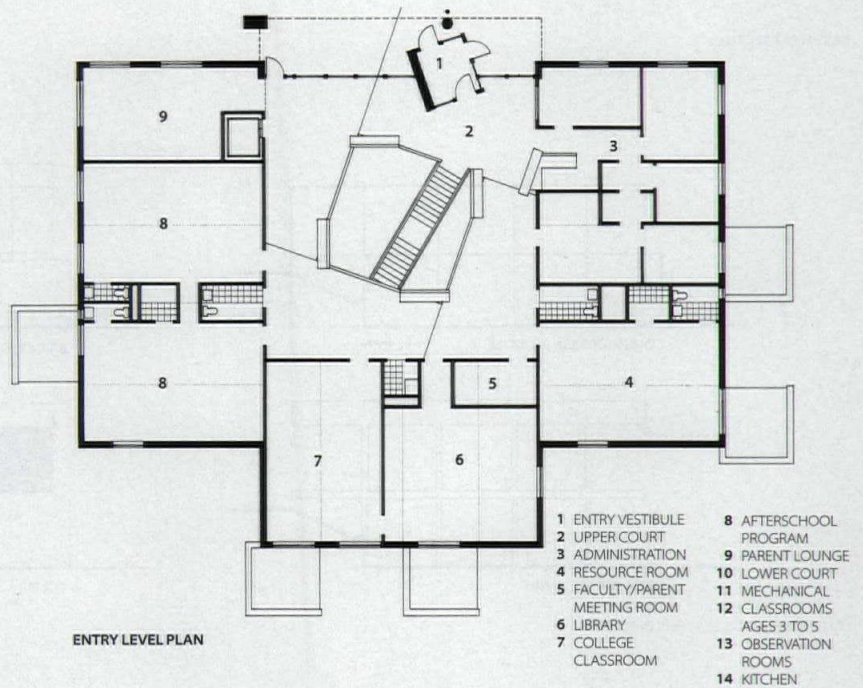


ENTRANCE ELEVATION

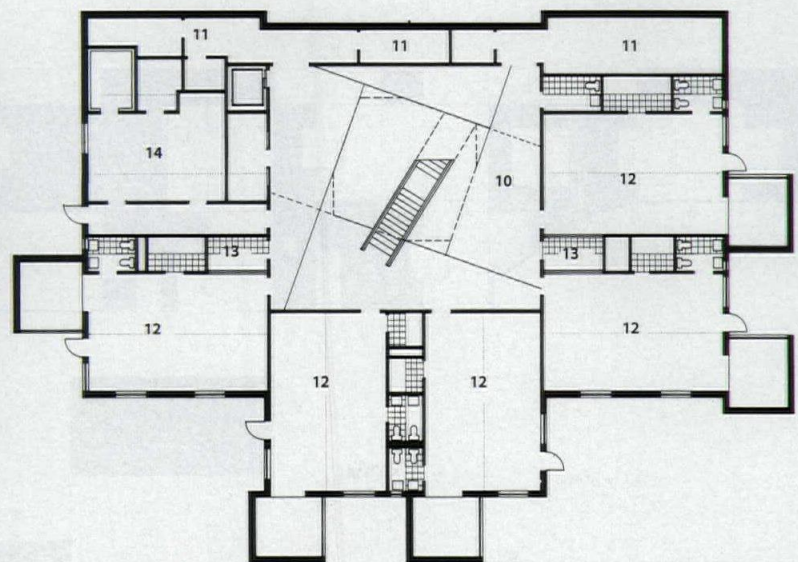
The design parti for the Child Development Center was developed in an early feasibility study, long before it became expedient to use factory-built construction. The Center, located on a slope, is entered from the upper level. Classrooms on both floors are arrayed around a central skylighted court. Skylighted boxes abutted to the lower-level classrooms provide indoor play areas.

In adapting the project to pre-assembled building, the architects divided the plan into 13- and 10-foot-wide modules (see plan diagrams, left). Where possible, the seams between modules were run through the bathrooms (see plans, right). The grid treatment of the fiberglass skylight, visible in the site/roof plan, is intended to reflect the geometry of the building. Among the field-built elements, a canted box inserted in the entrance façade's window wall forms the vestibule.

Duplication of the ceiling and floor plates of stacked modules is a peculiar consequence of this building method, since the modules are assembled in the factory as structurally independent "boxes." The structural system can accommodate 3-foot cantilevers off the steel frame, which allowed the formation of the court void using angular protruding plates on the lower module ceilings and identical "tongues" on the upper module floors.

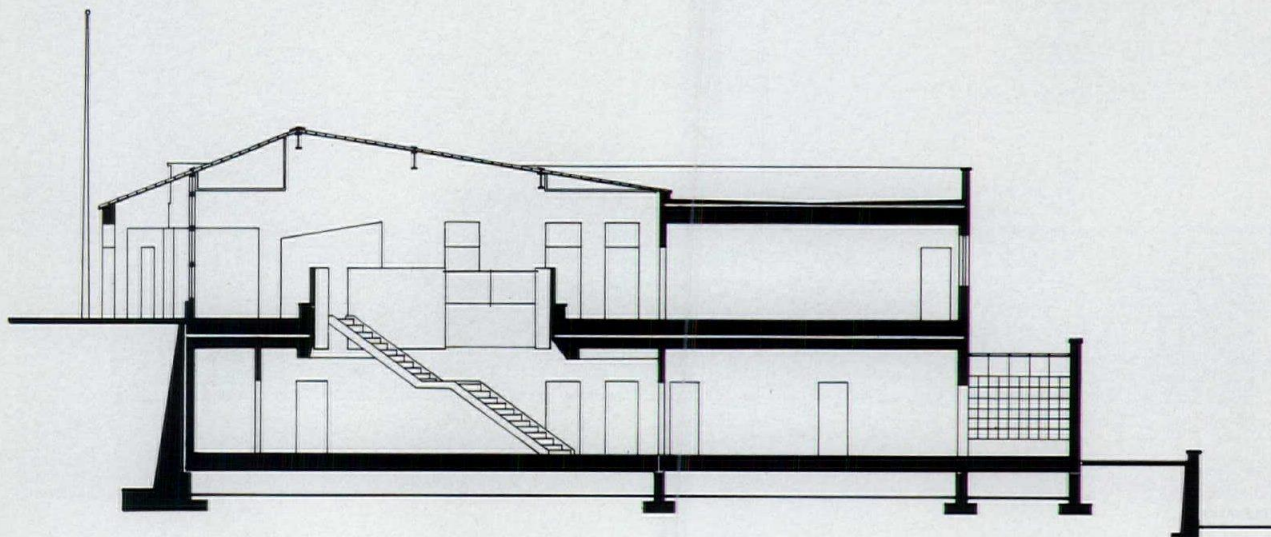


ENTRY LEVEL PLAN



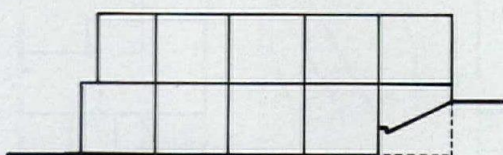
LOWER LEVEL PLAN

N ← ———— 20'/6m

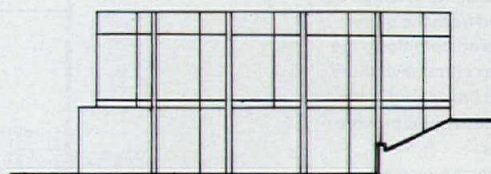


EAST WEST SECTION

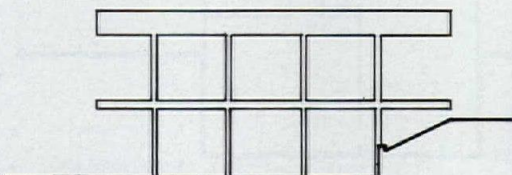
10/3m



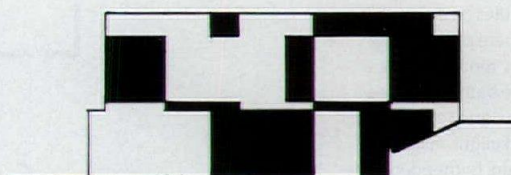
CONSTRUCTION MODULE



BRICK PATTERN

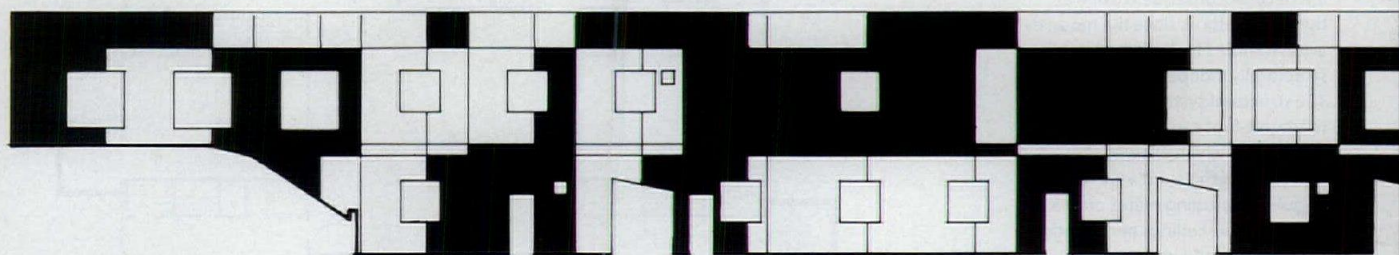


FIELD-SET MASONRY

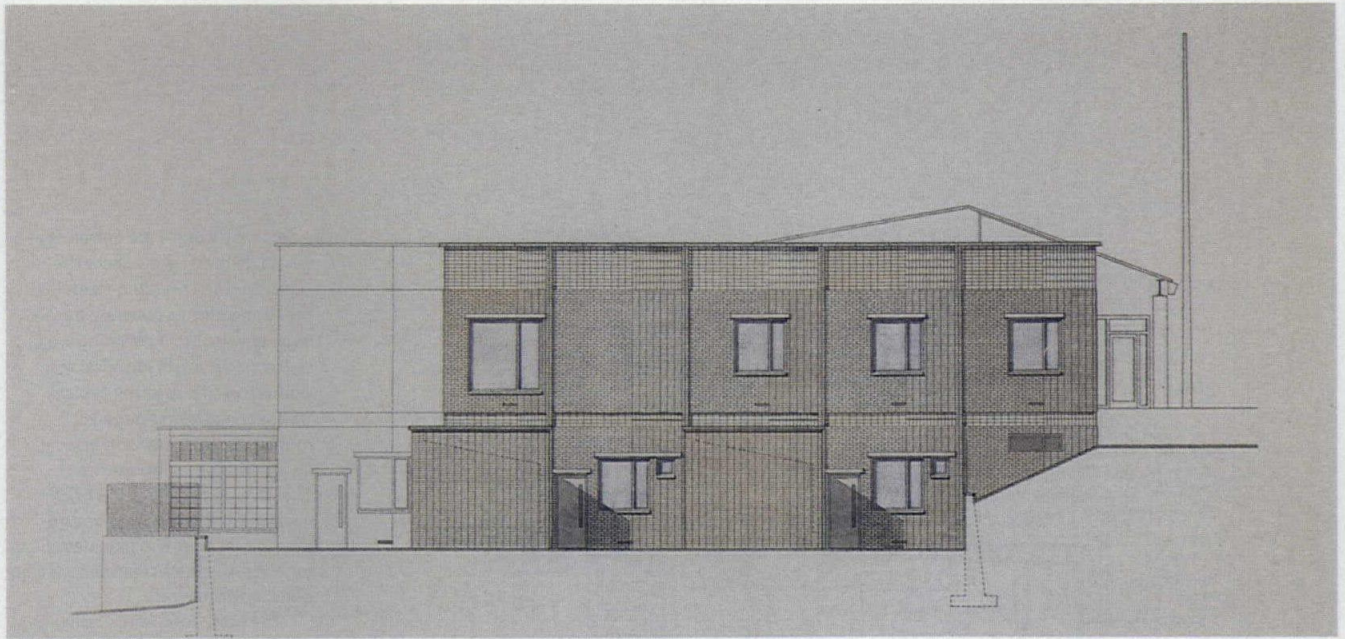


COLOR

SOUTH ELEVATION SYSTEMS DIAGRAMS

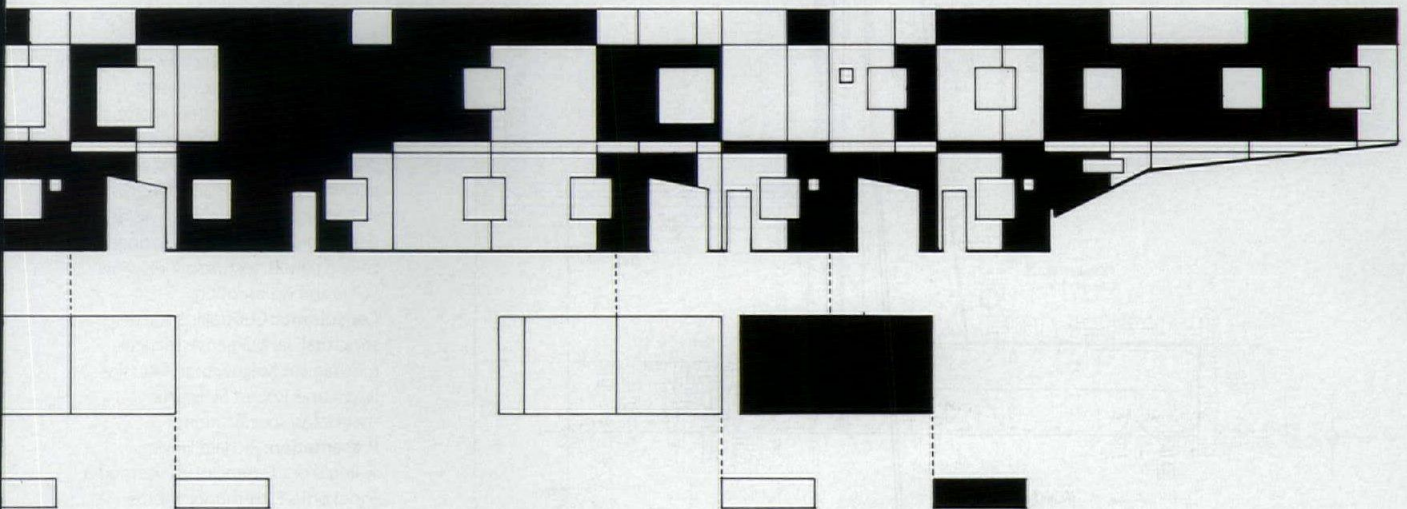
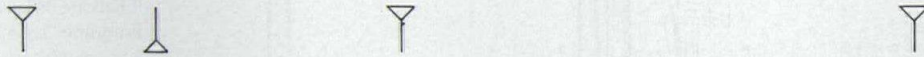
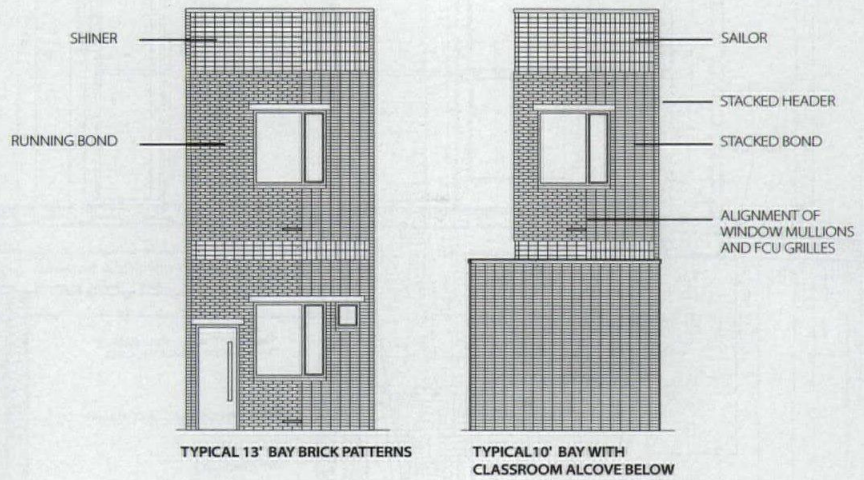


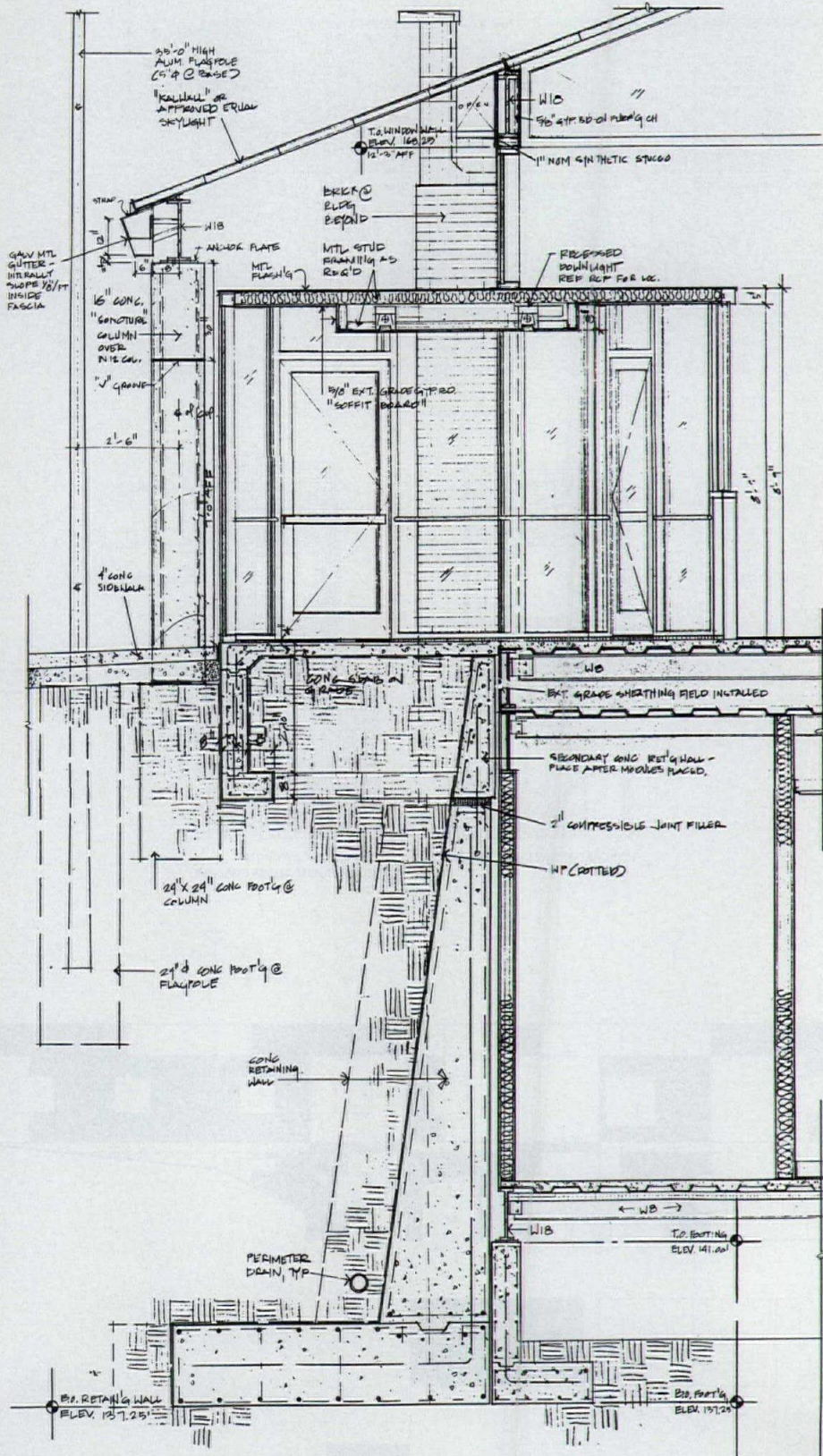
UNFOLDED ELEVATION INDICATING COLOR ALGORITHM



SOUTH ELEVATION

The elevation diagrams (center, facing page) express the architects' strategies to accentuate the building seams as special design features. The brick veneers on the field-built joints and parapet vary in depth from the factory-built cladding: vertical seams project two inches, horizontal seams and parapet surfacing are recessed two inches (see also wall section details, p. 63). The bricklaying patterns change in mid-module to further obscure the construction seams, and to organize the placement of windows and fan coil unit grilles (elevation detail, center right). A shifting palette of brick colors follows an independent grid that de-emphasizes the mate lines (see "color algorithm" on unfolded elevation, below).





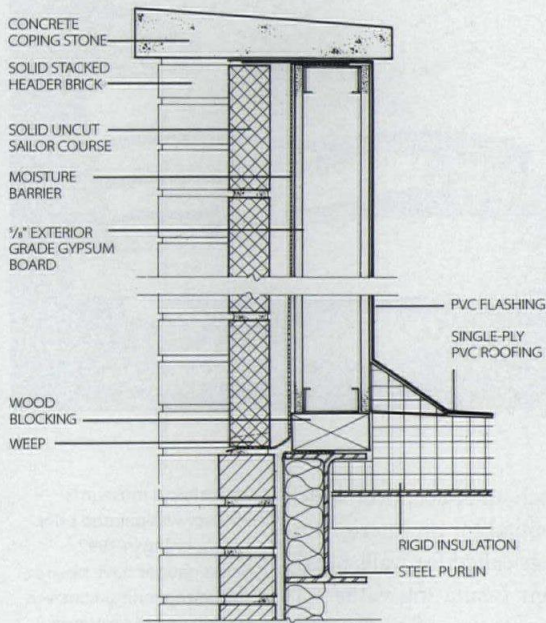
A section through the entrance vestibule (left) reveals how the preassembled building modules are slipped into a concrete framework consisting of retaining wall, slab on grade, and foundations poured on site. Another typical wall section (facing page, top) highlights the joinery of factory- and field-built components. The varying depths of the brick veneer signal the transitions on the façades (see also plan detail for mate line brick treatment, facing page, bottom).

The horizontal joints between floors are noticeably wider than in conventional construction because of the duplication of the modules' steel-frame structure. The advantage inherent in the modules' structural independence is that preassembled buildings can be dismantled and moved with relative ease – a feature that is attractive for institutional clients with long-term expansion plans.

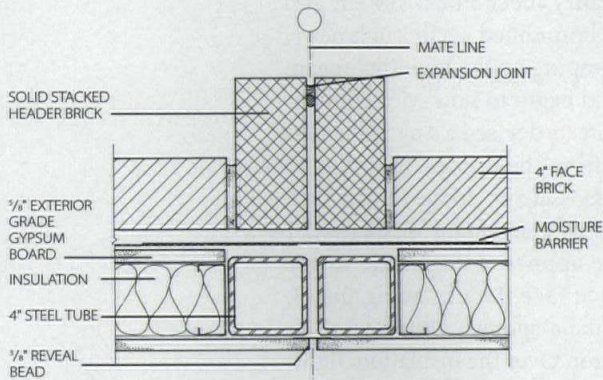
Project: Bronx Community College Child Development Center, Bronx.
Architects: Margaret Helfand Architects, New York (Margaret Helfand, principal; Marti Cowan, project architect; Martin Zogran, Scott Mahaffey, Toby O'Rorke, Meg Henry, project team).
Client: Bronx Community College (Charlotte Bellamy, director, CDC).
Program: Classrooms for ages 3 to 5 and for after-school program; administration; library; college classroom; indoor and outdoor play areas; total 15,325 square feet.
Structural system: Factory-built steel frame with brick veneer. Concrete foundations poured on site.
Major materials: Brick masonry, precast concrete lintels and sills, aluminum windows and window wall, structural fiberglass skylight panels; dichroic glass, wood fiber ceiling panels, tectum panels, vinyl floors and wainscoting.
Consultants: Christakis & Kachele, structural; Jack Green Associates, mechanical; Kolkowitz and Kusske, landscape; Robert Schwartz Associates, specifications.
Presentation: Richard Hoyer, watercolors; Etsumi Imamura, model; Jock Pottle/Esto, model photos.

SECTION THROUGH ENTRANCE VESTIBULE AND RETAINING WALL

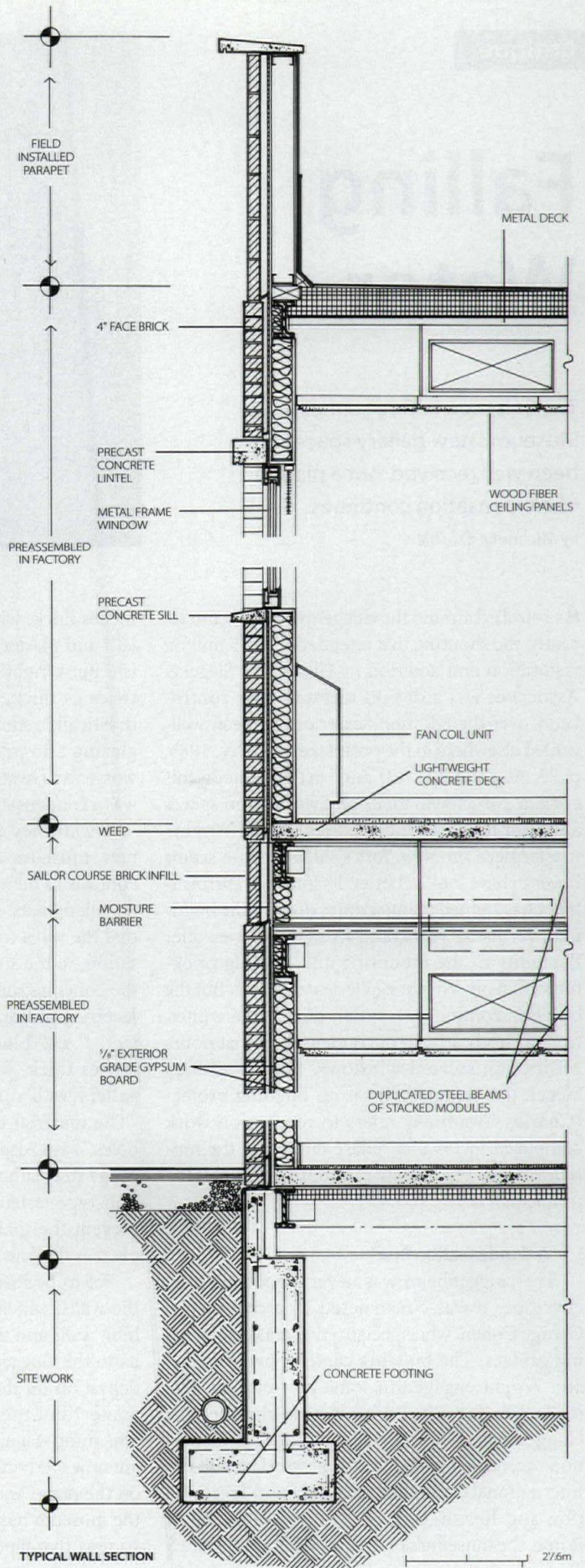
27.6m



PARAPET DETAIL



PLAN DETAIL AT MATE LINE



TYPICAL WALL SECTION

Falling Water

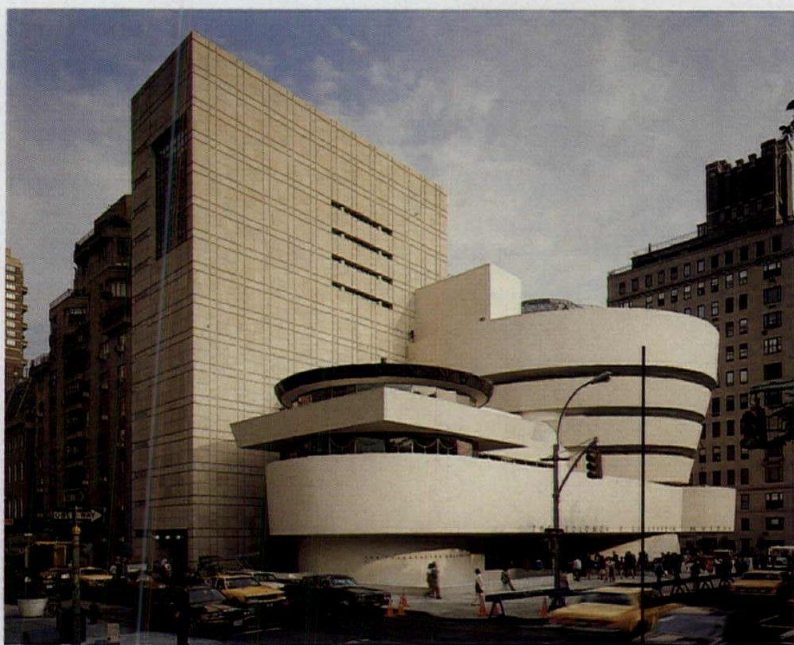
The Solomon R. Guggenheim Museum's new gallery spaces have been well received, but a plague of condensation continues.

by Michael J. Crosbie

As I strolled around the Guggenheim Museum recently, the shouting that attended the \$45 million restoration and addition by Gwathmey Siegel & Associates was a distant memory. The controversy over the addition's exterior has been well-ventilated elsewhere in the press (see *P/A*, Dec. 1985, p. 25; Aug. 1992, p. 13) and isn't an issue in this critique, which will focus on the museum spaces and their function. Indeed, Frank Lloyd Wright's masterpiece on New York's Fifth Avenue seems never to have looked better. Its interior refurbishment has righted many wrongs done to the building over its 36 years, and its new galleries offer flexibility in the mounting and lighting of exhibits that put Wright's galleries to shame. But the building continues to suffer, during the winter, from a steady stream of condensation that pours off its uninsulated windows. For Gwathmey Siegel, the Guggenheim is an ongoing project (Charles Gwathmey refers to renovation work completed in 1992 as "phase one") and the museum staff is proceeding cautiously to correct the problems.

"A Condensation Box"

The Guggenheim was never a good thermal envelope. It was constructed by a contractor, George Cohen, who specialized in concrete parking garages. The building came in over budget, and Wright engaged in some cost-cutting. Remarkably, for a building in this climate, the Guggenheim was constructed without insulation. According to Jef Malliet, a historian with the International Centre for the Study and Preservation and Restoration of Cultural Property in Rome, the museum's perimeter walls as built are 5



Paul Warhol

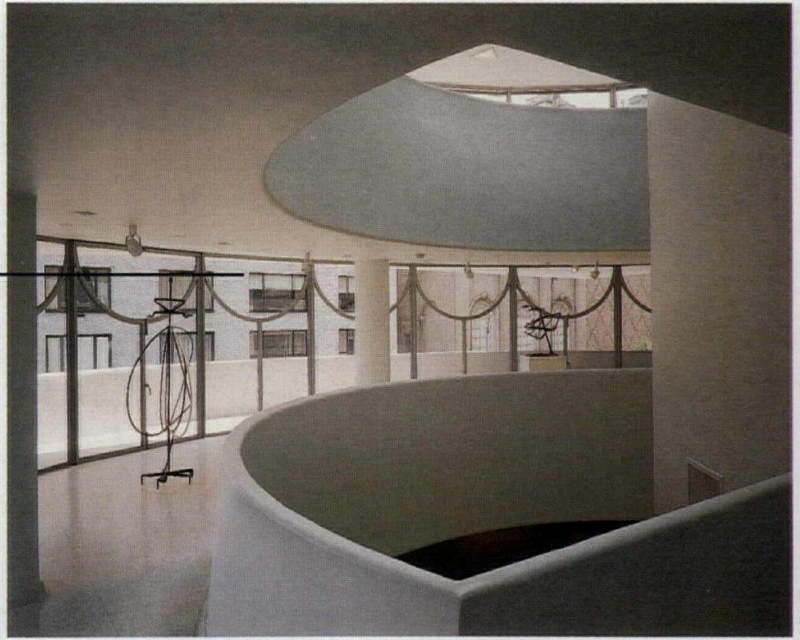
inches thick, with a 2-inch air space, over which lath and plaster were applied for an interior finish. But Wright's drawings called for walls nearly twice as thick; thus their insulating value was drastically reduced. Wright's use of single-pane glazing and uninsulated frames made matters worse. As Gwathmey describes the museum, "It was a condensation box."

Gwathmey Siegel's renovation included a new, museum-quality mechanical system and controls to deliver humidified air through newly installed ducts. Pumping up the humidity meant that the walls would begin to flow with condensation, so the architects devised a way to insulate the concrete shell from the inside. According to Jacob Alpector, associate in charge for the project, 1' x 2' blocks of glass-foam insulation, 2 inches thick, were applied with mastic to the gallery wall surface (see detail, facing page). "The material is like a sponge, with lots of air holes," says Alpector. Over the insulation, light-gauge steel lath was installed with plastic insulation-type fasteners and fiberglass clip angles to prevent thermal bridging. Plaster was then applied as the finished wall.

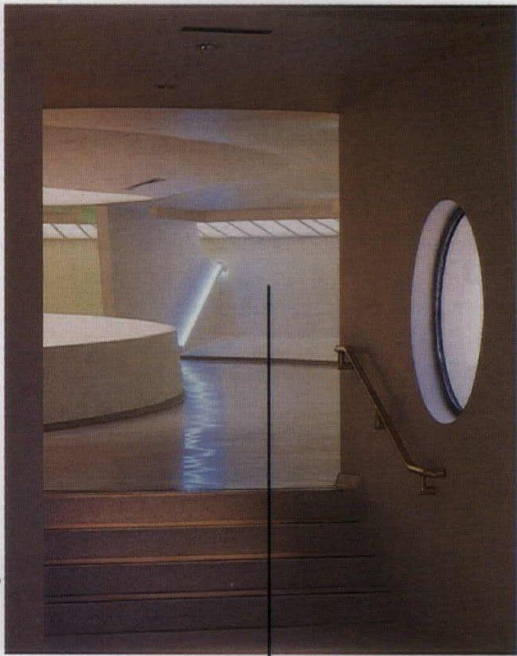
Yet to be insulated are the lower portions of the walls, which slope between the vertical exhibit walls and the ramp floor. On my recent visits to the Guggenheim there was no visible condensation on these surfaces (it has been a mild winter) but there were plenty of stains left by streaming water. The architects and the museum are now studying a solution, similar to that used on the upper walls. The lower wall in one bay of the museum has been fitted with a layer of polystyrene that tapers from 2 inches where it abuts

The original museum's exterior was painted prior to reopening in 1992. Stress gauges have been installed to monitor concrete cracking on the rotunda wing. The architects want to strip the exterior coatings and apply a new finish; the museum staff wants to study the proposal further.

Condensation is at its worst in the monitor building galleries, which have walls of uninsulated glass in steel frames. The New York Landmarks Commission gave approval for completely replacing the glass and frame with insulating units, but the museum wants to correct the problem while preserving the original materials. Now under study is a technique to install new glass in the original frames.



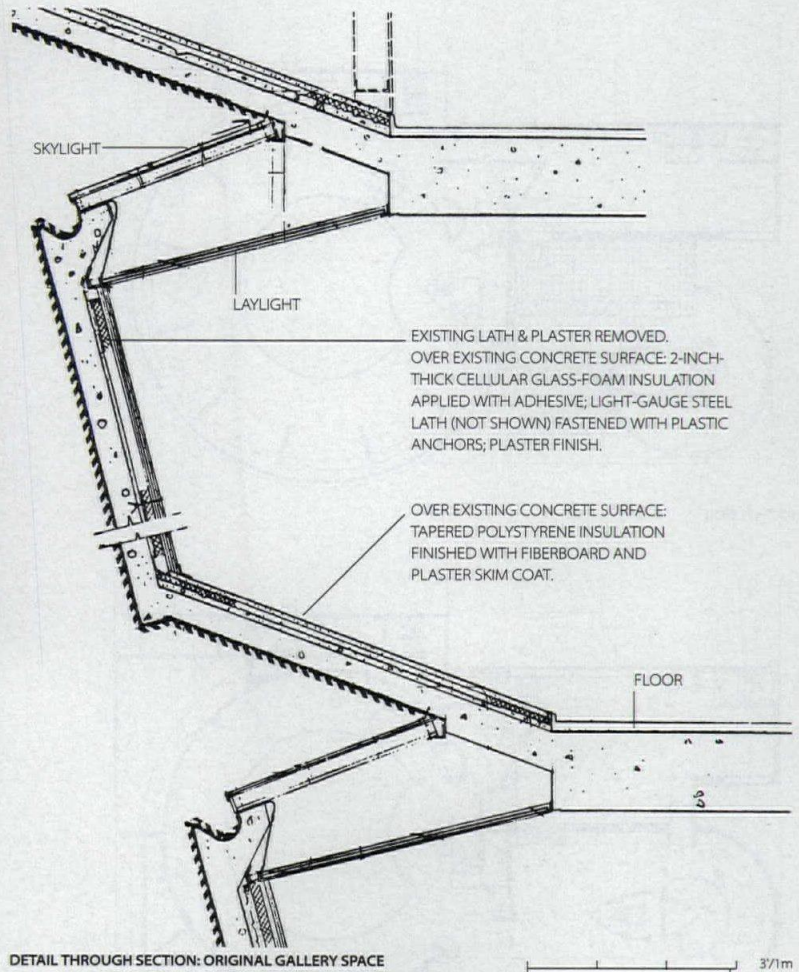
Jeff Goldberg/Esto

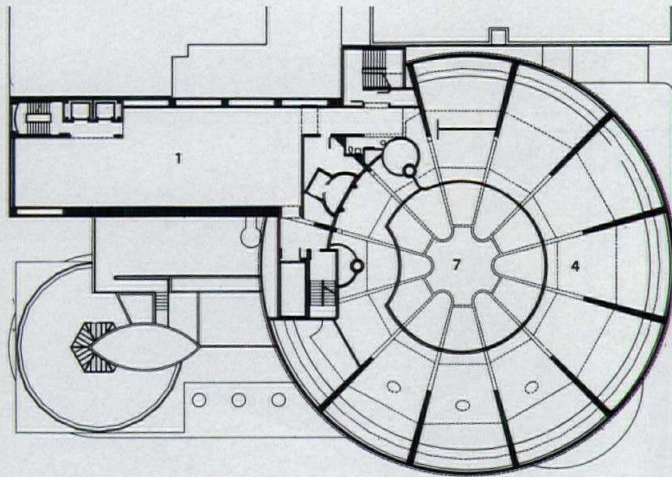


Jeff Goldberg/Esto

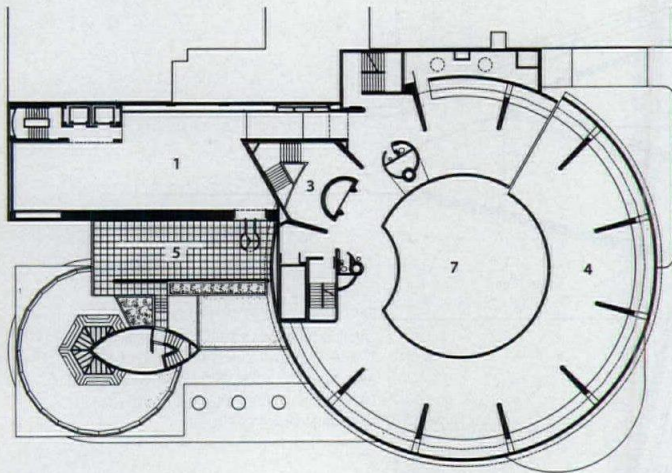
The walls of Wright's galleries were insulated by removing the original lath and plaster and installing glass-foam insulation and a new plaster finish. Anchoring structure was incorporated into the new walls to aid in the hanging of artworks. The sloped, lower portion of the gallery walls is being considered for

insulation retrofit, which would slightly raise the angle of this surface. The skylights above the gallery walls have yet to be replaced with insulating glass, but heaters between the glass and the laylights have been installed as a temporary measure to mitigate condensation.

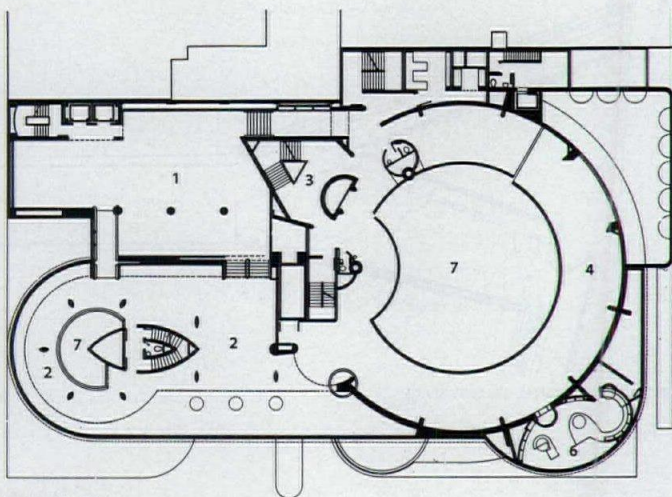




SEVENTH FLOOR

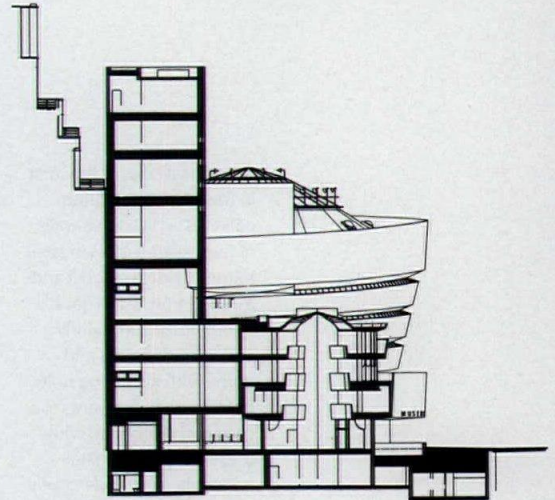


FIFTH FLOOR



SECOND FLOOR

- | | | |
|----------------------------|-------------------------|-----------------|
| 1 NEW GALLERY | 3 TRIANGULAR STAIR | 6 READING ROOM |
| 2 MONITOR BUILDING GALLERY | 4 RAMP (CLOCKWISE DOWN) | 7 OPEN TO BELOW |
| 3 TRIANGULAR STAIR | 5 TERRACE | |



SECTION THROUGH TOWER & MONITOR BUILDING, LOOKING SOUTH

40/12m

the vertical wall to a wafer-thin edge where it meets the floor. Fiberboard with a skim coat of plaster is applied over it. According to Guggenheim chief conservator Paul Schwartzbaum, the thickness of the polystyrene may have to be reduced to 1-½ inches because the thicker material produces a slope that is noticeably different. Its insulating value seems adequate, as the surface temperature is uniform to the touch. But lack of money has prevented completion of this work.

The Curse of the Blue Sausages

Part of the expansion of the Guggenheim included the conversion of the "monitor building" (a four-story wing just north of the rotunda) from staff offices to galleries. The monitor wing appears as a miniature version of the rotunda, with its own staircase, skylight, and curved gallery space. Its top two floors have floor-to-ceiling glass walls facing west and north, dripping with condensation. On especially cold days the condensation freezes and icicles form. Some museum-goers can't resist the impulse to leave a moist graffiti on the windows (I witnessed a guard scolding one such scribbler). To sop up the falls are sausage-shaped, pale-blue "pillows" of absorbent fabric placed at the wall base.

No art works are in danger from this torrent, but Schwartzbaum is concerned that the moisture will undermine the strength of the steel frame and sash. He and Alspector showed me a solution now under study: double-pane glass has been installed in two bays of the original frame, held in place with an additional frame on top of, and insulated from, the original. The new frame doesn't replicate the profile lines of the original, but only a



The new gallery spaces, this one on level two, afford the museum flexibility in hanging shows that the original museum spaces lacked. The monitor building galleries are visible beyond. Lighting troughs include indirect fluorescent fixtures and mounting posts for direct spotlighting. The ceiling above the troughs is painted with a UV-absorbent paint.

trained eye would notice. Schwartzbaum likes this solution, but it gets tricky around operable doors and with the third-floor glazing, which is complicated with half-circle shapes in the frame. The insulating glass would also make the temperature of these exhibit spaces easier to control (they can be cold, compared to the new galleries next to them). Once again, money is an obstacle to completing this work.

Gwathmey Siegel's new galleries receive high marks from the staff and from visitors I spoke with. Most museum-goers are barely aware that these spaces are not original to the building (I overheard several visitors asking guards whether they were in the new building or the old building). The architects have managed to do this without replicating in any way the geometry or spatial qualities of Wright's building. The new galleries are rectilinear, with variegated ceilings that allow troughs of concealed fluorescent fixtures to bounce light down into the galleries. (The light-reflective ceiling surfaces are finished with UV-absorbing paint.) There are also mounting posts in the troughs so that direct spot lights can be positioned virtually anywhere.

The museum staff praises the new galleries for their flexibility. Because they are discrete rooms on four floors, different shows can be exhibited simultaneously in a variety of ways. In short, they now allow the museum to now mount shows in a fashion that the Wright building, a notoriously poor gallery, never allowed.

Tyranny of the Ramp

The problem with the new galleries is finding them. Because of the placement of Wright's trian-

gular stair off the rotunda, the galleries must be entered through long corridors. Wright designed the spiral so that visitors would take the elevator up to near the top of the ramp and then circle down. Following the spiral, it is easy to miss the new galleries. I watched several people come down the spiral and become confused near the new gallery entry. Many of them wandered into the triangular stair, thinking they were heading into a new gallery. Oddly enough, it is easier to see the galleries and their entry corridors if you proceed up the ramp from the bottom, counter to Wright's intention.

Wright's spiral is also relentless. Once you begin to walk down, it's hard to decide whether you should stay on the ramp and enjoy the stroll, or exit into one of the new galleries. It's somewhat architecturally perverse to ask visitors to take the side trip – the spiral is best experienced as an unbroken thread.

The staff realized there was problem shortly after reopening, when it counted how many visitors entered the new galleries compared with the number admitted to the museum on a given day and found that the new spaces were being missed. Visitors are now encouraged into the new galleries with arrows and "Exhibition Continues" signs, but many visitors I observed seemed confounded or oblivious to the new spaces.

While the galleries, when they are discovered, seem well-received by the public, the building's thermal deficiencies cast a pall on the institution. A donor willing to help the museum correct these problems might not gain the same recognition as one who builds a new wing or donates a collection, but one Fallingwater is enough. □

Project: Solomon R. Guggenheim Expansion and Renovation, New York.
Architect: Gwathmey Siegel & Associates, New York.
Original Architect: Frank Lloyd Wright.
Consultants: Severud Associates, structural; John L. Altieri, mechanical/electrical; Light and Space Associates, lighting; Building Conservation Association, restoration/preservation; The Office of Pat DeBellis, landscape; Vignelli Associates, graphics; Heitman & Associates, curtain wall.

New museums on campuses have to perform double duty, as assets for their institutions and as cultural offerings to the world outside. *by John Morris Dixon*

Campus Culture

On American campuses, building types seem to come in waves: a surge of athletic facilities may be followed by a spate of biology labs. The timing of the wave on any one campus depends largely on what league of competing institutions the school belongs to. In the 1990s, a lot of schools have been finding the will and the wherewithal to build impressive new galleries and museums.

Of all the campus building types, campus museums are uniquely able to reach across the old town-gown barrier and appeal to a broader public. At big state universities, athletic arenas and stadiums also serve as magnets for the public. But even a small school without powerhouse teams can offer an art setting to draw artlovers – guests who don't cause traffic jams, don't litter, and rarely get rowdy.

Architecturally, the campus museum must actually address a lot of institutional objectives. Internally, it must provide a teaching environment,

a venue for temporary shows, an inducement for art donors, and a setting for receptions. Externally, it must enhance a revered setting yet establish a strong individual identity.

While such facilities tend to have name donors, much of their financing must be patched together from other sources, and budgets are not necessarily fat, especially when one considers the special qualities of lighting and air conditioning, which usually extend to art study and storage areas that aren't visible to the public.

In past decades we have seen campus galleries incorporated into ambitious arts centers that include the performing arts. Roche Dinkeloo's arts center at Wesleyan University (1972) remains one of the most refined of this type; Eisenman and Trott's Wexner Center at Ohio State University presents a fascinating combination of intellectual intensity and contextual accommodation (P/A, Oct. 1989). In the current wave are Michael Graves's formally respectful Carlos Museum at Emory University and Antoine Predock's volcano-shaped American Heritage Center and Art Museum at the University Wyoming, the winner of a P/A Awards citation (Jan. 1990).

Of the recent examples, we have chosen four for examination here: Gehry's Weisman Art Museum at the University of Minnesota; Pelli's Loeb Art Center at Vassar College; Moneo's Davis Museum and Cultural Center at Wellesley College; and the Palmer Museum of Art at Penn State, by Charles Moore with Arbonies King Vlock. Of the four, Vassar's art center makes the most pointed effort to reach out to visitors, from its position at the main gateway to the campus. At Minnesota, the new museum is on a highly visible bluff above the Mississippi River. At Wellesley and at Penn State, the museums had to be embedded well inside the campus, but each has been the occasion to develop a well-defined plaza, in contrast to the pervasive greenery.

In all four of these museums a strong identity is established by dramatic treatment of a portion of the exterior, in contrast with an otherwise bland envelope. Only in the case of Vassar has a specific greeting space been built, a small-scaled cousin to Pei's Louvre pyramid. And only at Wellesley are the galleries themselves the indisputable stars of the show. □



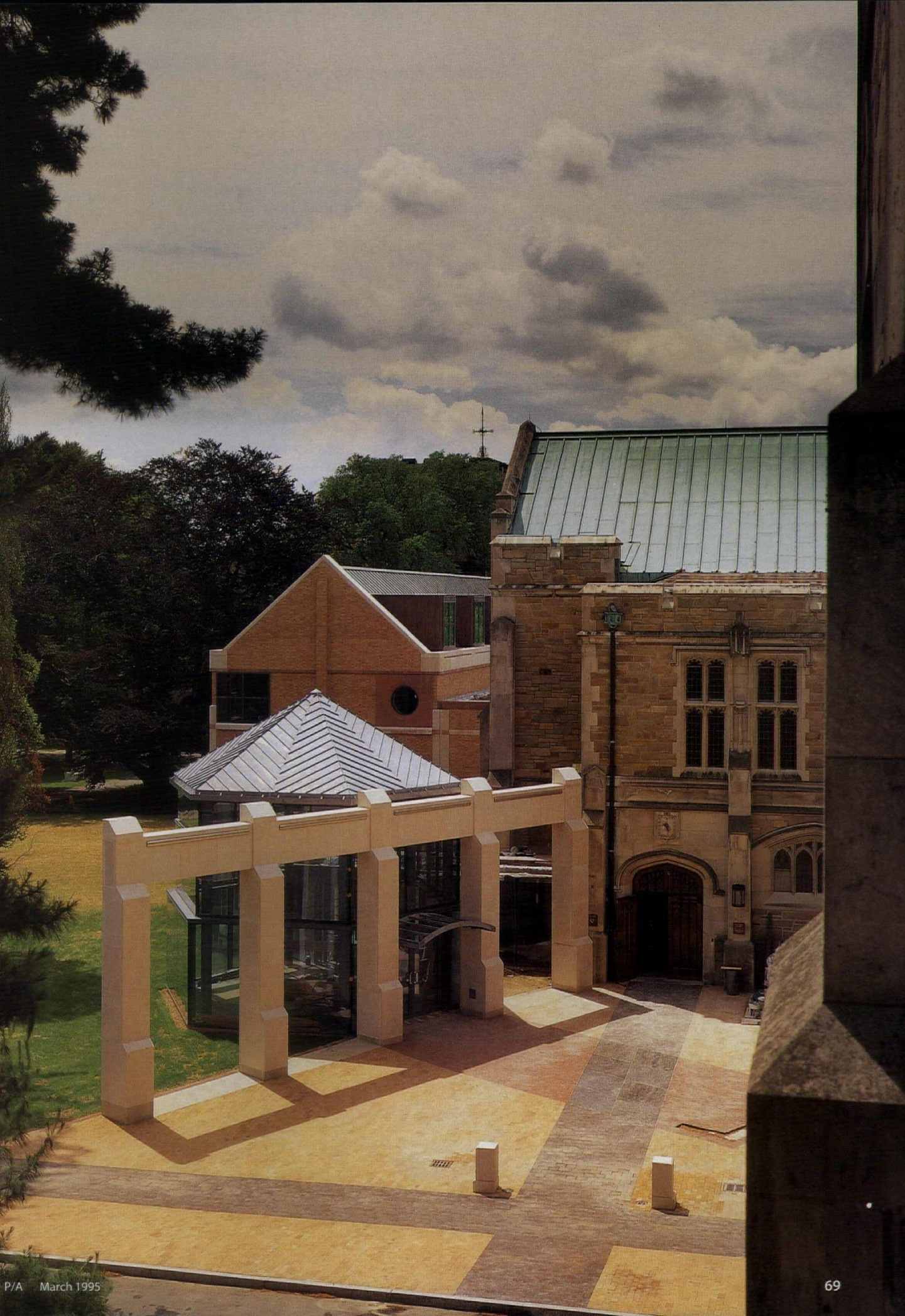
© 1994 Don F. Wong; Peter Aaron/Esto (facing page)

Above:
Weisman Art Museum
University of Minnesota

In these galleries by Frank Gehry, daylight flows in from roof monitors, through irregularly shaped ceiling cutouts (see page 76).

Facing page:
Loeb Art Center
Vassar College

The old Gothic art history building faces Pelli's new structures across an entry plaza designed by Diana Balmori (see following pages).



Frances Lehman Loeb Art Center Vassar College

It was only logical for Vassar's new art center to be placed just inside the campus's main gateway. The pre-existing art gallery occupied space in the gateway building, Taylor Hall, home of the art history department and part of a line of structures that wall off Vassar's main open space from the busy road outside. The new galleries had to be an extension of this structure.

There was a siting dilemma, however. A location just south of Taylor would be too inconspicuous, but extending a new wing to the east would violate that prime open space and block the view of the chapel.

Pelli resolved the dilemma by putting his new galleries and ancillary spaces in modest volumes south of Taylor and connecting them to it with an unusual sequence of glazed passages. Even more unorthodox is his polygonal glazed pavilion, placed right inside the gateway, whose only purpose is to announce the presence of the art center to those who pass.

While the passages seem more extensive than necessary, they are said to pay off in functional flexibility (using various spaces for receptions, etc.) and to have taken a very small part of the \$15,600,000 budget. (A whole basement floor of art study and storage, plus renovation of Taylor Hall, make the entire project much larger than it appears.)

The galleries themselves are spread on one floor, and all except some drawing galleries are under an array of monitors that flood them with daylight. This display space is completely flexible, but partitions divide it into roomlike combinations of 20' x 20' modules. Although the center's design is predicated on natural light, when one visits them on a bright day the paintings are seen in pools of more intense artificial light. Pelli says the modulated natural light is primarily to illuminate the space, that sunlight could not safely light the art. Whatever the lighting logic, the spaces serve the art well.

Glazed passages (below) link the new art center to Taylor Hall; the polygonal entry pavilion houses only a greeting desk and a sculpture. On the street side (facing page, bottom), the prominent roof monitors of the galleries can be seen above the sculpture garden wall, which has glazed windows. In the galleries (facing page, top) the 20' x 20' gallery module is expressed in columns and floor patterns.

Project: The Frances Lehman Loeb Art Center, Vassar College, Poughkeepsie, New York.

Architects: Cesar Pelli & Associates, New Haven, Connecticut (Cesar Pelli, design principal; Fred Clarke, design collaborator/project principal; Patricia MacDougall, design team leader; Laura Turlington, project architect).

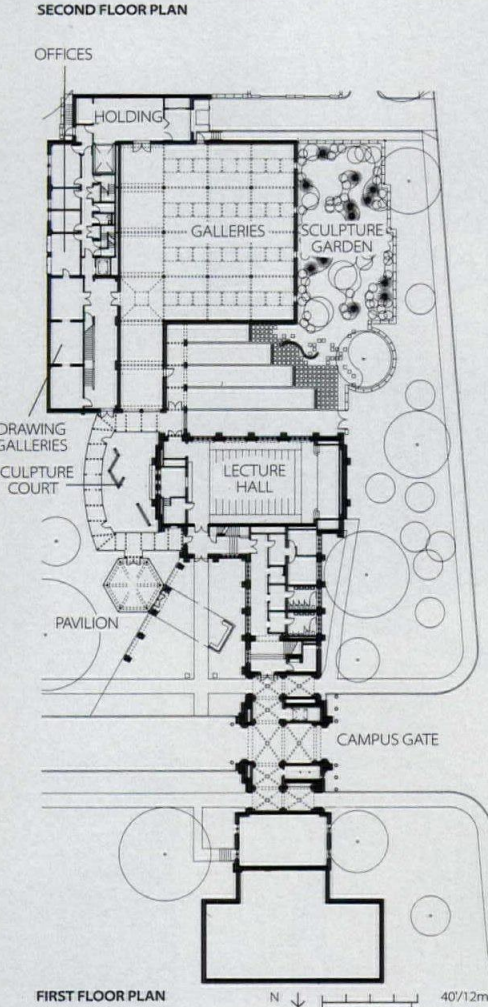
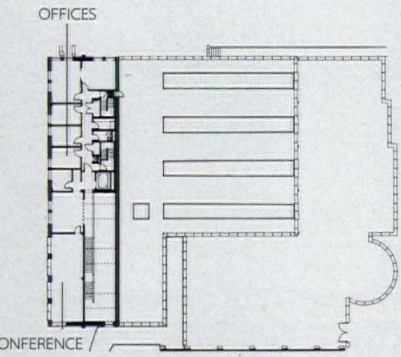
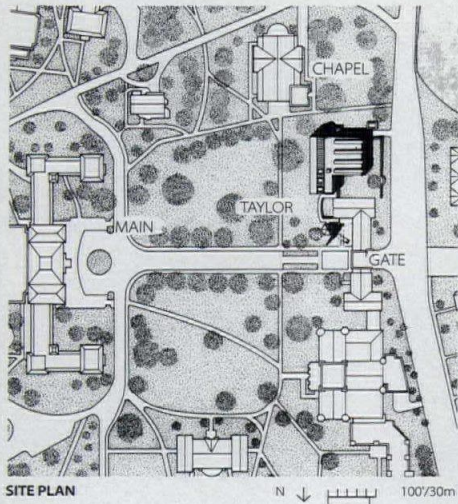
Landscape design: Balmori Associates (Diana Balmori, design principal).

Structural engineers: Thornton-Tomasetti.

Lighting design: H. M. Brandston & Partners.

Exhibit design: Stuart Silver & Associates.

Floor area: 30,200 square feet, new building; 29,500 square feet, renovated Taylor Hall.



Photos these two pages: Scott Frances/Esto





Palmer Museum of Art Pennsylvania State University

Penn State already had an art museum, but one that could exert little attraction on the campus or in its Central Pennsylvania region. Completed in 1972 as an appendage to the Visual Arts Building, it had no entrance of its own, and it shared that building's angular relation to everything around it.

Armed with a museum expansion gift, the university sought a "signature" building by a world famous architect. Charles Moore, their choice, brought on board the firm of Arbonies King Vlock, all of whose partners had worked with Moore on other museums.

Like all Moore buildings of recent decades, this one entailed the participation of many interested parties in the design. One idea that developed out of a public workshop was the desirability of a new outdoor gathering place at this location. Here, as in his 1982-1990 Beverly Hills Civic Center, Moore elaborated on a clash of geometries, distorting his building to enclose exterior space.

The new addition houses all the gallery space and art storage. The original box now accommodates offices, a workshop, and a 150-seat auditorium. One irony is that the new construction turns blank back walls toward the old arts building.

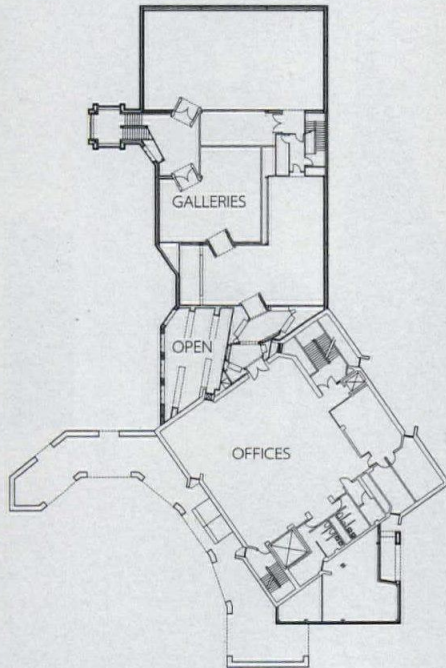
As inspirations for materials and details, Moore looked to older campus buildings, one of which suggested the flat red brick - unlike that of the original museum - the round arches, and the broken-brick bands that articulate them. But here the brick arches and even the squat concrete columns that support them are all just cladding on a steel frame. Inside, the spaces are adorned to varying degrees with insubstantial-looking references to the architectural motifs of the ages, in plainly artificial colors. One has to wonder whether all these symbolic paste-ons are sympathetic to the art.

Extending from a square existing museum wing (aerial photo, left) the museum's arcaded entry (facing page) reaches out as if to grasp one of the campus's major roadways; the original brick mass is visible above the central gable; lion-paw sculptures by Paul Bowden refer to the school's mascot. One wing of the arcade (below) spans a walkway that is framed further on by a new stair tower. The paper-cup column capitals with their rings of vivid tiles typify Moore's interpretation of tradition. The tall lobby (facing page, bottom left) helps reconcile the axial entry with the far-off-center location of galleries. Exaggerated portals in the galleries (facing page, lower right) emphasize their skewed enfilade layouts.

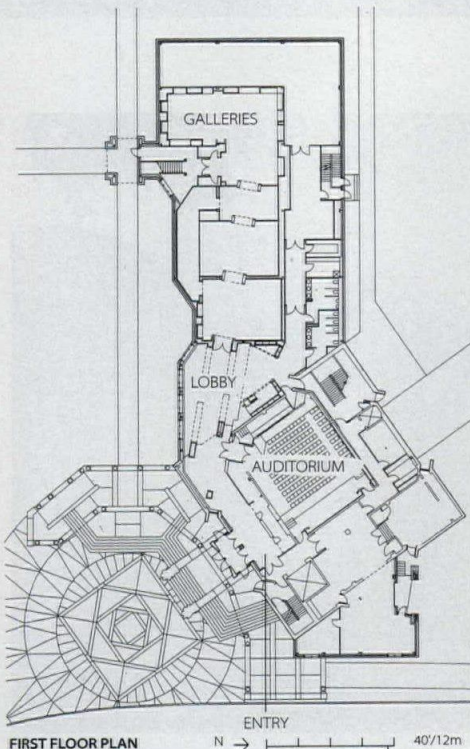
Project: Palmer Museum of Art, The Pennsylvania State University, University Park, Pennsylvania.

Architects: Charles W. Moore and Arbonies King Vlock (Glenn W. Arbonies, Richard L. King, and Sandra Vlock, design partners); Arthur Andersson, special consultant.

Floor area: 25,000 square feet (addition).



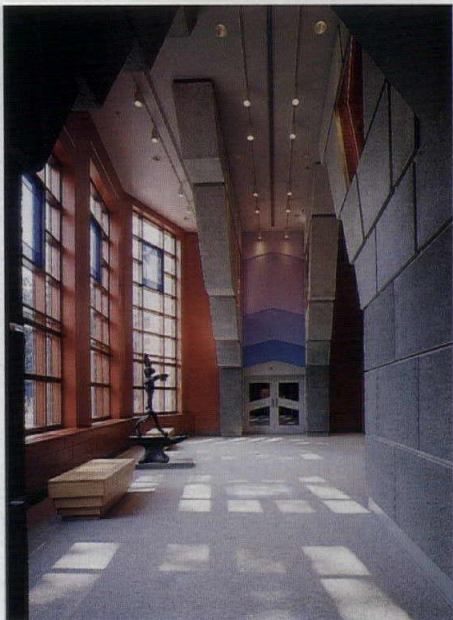
SECOND FLOOR PLAN

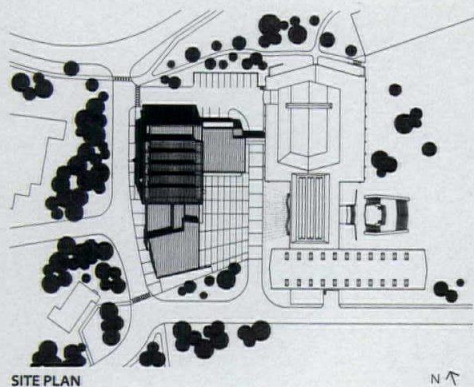


FIRST FLOOR PLAN

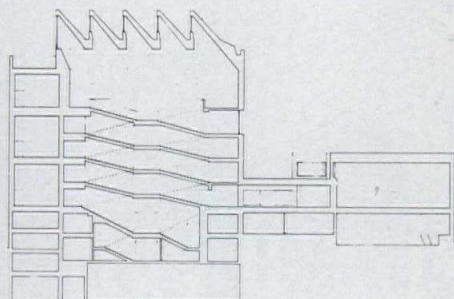


Photos these two pages: Timothy Hursley



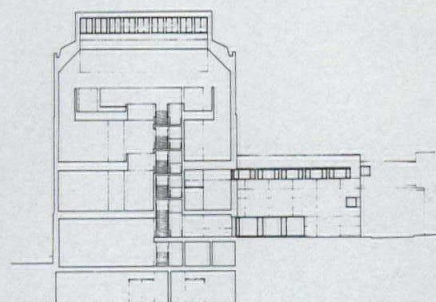


SITE PLAN



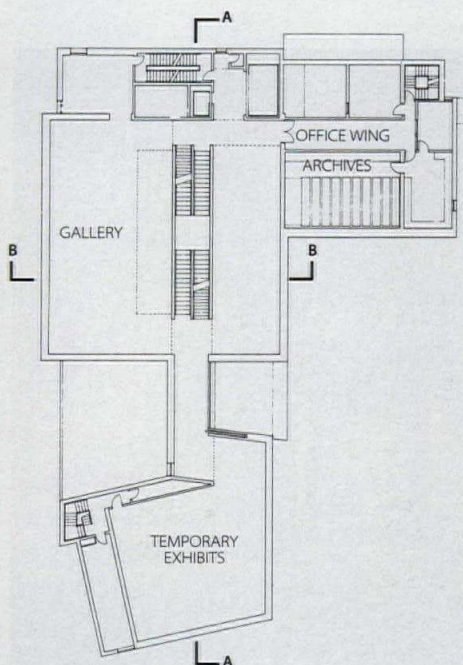
SECTION AA

40'/12m



SECTION BB

40'/12m



SECOND FLOOR PLAN

40'/12m

Davis Museum and Cultural Center Wellesley College

Wellesley's new museum is an extension of a major landmark, Paul Rudolph's 1958 Jewett Arts Center. Rudolph's arts center had exhibited "contextualism" and "historical allusion" before their time, using its building forms to shape a new hilltop quad and recalling its Gothic neighbors with vertical fenestration.

Moneo, in his first U.S. work, wisely decided to keep his distance from the distinctive Rudolph fabric, linking his addition by only a narrow enclosed bridge. With his site constrained by a key roadway, he developed a tall, narrow main block for his museum, a brick-clad volume more in the image of a Medieval keep than the urbane Wellesley Gothic.

Between the old and the new, Moneo placed an austere plaza at the foot of Rudolph's broad stair, then let the path continue under part of his building. Although deep in the heart of this verdant campus, the new plaza is designed as an entrance court of sorts, since the vans from M.I.T. stop here.

The inside of Moneo's castle keep, it turns out, is one multistory lightwell, with daylight from its sawtooth roof monitors spilling down through broad openings between floors. Rising through the center of this volume is a double stairwell, with gentle flights rising between maple-lined walls. Some criticize these stairs for relentlessly dividing every gallery floor into two constricted areas; I'm among those who see the stairs as offering a delightful visual and kinetic relief between floors, while defining very well proportioned exhibit spaces.

Visitors or alumnae approaching Moneo's museum for the first time are likely to wonder whether this structure isn't too utilitarian-looking for its cultural function. Once they enter its luminous volumes, however, they are likely to remember it as an exceptionally gracious exhibition setting.

In the multistory main block, scissor stairs (below) pass ceremoniously between walls lined with honey-colored maple. Wells bring light down from an array of monitors at the roof. The light-flooded top floor (facing page, top) is used only for the display of stone and ceramic objects. The plaza between Moneo's building and Rudolph's (facing page, bottom) is meant for temporary sculpture installation and an outdoor extension of an adjoining café.

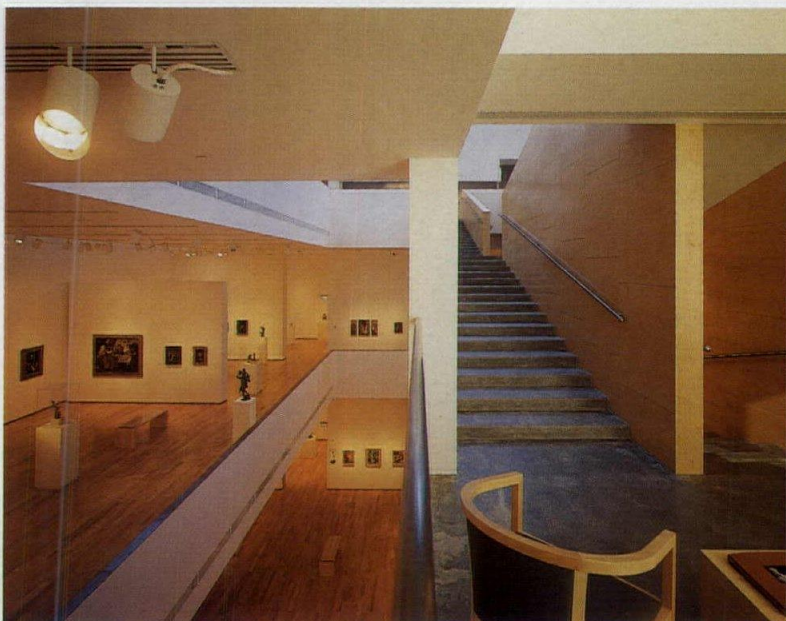
Project: Davis Museum and Cultural Center, Wellesley College, Wellesley, Massachusetts.

Architects: Rafael Moneo Architect, Madrid (Rafael Moneo, principal in charge; Victorial Kiechel, project architect). Associate architects: Payette Associates, Boston (Thomas Payette, George Marsh, principals in charge).

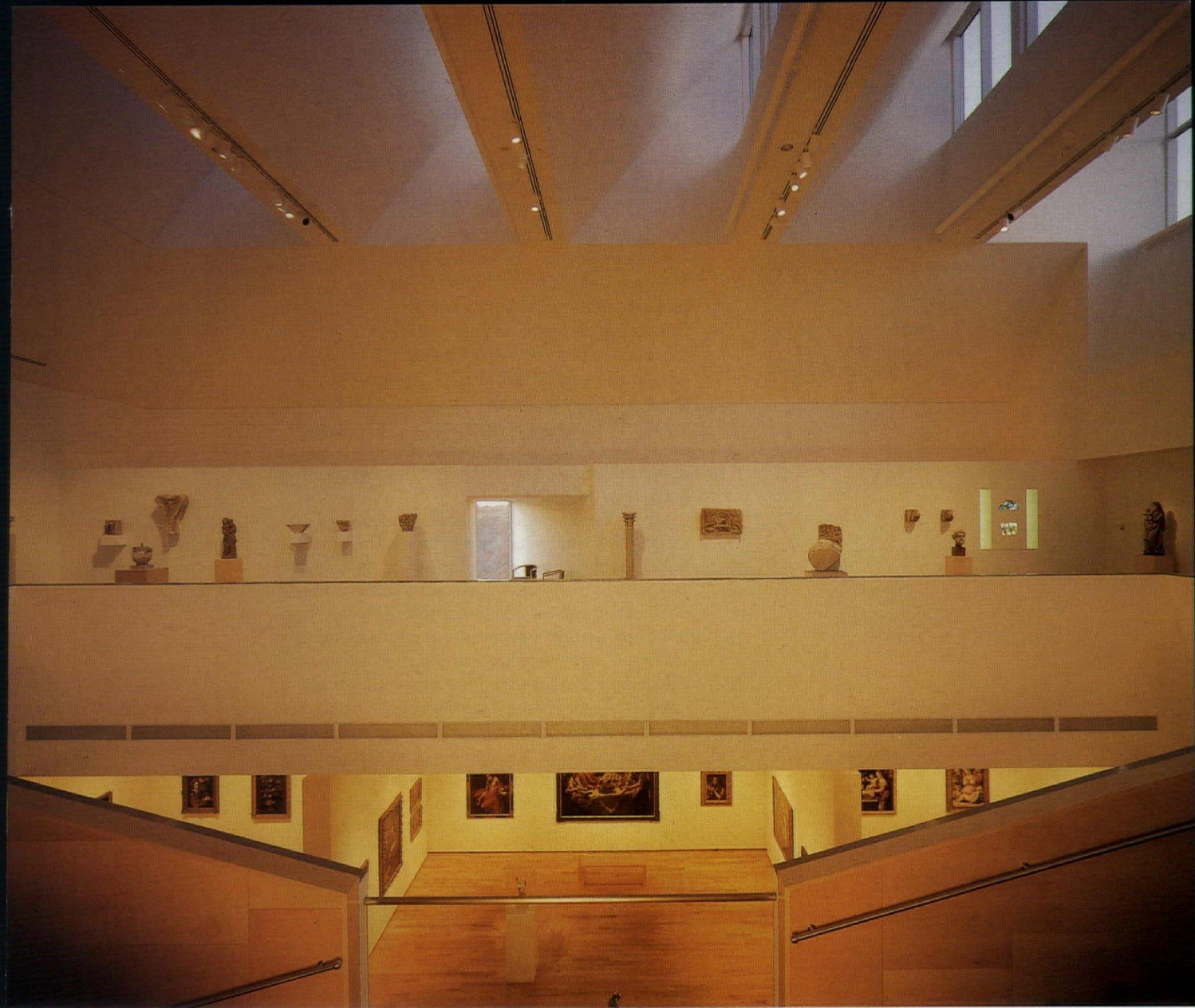
Engineers: Le Messurier Consultants (structural). John Altieri Consulting Engineers (mechanical/electrical/plumbing).

Consultants: Fisher, Marantz, Renfro & Stone (lighting); Carol R. Johnson & Associates (landscaping).

Floor area: 61,000 square feet.



Photos: this page and facing page, top: Steve Rosenthal



Scott Frances/Esto

Fredrick R. Weisman Art Museum University of Minnesota

For a riverbank site where a crucial pedestrian bridge reaches the university's East Campus, Frank Gehry & Associates have designed a building whose river frontage is a vast stainless steel sculpture that some locals compare to a collection of enormous tin cans. This explosion of forms sprouts from a simple box that presents mute brick walls toward its neighboring campus buildings; the lack of any distinct or welcoming image on the side toward the campus's main mall has aroused some criticism; the P/A Awards jury that gave the project a citation (January 1992 P/A) was divided on this point. The signature curves do reappear on the long entrance wall, in vast billowing canopies above the entrance and in "skirts" defining an entry platform at the bridgehead.

Inside the energetic riverside envelope is a predictably animated volume – a lecture hall lobby that is undoubtedly a good reception space. Its dramatic two-story portions are overlooked by windows in second-floor offices. The interiors of galleries in the bland brick box portion, however, turn out to be equally sculptural, with openings of varied shapes into large light monitors above the prevailing 16-foot ceiling height. The spaces have vast plain walls for the display of contemporary art, while a play of form and light goes on overhead. This combination led *New York Times* architecture critic Herbert Muschamp to call them "five of the most gorgeous galleries on earth." All of these public spaces rest on a two-story sandwich of parking and art storage.

As one of the first Gehry buildings outside Southern California, the museum raised some doubts about whether his metal forms would look too fragile for the Minnesota winter. While they are not loved by all, they have been durable enough and even have an affinity for the area's famous ice palaces.

Rising above the Mississippi, the museum's chameleon surfaces (left and facing page, top) suggest everything from junkyards to ice palaces. The stainless steel cladding forms a canopy on the entry side (facing page, bottom left). Galleries, (facing page, bottom right), are animated by arbitrarily shaped openings in their 16-foot ceilings.

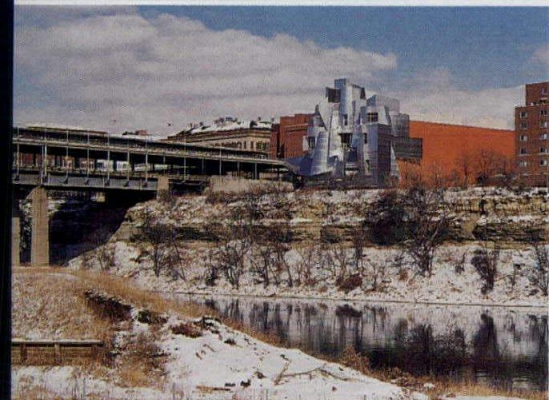
Project: Frederick R. Weisman Art and Teaching Museum, University of Minnesota, Minneapolis.

Architects: Frank O. Gehry & Associates, Santa Monica, California, design architects (Frank O. Gehry, principal; Randy Jefferson, managing principal; Robert Hale, principal; Edwin Chan, project designer; Victoria Jenkins, Matt Fineout, project architects). Meyer, Scherer & Rockcastle, Minneapolis, executive architects (Jeff Scherer, project manager; John Cook, project architect).

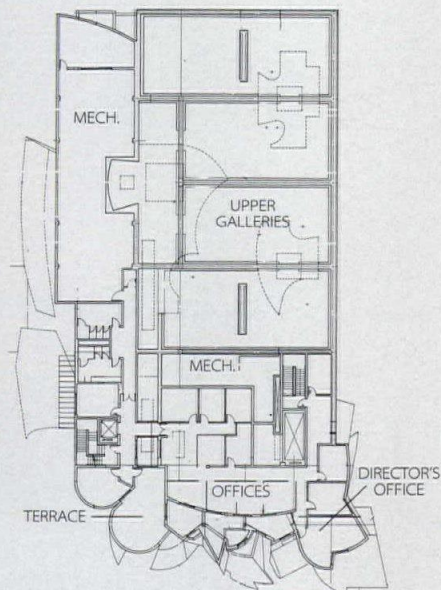
Engineers: Meyer, Borgman & Johnson, structural; Ericksen, Ellison & Associates, mechanical.

Lighting consultants: PHA Lighting Design.

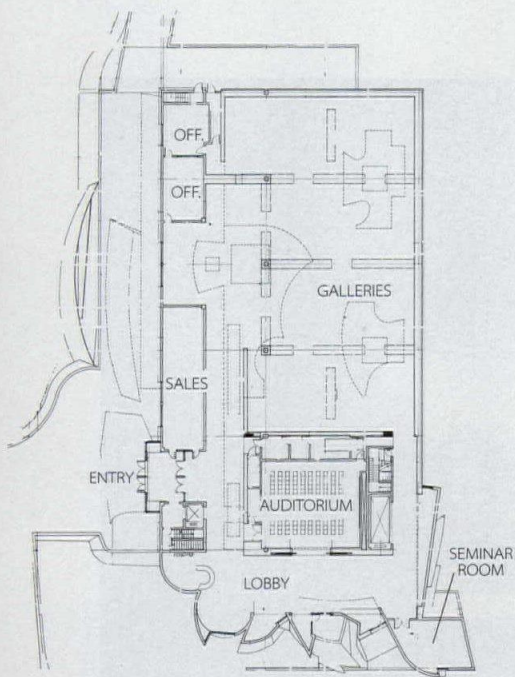
Floor area: 41,000 square feet.



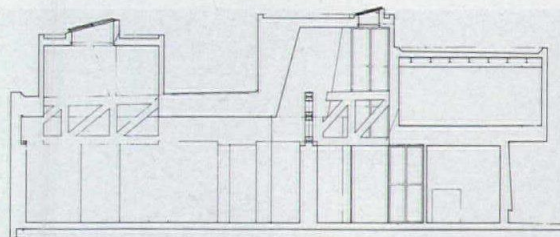
Photos: these two pages © 1994 Don F. Wong



UPPER/OFFICE FLOOR PLAN

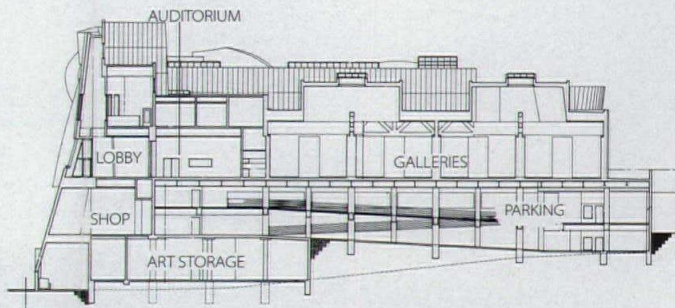


ENTRY/GALLERY FLOOR PLAN N ← 40/12m



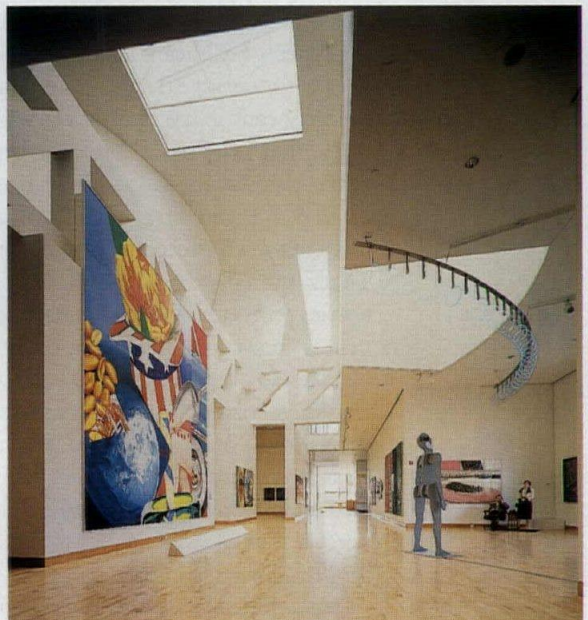
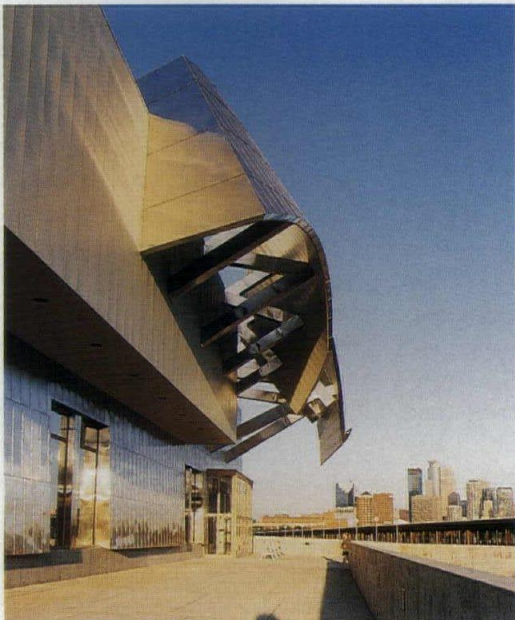
PARTIAL SECTION, GALLERIES

20/6m



SECTION LOOKING NORTH

40/12m



Building Security: An Architect's Guide

Security systems are now more complex, with system design shaped by a host of factors. Here's a primer on the most important issues.

by Walter Cooper and Robert DeGrazio

Abstract

Security system design depends on the building type and location, and on what needs to be secured. Systems must also be responsive to codes and regulations, appropriately interactive with other building systems, cost-effective in both the short and long term, and adaptable enough for foreseeable needs. Finally, security needs should be addressed early in the design process.

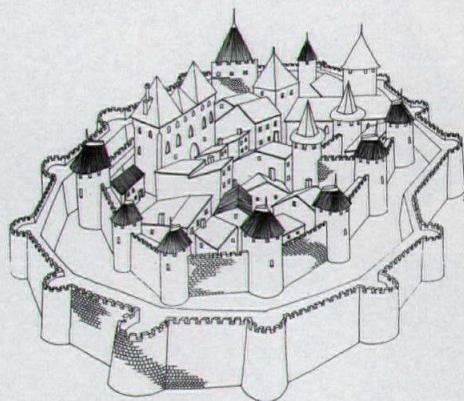
Building security is not just about installing the latest electronic gear and software package. Nor is it just a consideration for building types with highly specific occupancy considerations. Increasingly, buildings of all sorts are candidates for the kind of careful security planning that proceeds hand-in-hand with the architectural design process. To ensure an appropriate and cost-effective level of security, architects need to acquaint themselves with the range of security factors that affect design.

Security Against What?

The first question always has to do with what a security system is designed to protect. Obviously, a security system's most important job is to provide safety for all the employees, the staff, and the visitors who use a building. But security considerations go far beyond this. Access control very often extends beyond merely controlling who may enter a building – and monitoring when and where they do so – to include the control and monitoring of the specific people permitted access to particular areas within a larger facility. For different sets of reasons, a range of different building types – healthcare facilities, banks, hotels, offices with sensitive data storage areas – all require such concentric layers or levels of access control.

As that brief list of building types begins to make clear, security considerations are hardly limited to protecting people. All of a building's contents need protection from damage or loss. That's immediately obvious, of course, for warehouses and retail outlets, banks, and pharmaceutical storage rooms in hospitals, where pains must be taken to prevent the theft, respectively, of merchandise, currency and negotiable securities, and drugs and controlled substances. But it's also clear from even this partial list that control of access must always be complemented by control of egress, that is, who leaves a facility and what they're allowed to carry out.

In technically sophisticated facilities, it's not



Forrest Wilson/Zornik

just material property but information – and the systems that carry it – that must be protected from harm. In many contemporary facilities, data and data systems rank second in value only to people, and it's vital to remember that data must be protected not only from loss but, perhaps more important, from damage that could lead to “down time” and the financial and institutional chaos that might result.

Already, one can begin to see how security is not a separate, stand-alone concern but ties into a host of other considerations bearing on all a building's systems, including power, telecommunications, and other vital utilities. The connection between security and fire protection is obvious, as is, for example, the link between security and seismic engineering in earthquake-prone zones. But taking the safety of data and data systems into account shows that such things as adequate backup and systems redundancy are also security considerations. What's more, the integrated infrastructure design being incorporated into many new facilities links security to all the other building information systems. For example, connecting access control to electronic personnel records means that “security” can in these cases no longer be considered a separate

Walter Cooper is a partner and Robert DeGrazio is a security consultant with Flack + Kurtz Consulting Engineers in New York. Anthony Nuciforo, associate principal, and Kenneth Silver, associate, also contributed to this article.

system at all. Thus, selection and design of an appropriate security system become ever more dependent on knowing something about all the other systems a building will use.

It's important to note that in some kinds of buildings the potential dangers from within a facility are as great as any that might come from the outside. This is true, for example, in many laboratories, where the presence of hazardous materials adds yet another variable to the security needs an architect must consider. Here, again, egress turns out to be as crucial as access, since the effectiveness of such a lab's security system depends on how efficiently the facility can be evacuated in case of accident.

Two other purposes of security – important ones, though seldom discussed – should also be mentioned. First, security systems and devices (e.g., closed-circuit TV cameras) play an increasingly large role in reducing facility owners' liability to lawsuits. Second, security components not only protect against harm but can provide crucial documentation in the investigation of crimes that have occurred.

Issues to Be Considered

Waiting until the last stages of the design process to begin thinking about security system requirements can spell trouble for budgets and construction schedules, and is a sure way to guarantee that the system installed will be less than optimal. Such was the case with a recent New York City university facility we worked on: security issues hadn't been dealt with up front by the building's designers, and, when security engineers were brought on board late in the game, they found there was no room for housing security system equipment. This necessitated a good deal of redesign, stalling construction and inflating costs unnecessarily.

Without attempting to make a complete list of the security-related issues architects should be aware of at the outset of a design, let us mention several of the most important. First, effective security is always an interplay of three elements: natural and architectural barriers, including anything from landscaping strategies that discourage access, to the number, location, size, and type of doors and windows; human security, including the protection provided by guards and other personnel; and electronic security, provided by any one of the array of systems now available.

Deciding on the optimal mix of these elements can involve many factors, but one important variable is the building's location. For example, a suburban facility may allow ways of incorporating physical barriers into landscape design

that would not apply in an urban setting; a building located in a region (or country) where labor costs are low would permit greater use of human security than would be possible elsewhere. Staffing considerations should play another role in guiding the selection of a facility's electronic security system: the degree of that system's sophistication should depend, in part, on the number and skill of the personnel who will be available to operate it.

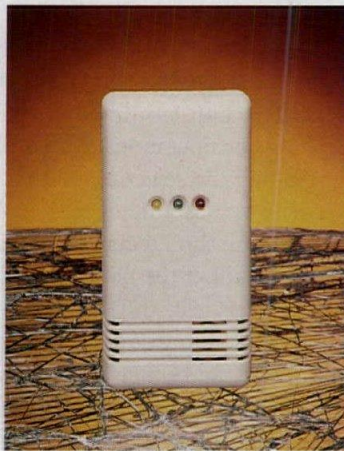
Local building codes regarding ease of egress during fire and other emergency situations present another set of issues affecting building security. The Americans with Disabilities Act has added yet another regulatory layer. The design strategies that will ensure that a building is both secure and accessible to the disabled need to be carefully thought out, especially since this is new territory that remains relatively unexplored. Just one hypothetical example should suffice to demonstrate the kinds of new variables the ADA introduces: an ADA mandate that a facility be accessible to the hearing impaired might mean that voice intercom must be supplemented by a visual intercom system, which in turn would alter the architectural requirements of an entry vestibule in which the intercom is located.

Another important design factor is the potential offensiveness of security systems. Security systems must often be designed in such a way that access control is not obtrusive, that users of a facility don't feel intimidated (and that legitimate visitors aren't made to feel unwelcome) by security devices, that employees' privacy is reasonably respected, and that restricting access to certain areas within a facility doesn't make those who are excluded feel like second-class citizens. Though such psychological issues pertain to a wide range of building types, they are especially germane to facilities such as hospitals and hotels, where the need to restrict access must always be balanced against the desire to provide a welcoming environment.

Aesthetic issues are related to this last set of challenges, though it's important to remember that aesthetic issues are seldom only aesthetic. For example, poor security-system planning at a Manhattan office tower complex created a doubly unfortunate situation: access control requirements were figured into the building's design after occupancy, meaning that large sections of what was a spectacular lobby are now cordoned off. The barricades and turnstiles belatedly introduced not only ruined the lobby's beauty, they also created huge, frustrating pedestrian-traffic bottlenecks at the beginning and end of the business day, since these turnstiles impair egress as well as access. *(continued on page 81)*



1



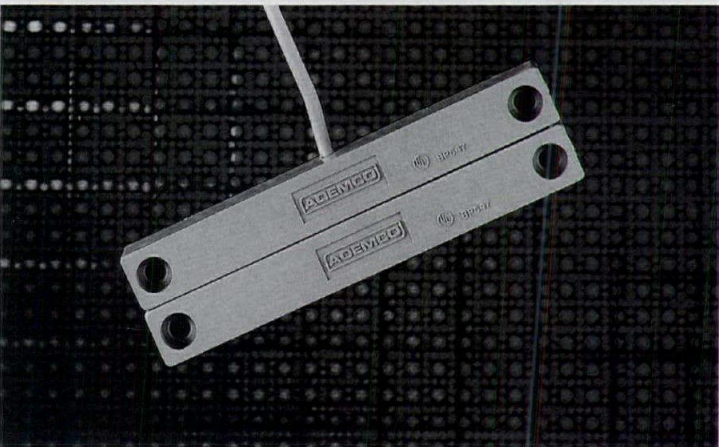
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Security System Components

Lighting: One of the most basic (and cheapest) components of a security system. Carefully designed and coordinated interior and exterior lighting systems can exert a significant deterrent effect.

Perimeter control: Includes elements such as fences, walls, and landscaped berms that protect a facility's potential access ways.

Access control: Includes the immense variety of card-readers, chip-readers, and electronic locks that read information encoded on the cards, disks, or keys carried by employees. Popular systems incorporate insertion- or swipe-readers that interpret magnetic-stripe cards, or proximity-readers that do not require physical contact with the cards they read. Other components are the software for managing the distribution and encoding of cards and the processing of transactions, as well as the strikes, contacts, and releases that operate doors. Some more sophisticated systems incorporate biometric devices based on fingerprints, voiceprints, retinal patterns and the like, to allow or forbid access to restricted areas.

Pedestrian traffic control: Closely related to access control, covers devices such as electronic turnstiles equipped with card-readers. Banks of turnstiles often include larger gateways, also equipped with card-readers, for wheelchair access. Vehicular traffic and parking control components also often play a role in facility security.

Intrusion detection: Includes the many types of sensors and alarm systems now available. Infrared motion sensors (1) can be ceiling- or wall-mounted; although such detectors are mostly used to protect interior spaces, there are motion detectors available for exterior use. Other devices detect the shattering of glass (2), or the opening of windows and doors (4, 5). Video motion detectors that detect movement on video signals transmitted from closed-circuit TV (CCTV) cameras are also available.

Monitoring and surveillance: Includes CCTV cameras and the monitors and security command centers they serve. Infrared cameras now on the market are capable of producing high-quality images in complete darkness. Pan-tilt-zoom (PTZ) devices permit the remote control of CCTV cameras; video switchers allow multiple cameras to display on a single monitor; time-lapse VCRs are capable of condensing nearly a thousand hours of continuous monitoring onto a single, 120-minute VHS tape. The monitoring of an entire security system is often performed from a single command center (3), or nerve center. In modern integrated systems, all security system information is carried over a single fiber-optic-cable infrastructure also capable of carrying other building control systems.

The kinds of security issues that must be considered always depend in large measure on the kind of building being designed. Designers of retail stores, for example, must pay close heed to security at loading dock and delivery areas and at customer and employee ingress/egress points; hotel architects must weigh security concerns against the importance of maintaining free public access to many hotel areas.

Tailoring Systems to Building Type

Among building types, healthcare facilities present so many security-related challenges to an architect that it's worth focusing on them in more detail. The need to achieve security while not impeding legitimate access is acute in hospitals and other healthcare facilities, making it especially crucial to attend to security considerations in the earliest stages of design. Recently, requirements have grown even more complex as more and more hospitals have tended to locate outpatient-care facilities outside the hospital proper. Where this is the case, the main and auxiliary buildings may have quite different security needs, intensifying the necessity for careful coordination of the different parts of a healthcare campus.

In designing healthcare facilities that are sympathetic to security needs, architects must take "do not impede" as an almost Hippocratic maxim. This applies not only to the flow of people in and out of the building but to the flow of materials as well. It's important to note that those areas of a hospital that are most sensitive in terms of security are also likely to be among the busiest: thus a pharmaceuticals depot must not only be utterly secure but also easy for those with legitimate access to use. This can affect a design in numerous ways, from the location of pharmaceuticals rooms to the width of corridors surrounding them.

Specialized functions within healthcare facilities also show how security needs are sometimes intimately linked to other aspects of facility management. This can be clearly seen in the containment and disposal of infectious and other hazardous wastes, where physical spaces and procedures must be carefully monitored to prevent liability suits. Space planners responsible for the design of staging and shipping areas for such materials need to be apprised of the range of security and related issues involved.

Of course, certain highly specialized building types – airport terminals, animal-research laboratories, prisons, casinos – carry enormously complex security needs, and the security design of government facilities is often regulated by specific codes with which the architect must comply. In every one the integration of architecture and security is essential.

An Integrated Design Approach

Integration occurs in two related ways. First, design strategies should be informed by security considerations from the beginning of the design process. This kind of integration involves architects' familiarizing themselves with the specific security issues of a proposed building, and in many cases may require that architects seek the advice of security consultants at a very early stage. Security engineers' input can help space planners minimize the amount of electronic security a finished facility will need – a vital consideration given the expense of electronic systems and the amount of technical expertise some systems require to operate. Security engineers can also help architects optimize a building's security system through the placement and size of perimeter barriers, windows and doors, corridors, stairwells, and so on.

Interaction between the architect and a security consultant can also help with the minutiae of architectural specification and decision making. For example, if a client plans to begin with a system of mechanical locks, but hopes to convert to electronic door locks at a later time, the security engineer can ensure that adequate conduits, cables, and spaces to ease that transition are installed at the beginning.

Second, intelligent security planning means taking advantage of the integrated infrastructure components now available. This entails planning up front for the spaces, pathways, and low-voltage communications backbone that will serve all a building's systems – not only security but fire protection, building management, lighting controls, and the audiovisual voice and data systems. Such integration is essential for future flexibility: when security information is no longer carried on a dedicated, point-to-point system, but instead shares the same media (cabling, etc.) used by other systems, all of them can be extended or rearranged at the same time. Since large, complex security systems often undergo extensive updates and renovations over a facility's lifetime, this integration can minimize costs over the long haul.

Conclusion

Ensuring that a security system will be sufficient and suitable for a facility's needs involves the balancing of many variables. By taking security considerations into account from the very start – and maintaining that awareness at each stage of the project – architects can help ensure that a building will be adequately protected, free of the kind of security overkill that often results when equipment is added at the last moment. □

Data Security by Design

A variety of strategies and technologies are now available to architects to thwart electronic surveillance of buildings.

by George R. Wilson

Abstract

Most office buildings are designed to stop physical intrusion, but electronic surveillance makes it easy to lift computer data and to eavesdrop on meetings. The author discusses a number of techniques the architect can use to deter electronic surveillance, including metal shielding and specially designed windows.

A confidential meeting is in progress in the executive offices of a large corporation. Spreadsheets and proposals involving new product development that represent millions of dollars in research and development are displayed on computer screens. At the same time, outside the building and three stories below, someone in an innocuous-looking van is electronically reproducing all of the information displayed on the computer screens above – information eagerly sought by and quickly sold to the corporation's competitors. Electromagnetic radiation from computer screens is easily and inexpensively accessible to anyone once it leaves the corporation's premises, and its reproduction is legal.

The scenario above represents a security issue that is little known to and understood by architects and is just one of many ways confidential corporate data are at risk to interception. As documented in Peter Schweizer's recent book, *Friendly Spies*, there are many people with the training to use ingenious ways to gather information from American businesses.

With dialogue that might come from a Le Carré novel, Dr. James Hearn, Deputy Director for Information Systems Security, National Security Agency (NSA), brought members of the House Subcommittee on Economic and Commercial Law face to face with the new reality of business. Despite old Cold War alliances, even friendly nations are willing to use their spy agencies to gather American corporate secrets. Pierre Marion, the former head of French intelligence, admitted on NBC's "Dateline" that the U.S. and France are not allied on economic matters, which was his justification for spying on IBM, Corning, and Texas Instruments.

Readily obtainable, inexpensive technology is capable of breaching corporate security and can be used to steal vital corporate information. We exist in the age of information and, as Hearn emphasized, "if people understand and appreciate

the value of the information they hold and the value of keeping it from their competitors, we will take a major step toward reducing the vulnerability of our information systems." Further, Hearn added, "Information has value; in fact, information is equity and there must be a focus in protecting that asset"

Electronic Eavesdropping

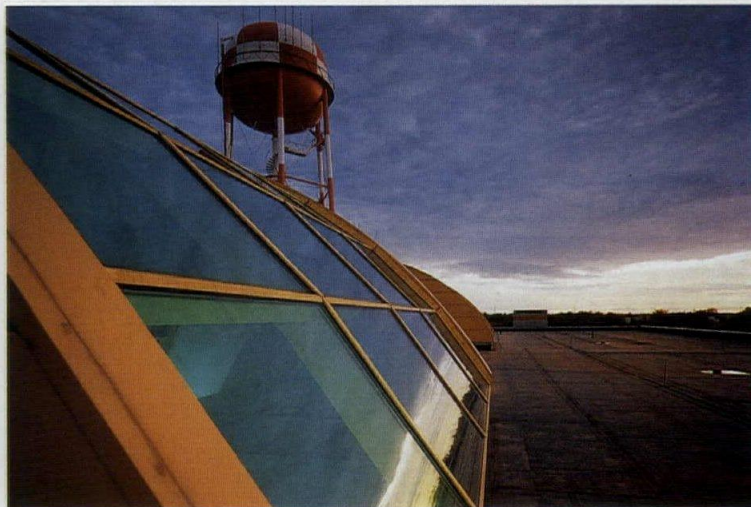
Within the electronic office there are routine security measures to protect valuable information. Besides locks or passwords, encryption can be used to code all information at the point of interface with the computer operator. Yet such encryption can easily be breached. All electronic circuitry emits an electromagnetic field. The more powerful the source or the density of the circuitry, the more powerful the field. A handheld calculator gives off a field that can be measured several feet away. Computers, even desktop models, give off emissions that can be picked up as far away as half a mile. Most of these emissions are "behind" the encrypted interface and therefore are not coded. The computer processor, busy with millions of operations a second, gives off a discernible signal. The emissions from the computer screen can be clearly reproduced at a remote distance. The equipment necessary includes a broad band radio scanner, a good antenna, and a TV set – all available at electronics stores such as Radio Shack for a few hundred dollars.

Various surveillance techniques developed during the Cold War can be used to eavesdrop on a business meeting whose members are completely oblivious of the surveillance. The techniques include the use of a laser beam pointed at

The author is an architect who consults on security issues and lives in Tuckahoe, New York. More technical information for architects on security is available in ITEM, a journal published by Robar Industries of West Conshohocken, Pennsylvania.



1



2

the outside of the window of the room in which the meeting is taking place. The laser picks up vibrations on the glass, causing variations in the beam. A converter can electronically reproduce the conversation.

Designing the Electronic Fortress

Architects need to be aware of these potential breaches in business security. Buildings not only house people, but must also shelter sensitive information.

The technology of electromagnetic or radio frequency (RF) shielding has been around for some time; the State and Defense departments have used it for years in a variety of facilities to ensure that information relating to national security does not fall into the wrong hands. RF shielding materials incorporated within a building's structure provide a high level of background security that is crash proof. Airborne emissions from a computer are contained and dissipate. Electronic bugs cannot transmit conversations from a shielded room.

The electromagnetic spectrum covers an infinite range of frequencies from large to small. In the middle range are frequencies that are used for radio and television transmission. The Faraday "cage" principle is required to shield an enclosed environment from the passage of radio signals. This cage is a continuous electrically conductive membrane that catches a signal and conducts it to ground. A whole industry has developed to construct such facilities for the Defense and State departments and their contractors. Shielded facilities often resembled vaults. The technologies are rarely found in private sector office environments, particularly those where appearance is of any concern.

The rating of protection against leakage of electromagnetic fields is measured in decibels (dB) of attenuation. Government facilities are usually designed for 100 dB of signal attenuation

across a broad band-width. This level of protection theoretically ensures 100 percent loss of any signal across the membrane. To achieve this, the membrane usually consists of steel plating for walls, floors, and ceilings. Heavy steel doors are used with delicate copper finger stock seals at all joints which require frequent maintenance. The cost of these systems is approximately \$50 per square foot of shield surface area.

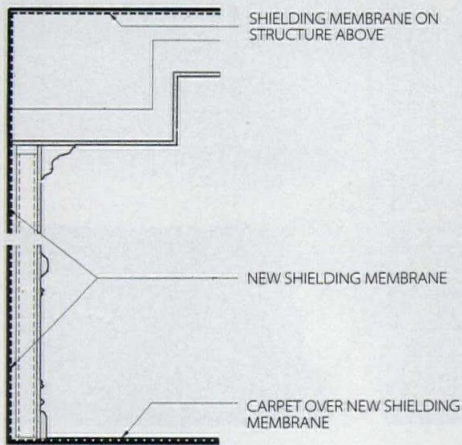
With the rise in the sophistication and the intensity of threats to business security, there has been an increase in the sophistication and cost effectiveness of the palette of high performance materials available. Companies that have catered to the government's security needs now see the private sector as a new market. Shielding technology for private business must be more cost effective and more attractive than that used by the government. Secure rooms have to meet the same criteria of attractiveness, cost efficiency, functionality, and design flexibility that businesses require of all their facilities. There have been significant and rapid advances in the attractiveness, performance, and cost of shielding materials. Special wall fabrics and paints provide a high level of security, while shielding glass or advanced metal screens can protect windows.

Research into the nature of the emissions of electronic office technology indicates that they are not so broad-band. An attenuation of 60 dB will stop more than 99.9 percent of the information emanating from such machines. Businesses have yet to develop a commercial specification standard for signal attenuation, so architects must be judicious in their selection of materials and must beware of false claims of effectiveness.

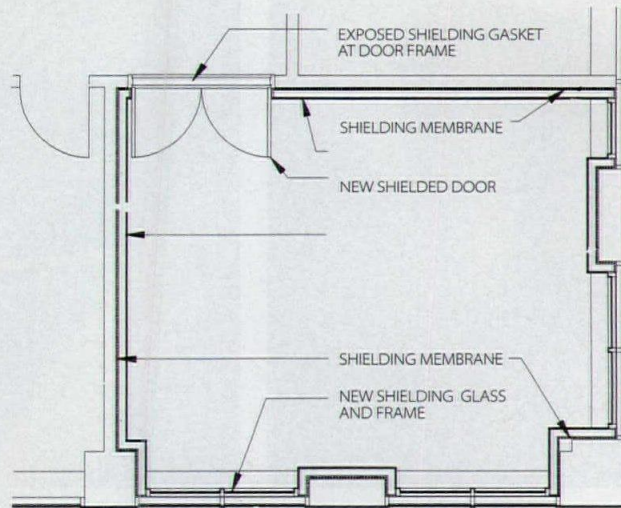
Electronic Nets

Fabric technologies that are by-products of defense and aerospace research and development are now viable for shielding private sector businesses. One such device uses a sophisticated non-

Fabrics, such as this one manufactured by Faraday Systems (1), are placed within the walls to shield the room from electronic surveillance. Shielded glass (2), known as Datastop by Pilkington, is used on a federal building in Oklahoma City, designed by Frankfurt Short Bruza Architects.



3 SHIELDED ROOM SECTION



4 SHIELDED ROOM PLAN

woven fabric with fibers running in random directions, which shields electronic emissions in other than the X or Y-axis. This nonwoven fabric is then covered with an electronically conductive metallic coating. The latest variation provides broad-band shielding ability where electromagnetic waves are randomly refracted and reflected as they try to penetrate. In the end this results in a relatively broad-band shielding level of 60 dB. Copper foils can also be used for the same purpose, although these delicate foils require special care during installation. All joints between sheets require soldered connections.

The past few years have brought a proliferation of fabric materials that have matched the nonwoven ones in shielding ability. Additionally there are now metallic shielding paints available. While these create a metallic shielding film with the stroke of a brush, the increased regulation of the volatile chemicals used in such paints and the high level of precision necessary to achieve the needed uniform thickness make future use of these paints uncertain.

Secure corporate interiors require viable transparent shielding material for windows. To give glass electromagnetic shielding properties, it is possible to use "off-the-shelf" materials. A British manufacturer has combined various coatings used to achieve high shading coefficients into a laminated composition glass. This product provides an advertised shielding level of 60 dB when it is a component of a complete shielded wall system.

Less costly alternatives to this imported product for shielding windows include fine metal screens that are inserted in a standard glass window and continuously integrated with the wall shield. These are far less expensive than shielded glass and provide up to 50 dB attenuation (95

percent protection) but they have the drawback of being visible and can obscure the view.

Wiring, including electric, telephone, cable TV, and computers, is best designed with the fewest number of shield penetrations. Because such wiring acts as an antenna broadcasting information through the shield, filters are required at the point of penetration. One may choose among a variety of manufacturers of such filters, which are usually inexpensive, and small enough to fit within typical wall construction.

Specifier Beware

The market for shielding products is rife with exaggerated claims of exceptional performance. Some products have not been thoroughly tested and provide only limited broad-band shielding.

To evaluate manufacturer claims, a comprehensive, viable, scientifically based commercial standard specification is needed. Such a specification would set minimum design levels of shielding attenuation, would describe recommended before-and-after-system testing procedures, and would force manufacturers to be forthcoming with actual performance capabilities.

An informed architect conferring with a security-sensitive client can bring to the table knowledge of the risks the client faces and solutions to security needs. Businesses that have been stung by losses through weak security usually insist on a secure building envelope, but other businesses remain blissfully ignorant of the risks. The most knowledgeable people within the client's business are those who handle security issues, and they should be included in discussions regarding a building's security. Knowing the potential security risks for a client, and how to minimize them, will continue to be a growing service opportunity for architects. □

Security Product Information

- Doors: Krieger Steel Corp., 310-695-0645.
- Shielding Membranes: Faraday Systems, 914-987-1234.
- Filters: Genisco Electronics, 714-938-0348.
- Windows: Dontec, 215-348-5010; Tempest Security, 813-884-4994.
- Testing/Compliance: Instrument Specialties, 717-424-8510.



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Asia Bound (continued from page 46)

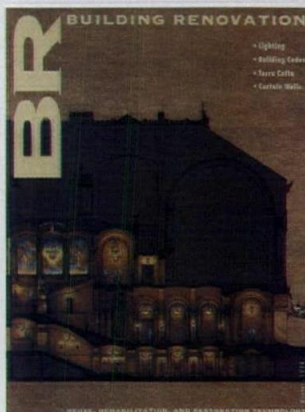
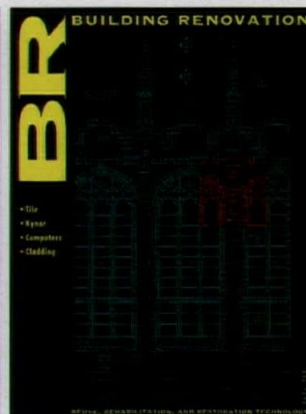
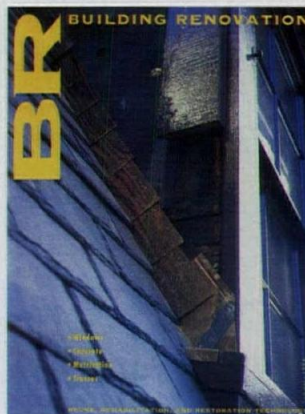
disciplined approach, one that takes seriously the history, culture, or other defining characteristics of each locality. Pelli's work on Petronas Towers is an example of how an American architect can produce a building that responds to its setting. The sponsors of an international competition for the Kuala Lumpur City Centre invited entries from a small group of prominent architects around the world, emphasizing, Pelli says, that "they wanted a Malaysian building." Kuala Lumpur, a relatively young city, contains numerous flat-topped Modern office buildings of the sort that were built worldwide in the 1960s and 1970s, so it was not initially clear what a "Malaysian" building of the 1990s ought to be. Alison Horne and others in Pelli's New Haven office launched an extensive investigation into the history, design, and culture of Malaysia. That, along with many consultations with the clients, including the national petroleum company and high government officials, led to a design based on interlocking squares - an Islamic geometric motif meaningful to the Malays, who began converting to the Moslem faith around the 13th Century. "Geometric principles are more understood in Islamic countries than among us [Westerners]," Pelli notes. Pelli regards his design as the only competition entry that seriously strove for a Malaysian character. The towers taper in a fashion suggesting traditional Malay buildings, but they use modern materials (stainless steel on the exterior) and they refrain from copying the past. Because of this fusing of contemporary and traditional influences, it seems likely that Petronas Towers will feel Malaysian while accomplishing its other purpose: advertising the country's arrival as a modern industrial nation.

The Influence of Feng Shui

Many designers in Asia have responded to the local culture by applying *feng shui*, the Chinese art of placement, to the design and siting of buildings. *Feng shui* holds that some locations and shapes are auspicious while others are likely to bring misfortune. Buildings influenced by *feng shui* are usually laid out with their most important spaces facing south. Symmetry is considered desirable. Often buildings are constructed as pairs - not slipping past each other, like New York's World Trade Center towers, but closely aligned. Certain shapes, such as a fish profile, appear frequently. The five-story atrium of Kohn Pedersen Fox's big Nanjing Xi Lu mixed-use project on the main commercial street in Shanghai has a fish-shaped plan. Certain numbers, such as eight, are considered lucky; many Chinese highrises are articulated in eight-story increments.

Symbolism plays an important role. For instance, the Shekou Harbor Building near Shenzhen, designed by Chicago's Loeb Schlossman and Hackl, will display a sail-like shape across much of its 40-story curtain wall and will have a plan like that of a ship, to recall the countless junks that have sailed past its site in the Pearl River basin. Sometimes a gesture of this sort can be effective. Many attempts at symbolic expression, however, seem slick and superficial. If large numbers of oversize symbolic buildings join an all-out competition for conspicuousness, as is currently the trend, *(continued on page 88)*

Don't Overlook a Growing Market



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BUILDING RENOVATION

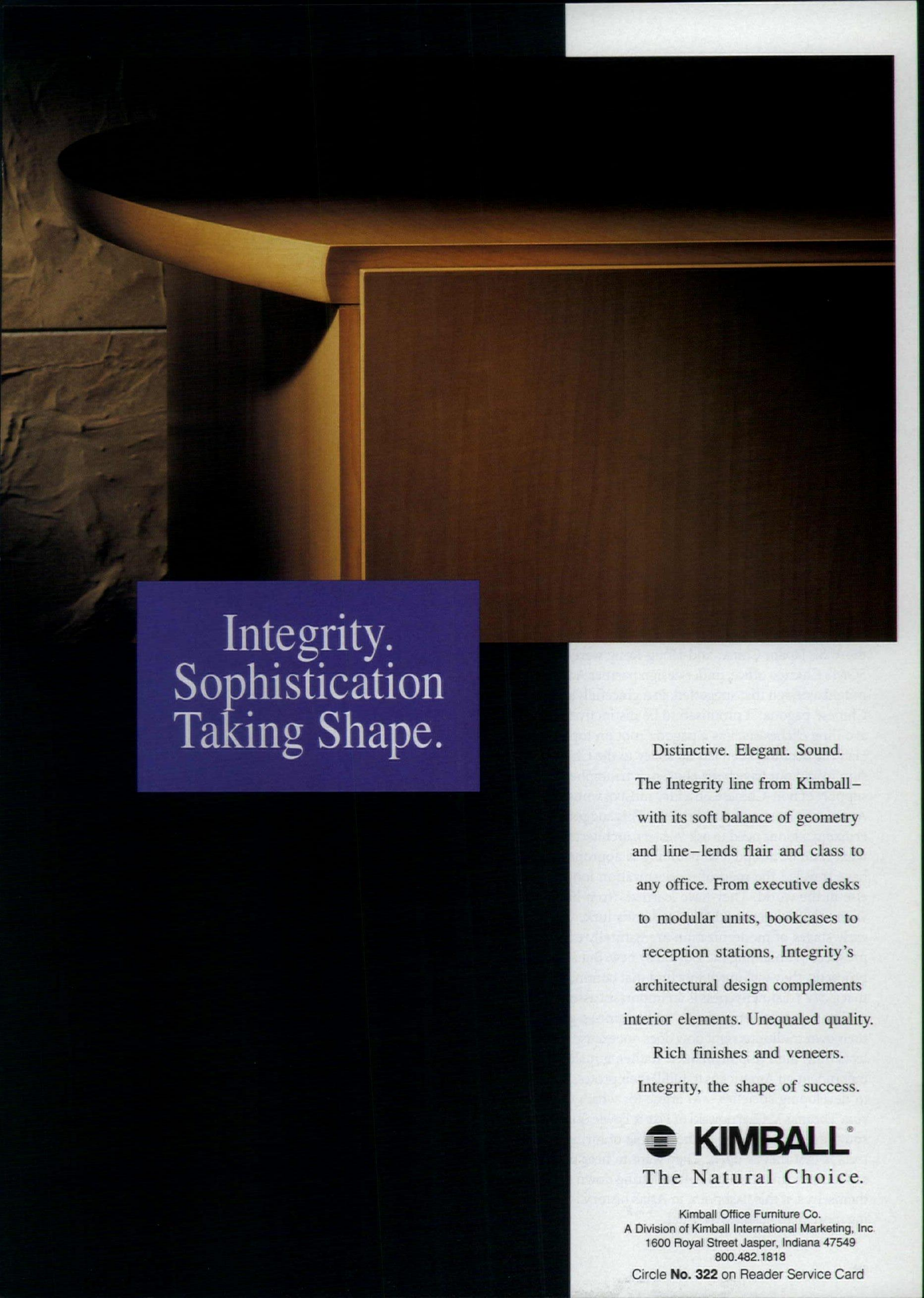
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Asia Bound (continued from page 86)

"Chinese junk" may take on a whole new meaning.

Asia has come to a crucial point. Its countries and its cities need to decide what path to follow, because the future character of these lands lies in the balance. American firms would do Asian cities a service if they questioned the obsession with towers and superblocks insensitive to human scale. A number of American designers have tried to do that. For instance, Fox & Fowle has worked to educate clients, design professionals, and planners in China about current thinking on urban design. Americans know from experience that urban environments are usually more comfortable when the buildings – whether tall or medium-height – rest on bases that have pedestrian-oriented enterprises along their perimeter. Choa says HLW typically submits varied schemes to a client but incorporates certain fundamental principles of urban design into all of them; whichever concept the client decides to pursue, it provides a decent relationship between the buildings, on the one hand, and the streets and the pedestrians, on the other.

Learning from the West's Experience

A final illustration of the difficulty of doing what, from an American perspective, seems the right thing is a competition held in 1993 for the Jin Mao tower in Shanghai. Chinese officials wanted a landmark building as the centerpiece of the Pudong New Area, so they conducted a competition that six firms from the U.S., Japan, China, and Hong Kong were invited to enter. SOM's Chicago office, under design partner Adrian Smith, submitted a design that suggested, in a gracefully abstracted way, a Chinese pagoda; it promised to be distinctively Chinese while avoiding clichés such as a pagoda roof on top of a skyscraper. Had the decision been left up solely to the Chinese, SOM's design would not have been chosen. It triumphed because of the support of non-Chinese on a jury most of whose members were American, Japanese, and English. This suggests that the modernizing nations need to ask Western architects for guidance on what kind of design and planning is appropriate. Westerners have traveled the road of modernization longer than anyone else in the world. They have learned, from harsh experience, where the dangers and the dead ends lurk. Countries in the early stages of modernization are naturally exhilarated by the prospect of obtaining the gloriously new. But as modernization proceeds, they will inevitably find that continuity matters, and that a city's distinctiveness is an important asset.

The fact that some clients and countries are indifferent to their own traditions right now does not excuse American architects from their responsibilities. Rather, it makes it all the more incumbent on Americans to fulfill their professional obligations to developing societies – to argue for what's right in the long run. Thomas V. Czarnowski of Fox & Fowle observes, "The reason they [Asians] went to the trouble of hiring Western architects is that they're open. They want to hear what you have to say." American architects will be letting down their clients, and themselves, if this flashpoint in Asia's history is treated as nothing more than business as usual. □

Send away for 1994 Architectural Research

Keep up

This publication contains the synopses of the 67 research submissions to the 1st Annual Awards for Architectural Research, co-sponsored by the AIA/ACSA Council on Architectural Research. Each synopsis discusses the importance of the research, describes the methods used, summarizes the key findings of the work. The name, address, and phone number of the principal researcher is also included for further information.

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Security & Related Products Literature Digest



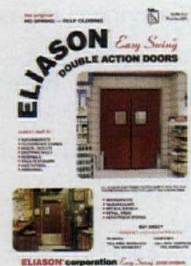
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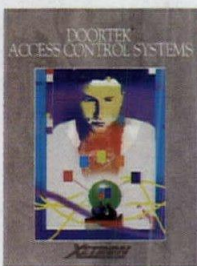
The Bilco Company announces the availability of its full 1995 catalog, featuring roof scuttles, fire vents, floor vault and sidewalk doors, and the LadderUP® safety post. Filled with detailed cross sections and architectural specifications, the 24-page catalog also features the new domed fire vent.
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The Eliason Corporation has announced the release of their 1995 Easy Swing Double Action Door Price/Spec catalog. It is illustrated in color and has complete specifications and application data. Doors open to a light nudge and the closing action is automatic with a slight time delay. The doors are sold direct and the catalog is free.
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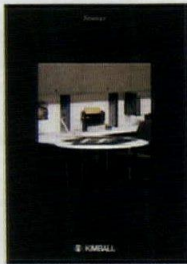
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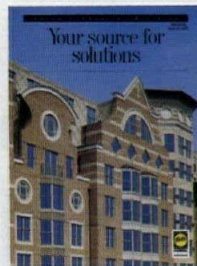
Catalog #6 from BEGA has a new graphic format and includes 25 new design groups and more than 125 new products. In addition to the new groups and products and documentation of established BEGA designs, this 200-page catalog features important ordering information, special order and color information, and easy-to-use Iso-foot candle chart data.

BEGA. Circle No. 357



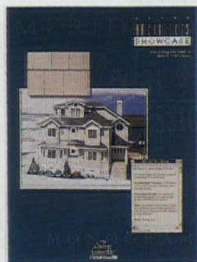
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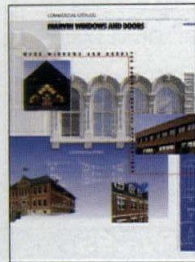
The Commercial Products Guide from Pella® Windows & Doors is a 33-page, full-color brochure, featuring commercial solutions for your new design and renovation projects. Detailed size charts help you to specify the right product for each opening. You'll find that Pella products are built to your exacting standards of quality. Local service and factory support is available.

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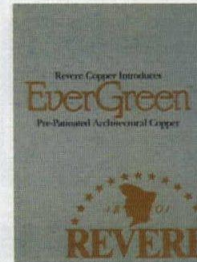
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Marvin's Commercial Catalog describes the nonresidential capabilities of Marvin's entire line of wood and clad-wood windows and doors. The full-color booklet provides information on product styles, performance and design capabilities, Marvin's architectural support department, and other nonresidential services. Detailed information on the Magnum Series, Marvin's premiere product line for commercial applications, is included.

Marvin Windows & Doors. Circle No. 361



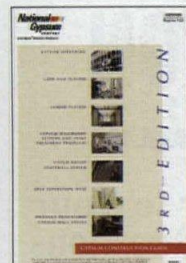
Revere Copper Products Inc., America's leading producer of architectural copper, introduces EverGreen™, a prepatinated architectural copper. Traditional copper roofing generally takes 15 to 30 years to achieve a green patina. EverGreen™ shares the self-healing, low-maintenance characteristics of naturally patinated copper, unlike coated or painted imitations. It's durable and adaptable to all sloped, curved, and vertical surfaces.

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National Gypsum Company. Circle No. 362



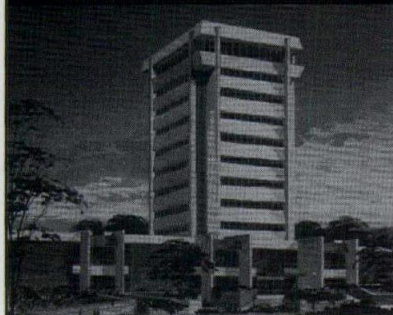
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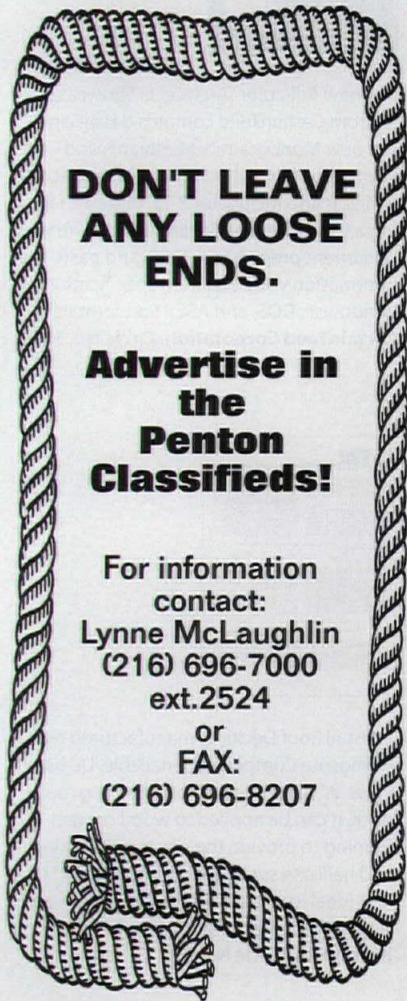
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Guggenheim Skylight

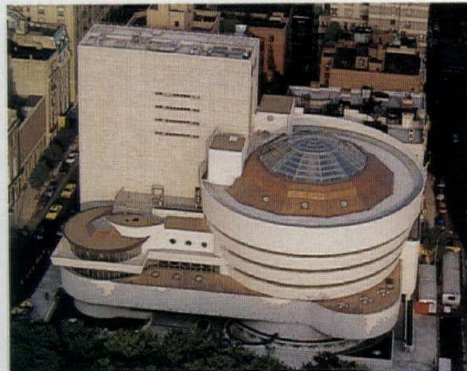
CSI SECTION 07820

When Gwathmey Siegel & Associates assessed the condition of the skylight in the main dome of Frank Lloyd Wright's Guggenheim Museum during their restoration (see page 64), they found it in rather rough shape. "Wright used an off-the-shelf skylight system," says Jacob Alspector, associate in charge, "but it wasn't water-tight, air-tight, or thermal-tight." Wright had specified single-pane glass, which had no filtering for ultraviolet or infrared light (such glazing technology was unheard of 35 years ago). The metal skylight frame held the glazing in place without the benefit of gaskets or sealants; the glass was fixed between two pieces of flat metal and was mechanically fastened. The concrete curb on which the skylight sat was covered with lumpy insulating material and gobs of tar.

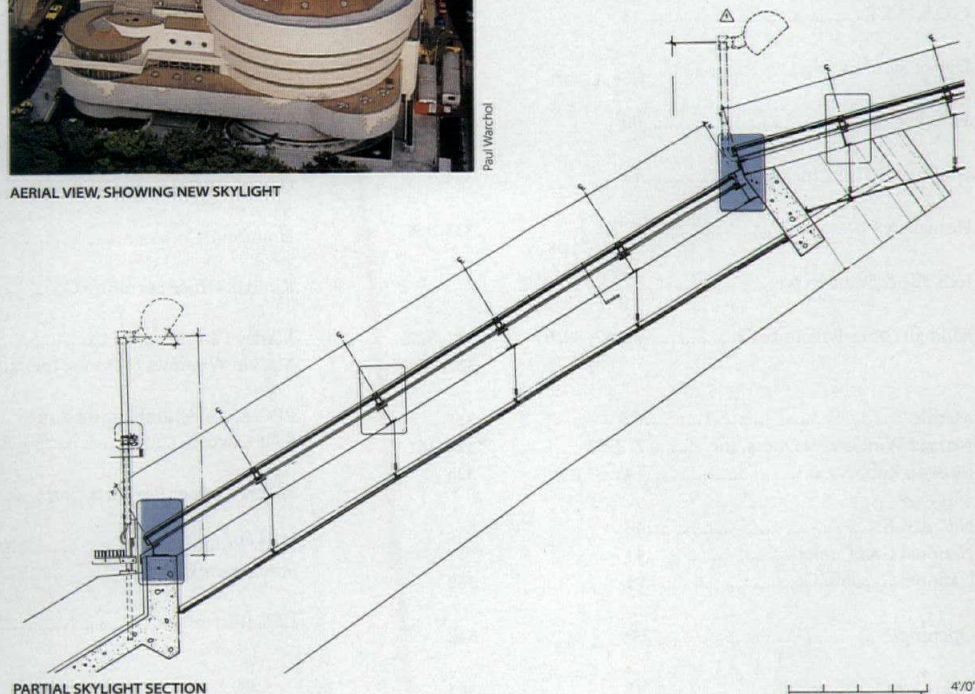
The new skylight matches Wright's original in configuration and mullion location, but the similarity ends there. The double-paned thermal glazing incorporates ultraviolet and infrared shielding, and has a shading coefficient of 50. The eyehooks shown in the details provide anchoring for a mylar fabric that provides additional light filtering. Blackout tarps that completely darken the skylight can also be installed. Moveable shading louvers were not used because they were not faithful to the appearance of Wright's design, and would be difficult to access for maintenance.

The original steel structure was used to mount the new skylight. Rigid insulation was installed over the concrete curb, and then covered with a copper-coated roofing membrane. Wright indicated in project correspondence that he intended to clad the lower part of the dome with copper, but the budget didn't permit it. The copper-coated membrane allows the fulfillment of Wright's wish with a contemporary material.

Michael J. Crosbie

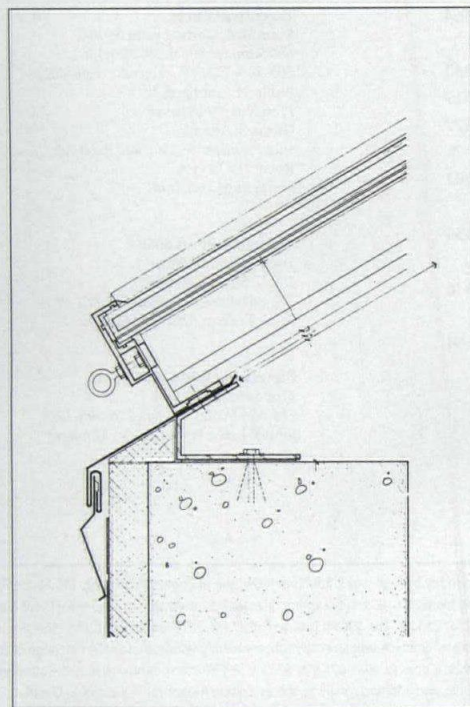


AERIAL VIEW, SHOWING NEW SKYLIGHT

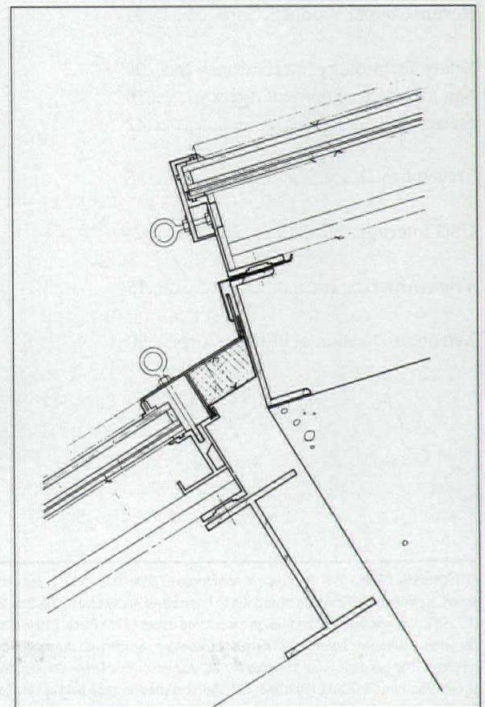


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