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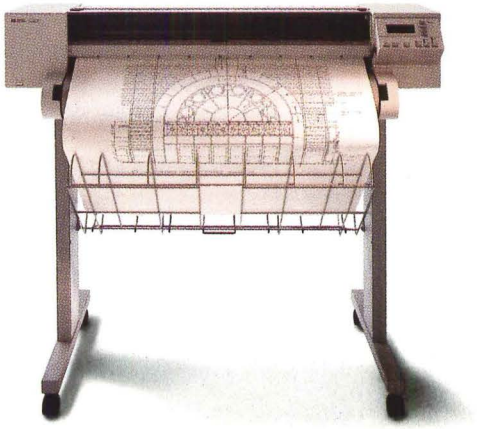

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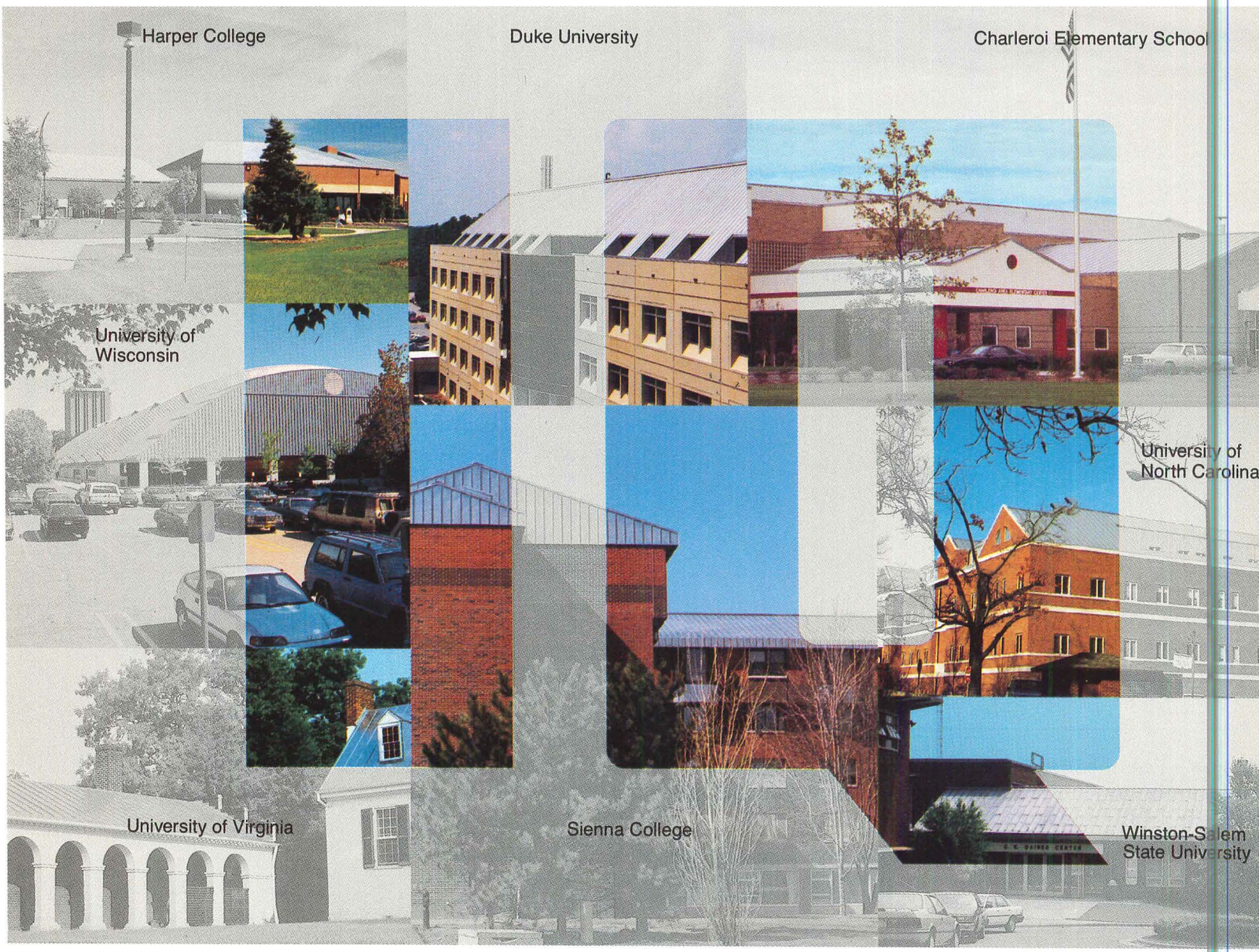

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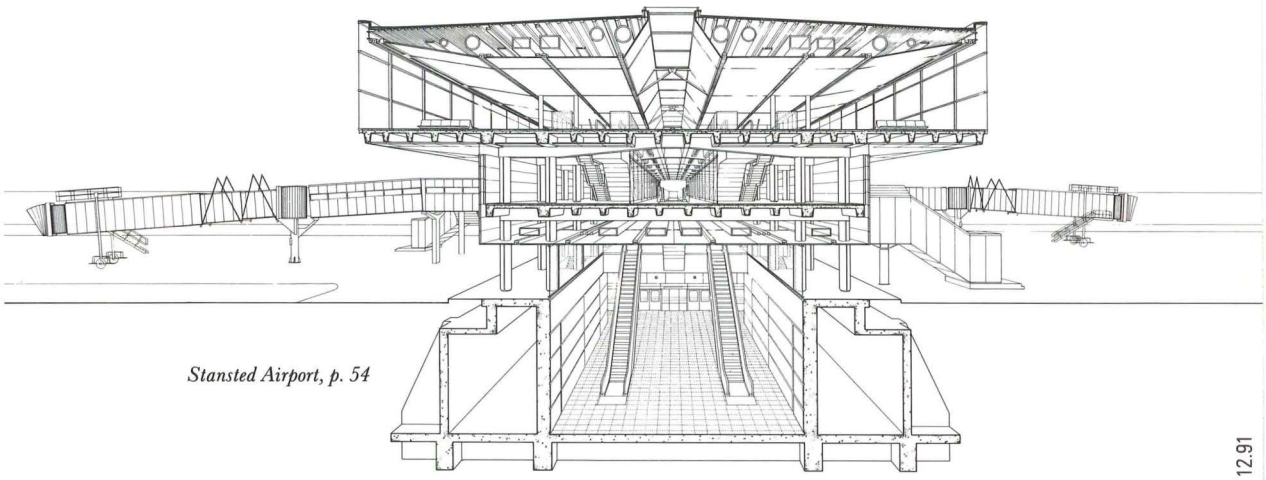
Cover: *Stansted Airport Concourse, London, by Foster Associates, page 54. Photo by Richard Bryant.*

Progressive Architecture December 1991

P/A

Design Editor in charge: Jim Murphy



Stansted Airport, p. 54

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Editorial
Architects as Capitalists

In the last one hundred years, the practice of architecture has gone from being an art and a craft to being a business, and we need to examine critically what we have lost in the process.

One centennial that has gone largely unnoticed by the profession this year was Daniel Burnham's decision, around the time of the death of his partner, John Wellborn Root, in 1891, to start the first corporate architectural practice – Daniel Burnham & Company of Chicago – which grew quite large designing buildings such as the Flatiron Building in New York and Union Station in Washington D.C. As Burnham told Louis Sullivan, "My idea is to work up to a big business, to handle big things, (and) deal with big businessmen." The momentousness of this comment may be hard to grasp today, so accustomed are we to large firms and to thinking of architectural practice as a business. But, a hundred years ago, Burnham's idea represented a major change for the profession, transforming it from a kind of guild to an essentially capitalistic enterprise.

As Karl Marx documented, the transition from guilds to capitalism that began in the late Middle Ages involved a major shift in the way people saw themselves and their work. Where the guilds, said Marx, strictly limited "the number of apprentices and journeymen that a single master could employ," the capitalists needed large staffs to gain sufficient profit from their labor. Where each guild controlled the number of its members, the capitalists benefited from having a "standing industrial reserve army" of workers who could be readily hired (and fired). And where the guilds focused on craft techniques and the making of high-quality goods, the capitalists turned to the mass production of commodities.

What is remarkable about the architectural profession is how long it retained a guild-like structure. Before 1891, architectural firms were small in size and simply organized, usually with a single owner. Architecture schools were few in number, and most aspiring architects learned through apprenticeships in offices. And, while the primitive state of engineering knowledge resulted in structural collapses and devastating fires, most buildings were well constructed and highly crafted. Today, there is still a large number of small, single-owner firms; internships in offices remain an important part of professional education; and high-quality construction has yet to totally disappear. But the capitalistic mindset that Burnham put in motion has affected everyone in the profession, completely transforming it.

Although small firms remain numerous, the 5 percent of firms with 20 or more employees now handle 50 percent of the billings, and their economic dominance seems destined to grow as architectural practice becomes increasingly international and – because of computers – more and more capital-intensive. Liability and client demand have also pushed large firms and small firms, alike, toward the characteristic pattern of all capitalistic organizations: specialization. Since 1891, the number of architecture schools, too, has mushroomed, graduating more people than the profession can easily absorb. This has created, however unintentionally, a standing reserve of unemployed or under-employed people upon which many firms, both large and small, now depend to handle the boom and bust cycles that Marx correctly saw as inherent in free markets. And many firms, themselves, have become, of late, a standing reserve for those building owners and developers who use the excess capacity within the profession to reduce fees and exact uncompensated services. Finally, there is the fact that much of what gets built today is viewed by many owners and developers as a kind of commodity, where things that enhance a building's resale or exchange value – the appeal of its exterior image, say – have come to matter more than other inherent architectural qualities.

No one can be blamed for this state of affairs, least of all Burnham; in 1891, he was simply among the first architects to see the inevitable and to adapt to it. Nor are there ready solutions to the problems of specialization, exploitation, and commodification. Marx's idea of throwing out all of the capitalists obviously didn't work, nor did William Morris's proposed return to guilds. Still, there may be a useful middle ground on which the profession can strengthen those aspects of the guilds that served to make better architecture. This might include a more active involvement in the making of structures through various forms of design-build or multidisciplinary practices; a more coordinated opposition to exploitation of all sorts, whether of an employee by an employer or of firms by clients; a more concerted effort to quantify the long-term value of well-crafted buildings; a more direct connection between the numbers of students entering professional school and the potential jobs for them; and a more forceful assertion in the marketplace of values other than those of profit and loss. In all this, we must recognize that the changes Burnham initiated one hundred years ago threaten some of our most basic ideals, and thus the profession itself. **Thomas Fisher** ■

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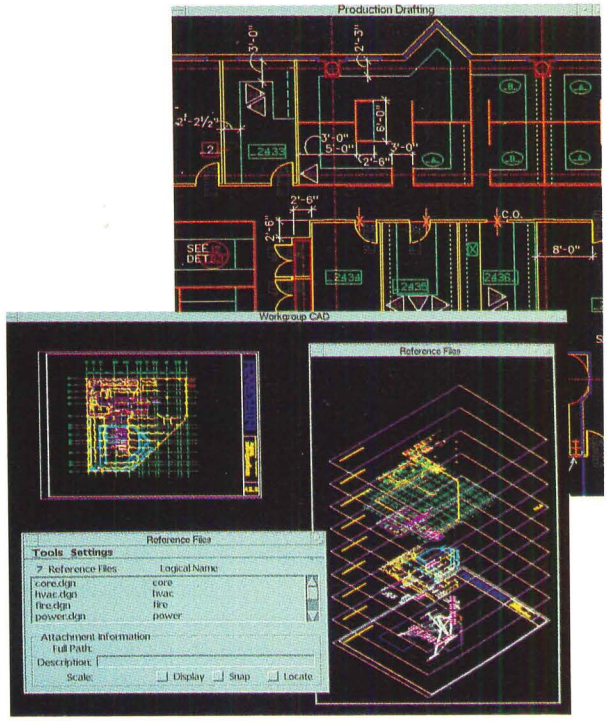

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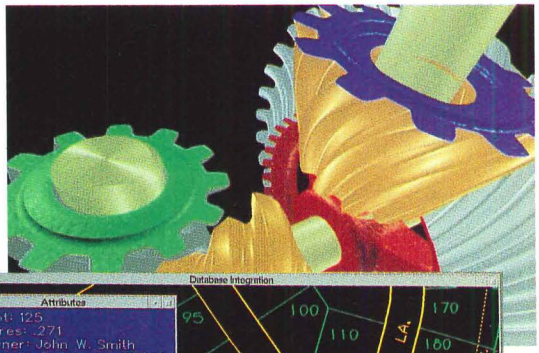

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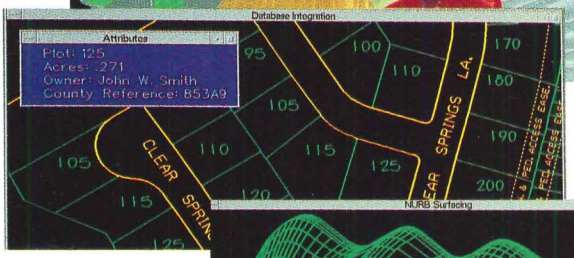

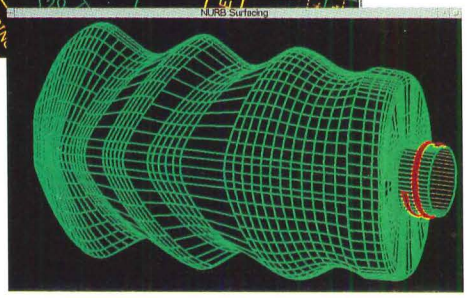

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Views

Computers in Practice

In his article in the September 1991 PA (p. 59) Dennis Neeley described a wonderful world – for machines.

He claims that CAD will liberate architects from the drudgery of modern architectural practice and therefore make us better architects. This logic is not the same used by the computers his company programs.

Instead of freeing us up, CAD promises to enslave us further to the industrialization of the design-build task. That practice has become increasingly defined by a catalog-of-parts concept of building requiring an "endless remaking of drawings and lists" should alert us that something is fundamentally wrong with the way we build.

The "bottom line" as they say, appears, however, to be the bottom line. There is more money to be made by the centralization of the building task that automated industrialized architecture provides. This is clear from the strange coincidence of the full page ad across the "gutter" from Mr. Neeley's article. It is by a software company extolling the virtues of CAD in the same prophetic fashion as Mr. Neeley. That's funny; it is Mr. Neeley's company! And I thought gutters were at the edges of roofs!

Richard Lee Hawksley
Kent, Ohio

[In accepting this article by Neeley, who is an architect, the editors were not aware that any ad for his company would appear in P/A. – Editor]

Computers and Creativity

Advocates of computerization, such as Dennis Neeley in September's Practice section (p. 59) are often very enthusiastic about their vision of the future. Observations on the impact of computerization on other professions and industries, however, suggest that we should look carefully at all possible impacts and choose with care as we adapt more of this technology to our practices.

Referring to his article, there's no question that this "tool will redefine the roles of the design team members and will change education and licensing processes." Whether these changes will "lead to better design, fewer errors, (and) better budget control" is entirely up to the skill and organization of the firm – not the computers. If people and management are deficient, computerization can make the problems spectacularly worse. We all know: garbage in, garbage out. That widespread use of computers will lead to "more exciting professional practice" is a real question. Mr. Neeley does not discuss the professional distinctions that have arisen between "CAD operators" and "designers." As computer technology improves and becomes more tempting to everybody in an office these distinctions may ease somewhat but I, for one, find it hard to believe that programming will ever be developed that is capable of all the nuances of pencil on paper, and these traditional methods will always carry the highest status.

I can find no fault with his last sentence "The computer is a tool like no other that has ever come to our profession: we should not sit and wait for it to arrive before planning to deal with its effects." What better time will there ever be than the current slowdown to think critically about these questions?

It seems clear that computers will promote more standardization in practice methods, as evidenced by the move to adapt ConDoc, with both advantages and disadvantages. By making the design process easier and quicker, the use of computers may be encouraging more facile but superficial design work – a frequent criticism of the architecture of the last ten years or so. Finally, computerization will probably not increase the time allowed for exploring design options, an often-promised benefit, but reduce it by making design time an ever more precious commodity, with corresponding pressure to spend not more but less time on every project phase, with an accompanying rise in stress levels. Is this the "more exciting professional practice" Mr. Neeley envisions!

In conclusion, there are indeed aspects of architectural practice that computers can perform to everybody's benefit, as we are seeing now. This does not mean, however, that more computerization will make things better. If Mr. Neeley's promise of a "more exciting professional practice" is to be realized we should probably be looking at the predictable impacts, both positive and negative, more critically.

Peter H. Borgemeister
Providence, Rhode Island

Arbitration Pitfall

Having recently been through the arbitration process, I read with interest your article "Law: Arbitrating Fee Collection" in the October issue of P/A (p. 49). Our case tracked the article fairly closely until the bit about "Arbitration Decisions are Binding".

I filed a Demand for Arbitration with the American Arbitration Association after not collecting a fee for architectural services performed under a customized contract that contained an arbitration provision. Both parties employed Attorneys.

The Client filed with the District Court to have the Demand overturned. The Court found in our favor and ordered the parties into arbitration in accordance with the contract.

We mutually agreed upon an Arbitrator and a date for the hearing was set. The Arbitrator awarded in our favor the full amount of the Demand plus attorney fees, court costs, arbitration fees, and interest on the unpaid architectural fee.

Thirty days passed and we still did not receive our fee. We filed for Summary Judgment in Court to force payment and the Client filed a motion to have the arbitration finding overturned because it was based on "gross error".

Their Counsel told our Attorney their intent was to eventually appeal our award to the Texas Supreme Court because they anticipated losing in the lower courts. This process could take approximately two more years. After already spending 15 months of energy and money trying to collect our fee, we did not look forward to more hearings, etc. We settled for partial payment out of court because, whereas the Client could well afford two more years of legal costs, we could not.

I think this is a flaw in the arbitration process as well as in court cases. Hopefully our experience is not typical.

Raymond C. Arhelger
President, WRA Architects
Dallas, Texas

[C. Jaye Berger replies: It is unfortunate that you had such an unpleasant experience, but I hope you will not blame it on the arbitration process. Most arbitrations are not so fiercely litigated. In addition, if the case had been in court, you would have had many motions, several levels of appeals to contend with, and it would have taken several years. This is one reason why most lawsuits are settled out of court.]

Penn Yards Workshop

The Design Review Workshop for Penn Yards in New York (P/A, Oct. 1991, p. 18) was conceived by Frances Halsband, president of the New York Chapter, AIA, and jointly sponsored by NYC/AIA, the Office of the Manhattan Borough President, and Community Board 7. Oculus (of which the author is deputy editor) is monthly publication of the NYC/AIA.

Penn Yards Model

The Model of the Penn Yards (P/A, Oct. 1991, p. 17) was made by Tenguerian Models, New York.

Courtyard Landscape Architects

Landscape architects for the courtyard of the Whittle headquarters (P/A, Oct. 1991, p. 19) were Zion & Breen. ■

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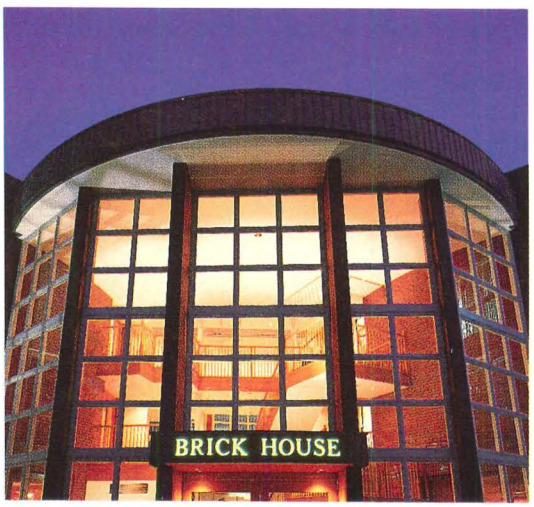

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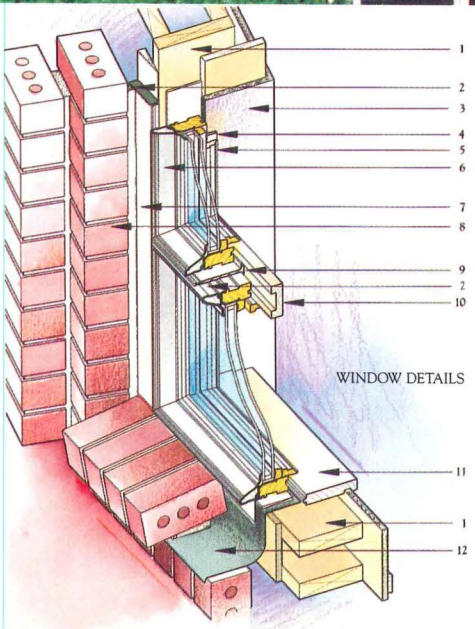

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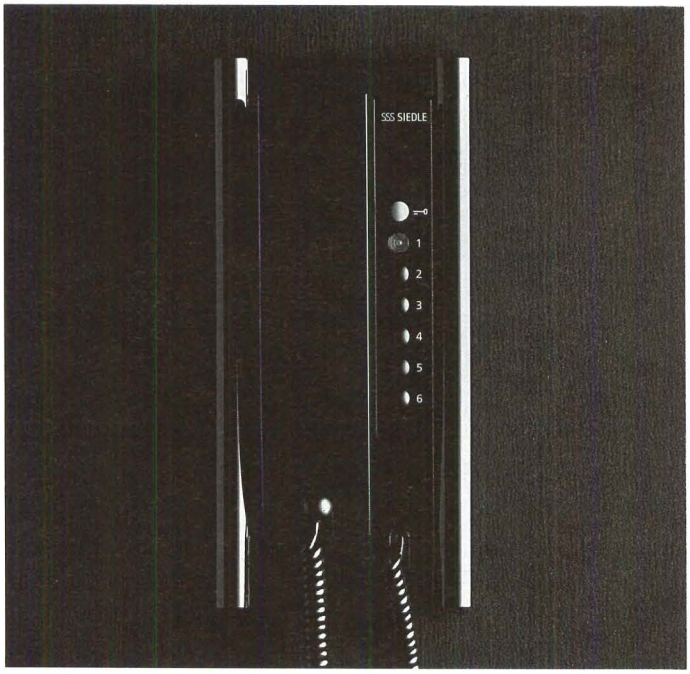

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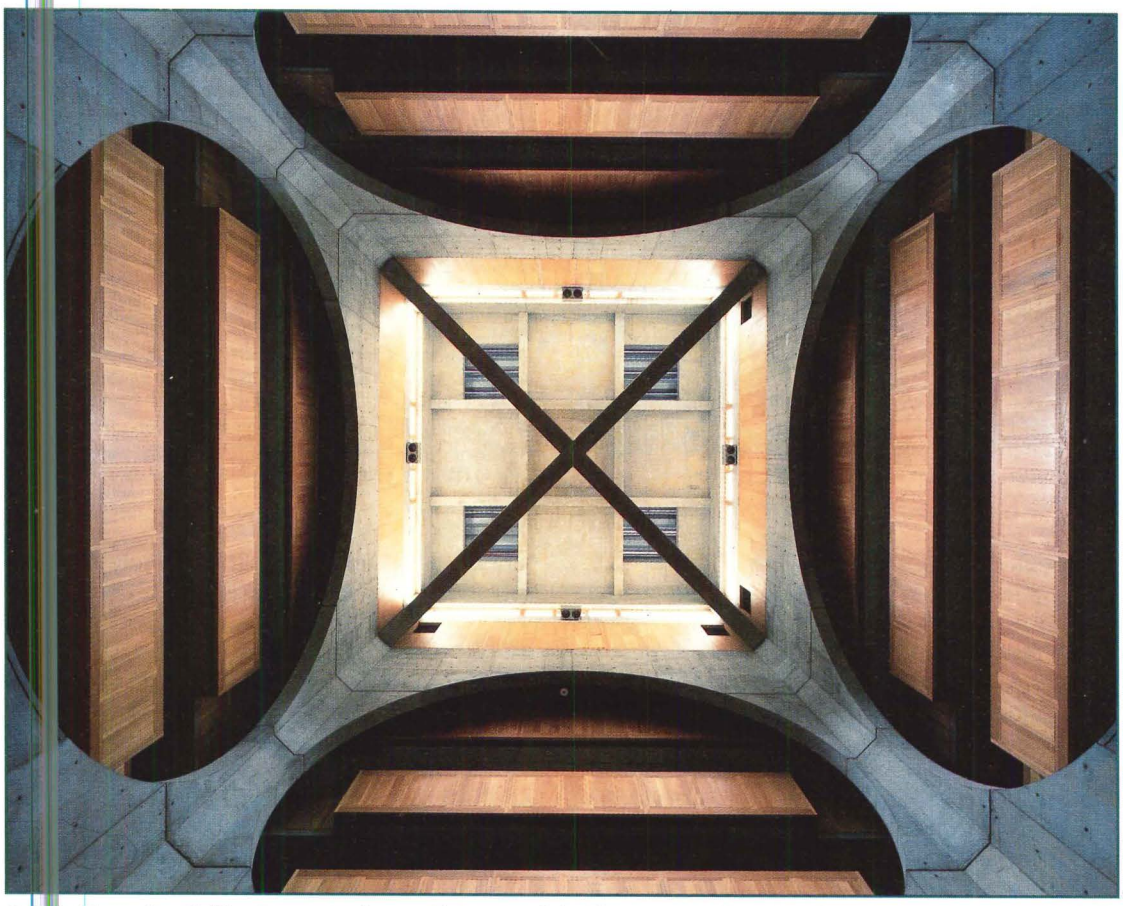


Grant Mudford

Kahn's library for Phillips Exeter Academy (1972); one of the photos commissioned for the show.

Revisiting Kahn's "Reverence for Place"

With great anticipation and fanfare, "Louis I. Kahn: In the Realm of Architecture," the first major retrospective exhibition of Kahn's work, opened at the Philadelphia Museum of Art in October. The excitement is justified; this is a rich and textured show that will undoubtedly do much to reawaken interest in the man and in his work.

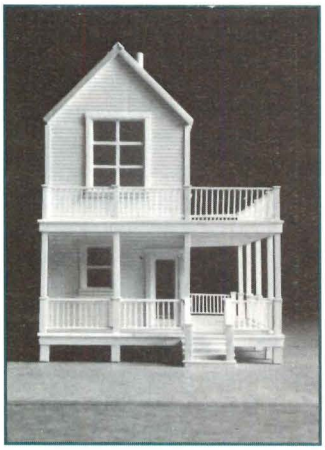
The show features dozens of scale models of buildings and projects by Kahn, including five new, meticulously detailed models especially made for the exhibition. Complementing these are myriad drawings from all phases of Kahn's career and contemporary black-and-white photos of buildings under construction. Throughout, there is a welcome emphasis on process sketches, unbuilt schemes, and preliminary versions of projects for which Kahn is celebrated, such as the Salk Institute for Biological Studies and the Yale Center for British Art. New color photographs of completed works, shown in their own central but sequestered alcove, were commissioned by the Museum of Contemporary Art (MoCA), Los Angeles, which organized the show.

Co-curators David B. Brownlee and David G. DeLong, architectural historians from the faculty of the University of Pennsylvania, reveal aspects of Kahn's *oeuvre* that have been overlooked until now. The vitality of his European travel sketches from both the late 1920s and the early 1950s, and his commitment to a wide range of social housing experiments during the Depression and war years are revelations. And his search for an appropriate design for the "Memorial to the Six Million Jewish Martyrs" (1966–1972) is a fitting coda to a lifetime of formal experimentation.

The success of the exhibit installation by Japanese architect Arata Isozaki is less obvious. Isozaki, who designed MoCA's main building in Los Angeles, based his scheme on Kahn's unbuilt project for the Mikveh Israel Synagogue in Philadelphia. Isozaki transformed curved fragments of the synagogue plan into a series of gray-stained plywood "ruins" on which drawings are hung or models supported. The effect is equivocal. The installation does little to organize or clarify Kahn's work, although the fragments do offer a dynamic, three-dimensional counterpoint to the predominant flatness and small scale of the exhibited items.

Over the next three years, the exhibition, which was made possible through a major grant from the Ford Motor Company, will travel to three continents and seven different museums. At each venue, Isozaki's installation will be reconfigured to suit the space. At the Kimbell Art Museum in Fort Worth, the work will be seen in a Kahn-designed setting, without Isozaki's constructions.

The exhibition begins at a propitious moment. In the 17 years since Kahn's untimely death, his reputation has remained strong, but his influence has fluctuated. Particularly in recent years, Kahn's insistence on the need for order has not been held



David Pollak

The pitfalls of manufactured housing: an update on P/A's affordable housing competition winner. Practice, page 47.

Ando on Ando in a MoMA exhibition. See page 22.

Pencil Points

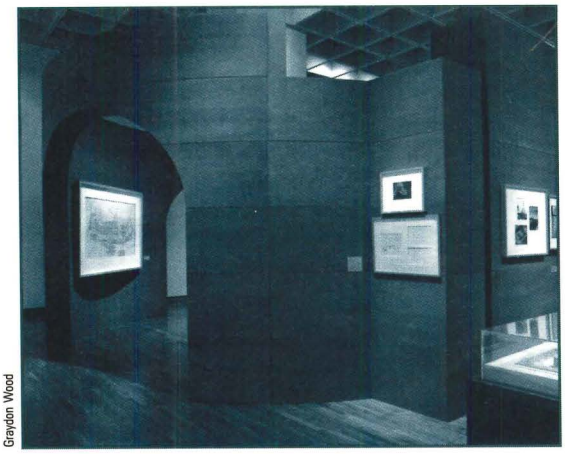
The fire that swept through Berkeley and Oakland Hills, California, late in October destroyed a number of significant 20th-Century houses, among them: Julia Morgan's Wells House (1911); William Wurster's Lamberson House (1941); Bernard Maybeck's Edwin Pillsbury House (1928) and Warren P. Staniford House (1925); and Moore, Lyndon, Turnbull, Whitaker's Talbert House (1965). The blaze left the majority of East Bay masterpieces intact.

The war raging in Yugoslavia has endangered historic sites in Dubrovnik ("protected" by its presence on the United Nations World Heritage List) and Split (where Diocletian's palace stands). To end the destruction, the Committee for the Preservation of Medieval Dubrovnik is asking architecture and design professionals to sign a petition it is submitting to the U.S. government and the U.N. Contact Sonia Bujas, c/o Institute on East Central Europe, 420 E. 188th St., New York, NY 10027 or FAX (212) 854-8577.

The Shinkenchiku Residential Competition 1991, "Another Glass House," has been won by French architect Zainie Zainul. Tadao Ando and Philip Johnson were the competition judges.

The Lesbian & Gay Architects & Designers Group has been established in New York. The group plans to address concerns of homosexuals in the design community and hopes to establish branches in other locations; architects, designers, and members of the allied disciplines are invited to attend monthly meetings. Contact (212) 477-5177, for more information.

Texas Tech College of Architecture has named a new dean: Dr. Martin Harms, RIBA, formerly of MPB Architects, Philadelphia, took office December 1.



Graydon Wood

Kahn exhibit; installation is by Arata Isozaki.

in high esteem by a younger generation committed to the primacy and dynamism of circumstance.

The exhibition reaffirms the persuasiveness of Kahn's search. His reverence for place, his insistence on the immutability of materials, and his preference for wall rather than frame present timely lessons. His is a powerfully serene body of work that, in Vincent Scully's phrase, "thrums with silence." **Donald Prowler** ■

Exhibition itinerary: Philadelphia Museum of Art, through January 5, 1992; Centre Pompidou, Paris, March 5–May 4, 1992; Museum of Modern Art, New York, June 14–August 18, 1992; Museum of Modern Art, Gunma, Japan, September 26–November 3, 1992; Museum of Contemporary Art, Los Angeles, March 7–May 30, 1993; Kimbell Art Museum, Fort Worth, July 3–October 10, 1993; Wexner Center, Columbus, Ohio, November 17, 1993–February 1, 1994.

Kahn-Centered Design Conference

Commemorating the opening of the Louis Kahn exhibition (article above), the AIA Committee on Design held its 1991 design conference in Philadelphia, October 18–20. Entitled "Louis I. Kahn and the Philadelphia School," the conference featured Kahn's best-known teaching colleagues at Penn and tours of illustrative buildings. Some 300 AIA attendees filled the exhibition, the speaking halls, and a fleet of buses that made a nine-hour circuit of the city's suburbs.

Philadelphia architect Charles Dagit, who organized the event, introduced the kick-off panel discussion with references to P/A's "Philadelphia School" issue of April 1961 and a 1976 Philadelphia issue that asked whether the "school" had turned out to be a mere phantom. Representing P/A, I (John Morris Dixon) recalled the background of these articles and moderated the discussion. Speakers included G. Holmes Perkins – spry for his 90-odd years – the dean who brought Kahn and the others to Penn; also recollecting Kahn were Romaldo Giurgola, Robert Geddes, and Robert Venturi, all of whom were young Penn faculty members and emerging design talents in 1961.

The touring day included visits to two Kahn houses and his dormitories at Bryn Mawr, Venturi's iconic house for his mother, and Mitchell/Giurgola's music school at Swarthmore. The day concluded with a spirited round of toasts to Kahn by various associates and admirers, in the uplifting setting of Furness's library (which housed Kahn's teaching studio and now holds his archives), newly restored by Venturi Scott Brown & Associates (P/A May 1991, p. 81).

In a final session, Philadelphia architects Denise Scott Brown and Charles Dagit, A.J. Diamond of Toronto, Thomas R. Vreeland of Los Angeles, and Hisao Koyama of Tokyo discussed the impact of Kahn on their work; members of the earlier panel then made summarizing comments.

As speakers acknowledged, the influence of Kahn on colleagues and students remains hard to pin down. As P/A pointed out in 1976, architecture in Kahn's hometown tended to follow the divergent path of Venturi and Scott Brown. But for Venturi, Kahn was a source of encouragement: He made history a legitimate source for his followers; he was Modern, but his efforts to "go beyond" Modernism gave his works a "both/and" quality. What Kahn shunned, points out Venturi, was the "everyday"; he could punch holes in walls, but would never insert a mundane window. Diamond wondered how the public accepted any of this work: "Why do these busloads of architects go to the houses the neighbors like least?"

On the whole, however, the participants seemed chastened by the profundity and authenticity of Kahn's work. The final discussion took on the air of a revival meeting. Koyama spoke of the "hint of revelation" in Kahn's speech. Giurgola spoke of the heroic, yet intimate quality of Kahn's work and its "sense of expectancy." Geddes pronounced the exhibition historic, saying it "clarifies what Modern architecture has been, is, and can be." Vreeland repentantly observed that we have "been traveling too long in the wilderness of Post-Modernism and Deconstructivism." Most of the conferees went home dreaming of a purer, more rigorous architecture. **John Morris Dixon** ■

Seville Expo Preview: Cooling the Fair

Architects and building scientists from 30 countries met in Seville, Spain, for the Passive and Low Energy Architecture conference (PLEA '91), September 23–27. The highlight of the conference, which focused on urban design, was a day devoted to Expo '92. Researchers reported six years of experimentation, computer modeling, and full-sized prototypes designed to relieve the summer outdoor conditions in the climate of Seville. The conference then went to the Expo site to experience results firsthand.

Although average daily temperatures in July and August are 79 F, the mean afternoon temperatures are over 95 F. Thus the design of outdoor spaces for a daily quarter-million visitors is a special Expo challenge.

The concentration of major circulation in five

major avenues, each 130 × 1000 feet, has promoted five distinct urban designs based on bioclimatic principles. Cooling strategies include the provision of shade, the evaporation of water through misting principles, fountains, cool towers, water walls, and the transpiration of vegetation. These physical principles are found in the best design traditions of Andalusia, but have been used in Expo in a fresh, urbane form. For instance, a cascading 20-foot-high water wall in Avenue Five weaves its way for over 1300 feet. In Avenue Two, the nations of the European Community are symbolized by 12 monumental "cool towers," white cones 100 feet high. Evaporatively cooled air will passively pour out of these reverse chimneys, providing more than 14 million BTUs of cooling per hour.

What the Expo visitor will see are dramatic public spaces where architectural acrobatics, urban elements, and hardware are woven through lush designs in a mass of flowers, vines, water features, and avenues of trees. Perhaps most impressive is the invention of the "Expo Pergola." Steel space frames have been cultivated with vines growing in integrated planting boxes. In modules of 20 × 20 and 40 × 40 feet, these fully grown canopies are mounted to provide a continuous living shade of flowers. Like instant groves of trees, they will shelter at least half a million square feet with a garden in the air.

Jeffrey Cook

Sunshades on Expo '92 site.

Most major world's fairs leave some lasting legacy to the built environment. For the Discovery Expo, it may be the realization of urban spaces bioclimatically conditioned for human comfort. **Jeffrey Cook** ■

The author is Regents Professor of Architecture at Arizona State University.

Boston Garage Goes Underground for New Park

Boston has rid itself of a blight and has a superb new park. For decades, a three-story municipal parking garage has dominated Post Office Square in the heart of the city's financial district. In 1983, a group of business people set up a private non-profit entity, Friends of Post Office Square, Inc., to put the garage underground and turn the site into a park. It took eight years and cost $80 million, but the process turned out to be as successful as the park itself. The non-profit developers manage the park, and they will own the garage until its costs are amortized, when it will revert to the city.

The Halvorson Company, a Boston landscape architecture firm, was chosen by competition to design the park, and Ellenzweig Associates of Cambridge were the architects for the park structures and the garage, with Parsons Brinckerhoff Quade & Douglas, civil engineers, and LeMessurier Consultants, structural engineers.

The park includes a copper-roofed cafe with trellis-patterned windows, its form echoed by the garage entry nearby. At the center of the 1.7-acre space is a lawn bordered on one side by an arbor on granite columns.

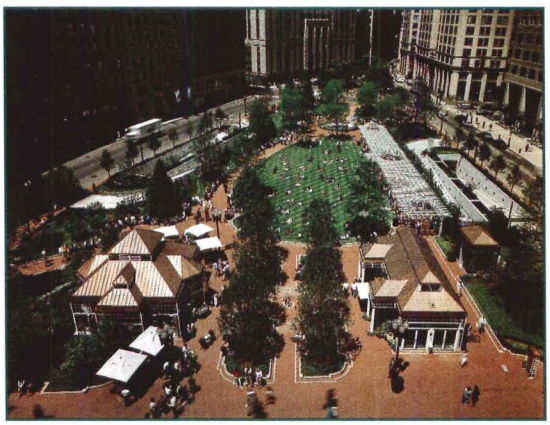
The new garage puts 1400 cars (about three times the number in the old structure) on seven levels in the deepest hole in the city. In a top-down construction system, each new level was excavated from under the previous level.

Post Office Square has already won local engineering, architecture, and preservation awards. The design turns every exigency to advantage in its mix of casual and formal, structure and open space. It has the look and feel of a real place: not so much as if it had always been there, but as if it will always belong. **Jonathan Hale** ■

The author, an architect in Watertown, Massachusetts, writes frequently on architecture and design.

Bill Horsman

Post Office Square: before (1988) . . .



Steve Rosenthal

. . . and after, with garage beneath park.

Washington Report

Editor's Note: P/A correspondent Thomas Vonier filed this report from Paris.

Foreign licensing practices may not appear – at first glance – to be of pressing concern to U.S. architects. The AIA listed only 74 of its members as residing in Europe in 1991. A few more show up in other parts of the world, small in numbers by any measure.

Yet U.S. architects are hardly stay-at-homes: A fair number of American firms (one responsible estimate says 35) have sizable foreign offices, but these employ mainly nationals of the host countries – just as, for many foreign buildings nominally designed by American architects, local firms perform most of the production work and navigate the regulatory gauntlets.

However, foreign licensing practices seem likely to assume greater importance as more U.S. architects seek commissions – and even employment – abroad. Stepped-up global trade (or at least stepped-up talk about it), coupled with the prolonged low in American construction, virtually assures that U.S. architects will continue to look abroad, and in particular toward Europe, for work. And in terms of licensing, these architects may find that Europe on the eve of 1992 looks very much like the fortress some analysts have proclaimed and others fear.

Relatively smooth reciprocal licensing agreements now exist for the 12 countries of the European Economic Community. But what about architects licensed in the U.S. and seeking to become licensed in Europe? In France, for example, they will find that the national government must issue special dispensation after a lengthy process that involves judgment of prior work and professional qualifications.

Only a few of the architectural degrees granted by U.S. colleges and universities are recognized as equivalent to those conferred by European institutions, so additional studies – in Europe – may also be required. The U.S. National Architectural Accrediting Board (NAAB) has begun to take action on this front, insisting that all North

(continued on next page)

Washington Report

(continued from previous page)

American programs to which it has granted accreditation be treated alike by foreign authorities. The NAAB has also invited European officials to observe the North American accrediting process in action, and intends to explore degree-recognition policies elsewhere in the world.

Although it goes mostly unstated, foreign licensing authorities clearly take American treatment of their architects into account. A New York architect who has served on international committees for the U.S. National Council of Architectural Registration Boards said recently, "Thanks to our efforts, any European seeking an architectural license in the U.S. can pretty easily get an NCARB certificate, and that's tantamount to being granted a license in many states."

But because "no official agreements exist on these matters," a European official said this fall, "we have no formal obligation to reciprocate, or to behave in any way or another" toward U.S. architects.

Meanwhile, the number of students in U.S. architecture schools shows no sign of diminishing. The Association of Collegiate Schools of Architecture reports that enrollments tend to rise in poor job markets, speculating that people who enter boom markets with only a first professional degree decide in leaner times to study for an advanced degree while awaiting better days.

But asked when the U.S. construction economy might absorb the potential architectural graduates now in the pipeline, one educator replied with gloomy assurance: "Never." With fewer ties to hold them at home, the profession's youngest members may already be the most likely to venture overseas.

If so, they – like all American architects who hope to practice abroad – will have to bear in mind the terse words of Annie Costantini, the French ministry official charged with licensing non-EEC architects: "For those who come from outside our community, the practice of architecture [here] remains entirely a privilege granted at our discretion – not a right."

Thomas Vonier ■

A Redesign for LA's Pershing Square

Mexican architect Ricardo Legorreta and Philadelphia-based landscape architect Laurie Olin have redesigned Pershing Square, the only public park in downtown Los Angeles, under the sponsorship of a novel group of local building owners and developers.

Pershing Square as envisioned by Legorreta and Olin.

The new design, which supplants an earlier scheme by SITE Projects, is marked by simplicity and urbanity. Legorreta and Olin have organized the five-acre park into two distinct areas, one for an informal stage and seating area, the other with a fountain and a 120-foot "campanile" of purple stucco, rendered with Legorreta's characteristic directness and minimalism. The perimeter of the park is densely planted, forming a visual screen from the high-rise district to the immediate west. Kiosks offer food and drink at each corner, while a yellow cafeteria near Olive Street will be the park's only retail building.

The $14-million design, which still awaits funding, is the result of a renewed effort to rehabilitate the aging park, an area of cracked concrete above an underground parking structure. Unsightly parking ramps border the park on three sides. Although surrounded by elegant buildings, the square attracts mostly vagrants and drug dealers.

In 1986, the city and local property owners held an international competition for a redesign of the park. The funding was to come from the Pershing Square Management Association, a consortium of surrounding building owners. Local property owners, however, never reconciled themselves to SITE's competition-winning scheme, which features a rolling landscape with such signature features as automobiles embedded in the plaza (P/A, Oct. 1986, p. 36). Despite a $6-million commitment from the Los Angeles Community Redevelopment Agency, none of the local developers who made up the first property owners' group contributed money to build the SITE scheme. Lacking support from its members, the Pershing Square Management Association went bankrupt, and local property owners used the occasion to walk away from the SITE proposal.

Working behind the scenes last year, developer Robert Maguire, known for his concern for urban design issues in downtown Los Angeles, took out a master lease on the garage directly beneath the park. Maguire also assembled a new coalition of property owners, this time called Pershing Square Property Owners Association, and brought in Legorreta, who had earlier worked for Maguire on the Solana office park in the Dallas-Fort Worth area (P/A, April 1989, p. 65). The newly formed association is hopeful that the less iconoclastic Legorreta scheme will get the nod from the property owners, who must agree to pay for the structure through an elective tax district. If approved, construction could begin next spring.

Morris Newman ■

Designer's Saturday: In the Green?

An agenda of earthly concerns and financial woes permeated this year's Designer's Saturday, held in New York in late October. Product introductions were at a minimum, as were free mementos and fancy parties. The pared-down festivities – and an admirable effort by the IDCNY, A&D, and DAC buildings to coordinate events – focused attention on urgent issues.

With the theme "The Greening of Design," IDCNY presented a series of environment-related programs and exhibitions. "Clearing Up the Claims: Materials and the Environment," a panel discussion moderated by P/A Executive Editor Thomas Fisher, made it clear that claims of environmental virtue are to be secured or dismissed through individual inquiries. Designers must question rubrics used to represent complex variables – acquisition of raw materials, production processes, shipping, and various post-installation syndromes.

The IDCNY also unveiled the World Environmental Business Center, "a forum for world environmental and business issues," featuring lectures, exhibitions, and continuously updated literature. Its first show, "Beginning to Make a Difference: The Architect's Office Considered Environmentally" was an exceptional effort. Sponsored by the AIA Committee on the Environment, Milton Glaser, William McDonough, Herman Miller, and Herbert Construction, the exhibition of a mock architect's office had two sides, each with information boards citing healthy and unhealthy products from building materials to drafting tools.

Product introductions of merit included: Metro's "Aliso" lounge seating system by Robert Arko – its cantilevered seat cushions providing a clever form of leverage; Steelcase's "Paladin" casegoods – a handsome, "moderately priced" system with contoured edges; Unifor's wood table by Aldo Rossi – its sheer monolithic form giving heroic dimension to four legs and a top.

As a major consumer of raw materials and a shaper of environments, the contract furniture industry faces daunting questions of its own future and its impact on the natural landscape. To confront them, Designer's Saturday offered an encouraging dialogue. **Abby Bussel** ■

(News Report continued on page 22)

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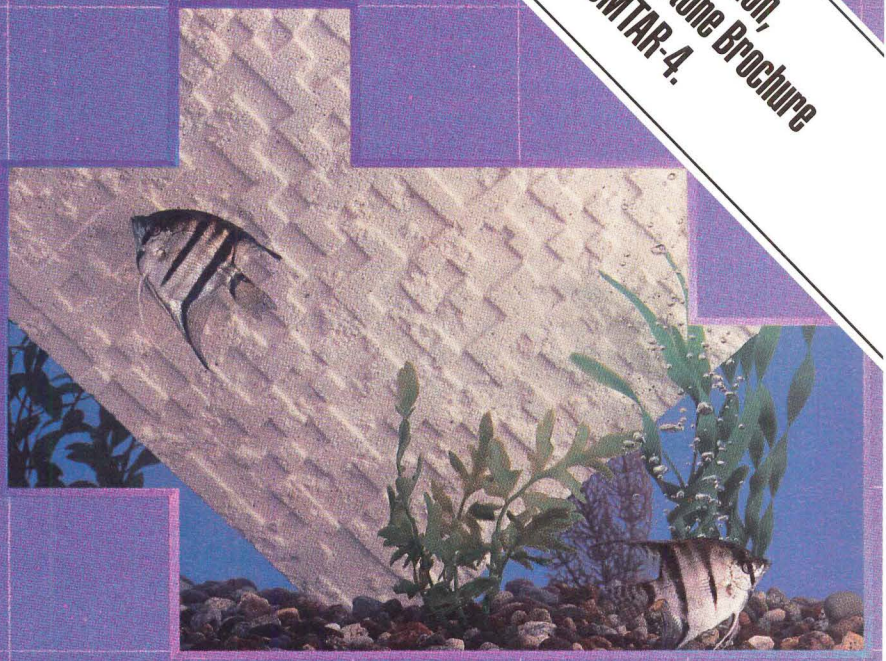

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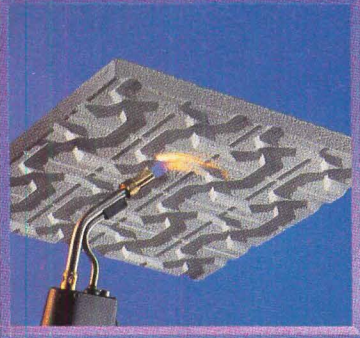

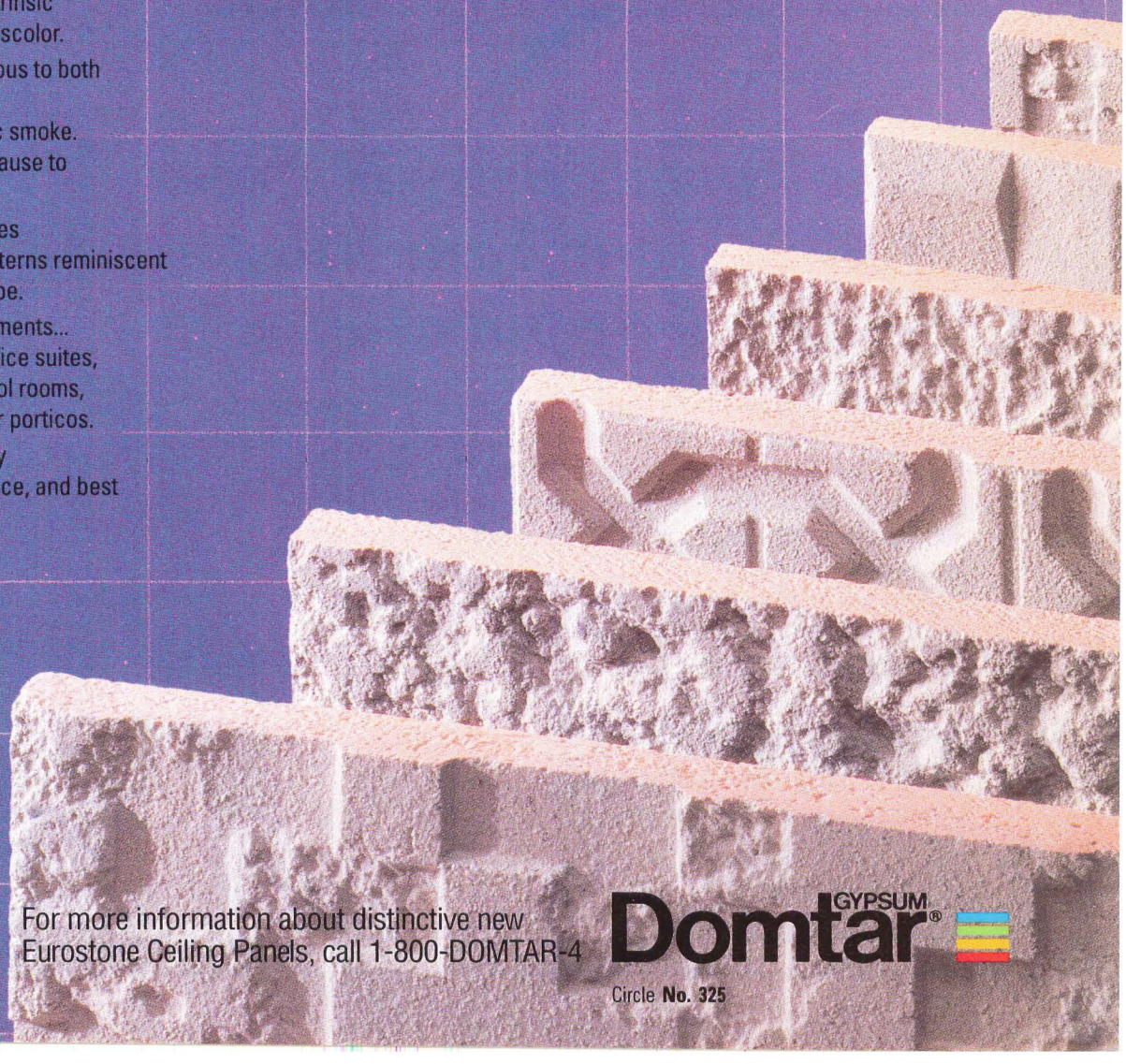

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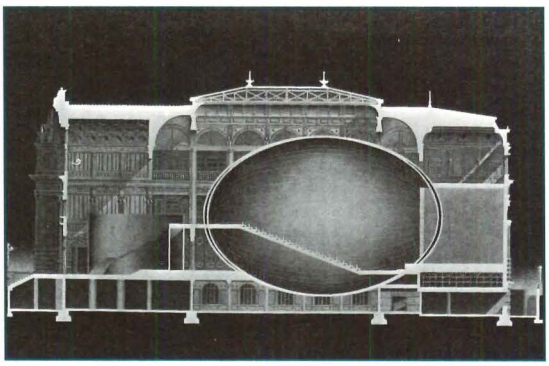
Ando Exhibit at MoMA

Ample spaces, shaped by the architect himself, distinguish the current exhibit on Tadao Ando from most others at the Museum of Modern Art in New York. The carefully selected photos, drawings, models, and computer displays of his works are set in a few subtly defined rooms, arranged in a sequence that begins and ends with the forced perspective of tapering passages.

Ando's exhibition concentrates largely on work in progress, with large models and drawings of the Chikatsu-Asuka Historical Museum near Osaka, the Forest of Tombs Museum at Kumamoto, the partly completed Children's Museum complex in Himeji, and his ambitious, urban-scaled Nakanoshima proposal for central Osaka. Completed works, such as the Kidosaki house (P/A, Oct. 1987, p. 96) and the churches of the late 1980s (P/A, Feb. 1990, pp. 95–96), are represented with modest drawings and black-and-white photos. Included as well are unusually effective computer-generated visualizations of three major projects; walk-throughs and fly-overs (accompanied by some fairly innocuous electronic music) vividly communicate the architect's intent.

As with any exhibition on architecture, this display can only hint at the experience of the buildings themselves. Models and drawings show Ando's bold use of geometry, and photos capture some of his masterful light and shadow play. The spatial qualities and virtuoso detailing are less easily conveyed. Thought-provoking here is Ando's own decision to simulate in gray-painted board his characteristic concrete walls – complete with little round plugs. As with the replications in the concurrent Isozaki-designed Louis Kahn exhibition (p. 18), this recall contrasts ironically with the actual buildings, which are noted for the authenticity and toughness of their construction.



Urban Egg proposal for a historic building in Nakanoshima.

The last of five MoMA exhibits supported by the Gerald D. Hines Interests, this one, which runs through December 31, was co-sponsored by Yoshida Kogyo. An international tour is being planned. The succinct catalogue, a handsome black-and-white production, is written by Kenneth Frampton. **John Morris Dixon** ■

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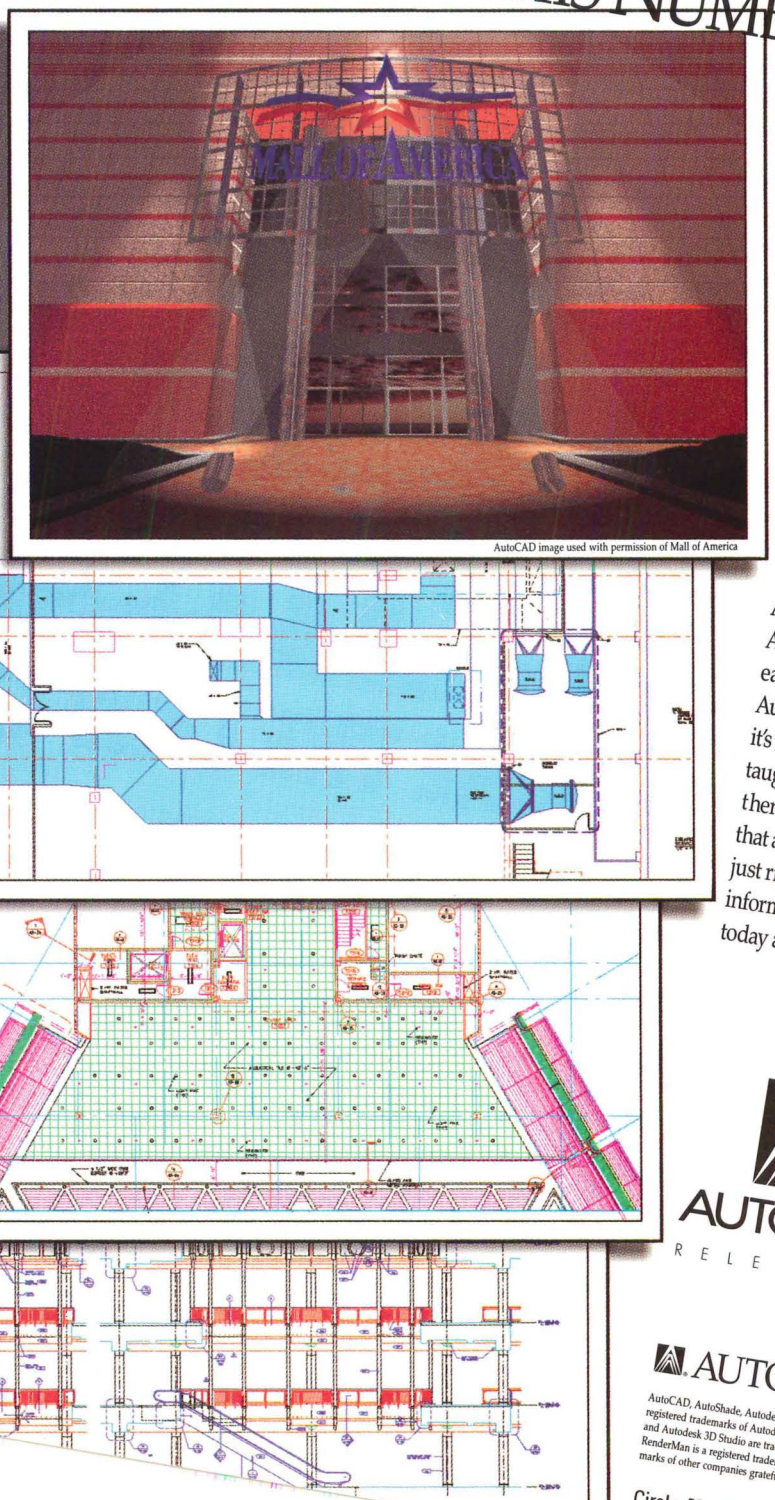

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Circle **No. 306**

Calendar

Exhibitions

The New American Ghetto
Through December 21

New York. Documentation of America's "new ghettos" by photojournalist Camilo Jose Vergara chronicles the growth of such sites in Detroit, Chicago, Newark, and New York. Computer-generated analyses of the urban, social, and architectural condition of the Mott Haven section of the South Bronx, conducted by 13 students at Columbia University's Graduate School of Architecture, Planning, and Preservation, will also be on view. Storefront for Art & Architecture.

Architecture of Slovenia
Through January 3, 1992

New York. "Contemporary Architecture from Slovenia" takes a broad look at the current Slovenian design community with works from the DESSA Gallery (a cooperative of 130 Slovene architects), and magazine covers, catalogs, and posters by architect/designer Ranko Novak. For historical context, work by Jože Plečnik will be on view. National Institute for Architectural Education.

Melvin Charney
Through January 12, 1992

Montreal. "Parables and Other Allegories: The Work of Melvin Charney 1975–1990" is composed of drawings, sketches, photographs, and three large-scale constructions in an effort to synthesize the architect/artist's desire to offer "philosophical and theoretical discussion on the city, its history, and its architecture." Canadian Center for Architecture.

The White House
January 23–April 12, 1992

Washington, D.C. "The White House: Image in Architecture 1792–1992" chronicles the history of the mansion in honor of its 200th anniversary. The exhibit will coincide with the AIA's third annual Accent on Architecture gala (see Conferences, below). The show will travel. The Octagon.

Competitions

The Gabriel Prize
Application deadline
January 2, 1992

Dallas. The Western European Architecture Foundation has announced the establishment of an annual traveling scholarship named in honor of the 18th-Century French architect Ange Jacques Gabriel. The prize winner will be expected to investigate and study "architectural compositions in France, or within its immediate spheres of influence, between 1630 and 1830." Drawings and sketches of these structures must be executed in France. Candidates must be U.S. citizens. Application requests must be made in writing. Contact Foundation Headquarters, Lee Park Center, Suite 437, 3141 Hood St., Dallas, TX 75219.

Park Revitalization
Registration deadline
January 17, 1992

Olympia Fields, Illinois. The Olympia Fields Park District has announced "A New American Green," a national, one-stage design competition for the adaptive reuse of its buildings and property and a new park. Contact Olympia Fields Design Competition, Olympia Fields Park District, P.O. Box 297, Olympia Fields, IL 60461 (708) 481-7313.

A Moment in Building
Entry deadline
January 31, 1992

Washington, D.C. Photographs of craftspeople and workers constructing buildings, bridges, highways, or other structures may be submitted by amateur or professional photographers in the third "A Moment in Building" photo contest. Contact Photography Contest, National Building Museum, 401 F Street NW, Washington, D.C. 20001 (202) 272-2448.

Innovations in Housing
Entry deadline
February 7, 1992

Tacoma, Washington. The 15th annual competition, sponsored by American Plywood Association, *Better Homes and Gardens*, *Builder*, and P/A, calls for an unbuilt, single-family "move-up" house; the design must use wood products and systems and be 2500-square feet or less. Contact Innovations in Housing, P.O. Box 11700, Tacoma, WA 98411-0700.

Young Architects
Entry deadline
February 8, 1992

New York. "On Hold" is the theme of the Architectural League of New York's 11th annual Young Architects Competition. Projects may be theoretical or real, built or unbuilt. Entrants must be ten years or fewer out of graduate or undergraduate school; students may not enter. Contact Architectural League, 457 Madison Ave., New York, NY 10022 (212) 753-1722.

Conferences

Paris Furniture Fair
January 10–14, 1992

Paris. The 1992 Paris Furniture Fair will be held at the Paris-Sud, Porte de Versailles Exhibition Park. Over 1000 exhibitors will be present. Contact Salon International du Meuble, 22, Avenue Franklin-Roosevelt, F-75008 Paris, France (1) 40-76-45-00 or FAX (1) 45-63-78-24.

Edge of the Millennium
January 15–18, 1992

New York. "The Edge of the Millennium" is an ambitious effort to discuss the future of design. Four sessions are included: "Setting the Stage for the Third Millennium"; "The City: Spirit and Form"; "Product Design and the Juggernaut of Technology"; and "Communications: Propaganda and Consumption." The symposium will be held at Cooper Union. Contact Education Department, Cooper-Hewitt, National Museum of Design, Smithsonian Institution, 2 E. 91st St., New York, NY 10128-9990 (212) 860-6868.

Winter Cities
January 17–21, 1992

Montreal. Participants at the fifth International Winter Cities Biennial will focus their attention on issues of the environment, urban planning, and physical fitness in relationship to the climates of northern cities. Contact Winter Cities Biennial, 770, Rue Sherbrooke Ouest, Bureau 1100, Montreal, Quebec H3A 1G1 (514) 872-0571.

Accent on Architecture
January 22, 1992

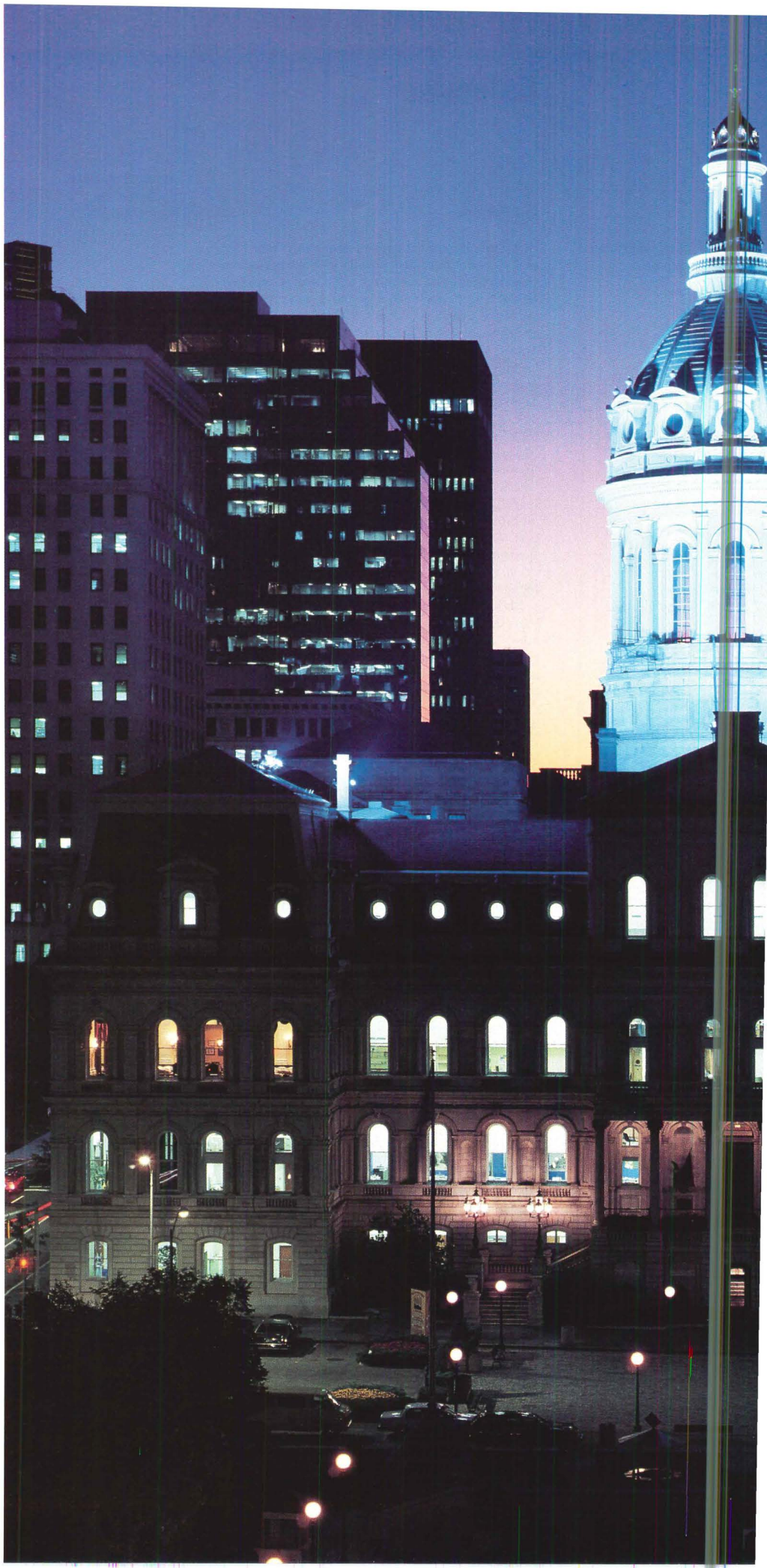
Washington, D.C. A day-long series of programs and an awards dinner featuring the presentation of the Gold Medal, Honor Awards, Twenty-five Year Awards, and Architecture Firm Awards are scheduled for the third annual Accent on Architecture, sponsored by the AIA and the American Architectural Foundation. A traveling exhibition honoring the 200th anniversary of the White House will open in conjunction with the event (see Exhibitions, above). Contact AIA, 1735 New York Ave., N.W., Washington, D.C. 20006 (202) 626-7300.

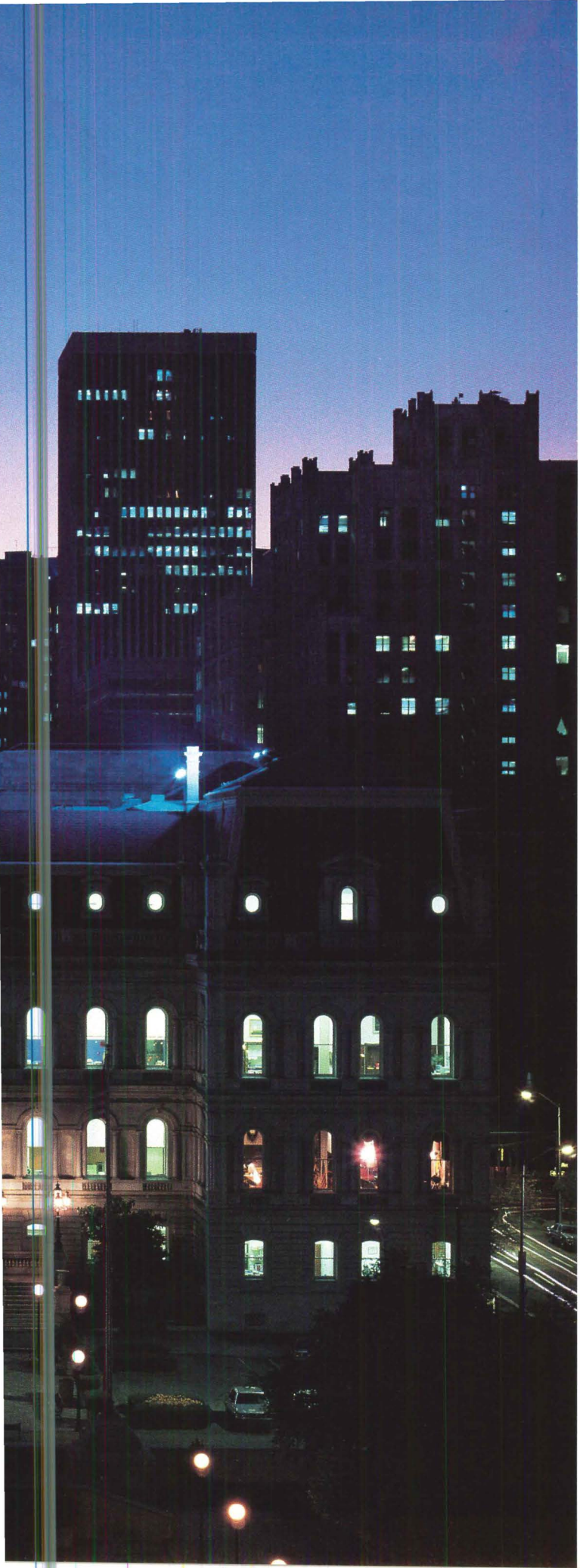
NAHB Convention and Expo
January 24–27, 1992

Las Vegas. The 48th annual National Association of Home Builders convention and exposition will be held at the Las Vegas Convention Center. Over 1000 home product exhibitors are expected and 170 educational programs scheduled. Contact Betty Christy, NAHB, 15th and M Streets, N.W., Washington, D.C. 20005 (202) 822-0200 or FAX (202) 822-0559. ■

Notice

We strongly encourage readers to contact exhibition venues and competition and conference sponsors to confirm dates, request competition briefs, etc. In order to provide timely Calendar information, listings information should be submitted one and one-half months prior to publication (December 15 for the February 1992 issue, for example). For possible inclusion, please send relevant information to Abby Bussel, P/A, 600 Summer St., Stamford, CT 06904 or FAX (203) 348-4023.





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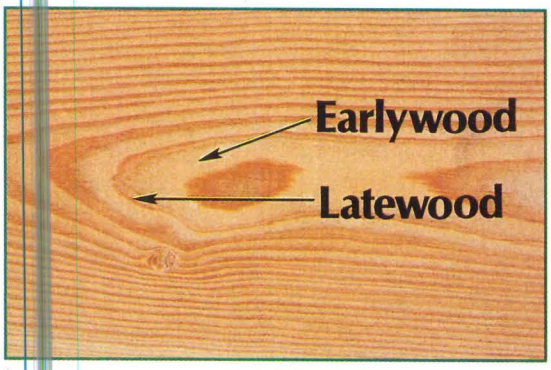
Technics
Painting and Finishing Exterior Wood

U.S. Forest Products Laboratory researcher **Dr. William C. Feist** describes the selection of wood and appropriate finishes for outdoors.



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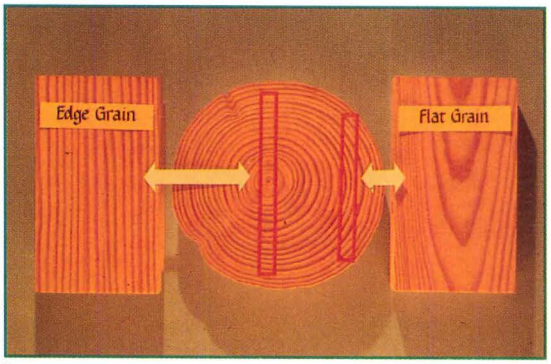

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A variety of finishes can be applied to outdoor wood. These include 1 clear finishes, which reveal and accentuate the grain, 2 stains, which darken or color the grain, and 3 paint, which covers the grain in a multitude of colors. This article describes the characteristics of exterior wood finishes and their proper application to solid and reconstituted wood products. It describes how manufacturing affects the surfaces of wood products, how various types of finishes interact with the surface, and how weathering affects the finished surfaces.

Wood Properties and Finish Durability

Wood is a biological material and its properties vary not only from one species to another, but also within the same species. Some differences can even be expected in boards cut from the same tree. The natural and manufacturing characteristics of wood strongly influence its finishing characteristics and durability.

The properties of wood that vary greatly from species to species are density, grain characteristics (presence of earlywood and latewood), texture (hardwood or softwood), presence and amount of heartwood or sapwood, and the presence of extractives, resins, and oils. The density ("weight") of wood is one of the most important factors that affect finishing characteristics. Excessive dimensional change in wood constantly stresses a film-forming finish such as paint, and may result in early failure of the finish.

The amount of warping and checking that occurs as wood changes dimension and during the natural weathering process is directly related to wood density. Warping is generally caused by uneven shrinking or swelling within the board. Boards may twist from one end to the other, deviating from a straight line along the length of the piece (a form of warp called "crook"). High density (heavy) woods such as southern yellow pine tend to warp and check more than do the low density (light) woods such as redwood. Low density woods are also generally easier to nail, machine, and handle than high density woods.

The presence and amount of latewood in softwood (conifer) lumber governs paint durability and is closely related to wood density. Latewood is denser, harder, smoother, and darker than earlywood, and its cells have thicker walls and smaller cavities. The wider the latewood band, the denser the wood.

As trees mature, most species naturally develop a darker central column of wood called *heartwood*. To the outside of the heartwood is a lighter cylinder of wood called *sapwood*. The sapwood transports water and nutrients from the roots to the leaves and provides mechanical support for the tree. The heartwood serves only as support. Heartwood is formed as the individual cells die and are impregnated with extractives, pitch, oil, and other extraneous materials. The old-growth timber from some species – such as redwood, redcedar, and cypress – is notable for its natural resistance to decay and insects.

Water-soluble extractives are extraneous materials that are naturally deposited in the lumens, or cavities, of cells in the heartwood of both softwoods and hardwoods. They are particularly abundant in those woods commonly used for exterior applications – such as western redcedar, redwood, and cypress – and are also found in lesser amounts in Douglas-fir and southern yellow pine heartwood. Extractives contribute to the attractive color, good dimensional stability, and natural decay resistance of many species. However, these same extractives can cause serious finishing defects. Because the extractives are water soluble, they can be dissolved and transported to the wood surface when free water is present. When this solution of extractives reaches the painted surface,

1 Earlywood and latewood bands in southern yellow pine. These distinct bands often lead to early paint failure. New paint adheres firmly to both earlywood and latewood. However, old paint that has become brittle with age and weathering loses its adhesion and peels from the smooth, hard surface of the latewood.

2 Effect of sawing method on ring orientation in lumber. Flat-grained lumber shrinks and swells more than does edge-grained lumber and also has wider, darker bands of latewood. Therefore, edge-grained lumber for siding will usually hold paint better than will flat-grained material.

3 RECOMMENDED INSTALLATION AVERAGE MOISTURE CONTENT*

Geographical Area	Moisture Content (percent)	
	Average	Individual Pieces
Most areas of United States	12	9–14
Dry southwestern areas	9	7–12
Warm, humid coastal areas	12	9–14

*Values are for wood used in exterior applications (such as siding and trim) at time of installation.

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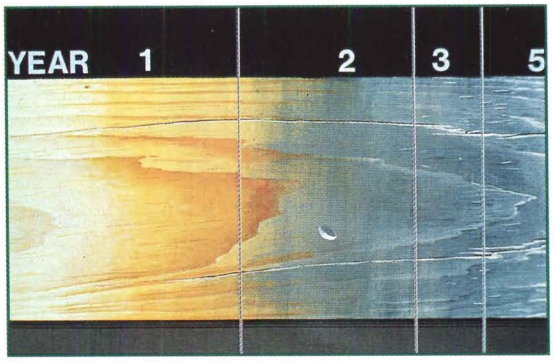

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3 *The recommended moisture content for wood used in exterior applications varies substantially, depending on geographic region.*

4 *Textured, roughsawn (T1-11) plywood (left), particleboard, waferboard, and textured hardboard (right) are manufactured or reconstituted wood products. Plywood should* never *be left unfinished if it is to be exposed outdoors. The natural weathering process degrades the thin surface veneer of most plywood fairly quickly. Transparent finishes are also unsuitable for plywood because they do not protect the surface from weathering unless they contain ultraviolet radiation stabilizers and water repellents. Film-forming finishes such as paints and solid-color stains will give the most protection to reconstituted wood panel products.*

5 *Artist's rendition of color and surface wood changes for a typical softwood during the outdoor weathering process. The first step in the weathering process is the development of a yellowish or brownish color on the surface of light-colored woods. As weathering continues, a thin gray layer develops. This usually results from the growth of micro-organisms such as fungi or mildew. Once weathered wood turns gray, additional changes in the wood occur very slowly because the process affects only the surface of the wood.*

(continued on next page)

the water evaporates, and the extractives remain as a reddish-brown mark.

Pitch in most pines and Douglas-fir can be exuded from either the sapwood or heartwood. Pitch is usually a mixture of rosin and turpentine; this mixture is called resin. Rosin is brittle and remains solid at most normal temperatures. Turpentine, on the other hand, is volatile even at relatively low temperatures. By use of the proper kiln-drying techniques, turpentine can generally be driven from the wood, leaving behind only the solid rosin. However, for green lumber or even dried lumber marketed for general construction, different kiln schedules may be used, and the turpentine remains in the wood, mixed with the rosin. The resultant resin melts at a much lower temperature than does pure rosin, and consequently the mixture can move to the surface. If the surface is finished, the resin may exude through the coating or cause it to discolor or blister.

Some characteristics of wood, such as how the board was sawn from the log (which determines growth ring orientation), the presence of knots and similar irregularities (lumber grade), and moisture content, are determined primarily during the manufacturing, grading, and distributing processes. These processes can affect the finishing characteristics and durability of wood.

The manner in which a board is cut from a log determines the orientation of the annual rings in the piece and consequently its paintability. Softwood lumber is referred to as either *flat grained* or *edge grained* (*plainsawed* or *quartersawed* in hardwoods) or a combination of the two. Most standard lumber grades contain a high percentage of flat grain. Lumber used for board-and-batten and shiplap siding is frequently flat grained. Bevel siding of redwood or cedar is generally produced in a flat-grained standard grade and an edge-grained premium grade.

Surface Condition

Lumber may be left in its roughsawn condition or surfaced smooth after drying. Paint is easier to apply on smooth edge-grained surfaces and will last longer than on smooth flat-grained ones. However, paint on roughsawn flat-grained surfaces will last longer than on smooth flat-grained ones. Natural finishes such as penetrating stains or preservative treatments are preferred for roughsawn and flat-grained lumber. The natural finishes often accentuate the rustic look of roughsawn lumber and allow the wood grain and surface texture to show through the finish. On plywood, paint will last longer on new, rough-textured surfaces than on smooth surfaces because more paint can be applied to the rough surface.

The presence of knots and other irregularities (such as bark, splits, pitch pockets, and insect damage) affects the paintability of lumber and is generally a function of lumber grade. Knots are mostly exposed end grain. End-grained wood absorbs more finish than does flat- and edge-grained lumber, and this can mar the appearance of the paint coating. In pine, knots often contain a high percentage of resin, which may cause the paint over the knot to discolor. Furthermore, large knots usually check and crack to the extent that a noticeable split or defect can result. The higher grades of lumber are generally preferable for achieving maximum serviceability of a paint coat.

Finally, the moisture content of the wood is critical to the service life of paint. The best time to paint wood is when its average moisture content is about that expected to prevail during service. Lumber that is marketed for construction purposes in the kiln-dried condition but is obviously wet and sometimes discolored should be rejected. If the material is used, it will dry in service, but shrinkage and accompanying warping, twisting, and checking are likely to occur.

7 CHARACTERISTICS OF SELECTED SOLID WOODS FOR PAINTING AND FINISHING

Wood	Density (lb/ft³) at 8 percent moisture content[a]	Paint-holding Characteristic (I, best; V, worst)[b]	Resistance to Cupping (1, most; 4, least)	Conspicuousness of Checking) (1, least; 2, most)	Color of Heartwood	Degree of Figure on Flat-grained Surface
Softwoods						
Western redcedar	22.4	I	1	1	Brown	Distinct
Cypress	31.4	I	1	1	Light brown	Strong
Redwood	27.4	I	1	1	Dark brown	Distinct
Eastern white pine	24.2	II	2	2	Cream	Faint
Ponderosa pine	27.5	III	2	2	Cream	Distinct
White fir	25.8	III	2	2	White	Faint
Western hemlock	28.7	III	2	2	Pale brown	Faint
Spruce	26.8	III	2	2	White	Faint
Douglas-fir[c]	31.0	IV	2	2	Pale red	Strong
Southern yellow pine[c]	38.2	IV	2	2	Light brown	Strong
Hardwoods						
Eastern cottonwood	28.0	III	4	2	White	Faint
Magnolia	34.4	III	2	—	Pale brown	Faint
Yellow-poplar	29.2	III	2	1	Pale brown	Faint
Lauan (plywood)		IV	2	2	Brown	Faint
Yellow birch	42.4	IV	4	2	Light brown	Faint
Gum	35.5	IV	4	2	Brown	Faint
Sycamore	34.7	IV	—	—	Pale brown	Faint
American elm	35.5	V or III	4	2	Brown	Distinct
White oak	45.6	V or IV	4	2	Brown	Distinct
Northern red oak	42.5	V or IV	4	2	Brown	Distinct

[a] 1 lb/ft³ = 16.02 kg/m³.
[b] Woods ranked in Group V are hardwoods with large pores, which require wood filler for durable painting. When the pores are properly filled before painting, Group II applies.
[c] Lumber and plywood.

Finishing Characteristics

Of the softwoods, redwood and western redcedar are the easiest to finish and maintain, whereas southern yellow pine and Douglas-fir are difficult to finish and maintain. Redwood and cedar are low-density woods and have narrow bands of latewood, whereas southern yellow pine and Douglas-fir are higher in density and have wide bands of latewood. The best hardwoods for painting are fine, uniform-textured (small-pored) woods with medium to low density such as yellow-poplar. On hardwoods, paint tends to scale off in rather large flakes, apparently regardless of the grain of the wood beneath the paint. The pores of some hardwoods are so large that they are not filled and leveled off properly by ordinary housepaint. The pores consequently become the foci for early paint failure. The pores, therefore, must be filled with wood-filler paste prior to painting.

When high-density hardwoods are exposed to the weather without paint or with inadequate paint protection, or when water enters behind the wood, the wood will tend to warp or cup and pull away from fastenings. These hardwoods need to be nailed firmly, although such nailing may cause the boards to split. Thinner boards are more likely to cup or warp from surface wetting and drying than thicker boards. For these reasons, ½″ siding of heavy hardwoods is impractical. Boards for exterior exposure should be no thinner than ¾″ at any point and preferably less than 6″ wide.

Wood Products Used Outdoors

Three general categories of wood products are commonly used in construction, namely, lumber, plywood, and reconstituted wood products. Each product has unique characteristics that affect the durability of any finish applied to it and any of these products may be treated with wood preservatives or fire-retardant chemicals, some of which also affect finishing characteristics.

Although the use of lumber for exteriors has declined for several decades, there is currently an increase in the use of solid wood siding. Bevel siding is perhaps the most popular type of siding for houses. Vertical siding is increasingly popular.

Exterior plywood manufactured from southern yellow pine, Douglas-fir, and western redcedar, with smooth and roughsawn surfaces, is commonly available. Roughsawn plywood with vertical grooving to simulate board-and-batten and other patterns is specified for exterior use (texture 1–11 or T 1–11). Smooth-sanded plywood is not recommended for siding, but it is often used in soffits. Both smooth and roughsawn plywood will develop surface checks (face checks), especially when exposed to moisture and sunlight. These surface checks can lead to early paint failure with oil or alkyd paints. This problem can be avoided by using quality acrylic latex stain-blocking primer and topcoat paints. The flat-grained pattern present in nearly all plywood contributes to early paint failure even more than does face checking. Therefore, painting smooth or roughsawn plywood requires special precautions. Penetrating stains are often appropriate for smooth-sanded and roughsawn exterior plywood surfaces, but the stains must be renewed regularly.

Reconstituted wood products account for more than half the total surface area of all materials used as exterior siding for new residential construction in the United States. Only reconstituted wood products manufactured specifically for exterior use should be used. Some such products may be factory primed with paint, with or without a topcoat. Others may be overlaid with a resin-treated cellulose fiber sheet, similar to medium density overlay (MDO) plywood, or with wood veneers. The objective is usually to improve the surface appearance and the finishing characteristics.

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However, the wood surface slowly wears away in a process called erosion. In general, for softwoods like pines, firs, white cedar, redwood, and spruce, about 1/4″ of wood thickness weathers away every 100 years. The maximum weathering rate reported is 65/100″ per 100 years for slow-grown (24 annual rings per inch) western redcedar exposed vertically facing south. For dense hardwoods like the oaks, the weathering rate is only about 13/100″ per 100 years.

6 *Test fences at the Forest Products Laboratory and other laboratories show that all-acrylic latex topcoat paints applied in two coats over a stain-blocking acrylic latex primer last longer than other paint systems even on difficult-to-paint roughsawn plywood surfaces. However, paints are not preservatives. They will not prevent decay if conditions are favorable for fungal growth.*

7 *Density varies tremendously from species to species and it is important because "heavy" woods shrink and swell more than do "light" woods. Cupping, the most common form of warp, is the distortion of a board that causes a deviation from flatness across the width of the piece. Wide boards cup more than narrow boards. Paintability is related to natural characteristics (density, presence of latewood, and texture) and manufacturing characteristics (such as ring orientation).*

8 INITIAL APPLICATION AND MAINTENANCE OF EXTERIOR WOOD FINISHES[a]

	Initial Application			Maintenance		
Finish	**Process**	**Cost**	**Appearance of Wood**	**Process**	**Cost**	**Timing**
Waterborne preservative	Brushing	Low	Grain visible; wood brown to black, fades slightly with age	Brush to remove surface dirt	Low	3–5 years
	Pressure	Medium	Grain visible; wood greenish or brownish, fades with age	Brush to remove surface dirt	Nil, unless stained, painted, or varnished	None, unless stained, painted, or varnished
	Diffusion plus paint	Low to medium	Grain and natural color obscured	Clean and repaint	Medium	7–10 years
Organic solvent preservative[b]	Pressure, steeping, dipping, and brushing	Low to medium	Grain visible; color as desired	Brush down and reapply	Medium	2–3 years or when preferred
Water repellent and oils[c]	One or two brush coats of clear material or, preferably, dip application	Low	Grain and natural color visible, becoming darker and rougher textured with age	Clean and reapply	Low to medium	1–3 years or when preferred
Semitransparent stain	One or two brush coats	Low to medium	Grain visible; color as desired	Clean and reapply	Low to medium	3–6 years or when preferred
Clear varnish	Three coats (minimum)	High	Grain and natural color unchanged if adequately maintained	Clean and stain bleached areas; apply two more coats	High	2 years or when breakdown begins
Paint and solid-color stain	Brushing: water repellent, prime, and two topcoats	Medium to high	Grain and natural color obscured	Clean and apply topcoat or remove and repeat initial treatment if damaged	Medium	7–10 years for paint[d]; 3–7 years for solid-color stain

[a]This table is a compilation of data from the observations of many researchers.

[b]Pentachlorophenol, bis (tri-n-butyltin oxide), copper naphthenate, copper-8-quinolinolate, and similar materials.

[c]With or without added preservatives. Addition of preservatives helps control mildew growth.

[d]If top-quality acrylic latex topcoats are used.

Volatile Organic Compounds

A most serious concern throughout the U.S. paint industry is compliance with volatile organic compound (VOC) emission legislation. Many of the traditional wood finishes may no longer be acceptable because of this legislation (including oil-based semitransparent stains, oil- and alkyd-based primers and topcoats, solvent-borne water repellents, and solvent-borne water-repellent preservatives).

VOCs are those organic materials in finishes that evaporate as the finish dries or cures. These materials are regarded as air pollutants, and the amount that can be released for a given amount of solids or coloring pigments in the paints is now regulated in many states. Many new regulations are currently being established. Legislation in California requires some wood finishes to have no more than 250 grams of VOC per liter of finish. Similar legislation is in place in New York City, Dallas/Fort Worth, New Jersey, Arizona, and elsewhere, and legislation is pending in at least a dozen other states. VOC emissions attributed to architectural finishes used in California alone were reported as 195 tons per day in a June 1977 California Air Resources Board report.

The result of this legislation is that all major paint companies

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The edges and ends of all panel products tend to absorb water more readily than the rest of the piece. As a result, they will often swell in thickness. The swelled edges in particleboard, oriented strandboard (OSB), waferboard, and hardboard will not completely return to their original thickness even when dried out. Therefore, the edges of these products must be treated with a water-repellent preservative and painted.

Weathering of Wood

Natural weathering of wood can be considered the first method of wood finishing. During the first century of American colonization, exterior surfaces were left to weather naturally. The aesthetic appeal and life expectancy of wood and the compatibility of the wood with potential finishes are greatly affected by the weathering process. Weathering results from a complex combination of chemical, mechanical, biological, and light-induced changes, all of which occur simultaneously, affect one another, and modify the molecular structure of wood. In general, with two months of exposure to sunlight, all woods will turn yellowish or brownish, then gray. However, dark woods eventually become lighter and light woods become darker. Subsequently, surface checks, then cracks may develop. The grain raises and loosens; the boards cup and warp, pulling fasteners loose; and the wood surface becomes friable, with fragments separating from the surface. After the weathered gray surface has developed, usually in a year or two, further changes are very slow to develop.

Types of Exterior Wood Finishes

Finishes can be divided into two general categories, 1 opaque coatings, such as paints and solid-color stains, and 2 natural finishes, such as water repellents, water-repellent preservatives, varnishes, oils, and semi-transparent penetrating stains. Paints provide the most protection against surface erosion by weathering and against wetting by water; they also conceal certain defects. Paints contain substantial quantities of pigments, which account for the wide range of colors available. Some pigments will essentially eliminate ultraviolet radiation degradation of the wood surface.

Oil-based paint films usually provide the best shield from liquid water and water vapor. However, they are not necessarily the most durable because they embrittle over time. No matter how well sealed, wood still moves with seasonal humidity changes, stressing and eventually cracking the brittle paint. On the other hand, latex paints – particularly all-acrylic paint – remain more flexible with age. Even though latex paints allow more water vapor to pass through, they hold up better by stretching and shrinking with the wood.

Paints perform best on smooth, edge-grained lumber of light-density species such as redwood and cedar and are the best way to achieve a bright, white finish. They do not penetrate the wood deeply. Rather, the wood grain is completely obscured and a surface film is formed. This film can blister or peel if the wood is wetted or if water vapor from the indoors moves through the wall and wood siding (in the absence of a vapor retarder, for example). Original and maintenance costs are often higher for a paint finish than for a water-repellent preservative or penetrating stain.

Most complaints about paint involve low-cost products, indicating that good paints are always worth the extra money. Better quality paints usually contain 50 percent solids by weight. Paints with a lower percentage of solids may cost less by the gallon but may be more expensive per pound of solids, and more or heavier coats will have to be applied to achieve equal coverage. The Forest Products Laboratory evaluates paints by generic type only. *Consumer Reports* (101 Truman Avenue,

9 SUITABILITY AND EXPECTED SERVICE LIFE (IN YEARS) OF FINISHES FOR EXTERIOR WOOD SURFACES[a]

	Water-repellent preservative and oil		Semitransparent stain		Paint and solid-color stain		
Type of exterior wood surface	**Suitability**	**Expected life[b]**	**Suitability**	**Expected life[c]**	**Suitability**	**Paint[d]**	**Stain[d]**
Cedar and redwood siding							
Smooth (vertical grain)	High	1–2	Moderate	2–4	High	4–6	3–5
Roughsawn	High	2–3	High	5–8	Moderate	5–7	4–6
Pine, fir, and spruce siding							
Smooth (flat-grained)	High	1–2	Low	2–3	Moderate	3–5	3–4
Rough (flat-grained)	High	2–3	High	4–7	Moderate	4–6	4–5
Shingles							
Sawn	High	2–3	High	4–8	Moderate	3–5	3–4
Split	High	1–2	High	4–8	—	3–5	3–4
Plywood (Douglas Fir and Southern Pine)							
Sanded	Low	1–2	Moderate	2–4	Moderate	2–4	2–3
Textured (smooth)	Low	1–2	Moderate	2–4	Moderate	3–4	2–3
Textured (roughsawn)	Low	2–3	High	4–8	Moderate	4–6	3–5
Medium-density overlay[e]	—	—	—	—	Excellent	6–8	5–7
Plywood (cedar and redwood)							
Sanded	Low	1–2	Moderate	2–4	Moderate	2–4	2–3
Textured (smooth)	Low	1–2	Moderate	2–4	Moderate	3–4	2–3
Textured (roughsawn)	Low	2–3	High	5–8	Moderate	4–6	3–5
Hardboard, med. density[f], smooth or textured							
Unfinished and preprimed	—	—	—	—	High	4–6	3–5
Millwork (usually pine)							
Windows, shutters, doors, exterior trim	High[g]	—	Moderate	2–3	High	3–6	3–4
Decking							
New (smooth)	High	1–2	Moderate	2–3	Low	2–3	1–2
(weathered rough)	High	2–3	High	3–6	Low	2–3	1–2
Glued-laminated members							
Smooth	High	1–2	Moderate	3–4	Moderate	3–4	2–3
Rough	High	2–3	High	6–8	Moderate	3–5	3–4
Oriented strandboard	—	—	Low	1–3	Moderate	2–4	2–3

[a]These data were compiled from the observations of many researchers. Expected life predictions are for an average location in the continental United States; expected life will vary in extreme climates or exposures (such as desert, seashore, and deep woods).

[b]Development of mildew on surface indicates need for refinishing.

[c]Smooth, unweathered surfaces are generally finished with only one coat of stain. Roughsawn or weathered surfaces, which are more adsorptive, can be finished with two coats: the second coat is applied while the first coat is still wet.

[d]Expected life of two coats, one primer and one topcoat. Applying a second topcoat (three-coat job) will approximately double the life. Top quality acrylic latex paints will have the best durability.

[e]Medium-density overlay is generally painted.

[f]Semitransparent stains are not suitable for hardboard. Solid-color stains (acrylic latex) will perform like paints. Paints are preferred.

[g]Exterior millwork, such as windows, should be factory treated according to Industry Standard IS4-81. Other trim should be liberally treated by brushing before painting.

Yonkers, New York (914) 378-2000) occasionally reports on the results of extensive weather testing by paint brand, as do other publications.

Solid-color stains (also called hiding, heavy-bodied, or opaque stains) are opaque, film-forming finishes that come in a wide range of colors and are essentially thin paints. Solid-color stains are made with a much higher concentration of pigment than are the semitransparent penetrating stains, but with a somewhat lower concentration of pigment than that of standard paints. As a result, solid-color stains obscure the natural wood color and grain, and they can also be applied over old paints or solid-color stains. However, surface texture is retained and a flat-finish appearance normally results. Like paints, solid-color stains protect wood against ultraviolet radiation degradation. Solid-color stains form a thin film much like paint and consequently can also peel loose from the substrate. They are often used on textured surfaces and panel products such as hardboard and plywood. These stains are most effective when applied in two or three coats.

Water-repellent preservatives may be used as natural wood finishes. The treatment reduces warping and checking, prevents water staining at the edges and ends of wood siding, and helps control mildew growth. Paintable water-repellent preservatives may be used as a treatment for bare wood before priming and painting or in areas where old paint has peeled, exposing bare wood, particularly around butt joints or in corners. This treatment keeps rain or dew from penetrating the wood, especially at joints and on end grain, thus decreasing the shrinking and swelling of the wood. As a result, less stress is placed on the paint film, and its service life is extended.

Many oil or oil-based natural wood finish formulations are available for finishing exterior wood. The most common are linseed and tung oils. These may serve as a food source for mildew, however, if they do not also contain a mildewcide. The oils will also perform better if a water repellent is included in the formulation. All these oil systems will protect wood, but their average lifetime may be only as long as that described for the water-repellent preservatives.

Semitransparent oil-based penetrating stains are moderately pigmented water repellents or water-repellent preservatives. They penetrate the wood surface somewhat, are porous, and do not form a surface film like paint. They do not totally hide the wood grain and will not trap moisture that may encourage decay. Stains will not blister or peel, even if moisture penetrates the wood. Penetrating stains are oil-based (or alkyd-based), and some may contain a fungicide (preservative or mildewcide), ultraviolet radiation stabilizer, or water repellent. Latex-based (waterborne) stains are also available, but they do not penetrate the wood surface as do their oil-based counterparts. Newer latex formulations are being developed that may provide some penetrating characteristics.

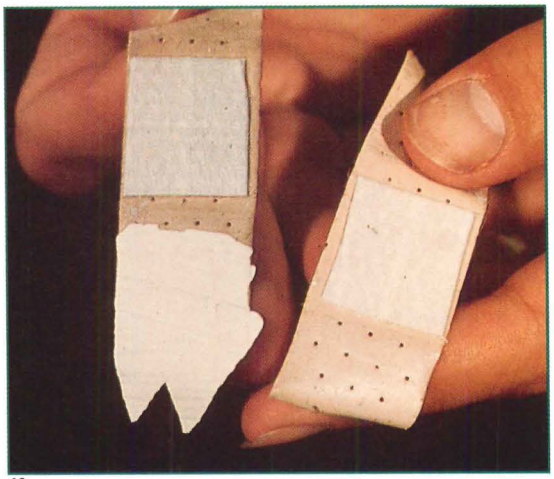
Clear coatings of conventional spar, urethane, or marine varnish, which are film-forming finishes, are not generally recommended for exterior use on wood. Ultraviolet radiation from the sun penetrates the transparent film and degrades the wood under it. Regardless of the number of coats applied, the finish will eventually embrittle as a result of exposure to sunlight, develop severe cracks, and peel – often in less than two years.

A finish that forms a thin, erodable film has been developed in Europe. This finish is commonly called a *varnish stain*. The film of varnish stain is thicker than that provided by a semitransparent stain, but thinner than that provided by a varnish. Varnish stains contain a water repellent, special transparent iron oxide pigments, and mildewcides. The surface coating will slowly erode

(continued from previous page)

have had to either change their formulation, or market additional low VOC formulations. The only manufacturers not affected by the legislation already in place are those marketing their products in limited geographic areas outside of the areas governed by the legislation. Many current wood finishes, including some latex-based materials, may be reformulated. These changes could affect the serviceability of different finishes and perhaps the method by which they are applied. At this time, little information on the long-term performance of these new finishes is available.

The introduction of these new low VOC finishes might also be complicated by changes within the wood industry. The change away from traditional species such as redwood and western redcedar will probably continue. More hardwoods will probably be used, and the trend toward faster-grown, smaller-diameter trees will probably continue. Wood from these different species and smaller trees will not have the same properties as wood from traditional, slower-grown species. New composite materials will be developed as will new adhesives. These composites will be wood-based or will be combinations of wood and non-wood materials. Compatibility of these new substrates with new finishes will be a major challenge.



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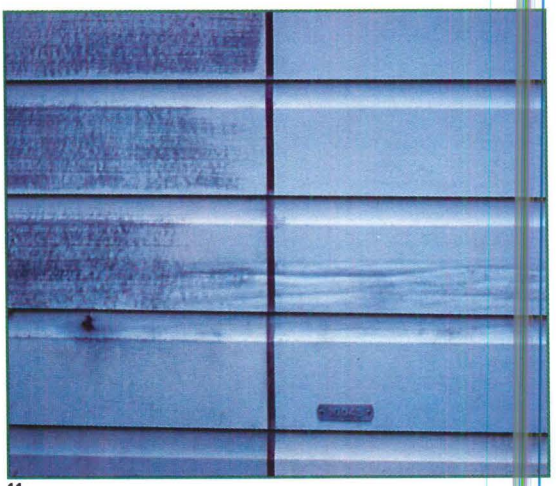

11

10 *Latex paint can be applied to weathered paint surfaces if the old paint is clear and sound, as may be simply tested: Clean the surface and apply the paint in a small, inconspicuous area, letting it dry overnight. Test the adhesion of the new paint by firmly pressing one end of an adhesive bandage onto the surface. Jerk the bandage off with a snapping action. If the bandage is free of paint, the paint is well bonded and does not need to be primed or cleaned. If paint comes off with the bandage, the old surface is chalky and needs priming with an oil-based primer or additional cleaning. If both the freshly applied paint and the old paint adhere to the bandage, the old paint is not well bonded to the wood and must be removed before repainting.*

11 *Mildew is probably the most common cause of discoloration of paints and stains. "Mildew" applies to both the fungus and its staining effects on the substrate; it grows on the surface and does not normally degrade the wood. Paint containing a mildewcide covers the siding on the right-hand side of the photo, the paint on the left-hand side has no mildewcide.*

Although mildew may be found anywhere on a building, it is most commonly found on walls behind shrubs and trees where air movement is restricted. Mildew may be associated with the dew pattern of the house: Dew will form on those parts of the house that are not heated and tend to cool rapidly, such as eaves, the ceilings of carports and porches, and the wall between studs. The dew provides a source of moisture for the mildew. The presence of mildew on paint can be confirmed by applying a drop or two of household liquid bleach (5 percent sodium hypochlorite) to the stained area. The dark color of mildew usually bleaches out in one or two minutes; discoloration that does not bleach is probably dirt.

and can be refinished easier than that provided by a conventional varnish. Varnish stains are usually applied initially as three-coat systems.

There are two other types of film-forming transparent coatings, but neither works well in exterior applications. Two-part polyurethanes are tougher and perhaps more resistant to ultraviolet radiation than other transparent film-forming coatings, but they are expensive, difficult to use, and usually have as short a life as conventional varnishes. The second type, lacquers and shellac, is *not* suitable for exterior application, even as sealers or primers, because these coatings have little resistance to moisture. These finishes are also normally brittle and thus crack and check easily. However, specialty pigmented knot sealer primers based on shellac are available for specific exterior applications. **William C. Feist** ■

The author is a supervisory research chemist with the Wood Surface Chemistry and Preservation Project of the Department of Agriculture's Forest Products Laboratory in Madison, Wisconsin. He has been researching the performance of exterior wood claddings and finishes for more than 16 years, and is the author of numerous technical reports and consumer publications on the subject.

Reading from the Forest Products Laboratory

Finishing Wood Exteriors: Selection, Application, and Maintenance, D.L. Cassens and W.C. Feist, Agriculture Handbook 647, Govt. Printing Office, Washington, D.C. (202) 783-3238, 1986, 56 pp.

Finishing Wood in the South: Selection, Applications, and Finishes, D.L. Cassens and W.C. Feist, USDA Forest Service Forest Products Laboratory General Technical Report No. 69, Southern Forest Products Association, New Orleans (504) 443-4464, 1991, 60 pp.

"Finishing Wood for Exterior Use," W.C. Feist, *Finishing Eastern Hardwoods*, R.M. Carter, editor, Forest Products Research Society, Madison, Wisconsin (608) 231-1361, 1983, pp. 185–198.

"Exterior Wood Surfaces," W.C. Feist, Chapter 7, *Preventive Maintenance of Buildings*, R.C. Matulionis and J.C. Freitag, editors, Van Nostrand Reinhold, New York (800) 926-2665, 1991, pp. 183–214.

Wood Siding – Installing, Finishing, Maintaining, W.C. Feist and A.E. Oviatt, Home and Garden Bulletin 203, Government Printing Office, Washington, D.C. (202) 783-3238, 1984, 27 pp.

"Finishing of Wood," Chapter 16, *Wood as an Engineering Material*, Agriculture Handbook 72 (Revised), #001-000-04456–7, Government Printing Office, Washington, D.C. (202) 783-3238, 1987, 29 pp.

Acknowledgment

The Forest Products Laboratory, an agency of the Department of Agriculture Forest Service, is maintained in cooperation with the University of Wisconsin. The mission of the Forest Products Laboratory is to improve the use of wood through science and technology, thereby contributing to the conservation and management of the forest resource. This article was written and prepared by U.S. Government employees on official time, and it is therefore in the public domain and not subject to copyright.

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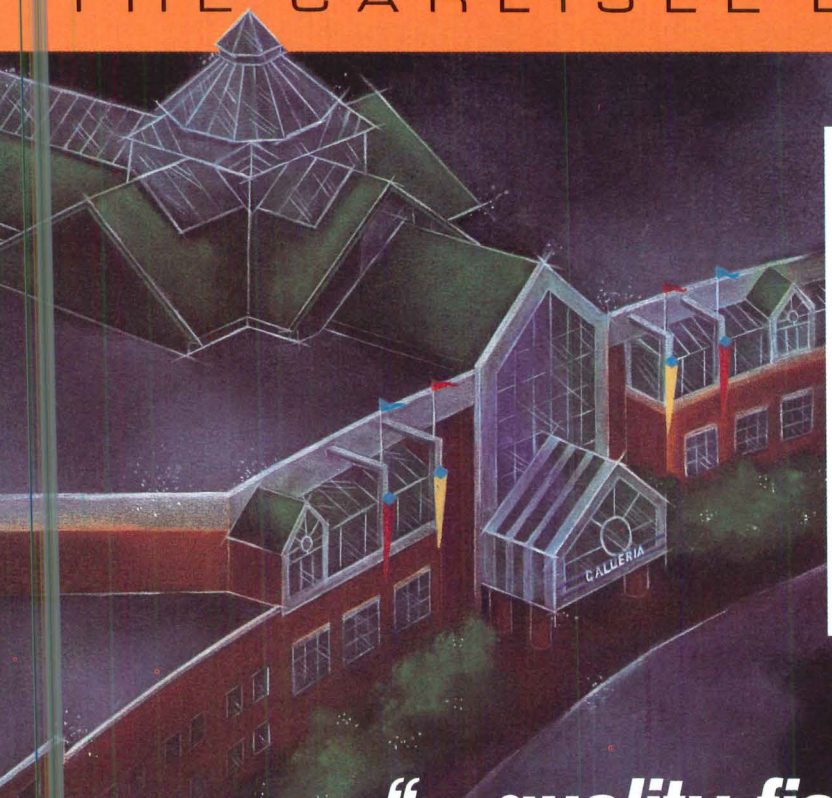

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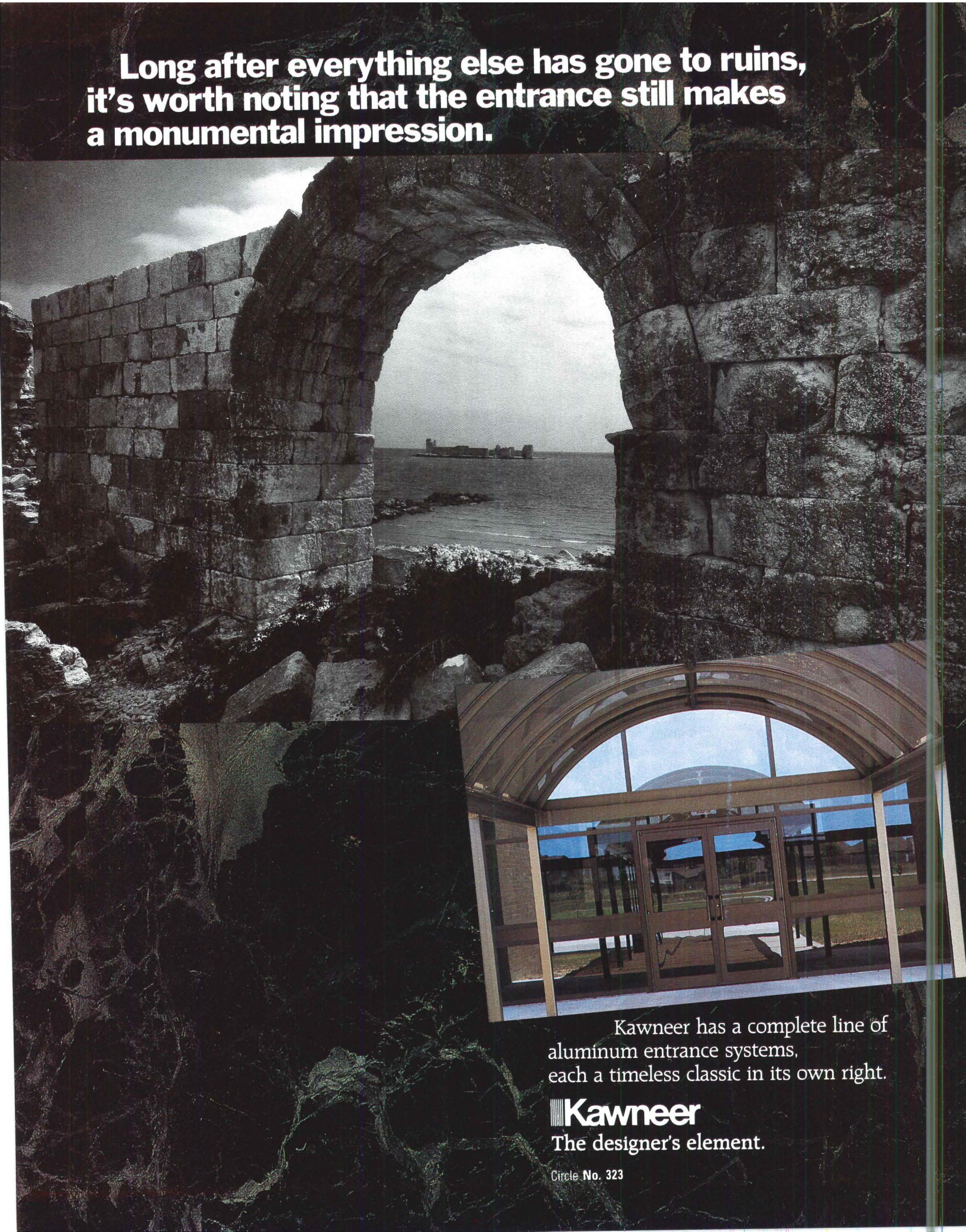

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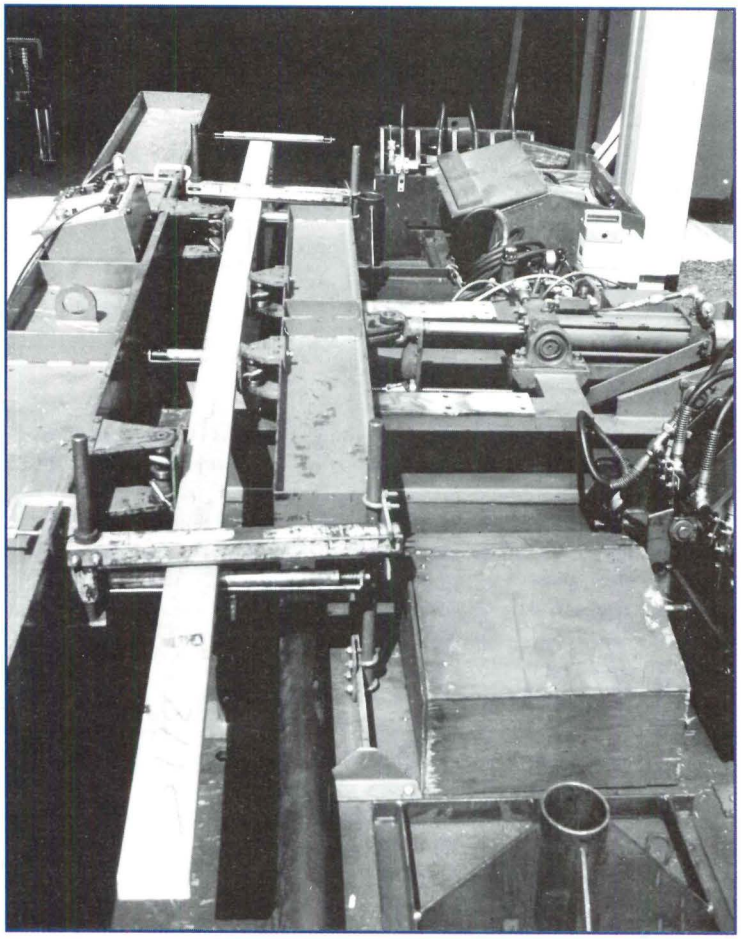
Technics Topics
Reassessing Lumber Strengths

NFPA Engineer **Gerald E. Sherwood** describes the joint U.S./Canadian "In-Grade Program" that has determined new allowable spans for North American lumber.

The *1991 National Design Specification for Wood Construction (NDS)* features a new and easier-to-use equation format and new wood property data from a 13-year program that tested the strength of over 70,000 lumber specimens. The *NDS* has been the authoritative guide for structural design with wood – and an essential reference book for architects and engineers – since it was first published in 1944. It has been revised 15 times as new data on structural properties of wood have become available and as new research has led to an improved understanding of the structural performance of wood members and systems.

To assure that it is current, accurate, and relevant, the National Forest Products Association (NFPA) established a special advisory committee in 1981 to provide regular review and to recommend improvements to the *NDS*. This committee is composed of practicing design engineers and architects, university and government researchers, and industry technical representatives.



1 *A bending test of a full-sized member used for the In-Grade Program.*

The In-Grade Program

One of the most significant changes in the 1991 *NDS* is the revised *Design Values for Wood Construction* supplement, which presents new design values based on an extensive industry-wide test program. Previously published structural properties were based on testing of small, clear specimens, with adjustments made for grade characteristics. One set of design values was assigned to 2×4s with a separate set of values assigned to dimension lumber 2×5 and larger. In the new system, separate design values are assigned to each grade and size based on tests of full-size members (1).

Test specimens were selected at mills after grading. Participants in the test program (referred to in the lumber industry as the "In-Grade Program") included the Canadian Wood Council, the Southern Pine Inspection Bureau, the West Coast Lumber Inspection Bureau, the Western Wood Products Association, and the U.S. Forest Products Laboratory (part of the Department of Agriculture).

Based on the new test data, design values were developed using the methods presented in ASTM D 1990 *Standard Practice for Establishing Allowable Properties for Visually Graded Dimension Lumber from In-Grade Tests of Full Size Specimens*. These new design values were approved by an independent Board of Review of the American Lumber Standards Committee (ALSC). ALSC reviewed the design

Tech Notes

ASTM Committee C-24 on Building Seals and Sealants will hold their 2nd symposium, featuring 26 presentations, in Ft. Lauderdale, February 2–5, 1992; Contact R. Malcolm, ASTM (215) 299-5531. C-24 also solicits papers for their 3rd symposium for January 1993. Abstracts of 250–300 words should be submitted by February 10, 1992 to Dorothy Savini, ASTM, Philadelphia (215) 299-5413.

A Practical Guide to Noise and Vibration Control for HVAC Systems **by acoustician M.E. Schaffer explains principles, practices, and details for equipment mounting, floating floors, sound insulation, and other architectural features. ASHRAE, Atlanta (404) 636-8400, 190 pp., $58.**

Wood as a Building Material: A Guide for Designers and Builders **by W. Wilcox, E. Botsai, and H. Kubler discusses composition, strength, moisture-related behavior, fire performance, deterioration, finishing, lumber, glulams, veneer, and construction. Wiley & Sons, New York (908) 469-4400, 215 pp., $44.95.**

Crime Prevention through Environmental Design **by T.D. Crowe offers a criminologist's summary of 20 years of theory and practice with the idea of "defensible space" first codified by architect/planner Oscar Newman. A valuable report on current thought and programs. Butterworth-Heinemann, Stoneham, Massachusetts (800) 366-2665, 253 pp., $34.95.**

2 FLOOR JOIST SPAN TABLE (LIVE LOAD = 40 PSF, DEAD LOAD = 10 PSF, Δ = *L*/360, DOL= 1.00)

		DOUGLAS FIR–LARCH (DF)		SO. YELLOW PINE (SYP)		HEM–FIR (HF)		SPRUCE–PINE–FIR (SPF AND SPFs)*		
SIZE	SPACING	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	NEW (SPFs)*
2 x 8	12"	14' – 5"	14' – 2"	14' – 2"	14' – 2"	13' – 6"	13' – 2"	13' – 2"	13' – 6"	12' – 6"
	16"	13' – 1"	12' – 7"	12' – 10"	12' – 10"	12' – 3"	12' – 0"	11' – 6"	12' – 3"	11' – 4"
	24"	11' – 3"	10' – 3"	11' – 1"	10' – 10"	10' – 0"	10' – 2"	9' – 4"	10' – 3"	9' – 6"
2 x 10	12"	18' – 5"	17' – 9"	18' – 0"	18' – 0"	17' – 3"	16' – 10"	16' – 10"	17' – 3"	15' – 11"
	16"	16' – 9"	15' – 5"	16' – 5"	16' – 3"	15' – 8"	15' – 2"	14' – 7"	15' – 5"	14' – 3"
	24"	14' – 5"	12' – 7"	14' – 2"	13' – 3"	12' – 10"	12' – 5"	11' – 11"	12' – 7"	11' – 8"

3 LOW SLOPE RAFTER SPAN TABLE (LIVE LOAD = 30 PSF, DEAD LOAD = 10 PSF, Δ = *L*/240, DOL= 1.15)

2 x 6	12"	13' – 9"	13' – 6"	13' – 6"	13' – 6"	12' – 11"	12' – 7"	12' – 0"	12' – 11"	11' – 11"
	16"	12' – 6"	11' – 11"	12' – 3"	12' – 3"	11' – 2"	11' – 5"	10' – 5"	11' – 9"	10' – 10"
	24"	10' – 3"	9' – 9"	10' – 1"	10' – 3"	9' – 2"	9' – 7"	8' – 6"	9' – 9"	9' – 0"
2 x 8	12"	18' – 2"	17' – 5"	17' – 10"	17' – 10"	17' – 0"	16' – 7"	15' – 10"	17' – 0"	15' – 9"
	16"	16' – 6"	15' – 1"	16' – 2"	15' – 11"	14' – 9"	14' – 11"	13' – 9"	15' – 1"	14' – 0"
	24"	13' – 6"	12' – 4"	13' – 3"	13' – 0"	12' – 0"	12' – 2"	11' – 3"	12' – 4"	11' – 5"

4 CEILING JOIST SPAN TABLE (LIVE LOAD = 20 PSF, DEAD LOAD = 10 PSF, Δ = *L*/240, DOL= 1.00)

2 x 6	12"	15' – 7"	14' – 10"	15' – 4"	15' – 6"	13' – 11"	14' – 5"	13' – 0"	14' – 9"	13' – 8"
	16"	13' – 6"	12' – 10"	13' – 3"	13' – 7"	12' – 0"	12' – 8"	11' – 3"	12' – 10"	11' – 11"
	24"	11' – 0"	10' – 6"	10' – 10"	11' – 1"	9' – 10"	10' – 4"	9' – 2"	10' – 6"	9' – 9"
2 x 8	12"	20' – 7"	18' – 9"	20' – 3"	19' – 10"	18' – 4"	18' – 6"	17' – 1"	18' – 9"	17' – 5"
	16"	17' – 10"	16' – 3"	17' – 6"	17' – 2"	15' – 10"	16' – 0"	14' – 10"	16' – 3"	15' – 1"
	24"	14' – 7"	13' – 3"	14' – 4"	14' – 0"	12' – 11"	13' – 1"	12' – 1"	13' – 3"	12' – 4"

Note: All values are for No. 2 lumber at 19% moisture content.
* "SPF" refers to Canadian Spruce–Pine–Fir and "SPFs" refers to U.S. Spruce–Pine–Fir.

***2–4** New design values and allowable spans are greater for some species groupings and lower for others, as shown in these sample values for floor and ceiling joists and roof rafters. The greatest changes generally occur in the greatest widths. A distinction is now made between Canadian Spruce-Pine-Fir (SPF) and U.S. Spruce-Pine-Fir (SPFs), each of which has its own design values.*

value derivations for conformance to the ASTM Standard. This committee also coordinates development of grading rules and inspection practices.

Design Implications

What does the assignment of new design values mean? While many design values do not significantly change, some are affected enough that allowable spans of joists and rafters are slightly different from previously allowable spans. Engineered components, such as trusses, have traditionally been designed to more fully utilize the available lumber strength than conventional joists and rafters, so design value changes may have a greater impact on these components.

Some changes have been made in the format of design value tables. New design values are given for 19 percent moisture content for all species, and adjustment factors are provided for wet service conditions. A new Spruce-Pine-Fir grouping has been added for U.S. lumber, and is designated "SPFs" to differentiate it from Canadian Spruce-Pine-Fir, "SPF." Sample allowable spans of some of the most commonly used species, grades, and sizes are given in the accompanying tables (2, 3, 4). Note that the allowable span increases in some species, while in others there is a slight decrease. The greatest changes generally occur in the greatest widths. In spite of changes in maximum allowable span, when considering lengths of joists and rafters in two-foot increments, the required member size may not change.

Example Cases

To illustrate, consider 2×8 floor joists at 16″ O.C. (2). The Douglas Fir-Larch (DF) No. 2 span is reduced by 6″ from 13′-1″ to 12′-7″; however, both old and new design values permit DF No. 2 2×8s to span an even 12′. The Southern Yellow Pine (SYP) No. 2 remains exactly the same. The span for Hem-Fir (HF) No. 2 is reduced 3″ from 12′-3″ to 12′-0″, so once again a 12′ span is permitted using both old and new values. The SPF span increases by 9″, while the new SPFs span is 2″ shorter than the old SPF. Again, if 2′ increments of span are considered, SPF permits a greater span, while the span for SPFs is the same as for the old SPF. The span in even increments for 2×10 floor joists at 16″ O.C. is unchanged for all species listed except for DF, which would change from 16′-9″ under the former design values to 15′-5″ with the new design values; this is a reduction when considering 2′ increments of span.

For low-slope roof rafters (3) of 2×6s at 16″ O.C., the span for DF decreases slightly, but other species have spans the same as or greater than their previous design values. Using 2×8s under the same conditions results in a slightly reduced span for both DF and SYP, while other species have slightly increased allowable spans.

When considering 2′ increments of length for ceiling joists (4) at 16″ O.C., there are no reductions in span for 2×6s; SPF could actually increase from 10′ to 12′. For 2×8s, there is no reduction in any of the species listed, and again the SPF joist could be increased from a 14′ span to a 16′ span.

Summary

In summary, the *1991 National Design Specification* includes new design values for dimension lumber. All reference to 15 percent moisture content has been deleted; only dry service conditions (19 percent or less moisture content) and wet service conditions are specified. A new U.S. Spruce-Pine-Fir has been added and designated "SPFs" to differentiate it from the Canadian "SPF." While the new design values result in some changes to maximum allowable spans, they will have only a limited effect on the sizes of structural members commonly used in light frame construction.

The *1991 NDS*, including the design value supplement, is available at $25.00 a copy, plus $3.00 handling charge per order from the National Forest Products Association, Publications Dept., 1250 Connecticut Avenue, N.W., Suite 200, Washington, D.C. 20036.

Gerald E. Sherwood, PE

The author is communications coordinator for the American Wood Council of the National Forest Products Association. Before joining NFPA, he was a research engineer with the Forest Products Laboratory, U.S. Department of Agriculture, where he conducted studies on structural and environmental aspects of wood frame buildings.

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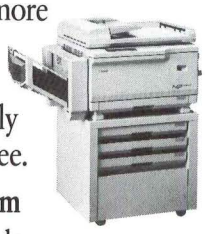

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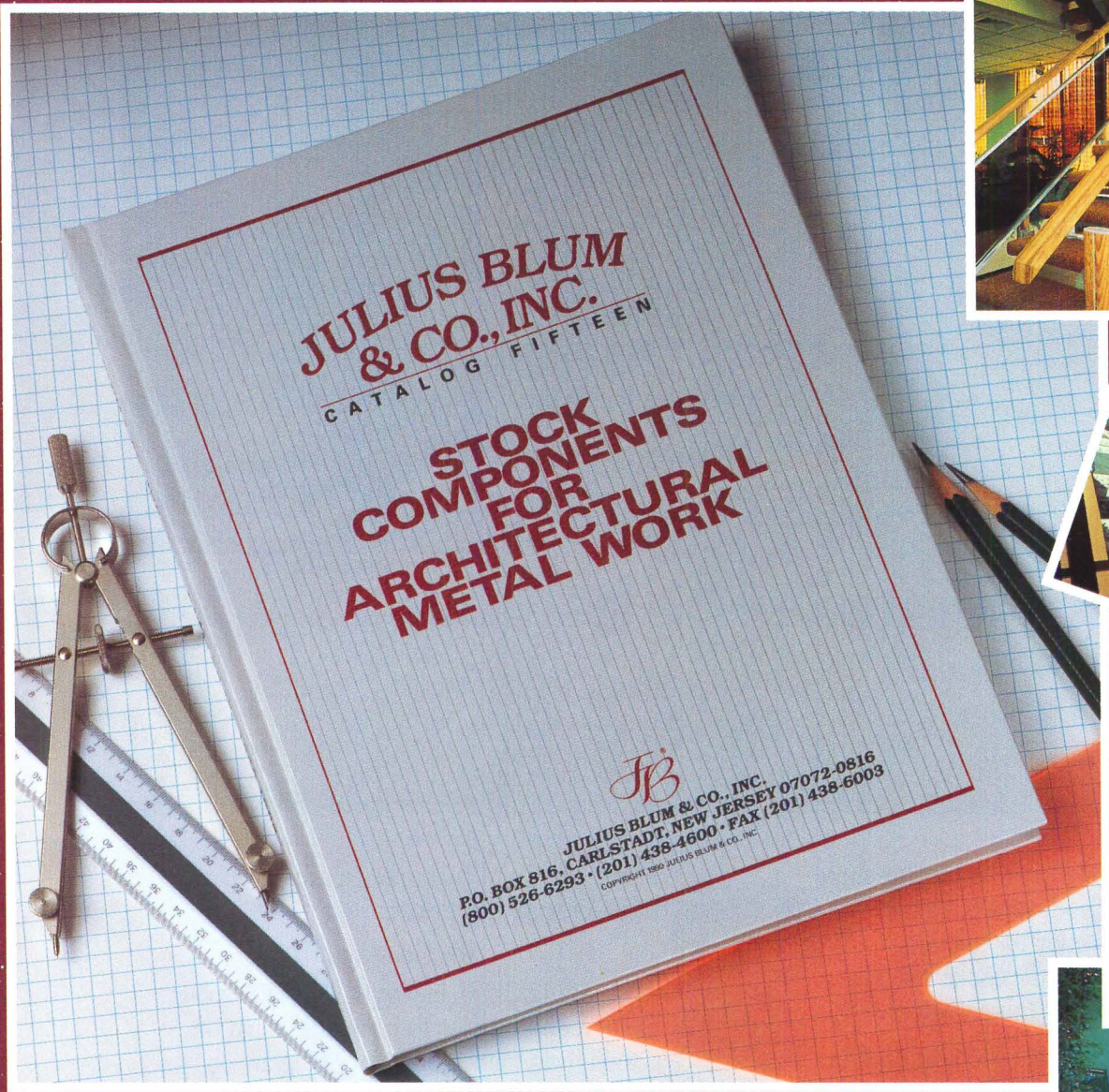

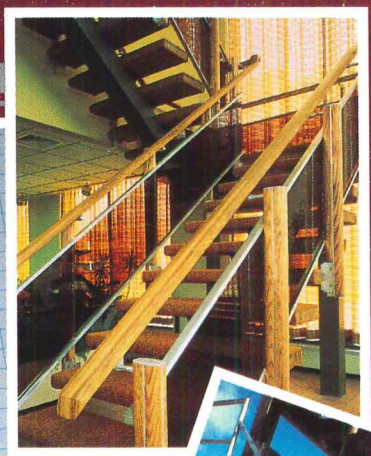

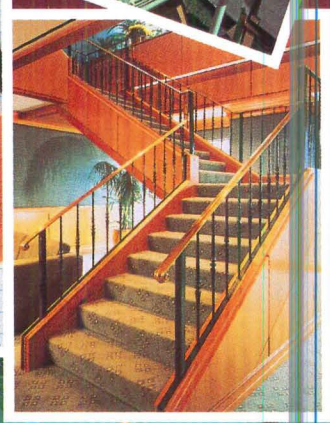

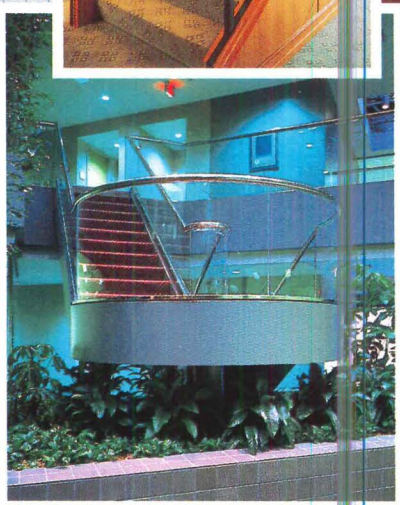

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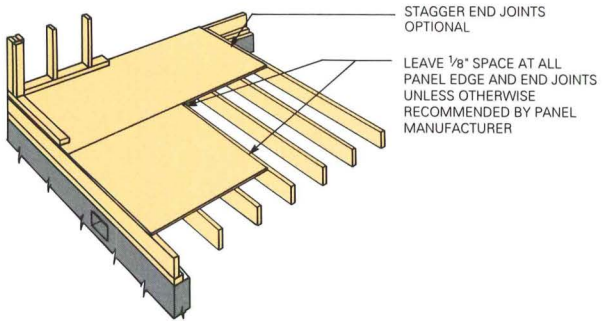
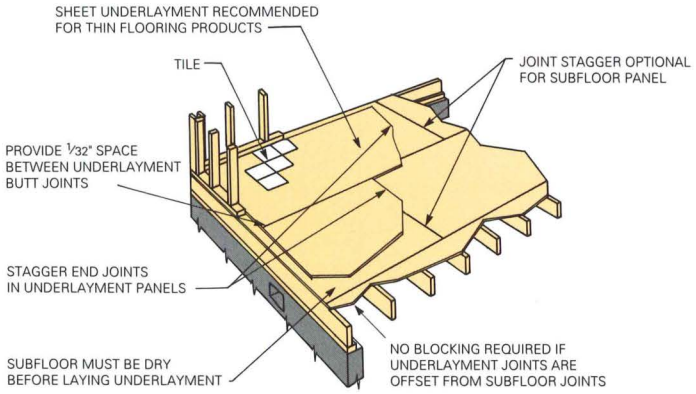
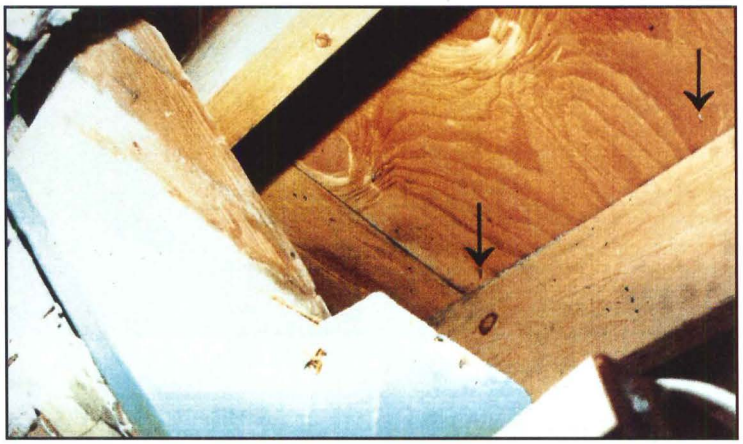


1 *Plywood requires spacing to accommodate shrinking and swelling.*



Adapted from the APA *Design/Construction Guide*

2 *Underlayment joints must also allow for moisture-induced movement.*



3 *Underlayment nailing at 12" O.C. (shown by arrows) was inadequate.*

The details of subflooring and underlayment for ceramic tile can affect the performance of these materials during changes in humidity and in the material dimensions that these changes bring about. Failure to consider all aspects and details of design and installation can result in cracked tile. Underlayment joints should be taped when applying adhesive, and perimeter expansion joints should be provided as noted by the Tile Council of America.

It is normal for the relative humidity in houses to be high in summer and low in winter. This changes the moisture content of materials, leading to cycles of expansion (high humidity) and contraction (low humidity) of the subflooring and underlayments.

Wiss, Janney, Elstner Associates Inc. (WJE) was asked to investigate cracked floor tile in the kitchen of a house. The crack pattern on the tile appeared to follow the joints between the sheets of the plywood subfloor and also the sections of a cement board underlayment. During the investigation, WJE calculated that a tensile strain of only 0.0043" (4.3 mils or 1/234") would crack the tile. The manufacturer's literature for the cement board underlayment recommended nailing 6" O.C. along edges and throughout its center into the plywood subfloor. The contractor admitted that the underlayment was nailed 12" O.C.

Tiles were removed from the floor in two locations for inspection of the subfloor and underlayment. The 12" spacing of the nailing was also visible at the underside of the subfloor, as was an adequate spacing of the plywood subfloor panels to permit movement. While there was a perimeter expansion joint, the underlayment joints were not filled.

Did the 12" O.C. nailing allow too much movement? Since this was a new subfloor, it probably was damp when placed, and it would tend to shrink in the relatively dry environment of the house. In addition, the cement board – which is composed of portland cement and aggregates – will expand and contract with changes in humidity. Under normal conditions, shrinkage of the plywood would be about 0.1 percent.

Using these criteria for shrinkage and 12" O.C. nailing for the composite subfloor and underlayment, our investigators calculated a shrinkage movement of 0.012" in the plywood joint, which is three times the 0.0043" tensile movement that had been determined would crack the tile over the joint. The cement board underlayment was estimated to shrink about 0.006" for the 12" spacing, which is close to the calculated value for cracking the tile. If the contractor had used 6" O.C. nail spacing, the joint movement of the plywood would also have been reduced to 0.006" and with joint filling and taping (to distribute strains in the joint vicinity) the chance of cracking would have been much reduced.

WJE recommended two possible remedies. One was to remove the tile underlayment and to replace it with 4" O.C. nailing to make sure the distance for shrinkage would be reduced well below that which would cause the tile to crack. The tile could then be placed over the underlayment. Another solution would be to use 6" O.C. nailing and reset the tile with a slow-setting mastic cement, which would allow some differential movement between the board and the tile. For both cases, the joints should be taped and perimeter expansion joints provided.

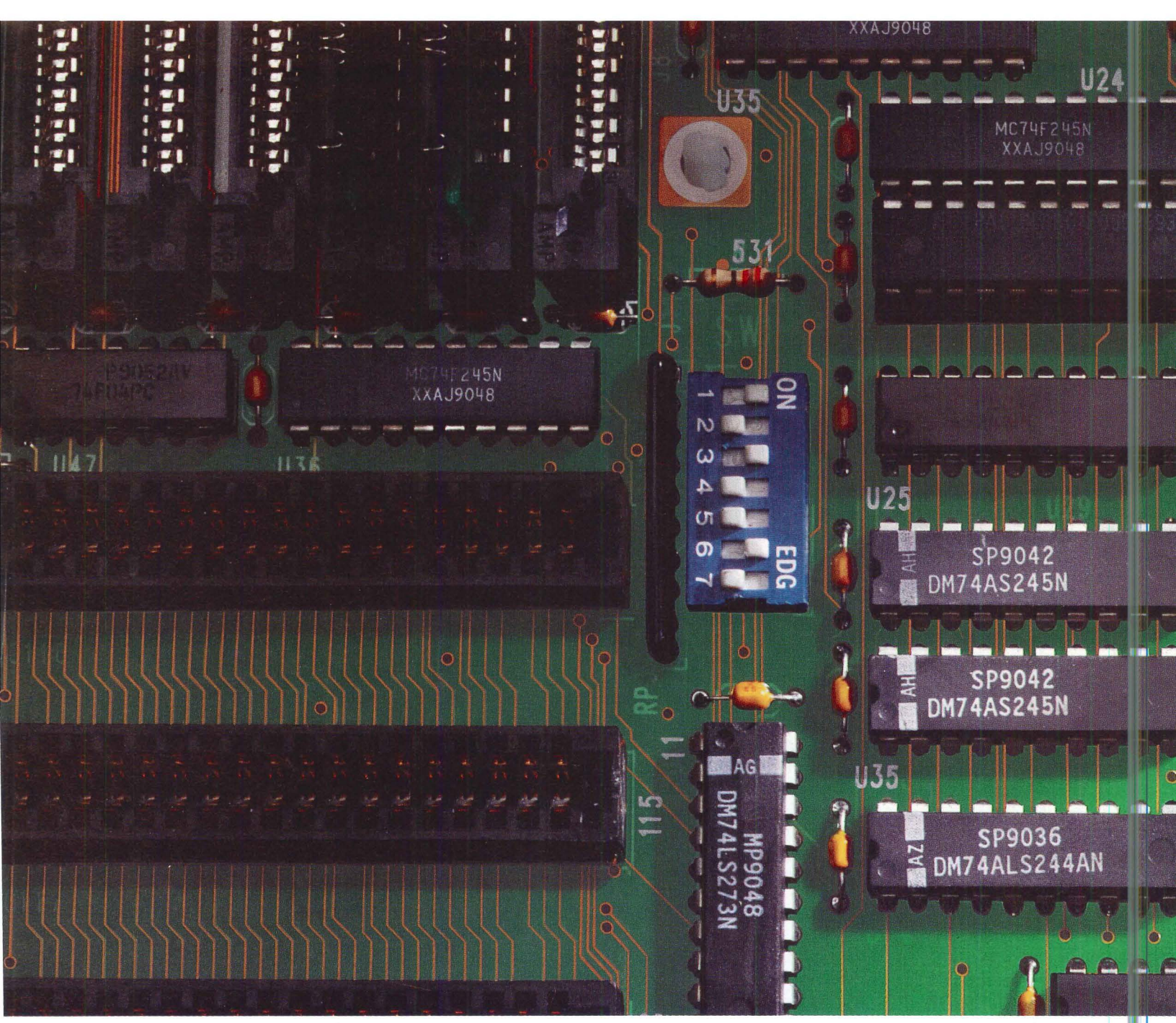
Seymour Bortz and **Gail Hook** ■

The authors are senior consultant and graduate architect, respectively, at Wiss, Janney, Elstner Associates, Consulting Engineers, Northbrook, Illinois.

Recommended Reading

APA Design/Construction Guide: Residential and Commercial, E30K, American Plywood Association, Tacoma (206) 565-6600, 1990.

Handbook for Ceramic Tile Installation, Tile Council of America, Princeton (609) 921-7050, 1991.



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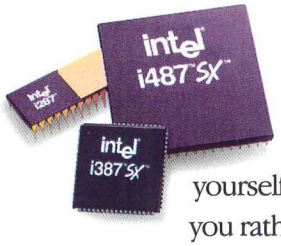

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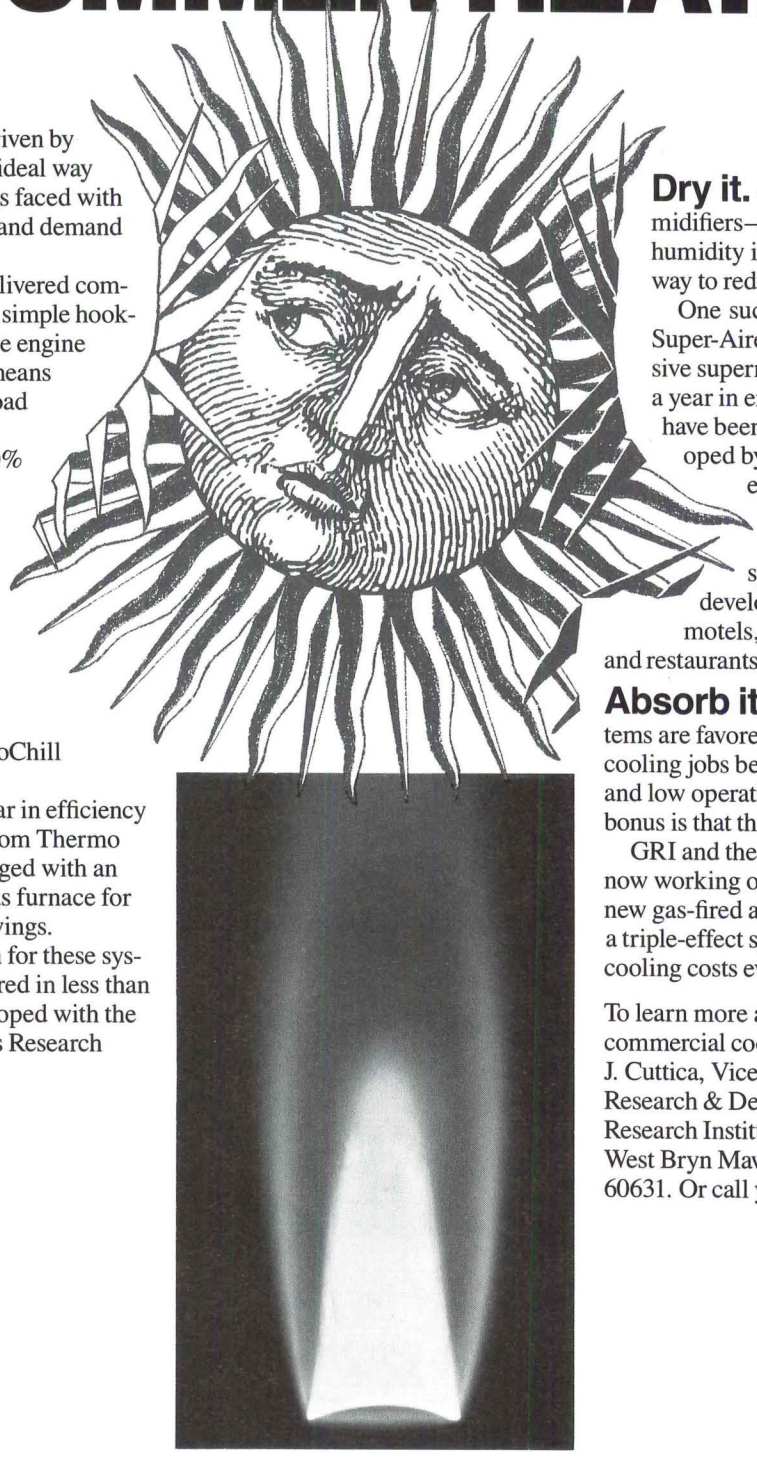

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Practice

William Lohmann discusses steps to take when reviewing project manuals.

Specifications: The Review Process

The specification process is changing. In the past, written construction documents were assembled from previous project specifications or master text created and maintained within a firm. The specifier was thoroughly familiar with their format and with the products, manufacturers, and reference standards described in the text. The entire project manual was often prepared by a single person and issued at one time. Technical review other than proofreading was minimal.

Now master text is being written, updated, and distributed nationally by vendors; editing is often being done through computerized expert systems; emphasis is shifting from trade names and workmanship details to performance criteria and testing requirements; engineering specifications are frequently being prepared by outside consultants; and major clients are developing their own general conditions and agreement forms.

Those changes make the review of these documents all the more critical to the success of the construction process. As legal documents, they are at the core of contract disputes and are frequently the basis for lawsuits. Therefore, they must be accurate, authoritative, and enforceable.

The review of written construction documents takes planning. Design professionals must establish standards, budget adequate review time, and develop a schedule for submittal, review, and return of document drafts. The written construction documents must also be carefully coordinated with the project drawings to eliminate conflict, duplication, and omission of information.

While the documentation process my be similar from one project to the next, each is unique and its special problems must be addressed. In fact, the repetitive process introduces the possibility of incorporating inapplicable material in the documents. The extensive use of comprehensive master text has the same effect, especially with loose or inexperienced editing. Duplications and omissions in the documents often have severe liability ramifications.

Review procedures for written documents are as important as those utilized for review of drawings. Schedules, turnaround times, and final issue dates should be established as soon as possible. Some offices even distribute detailed printed guidelines for preparation of the documents. Review guides and checklists also should be started. Early discussion of the role of consultants in the review process is important, and review of the documents must be continuous during their development, with scheduled intermediate and final reviews for each document.

The client's role in reviewing documents must also be determined. Early drafts of the preliminary project description and outline specification should always be reviewed by the client. A client with experienced staff may plan a full technical review of the subsequent project manual, but most clients will opt for selective review, concentrating on cost tradeoffs, areas of potential trouble, favored suppliers, and prior instructions to the architects.

The depth of review required is in inverse proportion to the depth of experience of the document preparer. Many offices use relatively inexperienced personnel to produce at least the first draft of written construction documents. As a result, a more detailed professional review is required. The same is true for documents prepared by consultants with whom the reviewer is unfamiliar. They may be full of surprises.

The design professional must review, in detail, the full content of the documents for which the design firm is responsible. An architect's review of a consulting engineer's specifications, however, may focus primarily on work items of direct interest to the architect (such as submittals, exposed equipment, finishes, and access panels) and areas of potential conflict or duplication (mockups and testing, for example).

Some repetitive items, such as bricks or windows, sometimes demand a closer review than others simply because they represent a greater proportion of the project budget. The same can be said of unusually expensive items. But one must remember that the role of such items in the work is no more important than the hinges on a single door.

Review of written construction documents should be an essential part of the quality assurance program of every design firm, especially in today's construction milieu. To err is human, but errors in the documents can only lead to later problems in the field and the courts. **William Lohmann** ■

The author is Vice President, Specifications, at Murphy/Jahn in Chicago. This article is based on the author's forthcoming book titled Construction Specifications: Managing the Review Process, *which will be released by Butterworth-Heinemann in March 1992.*

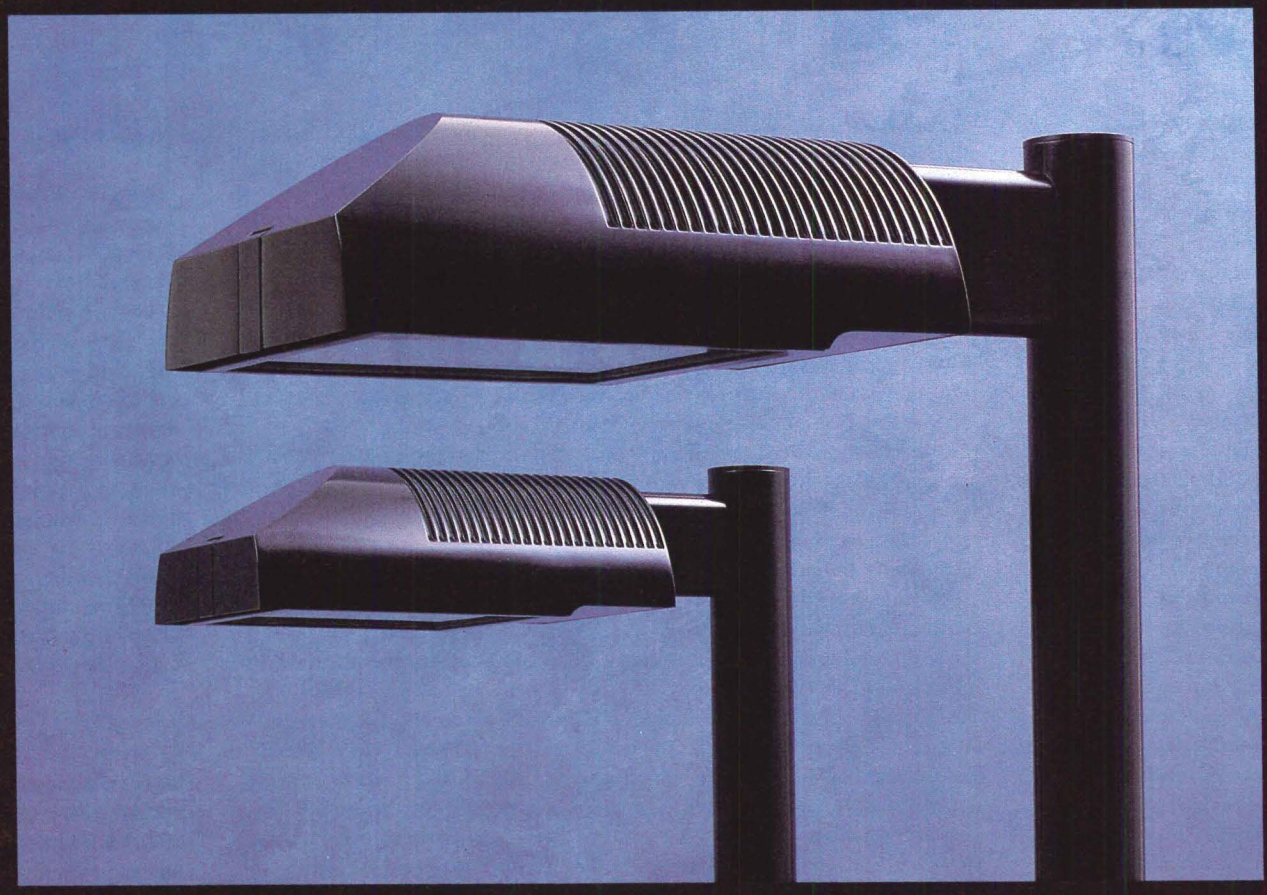
Practice Points

Where do architects find work? According to the *1991 AIA Firm Survey*, 44 percent of it comes from repeat clients, while less than one percent is won in design competitions. Small firms get about 40 percent of their billings from referrals and professional contacts, but large firms are more likely to find jobs owing to their reputation or through interviews, requests for qualifications, and proposals. The *Firm Survey* costs $95 ($50 for AIA members) plus $5 shipping and handling; call (800) 242-4140 or (301) 645-6936 to order.

By specifying recycled, low-toxic, energy- and water-conserving building materials architects and designers can help the environment. The *Interior Concerns Resource Guide* lists hundreds of manufacturers of environment-friendly building materials, furniture, and fixtures. The *Guide* costs $30, or $45 with a one-year subscription to the *Interior Concerns Newsletter*. Write: P.O. Box 2386 , Mill Valley, CA 94942; or call (415) 389-8049.

More stringent energy codes for building in 34 states have the potential to save 600 million kwh of electric power and one million gallons of fuel oil each year and to prevent 30 to 50 million tons of emissions over the next 50 years when 600,000 new single family homes are built. "Better Building Codes for Energy Efficiency" compares the various codes, building systems, and regional energy requirements; the report is available for $30 from the Alliance to Save Energy (202) 857-0666.

Scaled Lineage



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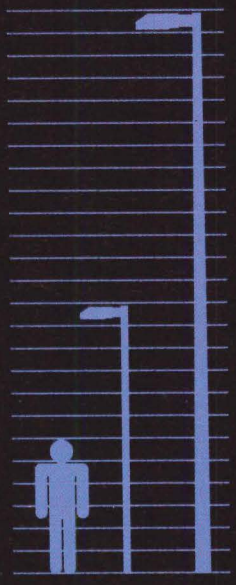

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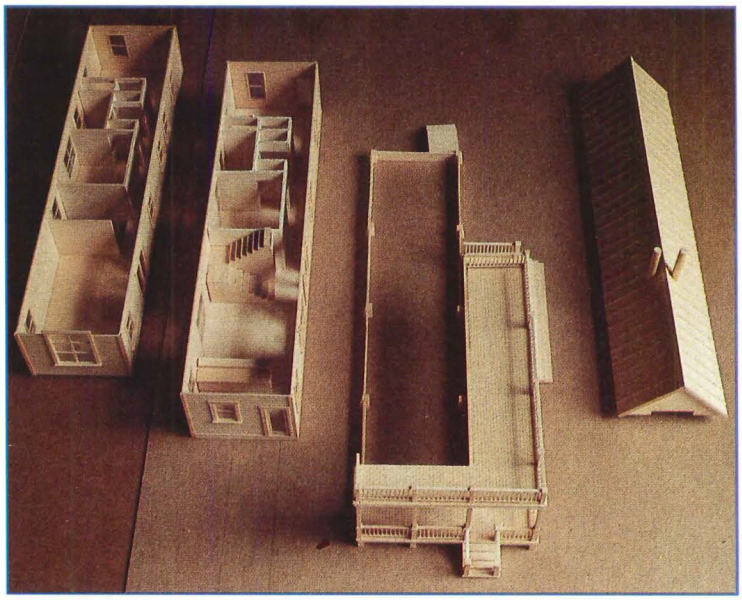
This update of P/A's Affordable Housing Initiative discusses some lessons learned about industrialized housing.



David Pollak

Industrialized Housing: Changing a Commodity

Since the 19th Century, architects have looked to factory-produced housing as an ideal way of producing low-cost shelter. But in working with Abacus Architects of Boston on their first-place design in our affordable housing competition (June 1991, p. 73), we have been reminded that industrialized housing has as many problems as it has potential.

The potential is perhaps obvious. Because it is built in a factory, industrialized housing is often more controllable and precise, less wasteful and costly, and more rapidly installed and secured than most site-built work. And the modules, typically no more than 14 feet wide and 11 feet high (to allow for highway shipment), lend themselves to placement on narrow urban infill lots, which most large cities have in abundance.

But most such housing is badly designed. "As in the auto industry," says Bryan Irwin of Abacus, "the technology is sophisticated, but it is used to produce a schmaltzy product because these companies *think* that is what people want." Accordingly, architects are almost never asked to generate designs. "It is safer for these companies to steal a competitor's plans," notes Anne Tate of Abacus, "than to test the market with something different." In the end, what seems to matter is not the design of the house, but its features. "These houses must have a lot of features," says Gabriel Feld, who worked with Abacus on the competition winning scheme, "because that is how people buy houses today."

The clients and perceived competitors of factory-built housing also have a lot to do with the industry's conservatism. "The main competitors of these companies," says Steven Winter, a New York architect who has worked with the industry for years, "are the large merchant builders, and their main clients are developers, not architects." Winter agrees that "most of the stuff being produced is terrible," and that it constitutes "a real missed opportunity." But he adds that "architects are not in a position to make changes. Developers are the only ones who can bring architects and manufacturers together."

Our experience bears that out, because, in the end, only one manufacturer serving the Cleveland area – Strattan Homes in Knox, Pennsylvania – was willing to work with us to build Abacus's design within the budget. "This house represents the missing piece in our industry," says Elliot Fabri, President of Strattan. Between the suburban models and the urban rowhouses offered by many manufacturers, "there is a need for urban single-lot infill housing such as this."

Still, getting this house built within the budget took some doing, since, in industrialized housing, anything non-standard or out of the ordinary adds greatly to the cost. "You pay a premium for anything that slows up the assembly line," notes Bryan Irwin. In Abacus's original design that premium included the metal roof and clapboard siding. We have, accordingly, moved to a composition shingle roof and hardboard siding as a compromise between the demands of the manufacturing process and the desire of the people who live in the neighborhood to see the house clapboarded. One lesson here is that the expense of housing has no relation to its simplicity. "Because they are standard and readily available, ugly turned porch posts," notes Anne Tate, "are less costly than simple square ones."

One of the major obstacles to change in the industrialized housing industry is the approval process for any new design. "Many states approve a plant and a company's fabrication system and kit-of-parts," observes Tate, "but Ohio is particularly anti-innovation in requiring the approval of every design and every change to a design." The review process, accordingly, demands highly detailed drawings, takes several weeks, and can cost a company many thousands of dollars. David Denison of the Ohio Board of Building Standards defends the system. "It is one thing to have a dangerous condition in one house and another to have it repeated a thousand times in an industrialized unit." But manufacturers, many of whom are non-union, typically see this red tape as part of a larger effort, prompted by the unions, to obstruct industrialized housing. Denison disagrees. "The law was written in 1970 based on the lessons of Operation Breakthrough and the recommendations of the Feds. The unions were not involved." Still, one thing manufacturers and regulators seem to agree on is the need to get away from the patchwork of state laws and to have a single national approval process, similar to HUD's rating system for mobile homes.

For architects, what is needed to influence industrialized housing is "a more consistent involvement in it," says Steven Winter, and a major change in the way a firm must practice. "The model becomes that of the industrial designer," notes Gabriel Feld, "innovating at the prototype phase, with very limited involvement in the mass production." This industrial design model also suggests a change in the way we think of housing, since every mass-produced object must, to some extent, be generic. "In most housing today," continues Feld, "the rooms have become extremely specific in their form and arrangement and have lost their flexibility." "We are trying to regeneralize housing," adds Tate, "to go back to six rooms off a corridor."

What effect our one small house in Cleveland has on the industrialized housing industry is hard to predict, but we hope to show that much more is possible than is currently being done to produce factory-built units that have greater flexibility, yet are still low cost and saleable. As Gabriel Feld puts it, "Architects have historically played the role of finding ways of doing something better. Here we are, trying to do it again." **Thomas Fisher** ■

Editor's note: Our next progress report will cover the construction of the house in the factory.

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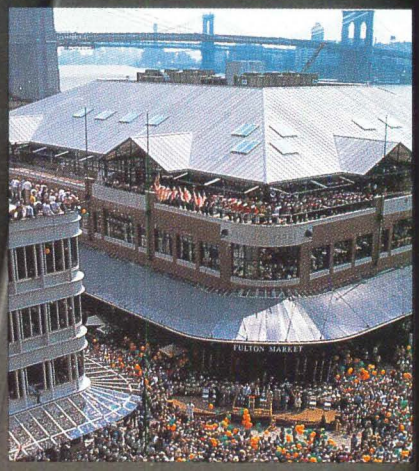

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Michael Chusid discusses new tools that can help architects make life-cycle assessments of products.

Products: Life-Cycle Economics

The architectural community too often disregards the life-cycle costs and operation of buildings. This attitude is not expressed overtly but nonetheless permeates architectural practice: We grovel before a project's bid price and all but disregard a building's cash flow, the streams of operational and maintenance expenses, financing, revenue and tax consequences, which spell economic success or failure to a building owner. When designing an addition or renovation, we too often fail to involve the building's maintenance staff in a serious discussion about their resources, schedules, and experience with the building's existing materials and systems. We rarely retain qualified building maintenance consultants on our design teams. And frequently, we pass along a hodgepodge of submittals and call it an Operation and Maintenance Manual without considering whether the accumulation really communicates.

Over the economic life of a building, operation and maintenance costs will typically equal or exceed first costs. And when we consider how a maintenance program can affect a building's resale or salvage value, the importance of building maintainability becomes even more apparent.

Building Economics

Building design and product selection decisions should be made with benefit of life-cycle cost analysis. Recently issued ASTM standards provide the building industry with clear guidelines for performing an economic analysis of building designs and components.[1] In a life-cycle cost study, each future cash flow must be adjusted for anticipated inflation and escalation and then discounted to a present value. When performed manually, these time-consuming calculations limit the use of life-cycle cost analysis. New computer-based programs, however, make it much easier to conduct life-cycle investigations.[2]

Even though calculations have been simplified, a building life-cycle cost investigation still remains difficult because reliable data on product longevity, maintenance schedules, and operation and maintenance expenses are difficult to obtain. How soon will a roof really be repaired or replaced? How frequently will various types of door operators require servicing? How will the selection of a sealant or weatherstripping affect energy use? Such information is not contained in the typical references found in an architectural office, but a new family of facility management publications and references is beginning to fill this gap. For example, *Means Facilities Maintenance Standards* discusses the mechanisms that contribute to building deterioration, and building maintanence scheduling and management.[3]

Architects must also take more initiative to discuss maintenance issues with their clients and consultants and to collect and analyze the maintenance history of their buildings. This information must then be transmitted to the drafters and specifiers who actually make product decisions.

Product Data

Although building product manufacturers and trade associations are a primary source of product information, few offer well documented data on their product's life-cycle performance, offering only inconclusive laboratory testing or anecdotal case studies to document their claims. They claim they are unable to predict a product's life-cycle because of conditions beyond a manufacturer's control, such as environmental conditions or maintainance procedures. Yet these variables can be quantified and applied to a sampling of historic product performance data. The resulting analysis could be used as a valid basis for predicting product performance and comparing product alternatives.

Some manufacturers have responded to the need for better information about product life-cycle costs. USG Interiors, Inc., for example, offers a computerized comparison of relocatable partitions and drywall partitions. Called DesignAid for Walls, the program enables a designer to consider the economic impact of partition relocation, financing alternatives, tax benefits and accelerated depreciation, and the escalation of waste disposal costs associated with drywall partition remodeling. A similar USG DesignAid program compares several floor construction and wire distribution systems to determine life-cycle costs vis-à-vis workstation relocation.[4]

Operational Assurance

Since many architects assume "building maintenance" means "janitorial services" or occasional redecorating it would be useful to introduce a new term into our professional patois. "Operational assurance" is a concept more familiar to industrial engineers who must assure that manufacturing equipment is kept at optimum operating capacity.[5] An operational assurance approach to buildings must consider the building operational goals and specify systems and products in view of their longevity and the ease and cost of their maintenance, repair, and replacement. Operational assurance can be applied not just to mechanical and electrical systems, but to the building envelope, finishes, and other architectural components as well.

Capability in operational assurance planning would enable an architectural or engineering firm to differentiate itself from its competitors and position itself for growth in industrial, commercial, or institutional markets. Maintenance programming, value engineering, training of the building staff, and post-occupancy evaluation also could be lucrative extended services and could lead to a continuing relationship with a client. **Michael Chusid** ■

The author is a building product marketing consultant with offices in Oklahoma City and Chicago.

1 ASTM Standards on Building Economics, Publication 03-506090-10, American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103, (215)299-5585.

2 As an adjunct to the Standards described above, ASTM offers the Building Life-Cycle Cost computer program and User's Guide, Publication 12-506089-10. Elite Software, P.O. Drawer 1194, Bryan, TX 77806, (409) 849-2340 publishes Life Cycle Economic Analysis program. Both programs are for MS-DOS compatible computers.

3 R.S. Means Company, Inc., R.S. Means and Company, 100 Construction Plaza, P.O. Box 800, Kingston, MA 02364-0800, (800)448-8182.

4 David Stover, USG Interiors, Inc., 222 West Hubbard, Chicago, IL 60610, (312) 822-3403.

5 Operational assurance seminars and publications are available from Maintenance Management Technologies, Inc ., P.O. Box 14818, Chicago, IL 60614, (312)642-8826.

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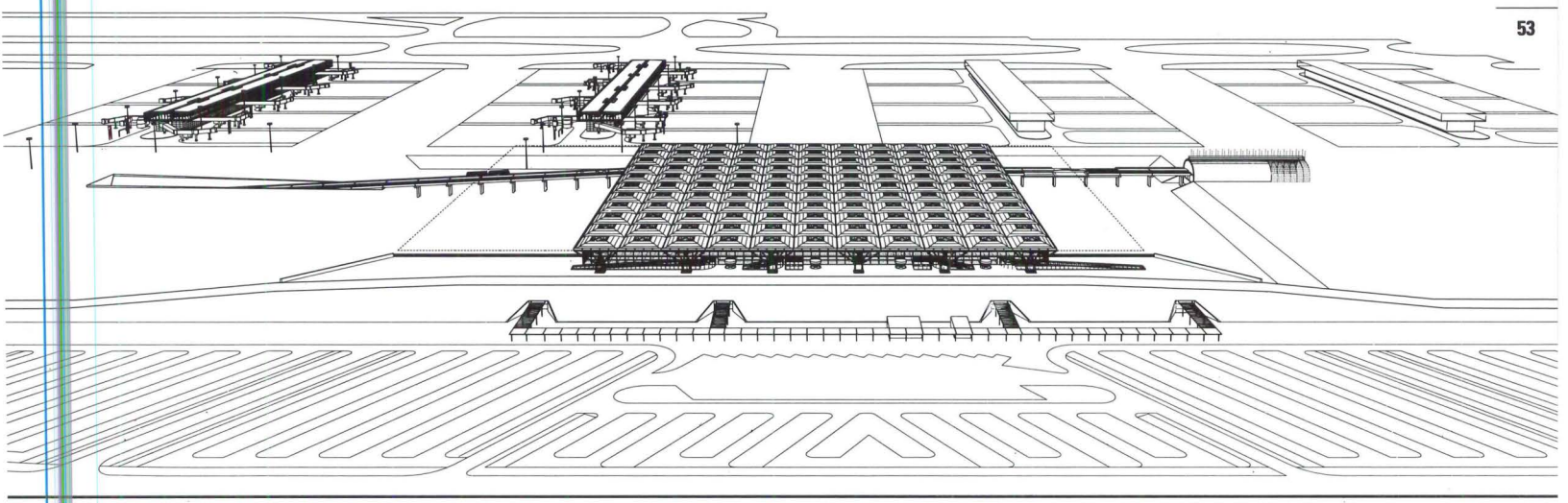
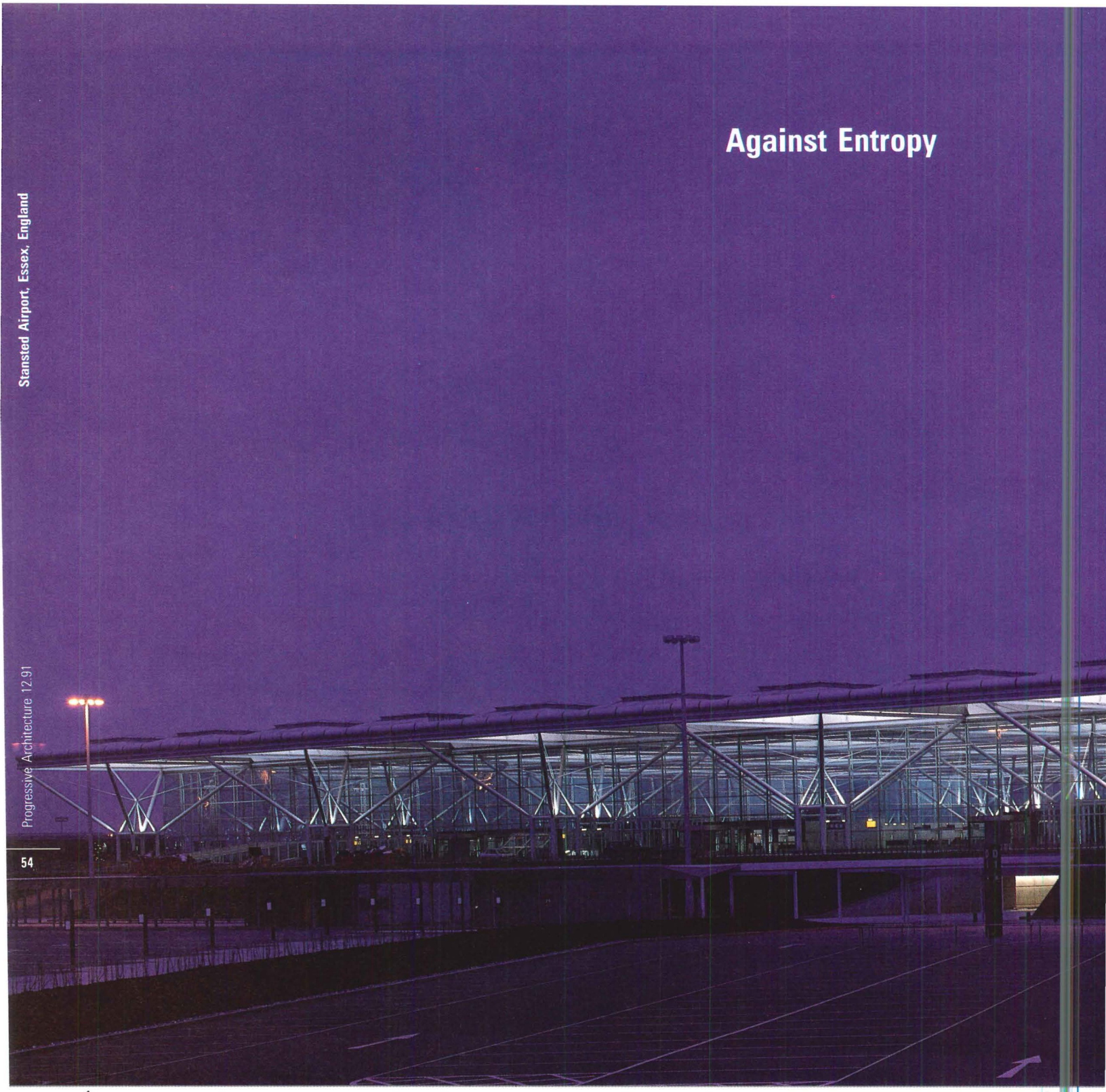
Norman Foster's most recent major work, Stansted Airport in England, is the featured building in this issue. This is followed by a P/A Inquiry on factories and a feature on two interiors in New York by Kohn Pedersen Fox Conway. Finally, there is a unique album by P/A Editor John Morris Dixon, reviewing the important architectural events and experiences of his first 20 years at this post.



Aerial view of Stansted Airport, London, by Foster Associates, showing main concourse and satellite buildings.

Against Entropy



Stansted Airport, Essex, England

1

London's new terminal at Stansted, by Foster Associates, imposes an elegant but possibly vulnerable order on the chaotic activities of airports.

Every architect, whether conscious of it or not, takes a stand against entropy, against the tendency of everything to decay, crumble, or devolve into chaos. Indeed, the very act of building is, by definition, an ordering and structuring of a world always moving toward disorder. Architects differ in their response to entropy, with some, in recent years, hardly resisting it at all. But among those architects who still put up a good fight, few do so with as much conviction as Norman Foster. His firm's new terminal at Stansted Airport, about 30 miles north of London, marshals a whole battery of innovative building technologies and systems against the disorderly or unplanned change that often occurs in such places. Every aspect of this airport seems to have been exhaustively studied. And yet, in their very thoroughness, Foster Associates have begun to demonstrate how limited architecture really is in overcoming disorder.

Geopolitical Disorder

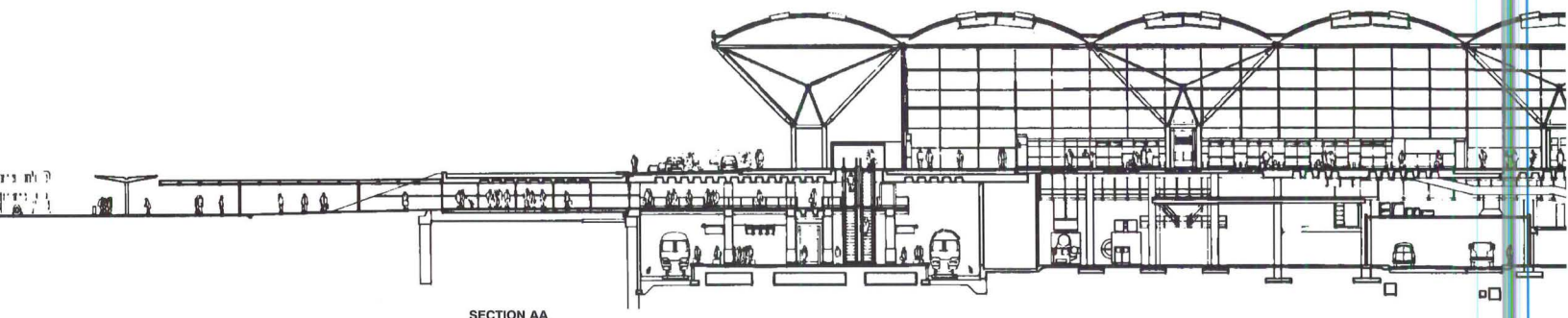
One form of entropy on a geopolitical scale is international terrorism, which has irrevocably changed the nature of airports. Foster initially

envisioned Stansted terminal as an open, glassy pavilion in which planes would always be in view and walking distances would be short. The requirements of security, however, have frustrated those good intentions.

The Stansted concourse remains a glassy, light-filled place; indeed, its eight-acre concourse is a great space to experience. The tree-like steel columns, with their elegant branching forms on a regular 118-foot grid, create a kind of forest in the terminal, as the angled steel limbs and cables criss-cross overhead in a seemingly disordered tangle. Above this forest canopy stretches the vast grid of 120 lattice shell domes, billowing like clouds. During the day, skylights and suspended perforated-metal baffles at the peak of each dome let in a soft, filtered light; at night, the domes and baffles serve as giant fixtures, bouncing uplighting from the trunks of the trees back into the space.

The breadth of this space, however, as well as the view of the planes, is obstructed at floor level by a maze of low structures housing check-in, security, immigration, baggage claim, customs, shopping, and eating facilities. Walking distances

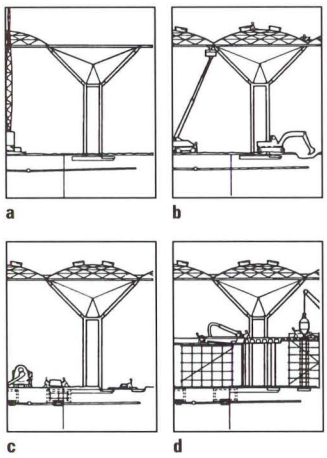
The square terminal roof, 650 feet on a side, contains 120 lattice domes supported by 36 steel trees in whose trunks are uplights that illuminate the underside of the domes and turn the entire concourse into a magical lantern at night (1). The north and south walls have clear glazing and are shaded from the sun by the projecting roof; the east and west walls have translucent glazing with no overhangs.



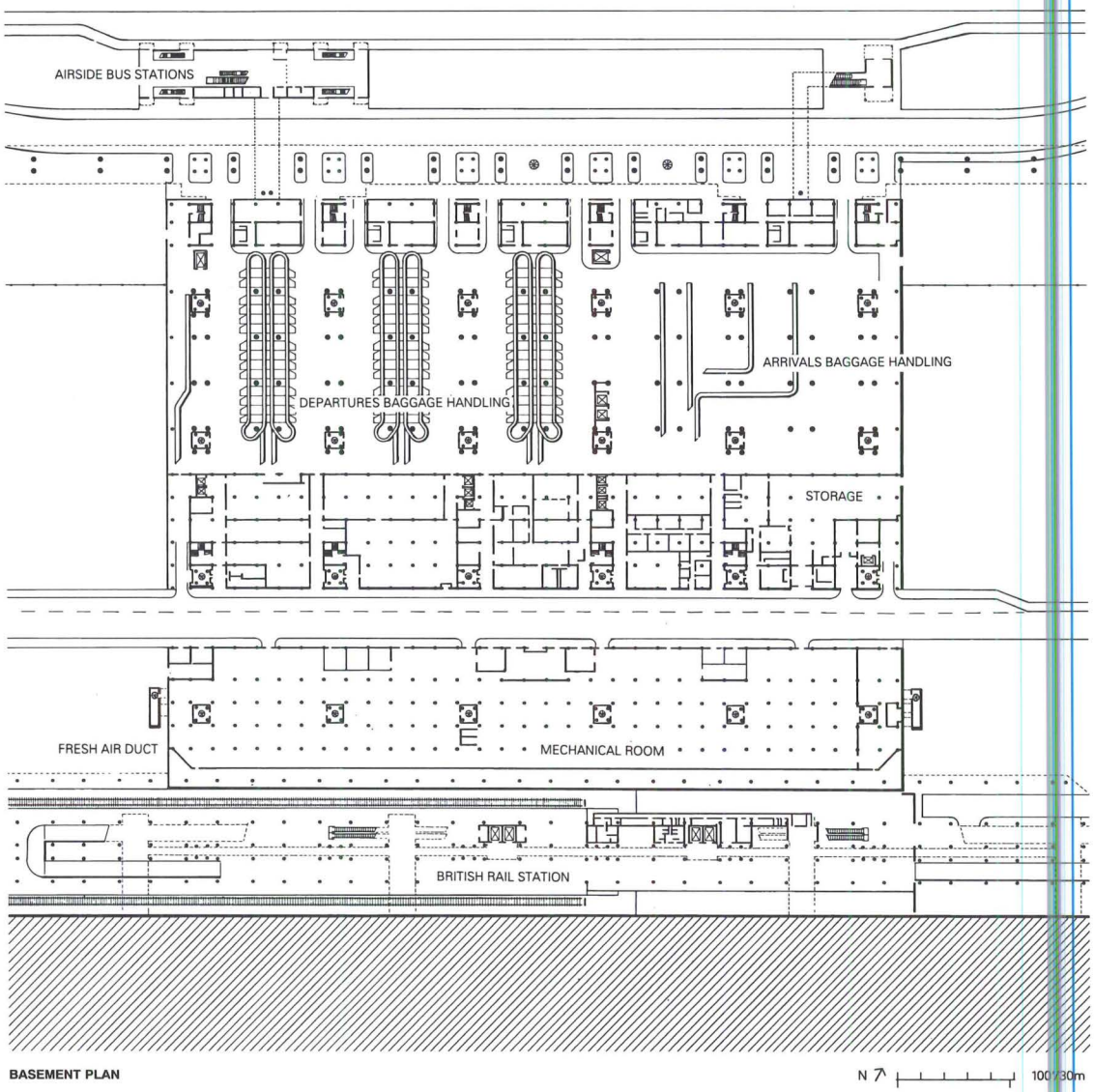
SECTION AA

Construction Sequence

The terminal was built top down, with the roof installed early to serve as a cover for the construction below. The first steps involved erecting the steel trees and roof grid (a); installing the lattice domes, each of which was built on the ground and lifted in one piece (b); and installing the underground services and concrete ground slab (c). Next came the casting of the interior concrete structure, whose waffle slab serves as the floor of the concourse, as a fire barrier, and as a midpoint stiffener of the steel trees (d). The slab also provided a platform on which further construction could take place. *(continued on next page)*



a b c d

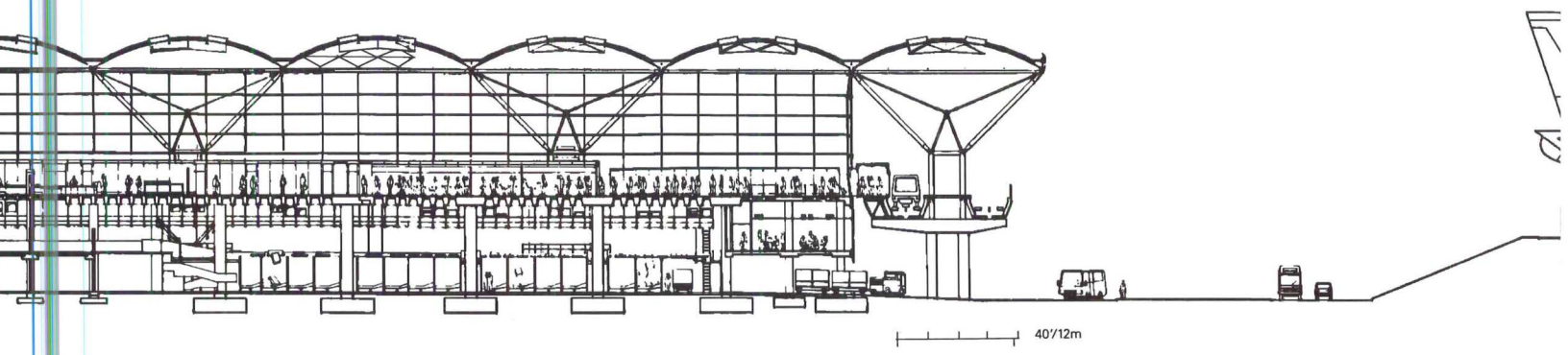


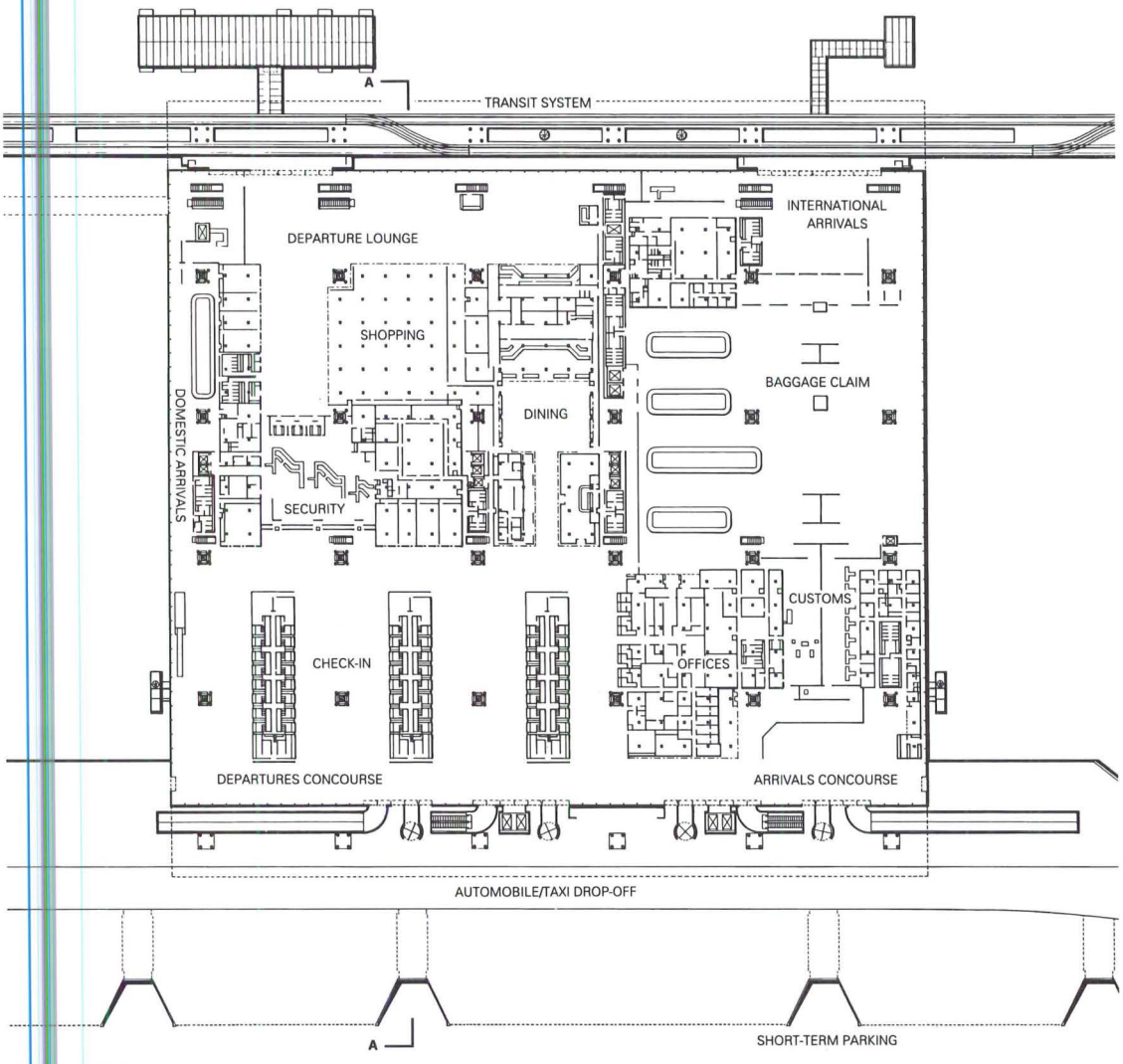
BASEMENT PLAN

The concourse stands on top of a service podium containing the mechanical, loading, and baggage areas, as well as the train station with service to London (section, top). Above the train station are walkways from the short-term parking lot, capable of holding 2,300 cars, and above that is the roadway for dropping off or picking up passengers. Unlike the arrangement in most large airports, *(continued on next page)*

also are anything but short as passengers must traverse 530 feet of concourse, past security checkpoints, just to get to the transit system, which then takes them to satellite buildings, where they must go up and down banks of escalators and do more walking to the planes. Finally, security concerns have compromised the public nature of the terminal: Less than one-third of the concourse, for example, is accessible to people without tickets.

Foster Associates, of course, have no control over the disorder in the world or the constraints it has placed upon airport design. But they are responsible for the idea of the terminal and its functional fit. Foster speaks of having had airplane hangars – the first commercial airline terminals – in mind when placing most passenger services on one floor within a high steel-framed space. His design at Stansted also recalls two other great airports – Eero Saarinen's Dulles terminal and SOM's Haj terminal – both of which create a large, almost classical space beneath an undulating roof. But commercial air travel, because of terrorism, has changed dramatically in even the last ten years, and it may be that these

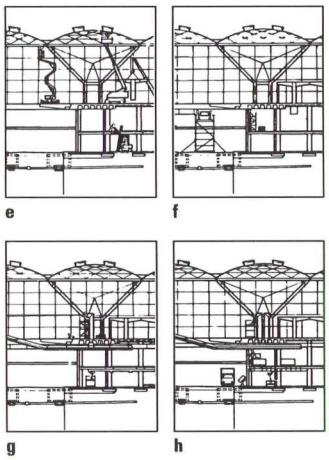




CONCOURSE PLAN

(continued from previous page)

The cladding was then installed, the steel painted, and interior "cabins" installed (e). Once the basic structure and enclosure were complete, the services were put in place. First, the mechanical plant was installed and the main supply and return ducts were hung from the floor slab (f). Then the automated baggage handling conveyors were installed and the mechanical and electrical services inserted into the trunks of the steel trees (g). The final stages saw the servicing of the shops, restaurants, and offices at the concourse level; the suspension of ceilings in the service podium; and the installation of the information pods (h).



e f g h

old models, however appealing, no longer fit the new reality of flying.

The Building as a Plane

Stansted, though, seems to emulate aircraft as much as earlier air terminals. Like a plane, the building, in many areas, uses the least amount of material or number of parts to achieve the greatest strength and efficiency. The structural system, for example, went through several phases (see sidebar, p. 58), each of which reduced the number of elements and the complexity of the design.

The servicing of the terminal also seems to take a cue from aircraft. Just as planes at a gate are serviced from below, from fuel and power lines running below the tarmac, so too is the Stansted concourse serviced from below: HVAC, electrical, plumbing, and baggage systems occupy a 27-foot-high "undercroft" and feed up into the terminal through the trunks of the steel trees or through the pans in the concourse's waffle slab floor (a scheme facilitated by the slight elevation of the terminal site above the field). This allows a great deal of flexibility in the placement of functions within the terminal, mini-

(continued from previous page)

departure and arrival are on one floor, side by side (plans, above). Departing passengers move on the left, past check-in and security to a lounge and a duty-free shopping area before boarding the transit to the satellite concourses. Arriving passengers come by transit to the right of the terminal, move past immigration, baggage pickup, and customs, and then out.

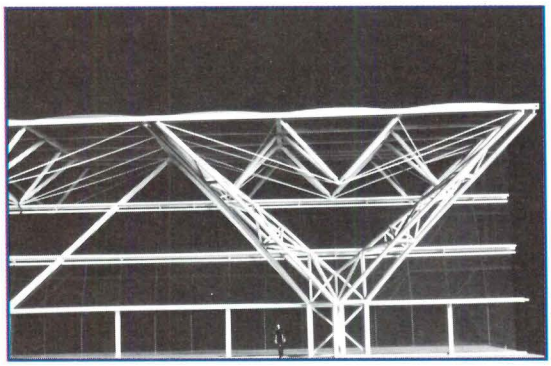
Design Development

The development of the structural trees went through a process of ever greater simplification. At one early stage (a), the trunk and branches of the trees were trussed, and they supported a smaller roof grid whose intermediate points were held up with compression struts and tension cables. A later stage retained the smaller roof grid, but replaced the trussed columns with prestressed ties bracing a welded frame (b). A further refinement had a larger roof grid pinned to the trees and stiffened by small trusses (c). These trusses were eliminated in the final design when it became a fully welded structure.

The glazing design also went through several stages of study. One design had the outer face of the trees glazed in a triangulated pattern, recalling some of the Chicago convention center designs by Mies in the 1950s (d). At another stage, Foster Associates studied a vertical wall of structural glazing, through which structural members penetrated (e). To avoid those penetrations, a further refinement had the glass wall tilted inward, following the slope of the tree branches (f). The final design returned to vertical glazing, pushed back from the first row of trees.

A German Relation

The new terminal at Stuttgart's airport, by von Gerkan, Marg & Partner in Hamburg, pursues a similar metaphor of trees supporting a floating roof (g, h). But it is much less restrained and empirical than Stansted. It is more romantic, its columns looking literally like trees, and more mechanistic, its air ducts looking like engines.


Richard Davies
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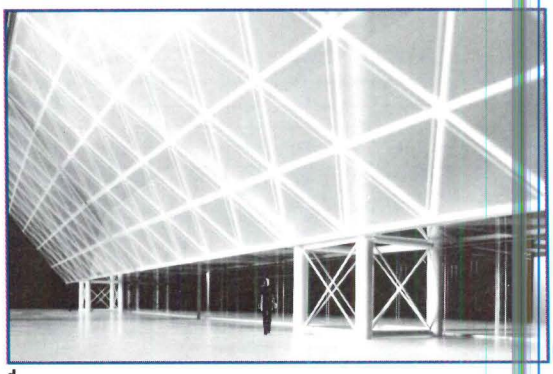
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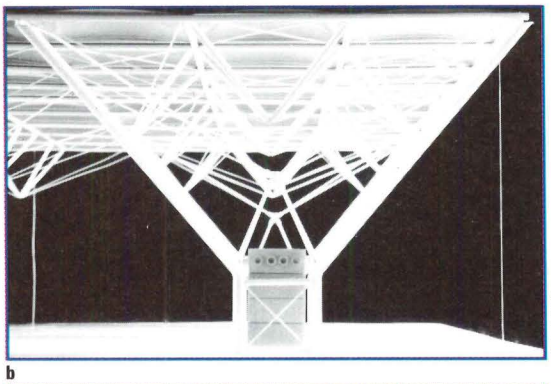
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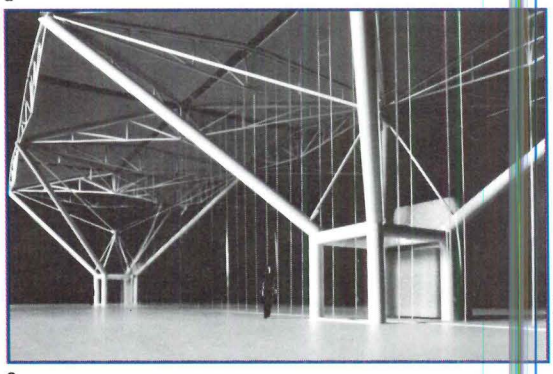
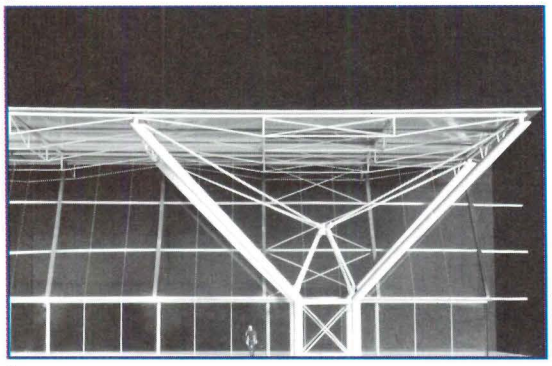

Richard Davies
e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Richard Davies
f


g


h

mizes the disruption of passenger flow as machinery is being repaired or replaced, and frees the roof of the building from any equipment.

There is a point, however, when the metaphor of a building as a machine, as a kind of aircraft, seems hard to sustain. Most buildings, after all, are more like tools than machines – objects that are largely hand operated, inefficient perhaps, but easily used and repaired. And, like tools, buildings can tolerate a high degree of entropy, often able to function even if some part is missing or damaged. Machines, in contrast, rarely function that way, and the more complicated the machine, the more likely it is to break down or freeze up.

Stansted is, without question, one of the most machine-like airports ever built and, as such, it is a remarkable achievement of human will and imagination. Yet, like some highly sophisticated mechanism, the building has a certain fragility about it, places where a single mechanical failure could prove highly disruptive. Take the movement of passengers within the terminal. People approach Stansted on the ground via train, car, or bus – varied modes of arrival that can accept a break-

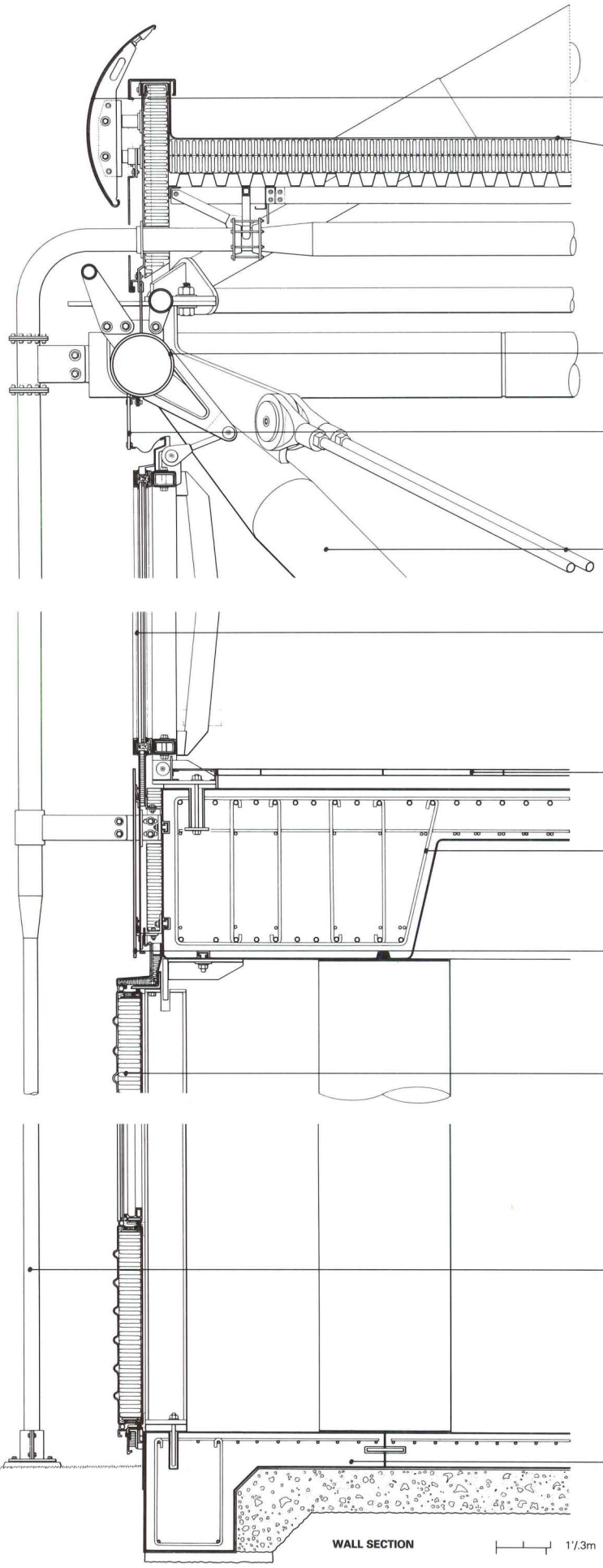
2

down of the train line or a storm that would make driving hazardous. But the connection between the concourse and the rather ordinary satellite buildings is via one mode: a mostly below-grade, computer-controlled electric transit system.

While such systems have proven generally reliable in the U.S., they nevertheless can break down. And, unlike airports such as Atlanta and Orlando, where passengers can always walk safely from one concourse to another, Stansted allows no such option. Short of running passengers back and forth on buses through a very small ground-level station on the airside of the main concourse or forcing them to walk across the tarmac, there is no simple way of getting passengers to and from planes should the transit not operate. Such a breakdown may not be likely, but it raises doubts about reliance upon mechanisms to operate a building. However reliable or redundant those mechanisms may be, without the option of manual operation – in this case, of walking easily from one part of a terminal to another – a building can indeed become like a plane: a temperamental piece of equipment needing a lot of care.

The final design of the structural trees (2) has four tubular columns that branch out to support the corners of the 59-foot-square steel roof grid. Steel cables resist the spreading tendency of the trees' limbs. Each dome has four skylights near its crown, providing a remarkably even light inside, and the roof eave has a "spoiler" to reduce uplift of the single-ply membrane at the edges and corners.

Selected Detail



Aluminum wind deflectors shed vortices, minimizing negative air pressure at the roof edge and reducing stress on the mechanically fastened single-ply membrane.

The PVC roof membrane has a lacquer finish to assist self-cleaning and is fastened (through seven inches of rockwool insulation and a vapor barrier) to an aluminum deck.

On a 59-foot grid, the tubular steel roof beams, just over 12 inches in diameter, support square shell domes formed by lattices of steel tubes.

To allow independent movement of the cladding and roof structure, the two are connected by a "swinging link" bearing on a horizontal stainless steel rod. To keep the weather out, a flexible EPDM sheet is attached to a glass "fin" hung from the steel roof structure and an aluminum extrusion along the top of the cladding.

The 18-inch diameter steel tubular columns branch out to support the corners of the roof grid. Stiffening each branch are two 1½-inch prestressed bars.

The translucent double-glazed side walls have inert gas fill and a low emissivity coating on the third internal face of the glass. The aluminum frames are fixed to the concrete floor and to steel mullions.

To avoid cracking because of the movement of the concrete slab, the architects laid the granite concourse floor in a specially prepared sand bed.

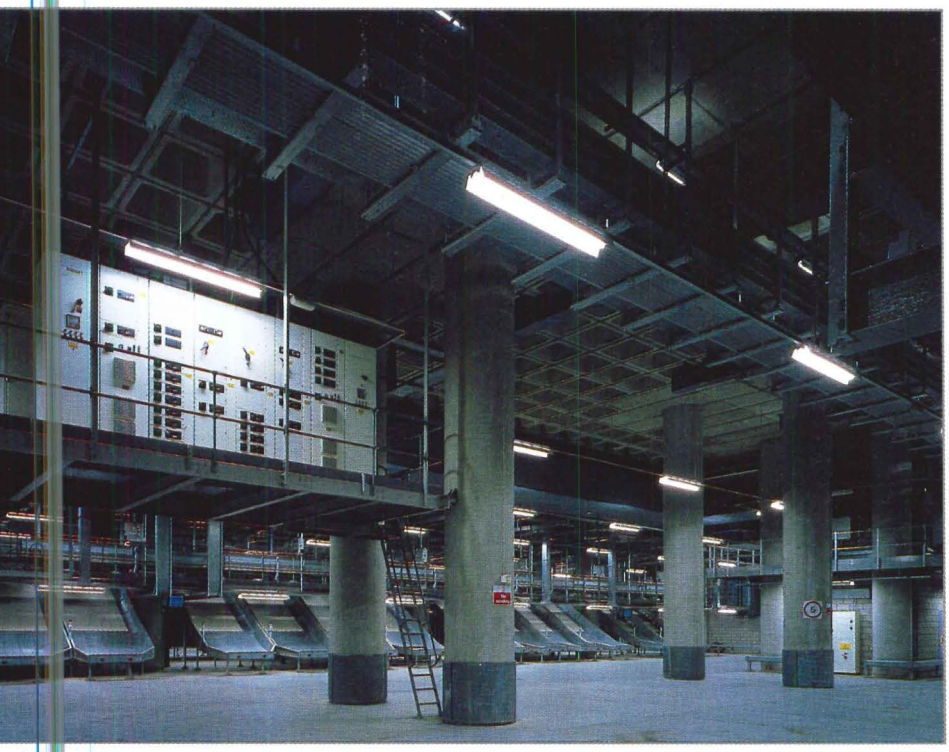
The concrete waffle slab forms a fire barrier between the mechanical service podium and the concourse. Services can penetrate the slab without affecting its structural integrity.

Flat aluminum panel forming a rain screen at the edge of the concrete slab. A similar detail exists at the parapet.

Because of vehicle entrances to the service podium, there could be no horizontal framing member for the cladding. As a result the cladding panels had to provide their own lateral stiffness. The panels are formed from rigidized brake press aluminum sheets attached to a thermally broken perimeter frame and contain four inches of mineral wool insulation.The glass units are fixed to their aluminum frames with structural silicone.

The siphonic "UV" roof drainage system has a specially designed outlet that prevents air from getting into the system; as the water accelerates down the tapered leaders, it creates a negative pressure that pulls water through the pipes. This allows drain pipes to run horizontally under the roof and makes it possible for fewer, smaller leaders to be used.

The reinforced concrete ground slab has a power-floated finish and rests on a compacted gravel base.



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Richard Davies

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5

Martin Charles

The 27-foot-high mechanical podium contains automated baggage handling equipment (3). Under the roadway and within the height of the service podium stands a train station (5). Least memorable at Stansted are the satellite buildings. Passengers arrive via a transit system, go up banks of escalators to top floor lounges (4), and descend via escalators to a middle level to board the planes.

The Machine Aesthetic

Foster Associates have worked hard to keep entropy at bay in the interior of the terminal. They have designed an ingenious system of demountable partitions and ceilings for the concourse shops and offices. The metal signage and fascias, for example, conceal smoke curtains and shutters, while creating a unified appearance among the the various shops. And the columns which support the office and shop roofs enclose air ducts, cleverly repeating the function of the terminal's larger steel supports. Combined with the availability of services at almost any point along the concourse floor, this system allows a high degree of physical mobility and flexibility of room arrangements.

The one main drawback of the system is that the many offices in the concourse have no windows or even skylights. One can argue that the visual unity of an air terminal, and the hiding of the messiness that naturally occurs in offices, overrides the need for natural light in such spaces. But there is no stopping people from violating that unity and personalizing their space. Already, at Stansted, the irrepressible disorder of life has begun to appear –

6

Martin Charles

7

Arriving and departing passengers mix in the 650-foot-long hall (6), and ticketed passengers proceed to a lounge and duty-free shopping area (7). Information pods in the trunks of the structural trees also conceal the supply and return air ducts and the uplighting. Even daylight in the terminal is provided by perforated metal screens suspended beneath the skylights in each dome (8).

plastic flowers on the check-in counters, for example, and ad hoc signs posted in shops. This, then, raises the question of whether interior systems in a building can ever be flexible enough to accommodate all future needs or visually strong enough to stop people from making a place their own.

At its deepest level, though, Stansted Airport offers a bracing retort to the skepticism and nihilism that now have much of architecture within their embrace. The terminal recalls, with great force and conviction, a time when we believed in the power of reason, the benefits of the machine, and the perfectibility of human society. Perhaps such convictions would still prevail if everyone held them with the same fervor that Foster Associates exhibits here. But there remains the stubborn fact of entropy and the nagging question of whether in architecture, as in politics, disorder is partly the result of an order too rigidly applied.

Thomas Fisher ■

8

Project: *Stansted Airport Terminal, Essex, England.*
Architects: *Foster Associates, London (Norman Foster, Spencer de Grey, directors; John Silver, project director).*
Client: *Stansted Airport Limited, British Airports Authority.*
Site: *2,400 acres with a gently sloping hill for the terminal.*
Program: *airport terminal for 8 to 15 million passengers per year.*
Structural system: *concrete pad foundation supporting tubular steel trees, 118 feet on center. Steel roof grid on which rest 120 steel lattice domes. Concrete waffle floor slab and columns.*
Major materials: *double-glazed aluminum window walls and steel mullions, insulated aluminum panels, single-ply PVC roofing, granite flooring, carpet, zintel interior panels.*
Mechanical system: *gas-fired boiler, heat recovery system.*
Consultants: *BAA Consultancy, transit system, infrastructure, satellite structure, movement system, quantity surveying, construction management; Stansted Development Team, project management; Ove Arup & Partners, terminal and rail station structures, fire engineering, drainage; Beard Dove and Currie & Brown, quantity surveyors; Laing Management, construction management; Claude & Danielle Engle, lighting; ISVR Consultancy, acoustics; University of Bristol, wind engineering; Pentagram, graphics; Ron Nixon, carpets, Adrian Lisney & Partners, landscaping; Penny Anderson, ecology.*
General Contractor: *Laing Management & BAACL.*
Costs: *not available.*
Photos: *Richard Bryant except as noted.*

P/A Inquiry: Agents of Industry

The factory may be utilitarian, but its image is an emblem of its cultural stature. In a portfolio of nine projects, we survey the position industrial buildings hold today.

"Mechanization is like an agent, like water, fire, light. It is blind and without direction of its own. It must be canalized . . . Because mechanization sprang entirely from the mind of man, it is the more dangerous to him." This excerpt from Siegfried Giedion's *Mechanization Takes Command* (1948) is both ominous and ironic: It is a critique of industrial technology, the wellspring of the Modern architecture he had promoted seven years earlier in *Space, Time and Architecture*. Giedion's misgivings were not unusual: Other Modern enthusiasts considered industrial technology potentially tyrannical or liberating. Peter Behrens, whose Turbine Hall for the AEG (1909) is one of the century's most admired factories, believed that science must be tempered by art. In 1925 he wrote that ". . . the form of the industrial building should be accentuated against the building's innate functionalism."

The factory, industrial technology incarnate, was one of the Modern Movement's exemplary building types, the place where machines and workers produced the *objets-types* venerated by Le Corbusier. But long before he extolled the rationality and serial aesthetic of automobiles, turbines, and factory-made glassware, writers from Thomas Carlyle to Karl Marx faulted the assembly line as an inhumane successor to the crafts industries.

To endow the factory with architectural integrity, whether the the Classicism of a New England textile mill or the abstract rigor of Albert Kahn's automotive plants, was to redeem technology and to give employees an attractive workplace. Some Marxist critics dismissed this as a manipulative gesture, but most architects saw the factory as a building whose scale, construction, and image called for a heroic design: The factory was (for better and for worse) the aesthetic prototype for other Modern buildings, from houses to churches.

Would that factories could be as inspiring today: There have been few architectural frontrunners among those erected over the past couple of decades. No doubt, architects' skepticism about Modernism has made factories a less captivating design problem. Nor are many new ones needed today. Moreover, when a corporation decides to build a production plant, efficiency and speed take priority over a patient design investigation by the architect. Before we find more well-designed factories, more patrons will have to be convinced that aesthetics do not contravene pragmatism. Unfortunately, few American companies believe this; most see production plants as expedient capital investments. Utility reigns in the industrial workplace, while the office building is deemed a worthy investment of architecture. But simply by virtue of its size, the factory calls for aesthetic quality. We ought not to relegate industrial workers to featureless boxes of metal and concrete.

The following nine industrial buildings are exceptions to the norm, the collaborations of enlightened patrons and responsive architects. The design solutions defy easy categorization: They range from a car plant on 2,450 acres in Tennessee to a *hôtel industriel* for start-up companies in Paris. This portfolio includes a recycling plant, testimony to society's belated realization that we must re-use resources as well as consume them. One project, a factory rehabilitation in Detroit, is a reinvestment in people as well as in architecture. It will become a prototypical engineering institute that links professional training with hands-on work. New programs like this answer economists' imperatives for more productive facories and enhanced research in high-tech.

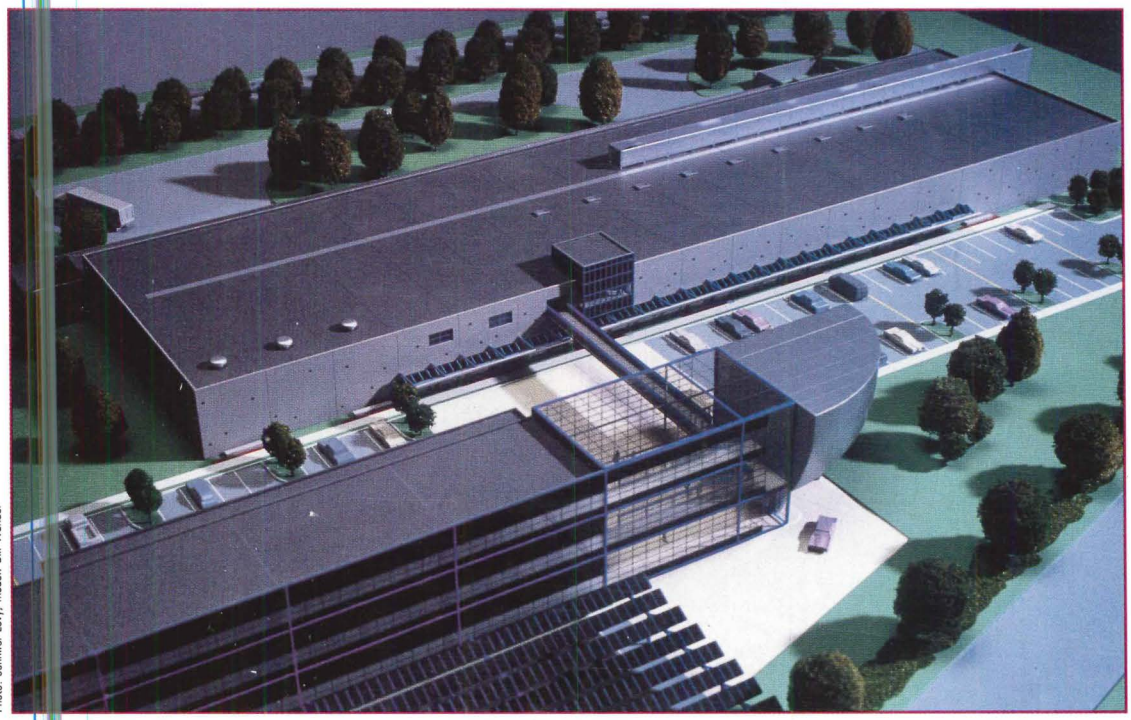
Giedion's opening salvo is as pertinent today as it was four decades ago. In fact, many consider computer technology more insidious than the first wave of mechanization: Jurgen Habermas and other Post-Structuralist thinkers warn of a corporate oligarchy and a depoliticized consumer culture. Others forsee a dysfunctional ecology. With prospects like these, can a single building offer any redemptive value to industry? Yes, if the architect has talent, a supportive client, and faith that industry's dividends outweigh its costs. Good architecture in the industrial workplace is a counterweight to the machine's imperative of efficiency. If we build factories that are aesthetically redeeming, as well as productive, we will be on a course that could bypass mechanization's grim consequences.

Philip Arcidi ■

The Shed: Thrifty Architecture

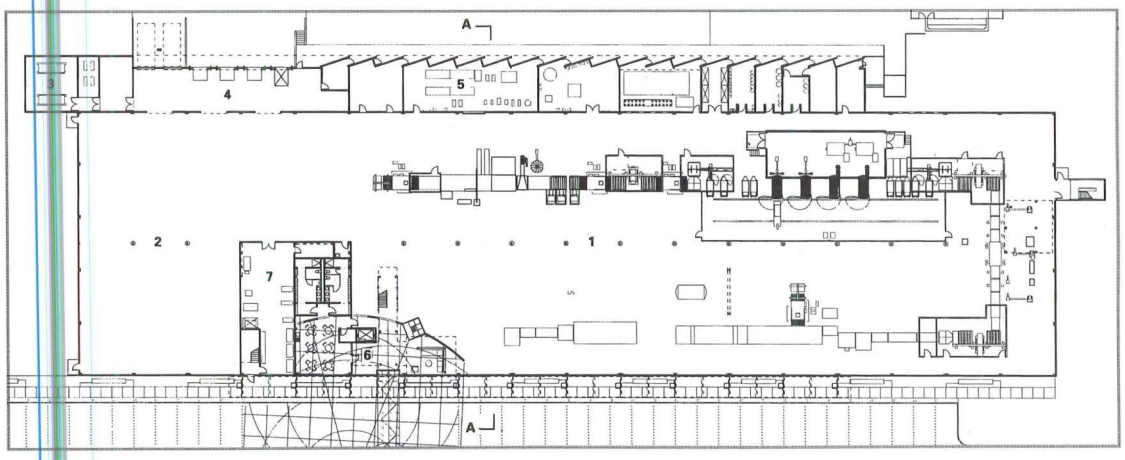
Advanced Photovoltaic Systems (APS) Manufacturing Facility, Fairfield, California

Architects: *KCA Architects, New York*



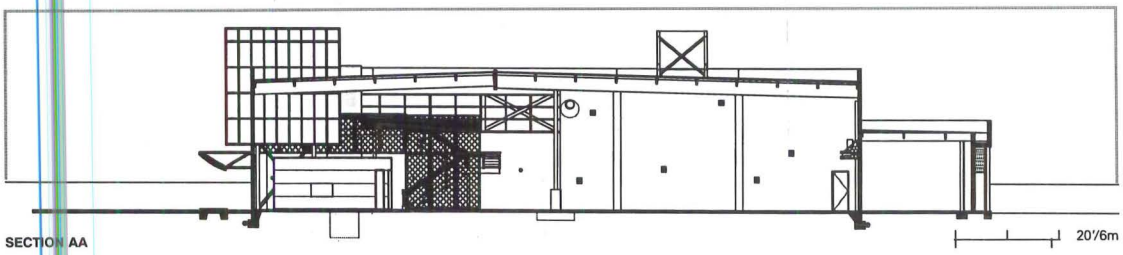
ADVANCED PHOTOVOLTAIC SYSTEMS FACILITY, PHASE 1 (BACKGROUND) AND PHASE 2 (FOREGROUND), MODEL

PHASE 1, COMPUTER-GENERATED RENDERING



FIRST FLOOR PLAN

1 PRODUCTION
2 WAREHOUSE
3 CHILLER
4 LOADING
5 MECHANICAL
6 ENTRY/RECEPTION
7 ELECTRICAL SHOP



SECTION AA

The Sheet Metal Workers' International Association and Advanced Photovoltaic Systems (APS), a privately-held firm, are staking an alliance on a new building technology: Both expect jobs and investment profits to grow in tandem with the market share of glass solar panels. The association members recognize that their skills can be transferred to this new technology; they invested their pension fund in APS's plant, which will be built next year in a Southern California industrial park. This tilt-up concrete shed will house an automated assembly line and warehouse space for photovoltaic (PV) glazing. A few years later, it will be supplemented by a technology center, where working PVs will be displayed as a marketing promotion and as training models for sheet metal workers.

KCA Architects designed a small photovoltaic plant for the company five years ago (P/A, June 1987, p. 80). This new facility culminates a long collaboration. KCA used computers to help arrange the PV assembly line in a spatially efficient way. They also tailored the shed structure to the processes within: Utilities will be aligned in a serrated row on the north side. Most of the personnel will work in the control room, a PV-clad cube that breaks through the façade and roof. It will be an architectural advertisement, like the PV awning that leads to the entrance.

Gregory Kiss, partner at KCA, describes these inflections as a late 20th-Century sequel to the structural heroics of the early Modernists. He sees most contemporary factories as a "wrapper to the equipment within, rather than a mechanical shell itself." KCA's options approximate those most architects can expect in a factory commission: to enliven an expedient construction method, and add some grace to a banal box.

Reinvesting in Buildings and People

Center for Advanced Technologies, Detroit

Architects: *Smith, Hinchman & Grylls Associates, Detroit*

If slogans were still inscribed on factories, "From the familiar comes the new" could be added to the façade of the Center for Advanced Technologies (CAT). This factory-cum-engineering-school, slated to open next year, will not attract much attention from passersby, but it will have a great impact on those enrolled in its work/study program. Its façade barely altered, CAT will resemble dozens of factories built in Detroit half a century ago. Inside, computer-integrated machine tools (part of a $66 million investment) will be manned by 175 students. Working and studying for 60 hours a week, they will earn wages and, pending accreditation, master's degrees for completing an intensive six-year curriculum.

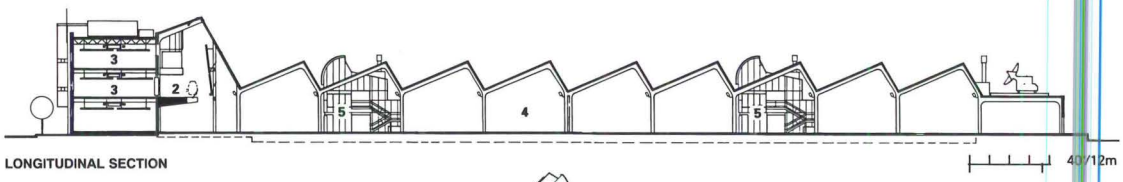
CAT's sponsor is Focus: HOPE, a Detroit civil rights group established 23 years ago by Father William Cunningham. Like him, William Hartman, the project designer at Smith, Hinchman & Grylls, believes that a modest rehabilitation of the exterior is more prudent than obliterating a familiar image. They hope Detroit residents see their industrial landscape as a springboard for high-tech companies with new routes for advancement. In this way, any sense of alienation should give way to educational degrees and well-paying jobs.

The sawtooth roofs will be surmounted by six new monitors for "power towers" where "neighborhoods" of 30 or 40 student workers will gather for conferences and classes when they are not manning the machines on the factory floor. A glazed sawtooth has been added to the masonry structure in front, once an office block. The factory floor will be visible from new meeting rooms upstairs and an elliptical visitors' platform. Focus:HOPE anticipates several hundred visitors a day, now that CAT has the support of the Departments of Defense, Commerce, Education, and Labor.

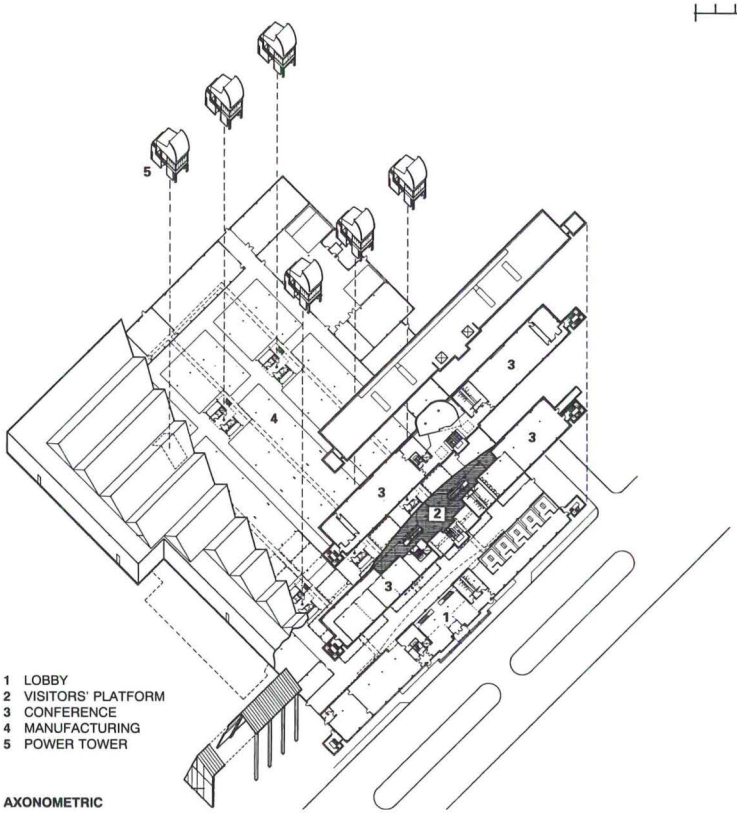
CENTER FOR ADVANCED TECHNOLOGIES, NEW SAWTOOTH ROOF ADJACENT TO ORIGINAL OFFICE BLOCK

FACTORY/ENGINEERING SCHOOL REHABILITATION IN PROGRESS

EXTERIOR VIEW; ORIGINAL OFFICE BLOCK IN FOREGROUND; FACTORY/ENGINEERING SCHOOL BEYOND

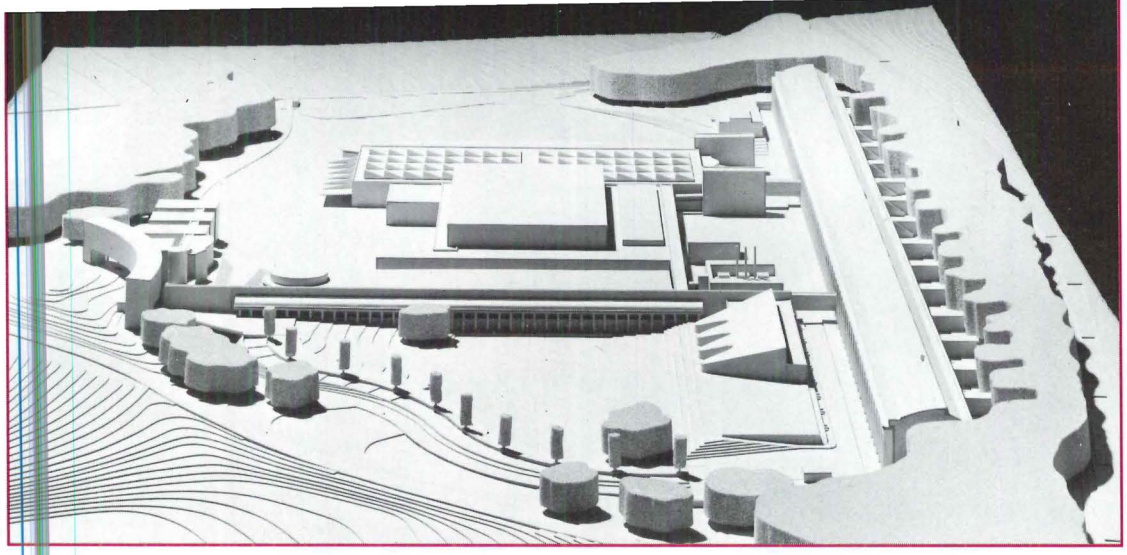


LONGITUDINAL SECTION



1 LOBBY
2 VISITORS' PLATFORM
3 CONFERENCE
4 MANUFACTURING
5 POWER TOWER

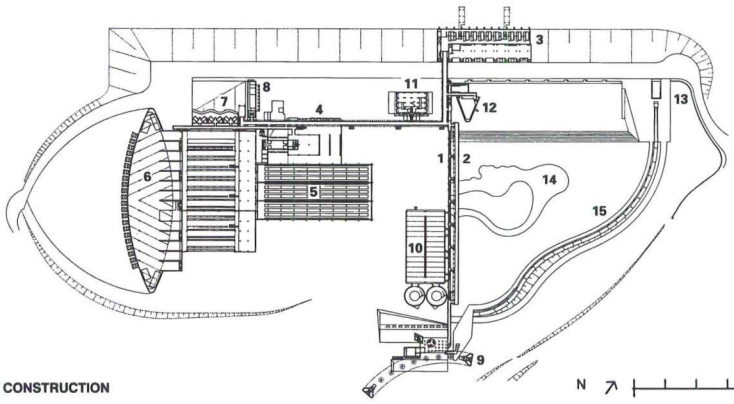
AXONOMETRIC



Udo Hesse

B. BRAUN MELSUNGEN PLANT AT CONCLUSION OF PHASED CONSTRUCTION, MODEL SEEN FROM NORTHEAST

1 CONNECTING WALL
2 PEDESTRIAN BRIDGE
3 PRODUCTION BUILDING
4 ENTRY TO STORAGE
5 AUTOMATED STORAGE
6 DISPATCHING
7 STAFF/CHANGING
8 ADMINSTRATION/DISPATCHING
9 ADMINISTRATION
10 GARAGE
11 POWER STATION
12 CAFETERIA
13 MAIN ENTRY
14 LAKE
15 WATER CASCADE



SECOND FLOOR PLAN, FIRST PHASE OF CONSTRUCTION

Figural Buildings in the Landscape

B. Braun Melsungen Industrial Plant, Kassel, Germany

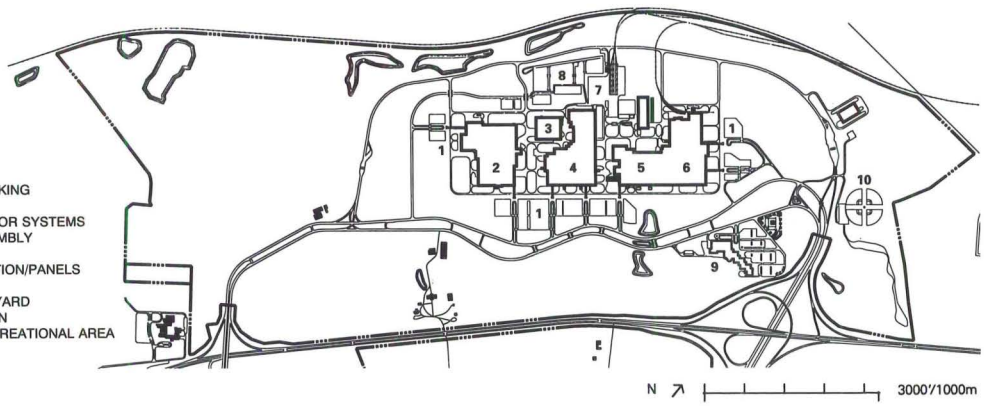
Architects: *James Stirling, Michael Wilford & Associates, London, in cooperation with Walter Nägeli, Berlin*

An assemblage of objects, this medical synthetics factory is a counterpoint to the serial architecture of most industrial compounds: It comprises a variety of buildings in a centrifugal composition. Because the architects were involved from the start, they were able to design the plant from the inside out; their master plan evolved simultaneously. Using the program as their guide, they rendered the structural system, utilities, spaces for production, storage, and administration as components of a hierarchically ordered design. The plant, now in its first phase of construction, is an adaptation of Corbusian models, an architectural landscape of high-tech industry.

Jamie Hamilton

AERIAL VIEW OF SATURN AUTOMOTIVE PLANT

1 EMPLOYEE PARKING
2 POWER TRAIN
3 VEHICLE INTERIOR SYSTEMS
4 GENERAL ASSEMBLY
5 PLANT SHOP
6 BODY FABRICATION/PANELS
7 SHIPPING
8 MARSHALLING YARD
9 ADMINISTRATION
10 EMPLOYEE RECREATIONAL AREA



SITE PLAN

The Assembly Line Reconsidered

Saturn Automotive Plant, Spring Hill, Tennessee

Architects: *Argonaut A.E.C./General Motors, Detroit, managing architects/engineers; Hellmuth, Obata & Kassabaum, St. Louis, consulting architects/engineers; Gresham, Smith & Partners, Nashville, Tennessee, associate architects/engineers*

At the new $1.9-billion Saturn plant, the continuous assembly line has been displaced by a more flexible structure, with separate business units for each stage of production, from building the power train to painting the body. Saturn's master plan is as progressive as its management structure, with measures that mitigate the environmental impact of the 4½-million-square-foot complex. All below-grade structures have double containments to preserve the quality of the ground water, and water consumption has been reduced to one quarter of the plant's projected rates.

An Industrial Basilica

Materials Recycling Facility, Springfield, Massachusetts

Architects: *DiMarinisi & Wolfe, Boston*

Now that "recyclable" is displacing "disposable" in America's consumer consciousness, plants like this are an emerging part of the industrial landscape. The process of salvaging material from refuse is analogous to fabrication methods: Here, as in a factory, the layout of the recycling machinery must be resolved before the enclosing structure is designed.

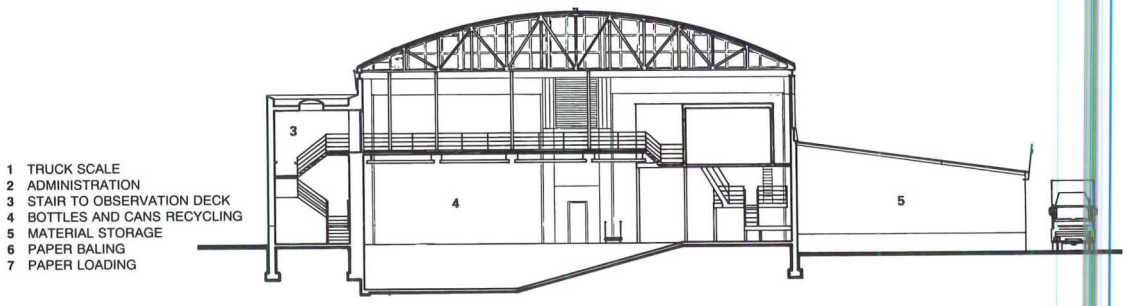
The Commonwealth of Massachusetts recognized that the image of this building called for careful consideration, and recommended that architects, rather than engineers, lead the design team. The facility is flanked by an aging industrial district and families with no interest in living next to a drop-off station for trucks full of trash. Zoning constraints called for a masonry street façade without any truck entrances. The long narrow site rendered a one-way loop the best way to route the deliveries: They are weighed on a platform scale in front and unloaded into bins and processors in the back.

Maury Wolfe, project architect for the plant, emulated Peter Behrens's Turbine Hall in Berlin, which uses traditional references to give the industrial building a civic presence. Wolfe envisioned the plant as a positive part of Springfield's urban image, with allusions as optimistic as those of a turn-of-the-century factory.

The basilica, a centuries-old prototype for public buildings, was the model for both Behrens and Wolfe: The arched roof and masonry piers have monumental implications, and steel windows and columns add utilitarian connotations. Wolfe notes that the three-tiered façades correlate with those of a Gothic cathedral: A band of glazing surmounts panels of unit masonry and a base course of smooth concrete. But here, as in the Turbine Hall, the massiveness of the walls is associative, not structural: The masonry is infill, not load bearing, and the steel X braces are essential for lateral support.

Douglas Gilbert

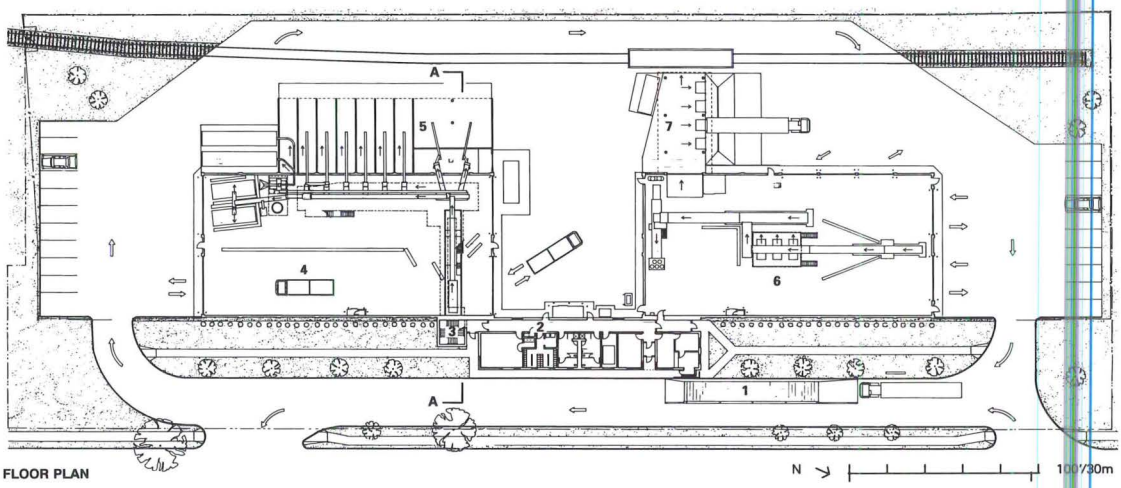
RECYCLING FACILITY SEEN FROM STREET



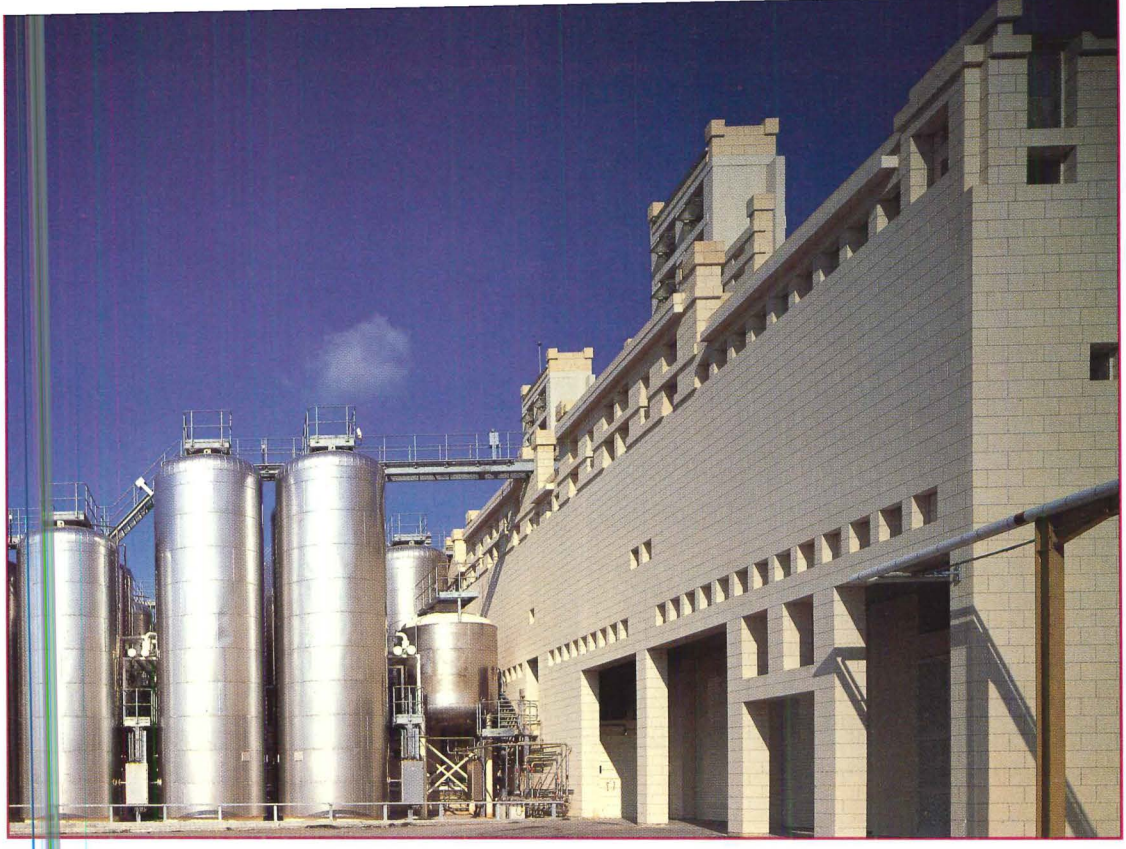
SECTION AA

Douglas Stefanov

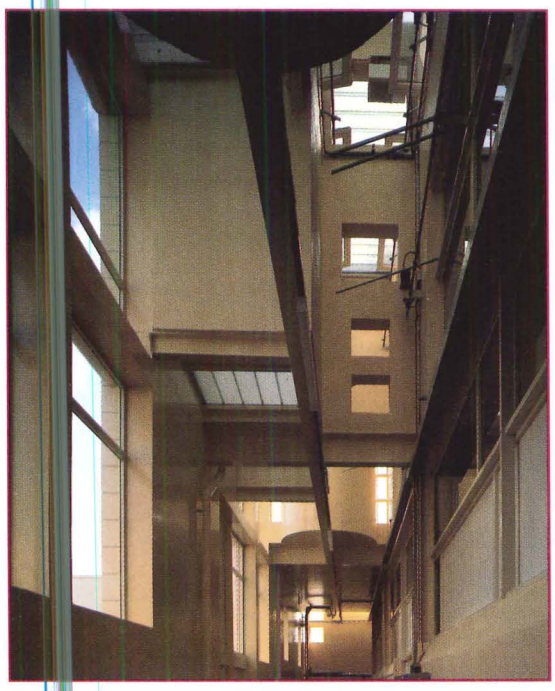
RECYCLING FACILITY SEEN FROM SERVICE YARD



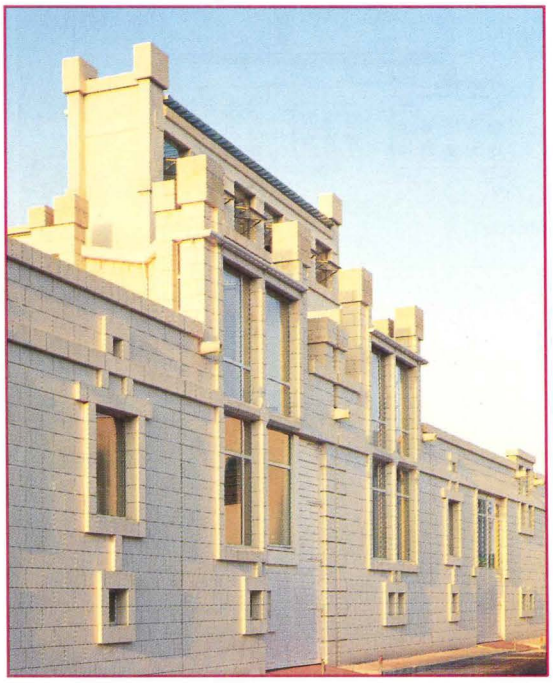
FLOOR PLAN



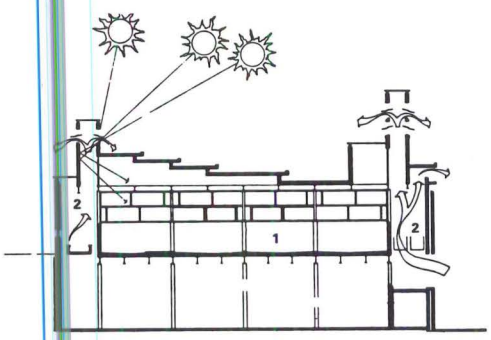
FARSONS BREWERY PROCESSING HALL; SOUTH FAÇADE WITH OUTDOOR FERMENTING VESSELS



CORRIDOR IN INSULATING "JACKET" ADJACENT TO PROCESSING HALL

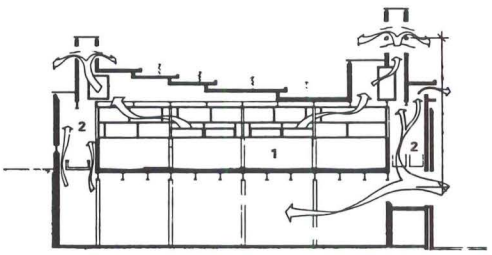


NORTH FAÇADE AS SEEN FROM ORIGINAL BREWERY



HOT DAYTIME AIR IS DRAWN TO LOUVERED ROOFLIGHTS

1 PROCESSING HALL
2 CORRIDOR



COOL NIGHTTIME AIR IS DRAWN BENEATH PROCESS HALL; WARM AIR IS DRAWN TO LOUVERED ROOFLIGHTS

40'/12m

Built of Stone and Cooled by Nature

Processing Hall, Farsons Brewery, Malta

Architects: *Peak Short & Partners, London*

In Malta, it is cheaper to build with load-bearing limestone than with concrete – a fortunate premise for the massive walls of the processing hall that Peak Short & Partners added to a 42-year-old brewery. Construction savings and aesthetic returns aside, the stone walls economize on electricity as well: They are the outer layer of a double-wall insulating "jacket," a passive cooling system for the new hall. It operates with a minimal amount of electricity for sensors and window openers, a sensible strategy for this Mediterranean island where utility rates are three times the norm on the Continent.

During summer days, when temperatures peak at 95F, the jacket acts like a chimney and draws hot air to open rooflights; the thick stone façade absorbs the heat of the sun. After dark, panels on the inner wall are opened to draw cool air through the interior. The process hall air temperature barely diverges from the 49F setting that is uncomfortably cool for people, but optimal for the brewery process. (Malta's consistently cool winter temperatures call for no special accommodation.)

The rooflights and the cornice, modulated by niches, gargoyles, and corner pavilions, show traces of the Maltese baroque, and animate the façades with patterns of light and shadow. But most of the elevations have a chastened flatness compatible with the aesthetic of the original Art Deco brewery. For pragmatic and aesthetic reasons, the architects ruled out a metal building with *brise-soleil*: Strong winds and the cubic masonry vernacular called for a more massive enclosure. Their elegant low-tech solution is concordant with the public perception of the brewery: To most, good beer is the product of safeguarded traditions; the building, like the brew, is evidence that these have been refined, not cast aside.

Machine in the Landscape

Trebor Candy Factory, Colchester, Essex, England

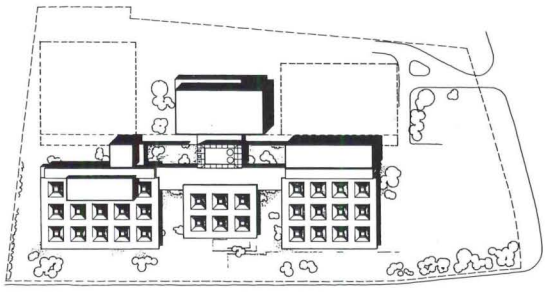
Architects and Engineers: *Arup Associates, London*

Like vernacular buildings of the countryside, this factory derives its aesthetic strength from its understatement. Designed and engineered by a firm famous for its systematic approach to building, the plant, a confectionary, is a composite of sheds and pavilions. A warehouse, sugar silo, and machine tower are housed in three box-like volumes, set behind multiple rows of smaller structures, the production spaces where most employees spend the work day. While the juxtaposition of forms correlates with the process within, their profile on the landscape is equally important. The Trebor plant was built in pastureland, and was soon followed by several more factories, a school, and a housing development. The confectionary is modulated to establish correspondences with the residential settlements nearby; the pavilions mediate between the bulky sheds and the landscape.

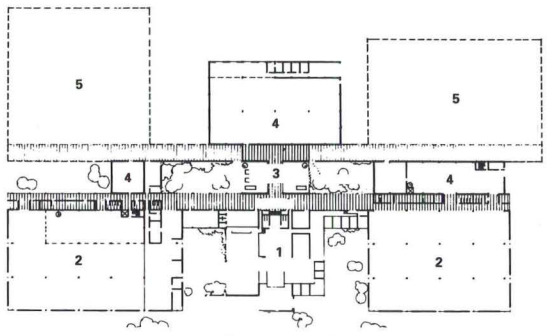
In keeping with its managerial style, the client wanted to provide autonomous work groups with their own distinct buildings. The pavilions, Arup Associates' solution, have proved popular with employees – they can enjoy views of the countryside while they work. A food production plant, the Trebor factory is designed for easy cleaning, with painted walls built of high quality concrete. The Miesian vocabulary has hygienic advantages as well as aesthetic merit: It is free of interstices and exposed structures that could collect dust and dirt.

One might consider this array of factory pavilions a machine in an English garden. A more literal version lies in the midst of the pavilions and sheds: Two gardens, bordered by parallel pedestrian "streets," flank the glass-enclosed boiler, a glistening object in the center of the plant. Instead of relegating the generator to the fringes of the site, Arup made it a shining machine in a place of honor, the centerpiece of an oasis.

TREBOR FACTORY PRODUCTION PAVILIONS; POWER PLANT AND WAREHOUSE IN BACKGROUND

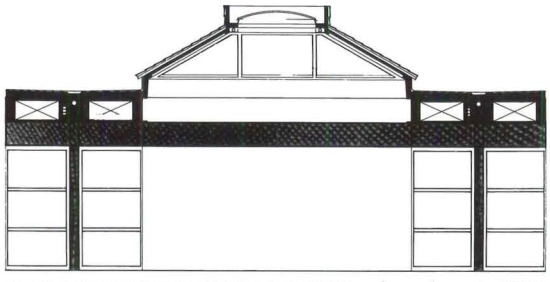


SITE PLAN N 200'/60m

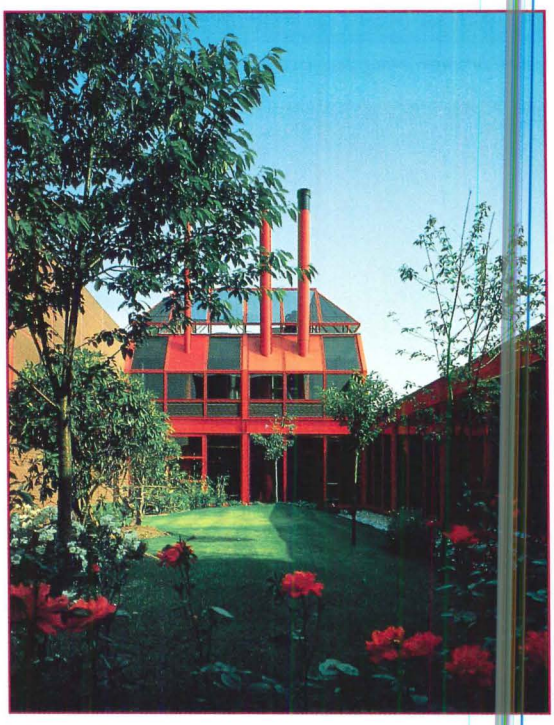


FLOOR PLAN N 100'/30m

1 ADMINISTRATION/CAFETERIA
2 PRODUCTION PAVILIONS
3 POWER PLANT
4 SHED STRUCTURES
5 FUTURE PRODUCTION



SECTION THROUGH TYPICAL PRODUCTION PAVILION 10'/3m



POWER PLANT AND GARDEN

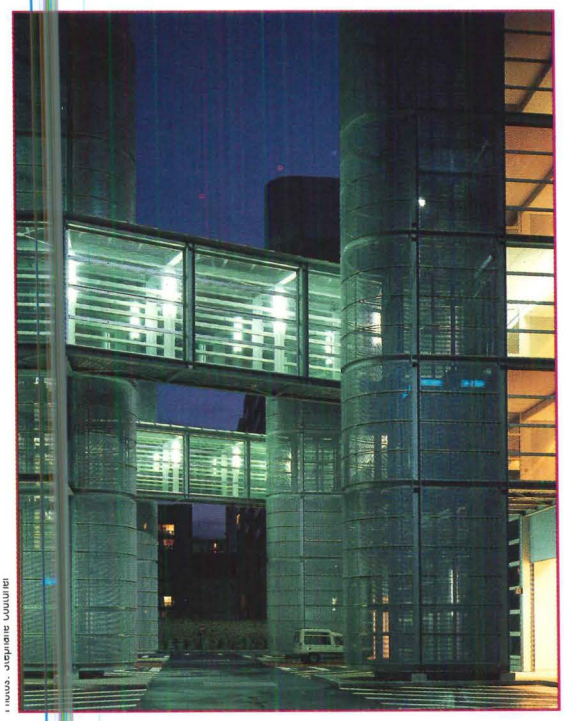
INTERIOR OF TYPICAL PRODUCTION PAVILION

Hôtel Industriel

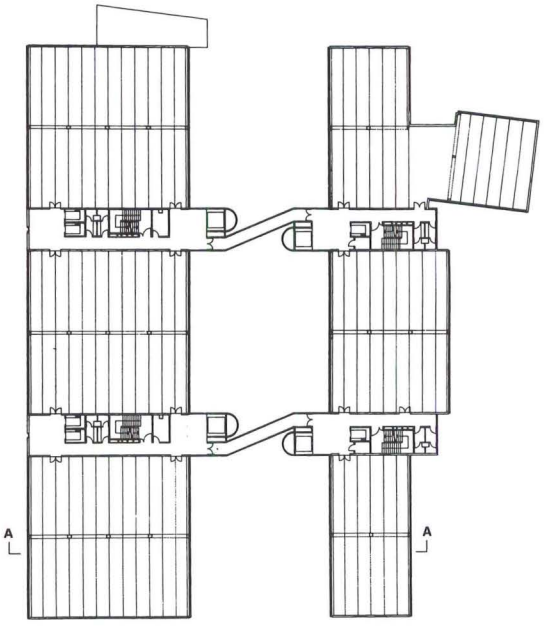
Métropole 19, Paris

Architects: *Jean-Paul Viguier, Jean-François Jodry & Associés, Paris*

SERVICE YARD OF INDUSTRIAL HOTEL; GLAZED BRIDGES LINK STAIR TOWERS

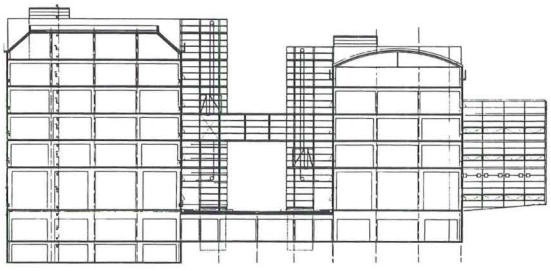


SERVICE YARD AT NIGHT

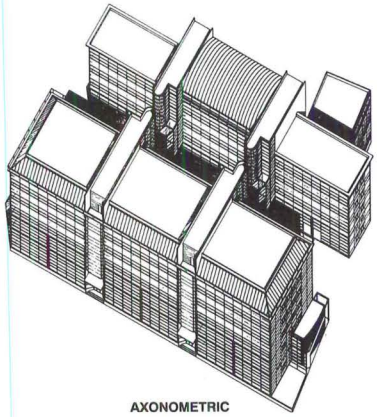


TYPICAL FLOOR PLAN WITH SERVICE SPINES FLANKED BY TENANT SPACE

N 40'/12m



SECTION AA (PARKING BELOW GRADE) 40'/12m



AXONOMETRIC

In Paris, as in American cities, fledgling companies rent space that is cheap and convenient – by default, on the edge of the city. Métropole 19, a 6-story urban infill structure, offers low rental rates and high-quality architecture, inducements to bring light industry back into the city. Prefabricated on a tight budget, this Miesian loft building was erected in 1988 on land donated by the City of Paris. Today it is home to some three dozen start-up companies that produce car parts, electrical equipment, books, and clothing. Now that two other industrial *hôtels* have been built next to Métropole 19, the neighborhood provides its residents with new jobs and a healthy juxtaposition of work and living spaces, a restoration of urban patterns that Modernists once discarded.

Jean-Paul Viguier said that Métropole 19 was inspired by industrial back streets common to 19th-Century Paris. The driveway/parking lot that bisects the building's twin structures is a more orderly version of alleys once lined with elevators and stair towers. It is a place of production removed from the wider front street, where formal façades have entrances for commercial clients.

Viguier's layered site plan likewise reconciles the design mandates of both the city and the factory. The Miesian structure is sympathetic with the Modern apartment buildings nearby. Viguier acknowledges that Métropole 19 looks as polished as an office building, and cites two reasons: A light industrial plant has more in common with an automated office than with a gritty factory shop. Secondly, he believes that the architect should use high technology modestly: It is not a pretext for the architecture, but something to be contained within the building. His strategy sets high-tech architecture within the parameters of good urban design: Métropole 19 is at once forthright and discreet.

An Investment in High Tech

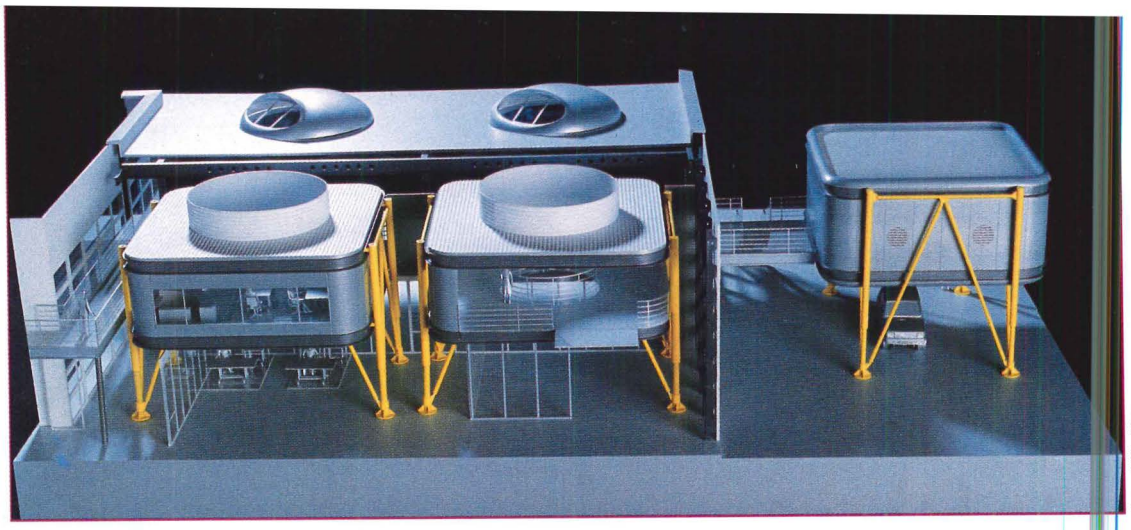
Production Plant, Cologne, Germany

Architects: *Nicholas Grimshaw & Partners, London*

The dividends of this factory will be both fiscal and spatial: It will provide the client with a marketable image as well as a highly flexible interior. Now under construction, the plant will have a reticulated structure, with 100-foot mast-pylons and tension wires that support the roof from above. From the *autobahn* and railways that flank the site, the roof, a grid of domes, will seem to float above the curtain walls that enclose the building. The client, a German firm, works in a competitive market (thus precluding any mention of the company's name or products), and sought Nicholas Grimshaw expressly for his high-tech aesthetic; its lyrical connotations parallel the firm's corporate persona.

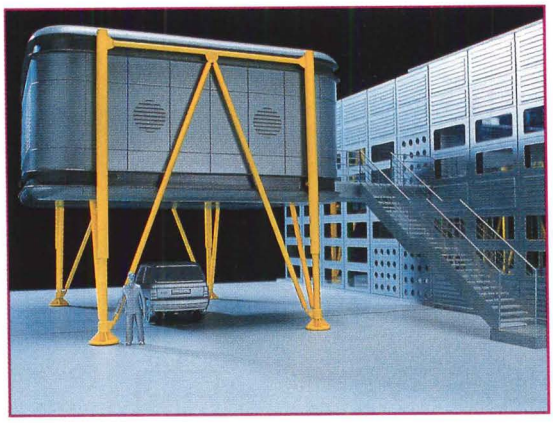
The roof will cover an equally articulated interior, interspersed with pod-like rooms elevated on steel legs. The number, configuration, and interior fittings of these modules can be altered as the factory grows. Distant relatives of the capsule structures envisioned by Archigram, these will be buildings within buildings – climate-controlled workstations, restrooms, or office suites. While Archigram's ideal of mobile architecture is not fully realized here (Grimshaw's rooms-on-stilts take some effort to move), their concept of plug-in buildings will be more evident: Wiring and plumbing for the modules will come from feeders that line the factory's walkways.

Ironically, the floating roof and paradigm of flexibility will not yield a single, freely flowing interior. The client requested a factory that could be subdivided, and envisioned a "forest" of solid objects, rather than a totally transparent interior. Grimshaw's design will easily accommodate disparate activities side by side, an inevitable situation at this plant: Its program encompasses product development, production, sales, and executive offices, an agenda as synthetic as the architecture.

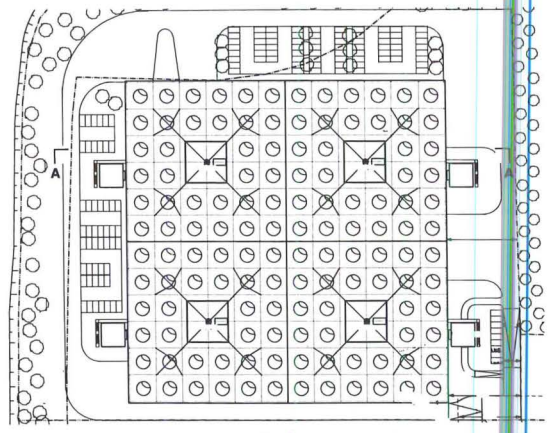


Photos: Michael Dyer

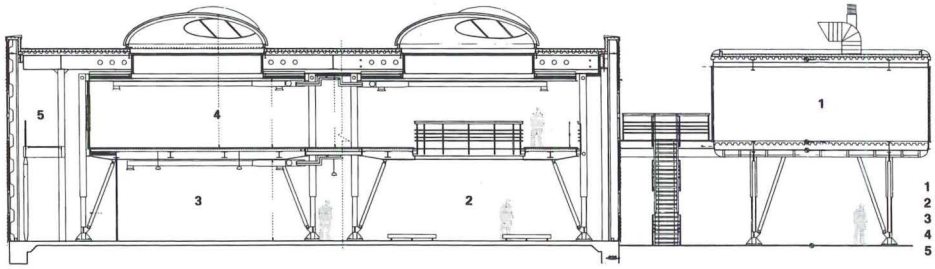
PRODUCTION PLANT IN COLOGNE; CUTAWAY MODEL OF PARTIAL BAY



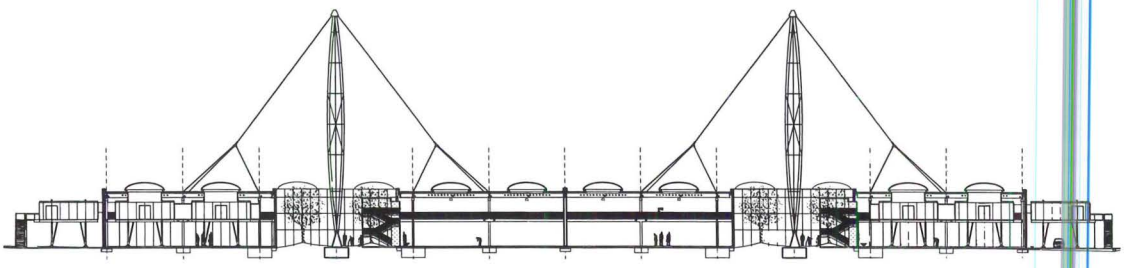
UTILITY SERVICE POD ADJACENT TO FACTORY ENTRANCE; STAIR LEADS TO MEZZANINE



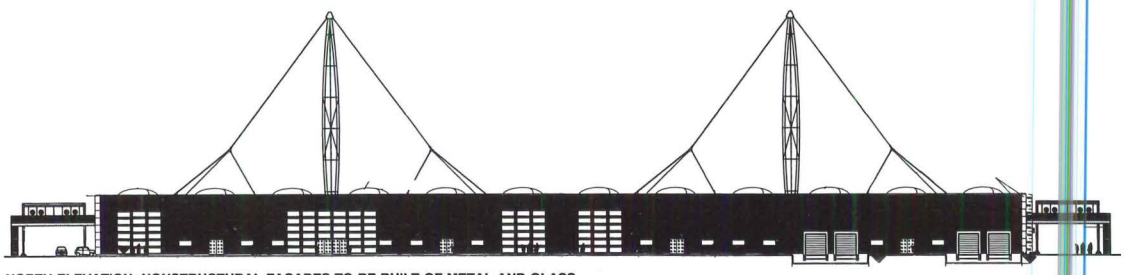
ROOF PLAN



SECTION OF PARTIAL BAY



SECTION AA; MAST PYLONS RISE FROM COURTYARD GARDENS



NORTH ELEVATION; NONSTRUCTURAL FAÇADES TO BE BUILT OF METAL AND GLASS

Sure-Shot Modernism

1

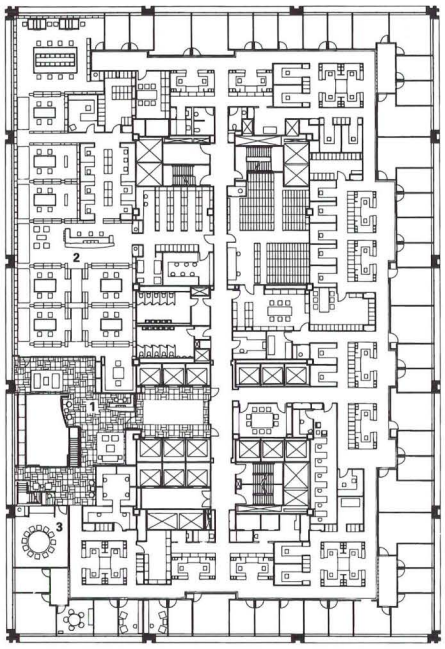
Two interiors by Kohn Pedersen Fox Conway illustrate the double entendres in corporate Modernism, with connotations of status and nonconformity.

To hire Kohn Pedersen Fox Conway (KPFC) for its lack of experience is at once a paradox and a sign of good faith – such was the scenario for designing the law offices of Cleary Gottlieb Steen & Hamilton. The client was impressed by KPFC's portfolio of corporate interiors, including, most notably, the Procter & Gamble headquarters (P/A, Oct. 1985, p. 71). But it was equally important that this was the architects' first law office. Cleary Gottlieb Steen & Hamilton presumed that KPFC would be innocent of the preconceptions that lawyers have of their ideal office; they wanted an interior that would have an aesthetic as progressive as their management style.

KPFC responded to this overture with a handsome pair of multistory lobbies that are Corbusian in concept and overlaid with a luxurious palette, like most corporate work in the United States. At the same time, the firm designed an investment banking office that is a distant descendant of Mies van der Rohe's architecture. Both commissions testify to Modernism's blue-chip value for image-conscious corporate clients.

The main lobby of Cleary Gottlieb Steen & Hamilton's law office (1) is a great hall lined with balconies.

1 3-STORY LOBBY
2 LIBRARY
3 CONFERENCE



LAW OFFICE, 40TH FLOOR PLAN N ← 40'/12m

2

Law Office

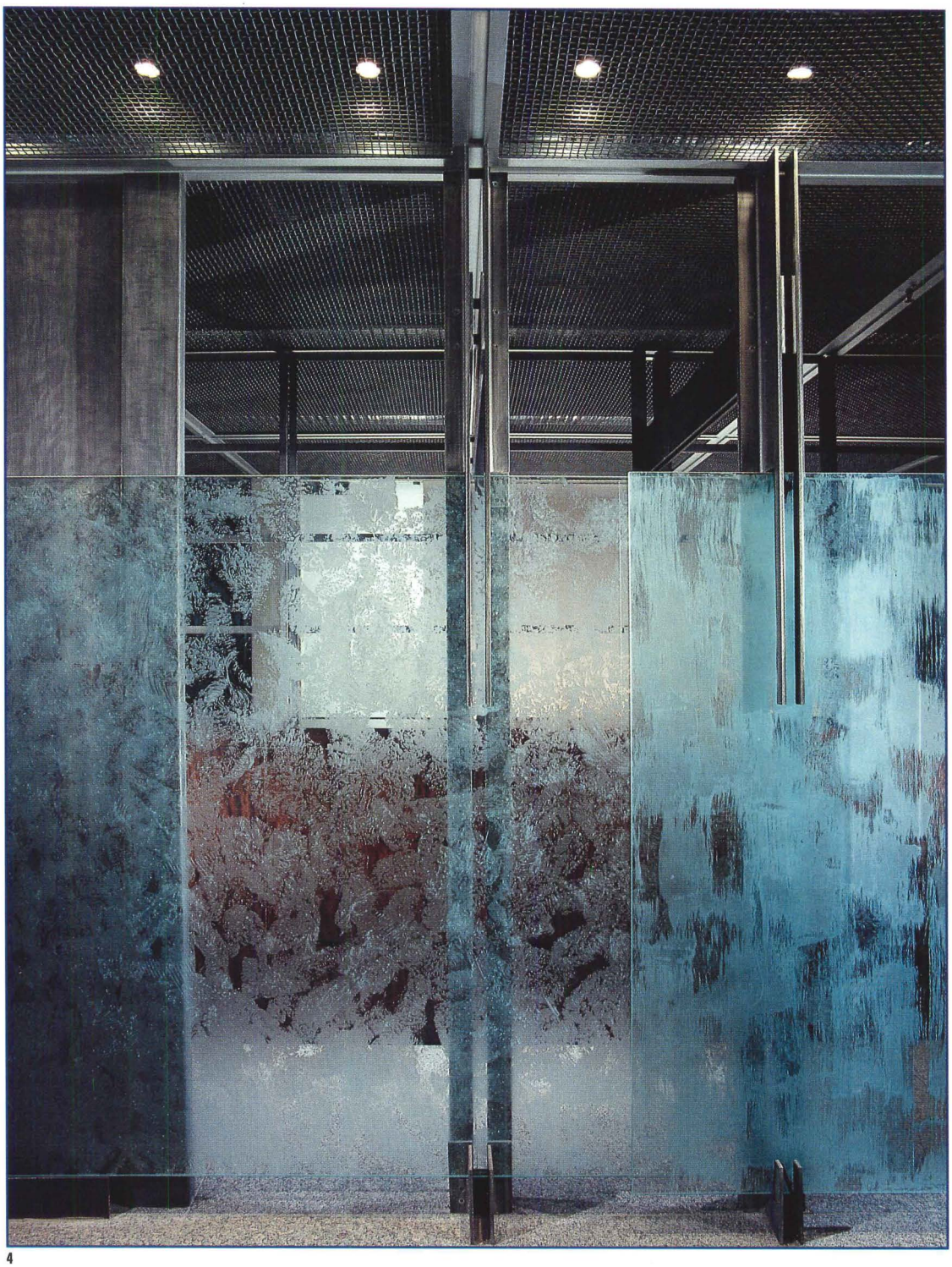
KPFC and Cleary Gottlieb Steen & Hamilton recognized that the law office's 40th-floor vista of New York harbor was more impressive than any interior design scheme could ever be. Accordingly, the architects created a three-story lobby with a panorama of Lower Manhattan, a vantage point that bespeaks power and authority. Views into the rest of the office were considered with equal care: In this lobby (it has a smaller counterpart four floors below), a glazed wall admits views of the adjacent library, whose bookstacks connote knowledge and competence.

The law firm wanted its lobbies to feel like comfortable rooms, not waystations. To the traditionalists among the law partners KPFC's adaptation of Le Corbusier was an unexpectedly apt solution: The architects erected paneled walls that stand free of the foyer's enclosing surfaces. They are iconic objects inserted in the multistory space, whose reductiveness (and orthodoxy) is on a par with that of the skyscraper it is in, designed by Skidmore Owings & Merrill in 1974. KPFC's panels, sculptural devices for channeling the flow of space, are informed by the work of Richard Meier, Gwathmey & Siegel, and other American students of Le Corbusier. The palette is more sensuous than Le Corbusier's, with anigre hardwood and kirkstone floor pavers. This is a surprisingly intimate space, with views and quiet seating areas bracketed by the paneled planes.

KPFC's design was reviewed by a committee of ten lawyers, as articulate as they were particular about details – a scenario that elicited design compromises. Perhaps this explains why the lobby seems more a judicious solution than a tour de force. It is even handed, but not resounding: Vigor has been tempered by corporate protocol.

3

Project: *Cleary Gottlieb Steen & Hamilton law office, New York.*
Architects: *Kohn Pedersen Fox Conway Associates, New York (Randolph H. Gerner, partner in charge; Judy Swanson, design partner; Patricia Conway, programming partner; Karen Dauler, project manager/associate; Keith Rosen, senior designer/associate; Robert Dick, Audrey Strom, Robert Ma, project architects; Lori Clark, Paula Rice, Sarah Hoyt, Thea Kosar, Iori Okura, Charles Dodge, Wat Puntoompoti, Carmen Rodriguez, design team).*
Site: *6 floors of a 1974 Downtown Manhattan skyscraper by Skidmore, Owings & Merrill.*
Program: *a 255,000-sq-ft law firm with 2 multistory atriums, legal offices, secretarial space, cafeteria, kitchen, library, records room, conference center, and computer room on 6 floors.*
Structural system: *concrete slab and steel beam; part of original structure demolished to install atriums.*
Major materials: *anigre architectural woodwork; glass walls; wood and glass doors; stone, wood, ceramic tile, and carpeted floors; gypsum board and acoustical tile ceilings (see Building Materials, p. 108).*
Mechanical systems: *existing base building system with supplemental units for special areas.*
Consultants: *Weiskopf & Pickworth, structural engineer; Flack & Kurtz, Consulting Engineers, mechanical, electrical, plumbing; Romano Gatland, kitchen; Cline, Bettridge, Bernstein Lighting Design, lighting; Shen Milsom & Wilke, acoustical; Carbone Smolan Associates, graphics; Ferguson Cox Associates, furniture; Kevin Gerard and Barbara Farsi, interior landscape; Elizabeth Levine, art; Xtend Communications, communications; Trellis Network Services, computers; John Van Deusen Associates, internal elevators & conveyers; Robert Schwartz Associates, specifications; Naremco Services, records; Electronic Systems Associates, security; Joiner-Rose Group, audio-visual.*
Contractor: *Lehr Construction.*
Photos: *Paul Warchol.*



The stairway in the lower lobby of the law firm (2) is a freestanding object, a counterpart to the tall paneled wall of the main lobby (3). In the Investment Banking Partnership (4), acid-streaked glass panels are framed by built-up aluminum columns.

4

Investment Banking Partnership

For this project, KPFC was free to take more design risks, with great success: It has a ceiling grid that adapts Miesian models (and more recent American interiors) to a Manhattan skyscraper of the 1980s. KPFC's grid is a datum for concentric bands of space that become more private as one approaches the building's periphery.

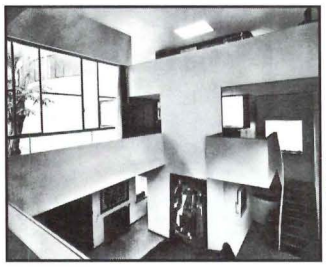
Fitting in the requisite number of desks called for the most straightforward floor plan: A public hall (which incorporates the reception area) wraps around the elevator/restroom core. A ten-foot-wide band of filing cabinets separates this public passage from the next layer of space occupied by the secretaries' desks. Ironically, the associates' and partners' enclosed rooms on the periphery are less interesting than the open offices of the support staff, where walls of glass and open-grid frames bracket views from one zone to the next.

The atmosphere seems muted, with subdued lighting that evokes an endless twilight. While serene, it is an adventurous design for investment bankers, who consider traditional interiors a surer sign of financial security. Nevertheless, a patina of age is evident here: The burnished aluminum columns and acid-streaked glass are compatible

The Open Plan: Parallel Strategies

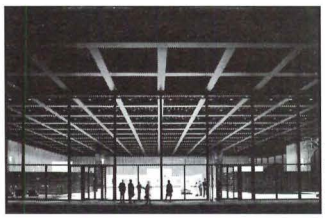
Any student of architecture knows that the freely flowing interior, whose pioneers include Le Corbusier and Mies van der Rohe, is fundamental to the Modern Movement. But the contrasts between these two architects are as consequential as their similarities. Each developed his own syntax for space making: Le Corbusier's interiors are episodic passages around sculptural masses, while Mies created volumes that imply a limitless horizontal expanse.

The entrance hall of the La Roche House, part of a seminal Corbusian villa, is a distant precursor to KPFC's law office foyer: It is a double-height volume whose mezzanine and stair offer a sequence of views within and beyond the interior. Patterns of light and shadow animate Le Corbusier's walls and highlight contrasts of solids and voids.



Fondation Le Corbusier

Le Corbusier, entrance hall, La Roche House, Paris, 1923.



David L. Hirsch

Mies van der Rohe, Nationalgalerie, Berlin, 1968.

In Mies's interiors, both steel construction and the spatial volume are reduced to their essences. The Nationalgalerie of Berlin exemplifies the Miesian aesthetic: It is simply a gridded steel roof set over a vast glazed space, with rigorous steel detailing that matches the interior in its simplicity. This building is reduced to one unified concept, a counterpoint to Le Corbusier's architecture of juxtaposition and contrast.

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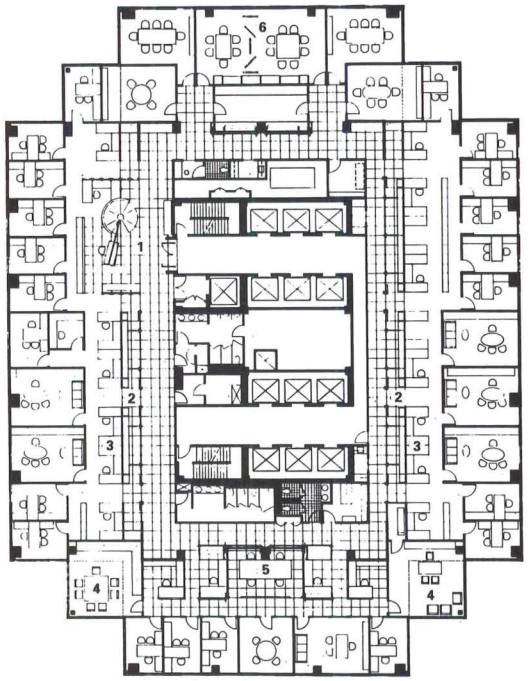
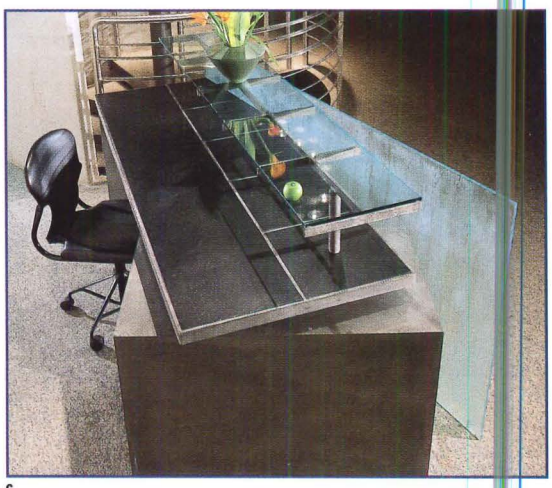


BANKING OFFICE FLOOR PLAN



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1 RECEPTION
2 FILES
3 SECRETARIAL
4 PARTNER
5 TRADING ROOM
6 CONFERENCE/DINING

with the antique sculpture on display, part of the collection of one of the banking partners.

KPFC's formal vocabulary accommodates computer terminals as gracefully as it does Classical busts. The metal and glass partitions are not painfully minimalist: Keyboards and video screens have been added to workstations without undermining the disciplined aesthetic. The trading room, where traders buy and sell stock on multiscreen computers, is a vitrine of sophisticated hardware installed in an ostensibly older framework. This is the modern investment firm's sanctum sanctorum, where blinking screens trace instantaneous transactions. Information technology assumes a place of honor in an interior with precursors from the 1920s. It is a metaphor for the shift from the First to the Second Machine Age, a symbol of today's global marketplace. **Philip Arcidi** ■

An open grid separates the secretarial and filing areas of the Investment Banking Partnership (5). In the main hallway, KPFC's reception desk is adapted from a syntax of layered components (6); it is adjacent to the circular stair (7), whose textured wall is highlighted by a circle of overhead lights.

Project: *Investment Banking Partnership, New York.*
Architects: *Kohn Pedersen Fox Conway Associates, New York (Randolph H. Gerner, partner in charge; Anne L. Manning, project designer/associate; Gustavo Matticoli, project manager; Karen Fuchs, Melanie Ide, Thomas Yo, design team).*
Site: *one-and-a-half floors of a Midtown Manhattan 1980s skyscraper by Roche Dinkeloo Architects.*
Program: *a 33,000-sq-ft private banking firm with enclosed rooms for senior staff, a trading room, secretarial stations, dining and conference rooms, and kitchen; accounting offices occupy the lower half-floor.*
Structural system: *existing concrete filled metal pan floors and steel framing.*
Major materials: *granite paving, carbon steel mesh ceiling panels, tempered glass, acid-treated aluminum, makore and pear wood, textured cementitious plaster (see Building Materials, p. 108).*
Mechanical system: *standard HVAC diffusers above suspended mesh ceiling; poke-through electrical floor outlets.*
Consultants: *Johnson Schwinghammer, lighting; Shen Milsom & Wilke, acoustical; Robert Schwartz & Associates, specification; Flack & Kurtz, Consulting Engineers, mechanical & electrical; The Office of Irwin Cantor, structural; Ferguson Cox Associates, furniture; Degnan/Laurie, glass artisan.*
Contractor: *Herbert Construction.*
Costs: *$155/sq ft (no fees included).*
Photos: *Elliott Kaufman.*

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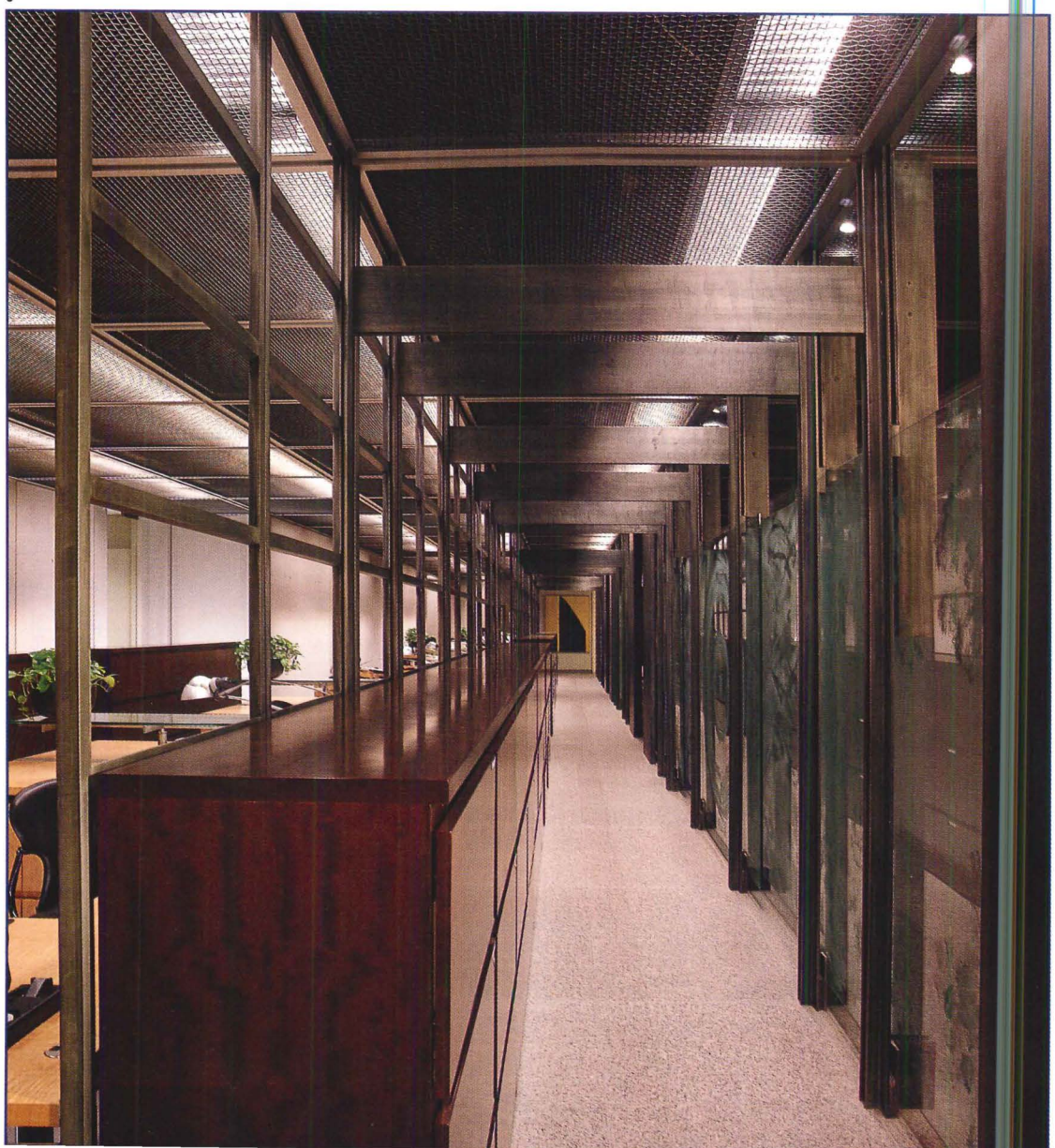

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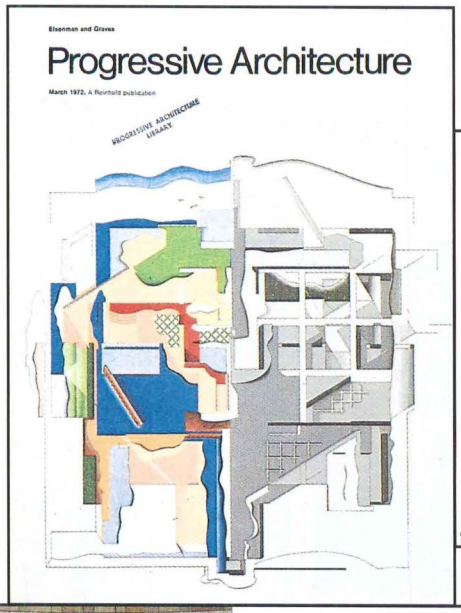
The trading room (8), centered between the partners' corner offices, is an electronic nerve center, where computer monitors trace silent transactions of stocks and bonds. The filing area is a hall with open walls (9). Rows of overhead lights are modulated by the mesh ceiling and aluminum beams, aligned on a five-foot grid that pervades the office. This structural module imparts an aesthetic both progressive and understated.

John Morris Dixon's 20th-Anniversary

SCRAPBOOK



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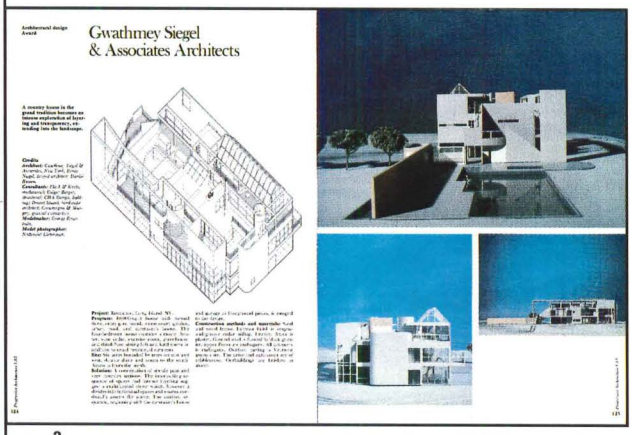

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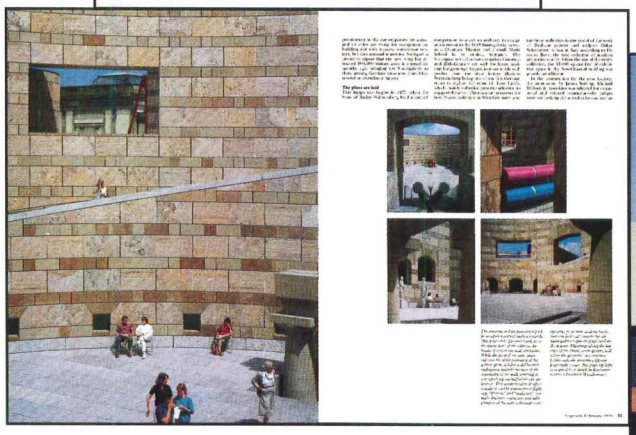

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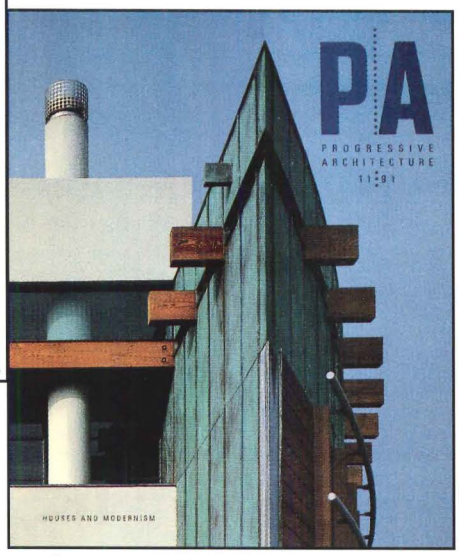

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1 First issue as editor March 1972, cover. *Conceived before my arrival in December 1971, this issue was the first I oversaw; Michael Graves designed the cover to represent features on his work (left side, in color) and Peter Eisenman's (right side, black and white).*

2 P/A Awards pages January 1982. *An award-winning house on Long Island, New York, by Gwathmey/Siegel & Associates was detailed further on subsequent pages.*

3 Landmark of the times October, 1984. *Stirling/Wilford's Neue Staatsgalerie in Stuttgart was the subject of a 21-page critical assessment.*

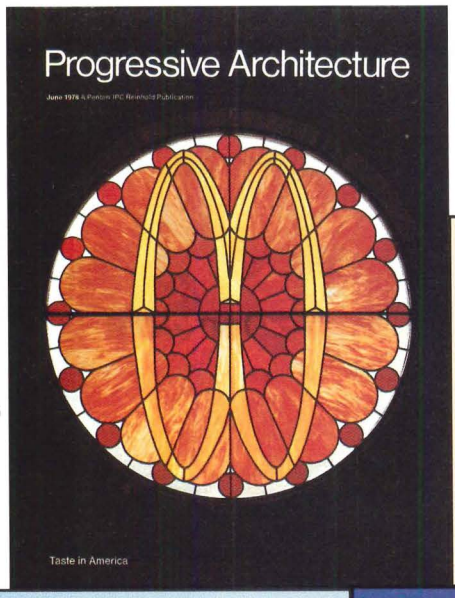
4 Latest issue November 1991 cover. *A photo of the Crawford house in Montecito, California, by Morphosis, represents - coincidentally - the ascendancy of Southern California as an architectural center during these years.*

In the two decades since I first became Editor here at P/A, there has been a tremendous amount of activity in architecture, worldwide – enormous amounts of construction, incalculable hours of debate, and unprecedented reams of printed matter on the subject. And yet, it seems that little really new has been introduced to the field.

By 1971, the design issues of these decades had already been laid out and all the current technical means established. Modernism's obituaries had already been written and reflective insulating glass perfected. The agenda for the 1970s and 1980s was mainly to work through the ramifications of such developments.

External circumstances had strong effects: There were energy shortages and gluts, severe ups and downs in construction, openings and closings of foreign markets. There was a huge shift in America's resources from public undertakings to private ones.

On the following pages, I have collected illustrations and excerpts to characterize these 20 years. These assembled bits are arranged by theme, not date. The selections do not necessarily represent the concerns or preferences of my esteemed colleagues, past or present, at P/A – to whom much thanks is due.



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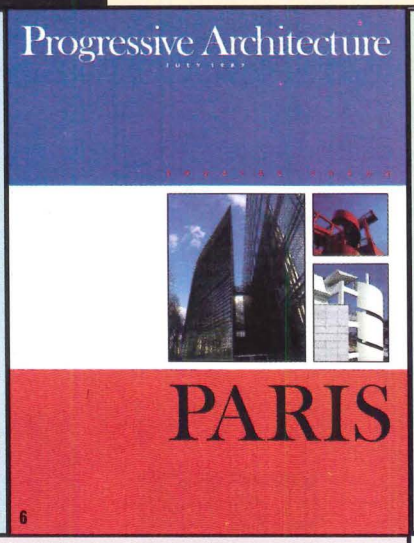
P/A Awards: Persistence of the 1960s

In recent years some juries have seriously questioned whether design, as it is traditionally understood, should even be a criterion for judgment. This year, for instance, the jury acknowledged design as something quite broad and somewhat nebulous that includes everything from concept and organization to programming and process. They felt that all of these aspects should be looked at separately to see how an idea is satisfied, recognizing that the actual form that results may be unimportant, In other words, the mechanisms by which environmental objectives are accomplished are now looked at for their own merits. *Editorial, June 1973*

P/A Parodies 1970s P/A

Schwarting painted the main stair leading to the master bedroom and studio green (to allude to trees once outside before the industrial area was developed, but now referring to the ficus plants in the double-height living room.) Another stair, a spiral, links the secondary sleeping wing (for guests and children) to the upper-level work area (its form alluding subtly to the previous function of the industrial space – the manufacture of drills – and at the same time referring architecturally to the history of this form seen in bell towers of Gothic cathedrals and the stair of the Villa Savoye.) Another circulation link, the bridge connecting upstairs sleeping with studio (where walls are painted blue to signify the sky one used to see before the building was built), is juxtaposed with the fire alarm (painted red to allude to fire) and water pipes (green to signify water). *Suzanne Stephens, Taste in America issue, June 1978*



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P/A Awards: Selection Standards

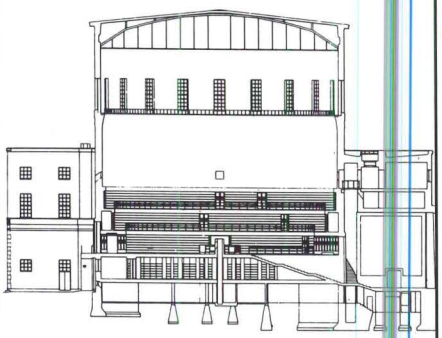
Rudolph: What would a P/A jury have said about the design of Ronchamp?
Eisenman: If Peter Chermayeff were on it, he would have said it had no humility.
Other jurors (with mock disdain): What's inside those thick walls? It's too complicated for such a straight-forward program. No provisions for parking. Pensive chuckling; attention reverts to sandwiches.

It was lunch break on the second day of judging, and the P/A jurors were pondering their criteria before the final rounds. Like jurors of the past, these eight people hoped to transcend momentary preoccupations that might blind them to eternal values among the entries. *Awards issue, January 1975*

Architecture in an Electronic Age

The distribution of information, once motivation for cathedrals, halls of government, and great libraries, is no longer dependent on proximity. A pervasive nostalgia for the form of these things makes contemporary architecture falsely hierarchical in an autonomous landscape.

The urban environment is seen as perhaps it always had been – as information intensive rather than location intensive. The old landmarks have been replaced by movable distributors of economic cultural information which are as portable as the objects which repeat, store, and relay it. The new geography has as many centers as points. Everything originates everywhere. *Craig Hodgetts, from the first Interior Design issue, November 1973*



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THE MAGAZINE

P/A has been evolving with the profession for these two busy decades. Annual P/A Awards issues chronicled shifting attitudes toward architectural design, urban design, and starting in 1974, architectural research. New departments or features initiated include Technics, Practice, Precursor, Pencil Points, Reader Poll, Inquiry, Perspectives, and Furthermore... Thorough-going redesign of P/A itself took place in 1980 and 1990. The passage of years is vividly indicated by the increase in color photos, from an average of 10 per issue in 1974 to 100 per issue today.

5 Taste in America issue
June 1978, cover. *A rose window from a McDonald's eatery introduced an issue that won P/A a highly prized National Magazine Award.*

6 Paris issue
July 1987. *P/A heralded the revival of Paris as an architectural center, examining the* grands projets *and other contributing efforts.*

7 Asplund's Stockholm Library
February 1980, section. *An evaluation of the early-20th-Century Swedish master set the pattern for Precursor articles on Lutyens, Plečnik, Arthur Brown, the Italian Rationalists, and others.*

8 Selected Details
April 1988, interior stair by Hariri & Hariri, Architects. *The decades-old tradition of P/A Selected Details pages was revived in 1988.*

9 Young Architects issue
June 1987, excerpt from introduction. *Inviting submissions from architects out of school ten years or less, P/A featured 32 out of 350 who responded, a*

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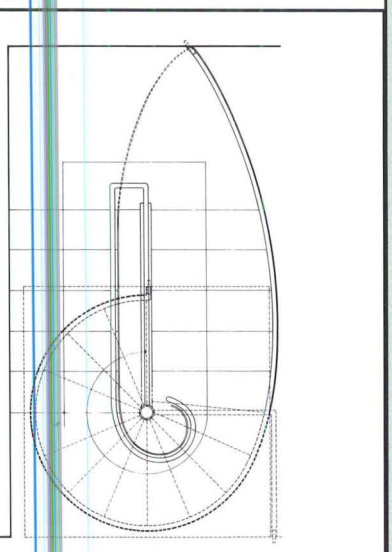


Hotels at Disney World

One would have to be a mean old curmudgeon indeed to be less than delighted by Michael Graves's Dolphin Hotel, at least for a while. It is a quick read on the giant screen. The first view of it is the best. We drive in along Disney World's entrance road and come to a bridge and the foliage opens out to the right, and there they are, the Swan and the Dolphin, seizing the Florida sky... Shocking in scale, apparitions, they stretch wide under the sky's incomparable expanse, and the enormous animal figures that crown their extremities like barbarous akroteria stand out against the towering castles of the clouds and are constantly echoed and re-echoed in their shapes. *Vincent Scully, October 1990*

Remembering Aalto (1852–1975)

In Baker House, as elsewhere, Aalto showed that distorted symmetry could be more rewarding than the pure kind, that an underlying geometry can be improved by irregularities. He showed that great architecture could be a response to context – to urban context as well as natural setting. (Baker House, in fact, would make no sense at all in isolation.)

Above all, Aalto demonstrated in this building – as in all of his buildings – design determined by human experience rather than mere abstraction: the changes in ceiling height that signaled degrees of privacy, the windows placed for the view rather than the formal pattern, the Aalto-designed furniture that never felt cold to the touch or reflected too much sound, the handrail shaped for a satisfying grip. *Editorial, July, 1976*

10

Opinions of the East Building, National Gallery

Stephens: The East Building falls into the old trap shared by much Modernist architecture: it ignores a prime communicating device of architecture – the elevation... While each elevation is treated differently, none is designed as a "façade" Each reads as part-of-something-else, without, however, giving the vaguest clue about what comes around the next corner.

Dixon: The minimal angular volumes, faced in such pale translucent marble, are highly abstract, scaleless, and ephemeral; seen from certain key angles they form a fine minimal composition. From other, unplanned angles – across the Mall, for instance – the angular towers cluster into a clumsy and rather aggressive-looking silhouette.

Filler: It eventually becomes apparent that as a composition the building reads most satisfactorily as a pattern on paper.

Murphy: I feel that the East Building's response to the city plan could hardly be better thought out. While its response to the Mall might be a little bland, it does a good job of keeping the scale down to a point where it does not become overwhelming. *Editor's Round Table, October 1978*

9

SPECIAL ISSUE

Young Architects

What does it mean to be a young architect in a profession that is notoriously tough for beginners? Thirty-two architecture graduates selected by competition for this issue talk about their experiences and their work.

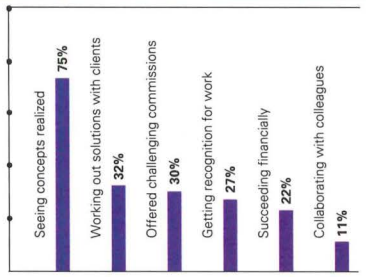
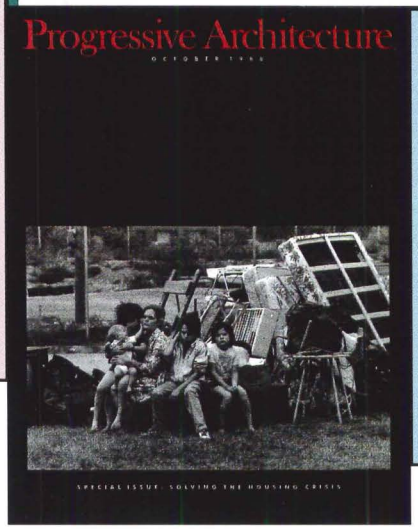


Figure 8 "What are the most rewarding experiences for an architectural professional?"



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The Semiotic Discourse

As everyone became a semiotician, a terrible thing began to happen. Architects started to assume that since form was the repository of meaning, the invention of meanings fell within the architect's purview. No longer content with placing a stick figure in a skirt under the Helvetica letters spelling "ladies," designers began to produce projects so rife with studied symbolism as to make a 99th-degree Mason blush. *Michael Sorkin, September 1981*

second Young Architects issue was published in July 1990.

10 P/A Reader Poll graph
February 1987. *Third in a series of reader opinion surveys begun in 1986, this one measured career satisfaction, touching on education, career choices, financial rewards, and measures of success.*

11 Housing Crisis: special issue
October 1988, cover. *A photo of an evicted family set the tone for subjects that ranged from emergency shelters to middle-income apartments.*

Favorite Headlines

Slouching toward Barcelona
February 1975, by Roger Yee for an article on chair comfort.

I'd Rather Be Interesting
February 1984, by Susan Doubilet for the Introduction to an issue on Philip Johnson and John Burgee.

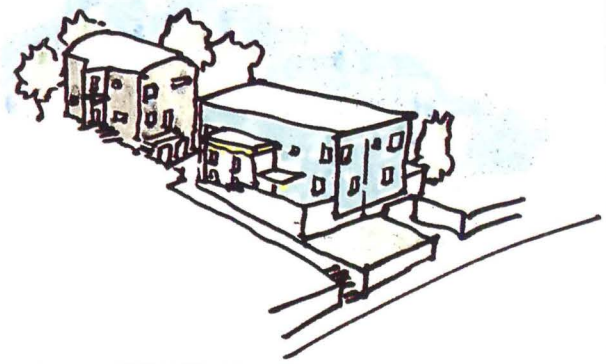
Attack of the Killer Fries
September 1986, by David Morton for feature on a fast food shop by Grondona Architects.

12

Affordable Housing

Is affordable housing an American birthright? Technically no. Although John Locke listed property, along with life and liberty, as the three natural rights, Thomas Jefferson dropped it in favor of the pursuit of happiness when writing the Declaration of Independence. The idea of housing as a birthright wasn't formally addressed until 1944, when Franklin Roosevelt [referred to] "the right of every family to a decent home." Behind the pieties of "free enterprise" stands the bare fact that the lack of affordable housing benefits most those who own and develop property. The median price of a new house rose 23.5 percent this last decade, while median income rose only 8 percent. And, between 1980 and 1988, gross rents rose an average of 14 percent, while renters' incomes rose an average of only 5 percent.

Whether one agrees with Roosevelt or not, what he realized is that a poorly housed population is also a politically volatile one. The provision of affordable housing is, thus, in everyone's best interest, even those who are adequately housed. *Thomas Fisher, P/A, June 1991.* [*For more on P/A's Affordable Housing Initiative, see this month's Practice section.*]



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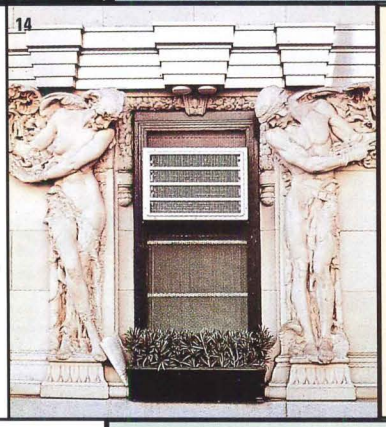

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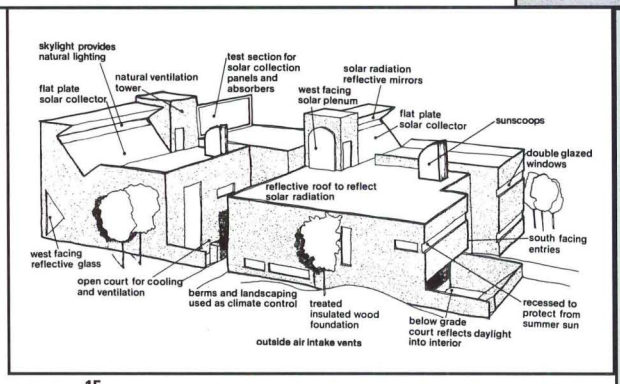
Preservation

In the end, nothing beats preserving the uses along with the buildings. We cannot, of course, save uses that are economically or socially obsolete (sweatshop industries in our urban lofts or millionaires in our marble mansions). We can, however, try hard to keep urban functions in our cities and working farms around our farmhouses. It is to the larger issues, of how our society's resources are used and distributed that we must give some serious attention if we are to keep the best of the world's architecture as a setting for real life. *Editorial, November 1984*



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Architecture for Export

Right now, demand for new construction and money to back it seems to be concentrated in the Middle East oil-producing states, in countries such as Egypt where oil money is invested, and in those flourishing trade centers of the Far East, Hong Kong, and Singapore.

Once again, we are forcibly reminded that building activity responds less to the *pull* of demand than to the *push* of resources at hand – a principle as old as the Pyramids. *Editorial, December 1974*

16

On-Going Concerns

During these 20 years, American architects had more worries than dreams, more theories than visions. The 1970s saw the dismantling of virtually all Federal housing and development programs. Architects made strides in energy-conscious design, but the public's concern abated. Liability insurance skyrocketed; marketing of services got serious; architecture appeared on gallery walls; computers entered the drafting room. Many women joined the profession, but only modest numbers of minority members. One area where most of the news was good was in the preservation and reuse of our architectural heritage.

12 Razing of Pruitt-Igoe housing
St. Louis, October 1972. *This image, widely cited to discredit public housing and Modern architecture, introduced a P/A feature on the "Defensible Space" housing concepts developed by architect Oscar Newman.*

13 Dispersed Housing
Santa Monica, California, by Koning Eizenberg Architecture, January 1987. *First Award winner in the 34th annual P/A Awards program, this infill project (completed 1988) exemplifies the humane – but too rarely executed – housing concepts of the 1920s.*

14 Old building in St. Louis
Cover photo, Preservation issue, November 1972. *Taken by associate editor (later executive editor) David Morton, the photo showed the impact of modernization on Beaux-Arts ideals.*

15 Energy-concious building
Professional offices in Denver by Richard L. Crowther, December

17

Women's Place in Architecture

A few years ago, I was visiting a firm in a distant city – one whose work has been published in P/A and elsewhere. As I was talking with one of the partners, a woman slipped into the conference room for a brief, hushed conversation about which of two fabrics to specify for some seating; we were not introduced. Later, over dinner, we were discussing his staff. It turned out the interior design woman was his wife; they had been classmates at a most prestigious architecture school and had worked together ever since. Why was he the firm's best known partner, while she supported behind the scenes? His answer: She has a really rare sense of color and texture, which makes her invaluable for choosing materials. Too bad he isn't so blessed.
Editorial, March 1977

Money and Design

Receipts for architectural design and consulting services are a shrinking share of a shrinking market. This occurs because superior technical knowledge has increasingly replaced lore as the primary basis for decisions within the economy and within the building community itself. Architects can enhance their contribution to the building industry and the industry's contribution to the economy through the development of systematic and reliable knowledge about the design and use of environments. We must supplement, not supplant, lore-based intuition with research-based knowledge.
Francis T. Ventre, December 1982

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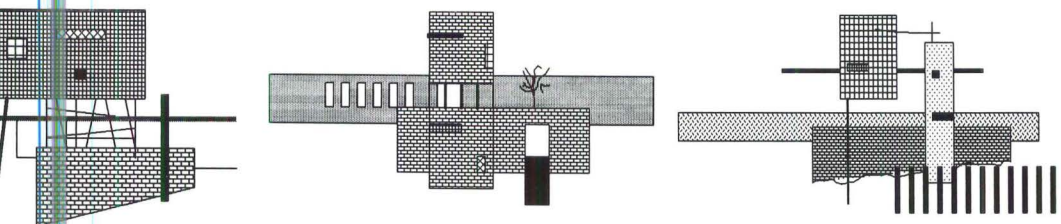

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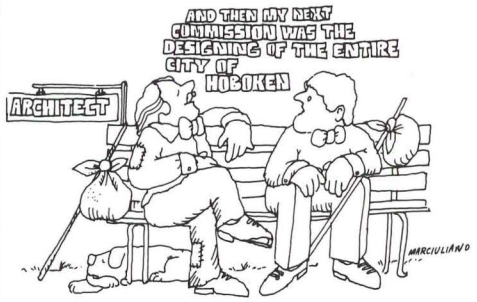
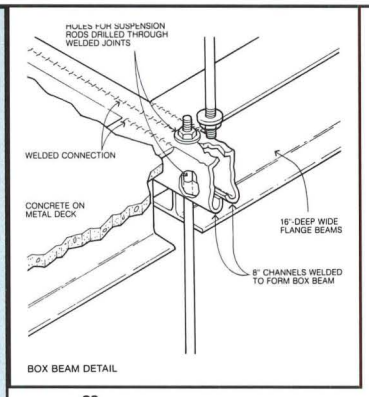


Minorities in Architecture

Just as we asked whether there is a "women's architecture" as such (P/A, March 1977), Black Enterprise asks [In a Sept. 1976 article by Richard Dozier, architecture chairman at Tuskegee Institute] whether there is such a thing as a "Black Architecture." The answer seems to be "no," or at least "not yet." Don Stull is quoted as observing that "Jackie Robinson didn't hit black home runs." We don't ask I.M. Pei to serve the Chinese-American community, and we cannot impose any comparable obligation on blacks. Those who do involve themselves in the problems of black communities may make some distinctively black contributions to the advancement of architecture – with lessons for all user-oriented designs. Those who don't will have – must have – an equal opportunity to advance the profession as a whole.
Editorial, July 1977

Western Architects in Japan

The respect for the foreigners' artistic strengths is attended by a supportiveness that has been long lost in the West, James Wines contends. The Japanese have perfected the art of motivating people, giving them the sense that their contribution is crucial. "The spirit of teamwork is incredible. You get the feeling everyone is on your side, everyone wants it to be perfect," he says. This ethic is in stark contrast to the adversarial, "cow-the-artist" roles that American clients favor. "American minds have an antagonistic view," Wines says. They're not satisfied unless they've "whittled the architect down in some way." Whereas Japanese clients, while extremely demanding of the architect's time, and strict about quality and budget, will "do almost anything to keep the integrity of the idea." *Ziva Freiman, May 1990*



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Photos: **12** Lee Balterman, ©Life Magazine, 1971, Time Warner, Inc. **14** David Morton. **17** Philip Turner.

1977. *Published as a completed work, this project presaged many that appeared in annual Energy issues from 1979 through 1983.*

16 Drawing by Malcolm Wells
June 1974. *The environmental advocate drew this for his guest Editorial, which was also illustrated with underground buildings he had built.*

17 Accessible building
Library for the Blind and Physically Handicapped, Chicago, by Stanley Tigerman & Associates, April 1978. *In a special issue on accessibility, imaginative solutions appeared along with hard-headed criteria.*

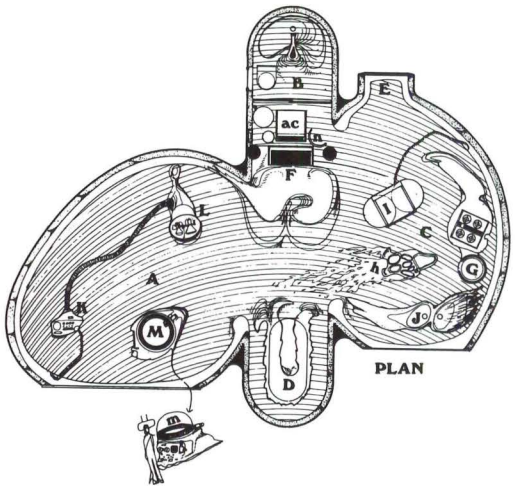
18 Computer as design tool
sketching on the screen by UKZ Architects, May 1984. *With equipment loaned by Apple, P/A invited three young P/A-Award-winning firms to try the new design tool – and critically discussed the results.*

19 Recession-prone architects
cartoon by Marciuliano, December 1974. *By August 1978, an Editorial reported that recovery was well under way.*

20 Fatal joint
detail from a News Report article, October 1981. *Altered on site, this bridge hanger connection failed, killing 111 and maiming others at the Kansas City Hyatt hotel – in the worst of several notorious construction failures around 1980.*

Shop Fabrication

Uniting the diverse interests of preservationists, entrepreneurs, and anxious local officials, the festival marketplace was the quintessential building type of the period. Although San Francisco's Ghirardelli Square and Cannery preceded it, Boston's Faneuil Hall Marketplace set off the rush of boutiques into historic settings. Conceived by architect Benjamin Thompson for developer James Rouse, the Boston scheme won a P/A citation in 1975.



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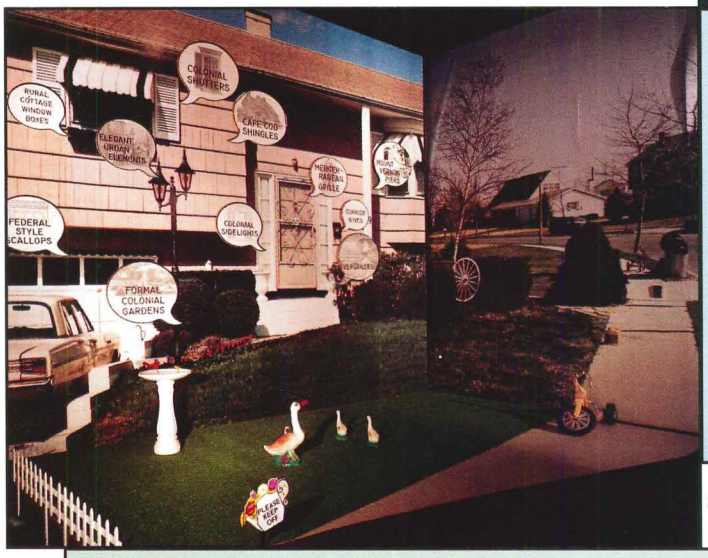

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Post-Modernism

Columns, walls, the free plan grew
A sense of space à la Corbu
A bit of Mies and Rietveld too,
I looked on plans that way...
But I have changed; I now make rooms,
Discrete space now has come to bloom,
Poché now sings the major tune,
I think it's here to stay.

I look on plans from both sides now,
From sparse to dense, Thru all events,
It's plans' delusions I recall
I really don't know space at all.

Terragni, Mies, Frank Lloyd and Corb,
I picked and chose 'til I was bored.

From Borromini, Soane I hoard
Some stylish moves and plays.
Collaging them to suit my taste,
What once was crime's no longer waste.
Post-Modernism isn't chaste,
The purists it annoys.

I look on styles from both sides now,
From pre and post, From then and now,
It's style's allusive qualities
That questions all Moderne's decrees.

Excerpt from lyrics concluding the Beyond Modernism *issue, December 1979. Words: Alan Chimacoff, Thomas Schumacher. Music: "From Both Sides Now" by Joni Mitchell.*

Contextualism

An endlessly cited failing of Modern architecture is its insensitivity to setting and to users. That is all too true of run-of-the-mill Modern, but it may be even more typical of run-of-the-mill Beaux-Arts. Of the Modern masters, only Mies called for universal solutions; in fact, however, some of his best works are adjusted with remarkable subtlety to the specifics of their sites. Consider how well his Seagram Building in New York and his museum in Houston (in both phases) related to streets and grades and to fine existing structures. *Editorial, June 1982*

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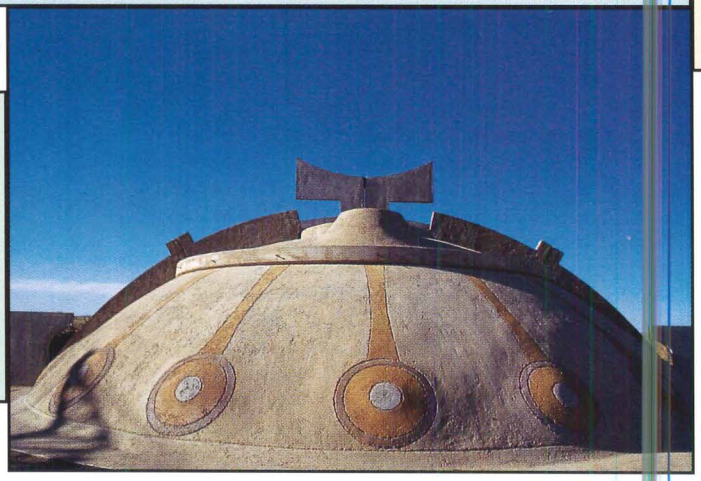


DESIGN DEVELOPMENTS

These were decades of search for design answers – successors to the dethroned Modernism. Contextualism and inclusivism set the tone for a flock of other "isms." P/A's March 1972 cover (p. 79) indicated the basic split between allusion and abstraction. In December 1979, P/A ended a decade with a special Beyond Modernism issue. But Post-Modernism was coming under fire, both from the Establishment and from radical Modernists. Largely ignoring the style fray were visionaries such as Soleri and Alexander and practitioners such as Fay Jones, who won the AIA Gold Medal in 1990.

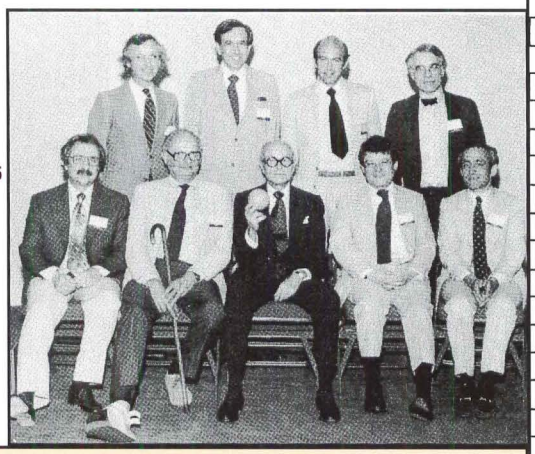
21 Anti-Establishment design
House of the Century by Antfarm, P/A citation-winning scheme, January 1973. *The house was completed and published in P/A, June 1973.*

22 Post-Modernism abroad
Le Viaduc housing, outside Paris, by Taller de Arquitectura, cover photo, October 1981. *The Taller's Ricardo Bofill was one of the few advocates of historical allusion on the Continent.*

23 Symbols in the Home
exhibit by Venturi & Rauch, August 1976. *Wry tableaus at the Renwick Gallery, Washington, analyzed popular imagery.*

24 Visionary outpost
vault at the Arcosanti community, Arizona, by Paolo Soleri, April 1973. *Still under development, Arcosanti embodies 1960s idealism.*

25 Philip Johnson and his "kids"
News Report photo, June 1978. *On*



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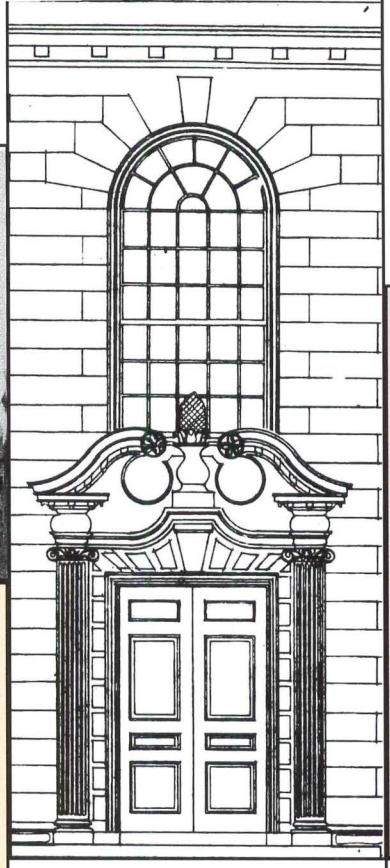

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Modernist Backlash

The standard denunciations of the Post-Modernists accuse them of considering only façades, which are rendered in seductive colors and are always said to bear no relation to what's behind them. Such work is portrayed as impractical and insubstantial and reflecting poorly on architects. In sessions of this year's AIA Convention, where some members were disturbed by this year's AIA Honor Awards, one heard such code phrases as "buildings that won't last," "buildings that don't work," "buildings that undermine the architect's credibility with the public." It seems that architects' credibility could stand some reinforcing, but Post-Modernism need not be made the scapegoat. The public, in fact, seems eager to trade imposed visual austerity for ornament, color, and symbolism, That's why the public rushed to defend every old decorated relic against demolition – fearing a bleak Modern replacement. *Editorial, October 1983*

Whitney Expansion

Perhaps seeing the Whitney subsumed by Graves's first brash collage of forms was unfair to Breuer's design, but so is this solution, which competes with the original for attention without involving it in a larger whole.

Between the public outcry that the earlier, better designs faced and this disappointing response to that criticism, the best solution may be for the Whitney to leave the original building alone, as was suggested in these pages in 1985, and satisfy its growing space requirements elsewhere.
Mark Alden Branch, News Report, February 1989

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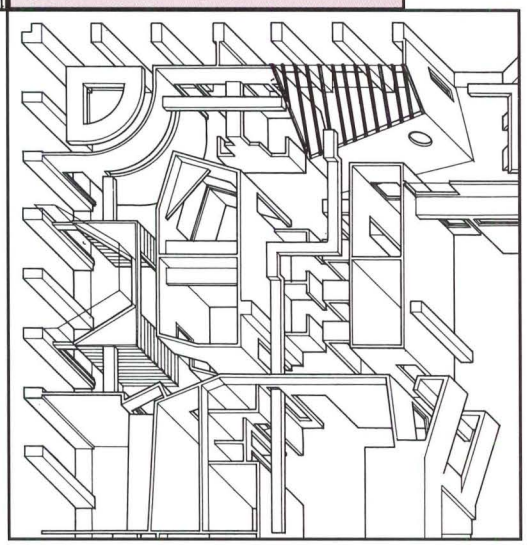

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Photos: **22** Deidi Von Schaewen. **23** courtesy Venturi Scott Brown Associates. **24** Ivan Pintar **25** courtesy AIA. **27** Mark Darley/Esto.

receipt of his Gold Medal, Johnson gathered younger lights (l. to r., from top) Graves, Pelli, Gwathmey, Eisenman, Gehry, Moore, Tigerman, and Stern.

26 Georgian Revival
drawing for Brant house by Allan Greenberg, October 1981. *This Connecticut mansion, subsequently built, is based on Washington's Mount Vernon – but larger and more correct.*

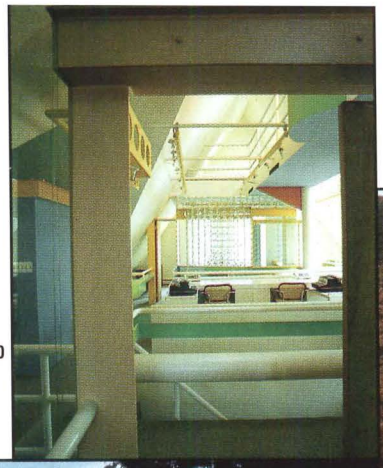
27 Timeless Way of Building
Whidbey Island house by Christoper Alexander, July 1991. *The spirit and methods of vernacular building inspire the work of Alexander's Center for Environmental Structure.*

28 Backlash Button
News report, July 1978. *Distributed at the AIA Convention where Graves's Portland Building received an Honor Award were these rude reactions to Post-Modernism.*

29 Proto-Deconstructivism
Cover drawing by Frank Gehry, July 1978. *A decade before the Museum of Modern Art's 1988 Decon show, the pattern was visible in this scheme for law offices in Los Angeles – completed at the time of publication.*

Post-Modern Planning

While Modernism has vigorously revived in architectural design, there are few diehard defenders of the tower in the park or the grade-separated superblock. The now dominant incremental and neo-traditional planning concepts are exemplified in the plans for New York's Battery Park City (by Cooper and Eckstut) and the Florida town of Seaside (Duany and Plater-Zyberk), both of which won P/A citations in 1984.



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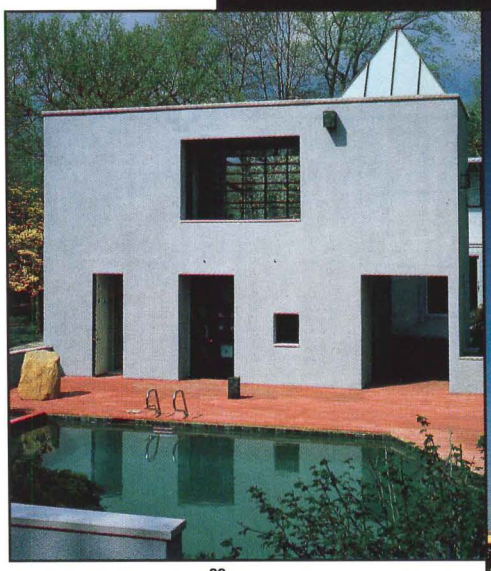

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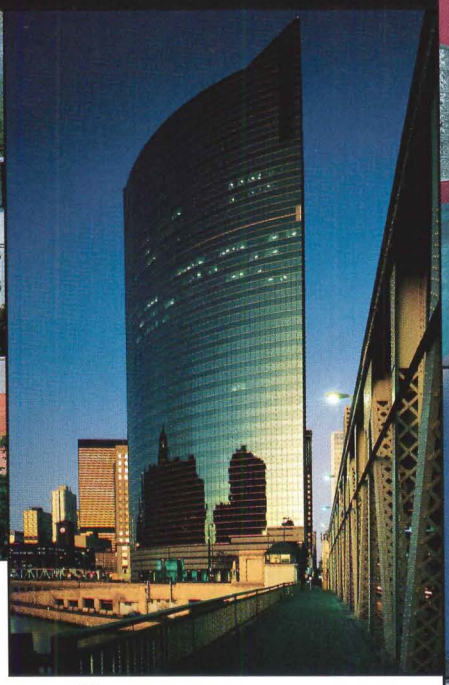

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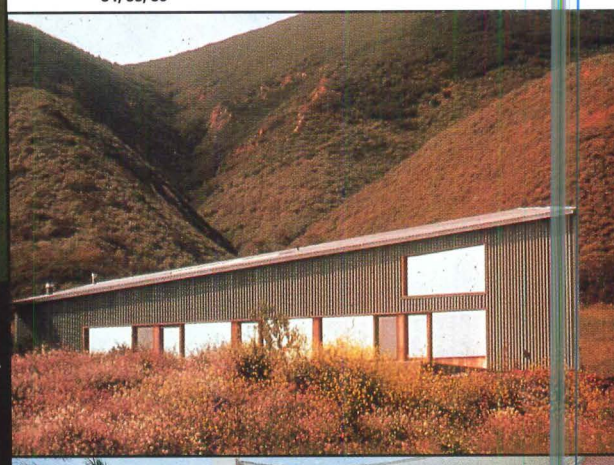

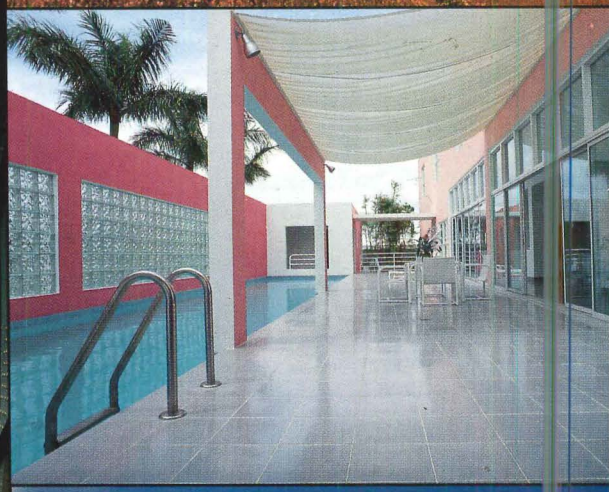

DISCOVERIES/REDISCOVERIES

P/A has long prided itself on discovering new talent. Before I became editor, the P/A Awards program had recognized many outstanding architects at the outset of their careers, including: Paul Rudolph (1954), Charles Moore (1962), Cesar Pelli (1966), and Robert Venturi (1967). In the two decades since, P/A has continued to identify promising designers. Meanwhile, a heritage of fine architecture, much of it scorned until the 1970s, has been rescued. Preservation won broad backing, and "adaptive reuse" became a buzzword and then an indispensible part of professional work.

30 Michael Graves, Gunwyn Offices
Princeton, New Jersey, February 1973. *In this office renovation, he moderated Modernism with allusive colors.*

31 Robert A.M. Stern, Lang house
Connecticut, April, 1975. *This was the cover subject for an issue entitled "The Revival of Historical Allusion."*

32 Steven Holl, Poolhouse
suburban New York, July 1982. *Holl had won P/A Awards recognition in 1978.*

33 Kohn Pedersen Fox, 333 Wacker Drive
Chicago, October 1983. *With this building KPF, became widely known.*

34 Frank O. Gehry, Ron Davis studio
December 1974. *Esther McCoy introduced Gehry in a one-page story.*

35 Arquitectonica, Spear house
Miami, December 1979. *This house evolved out of a 1975 P/A-Award-winning scheme by Laurinda Spear and Rem Koolhaas.*

36 Holt Hinshaw Pfau Jones, Astronauts Memorial

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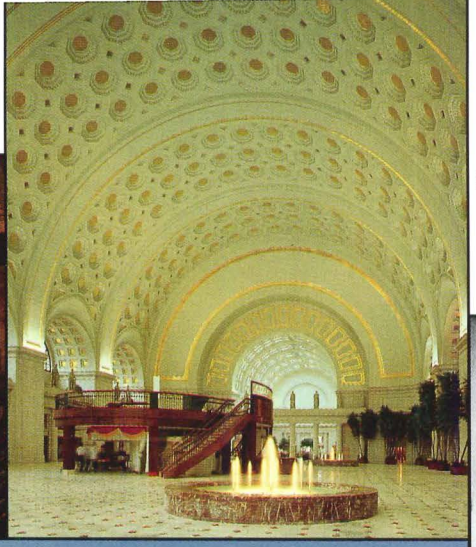

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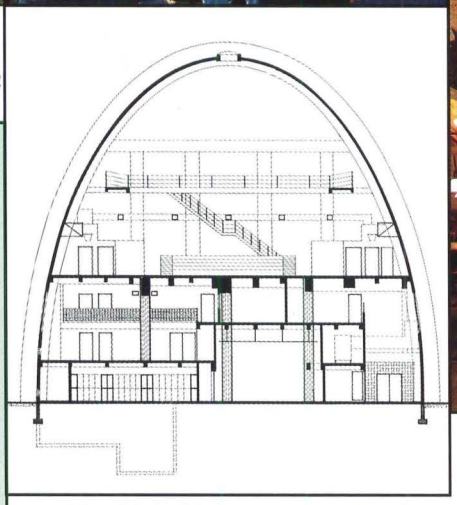

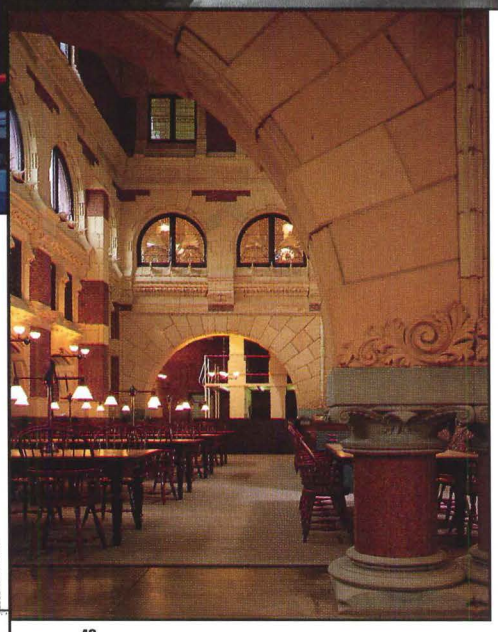

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Heritage Revealed

Revisit the downtown of almost any American city today and you are likely to see handsome old buildings that you never noticed before. Your appreciation of Pre-Modern architecture may have increased, of course, but many of the venerable façades you now pause to inspect were simply not visible a few years ago. They have recently reappeared from behind masks of dull gray grime. We can again examine the polychrome masonry of 19th-Century Venetian Gothic and Romanesque Revival, the light-colored relief of American Renaissance Classicism, and the exotic colorings of Art Deco.
Editorial, November 1983

Photos: **30** Norman McGrath. **31** Ed Stoecklein. **32** James D'Addio. **33** Barbara Karant. **34** Tim Street-Porter. **35** Robert Lautman. **36** Mark Darley/Esto. **37** Rob Super. **38** Carol M. Highsmith. **40** Deidi Von Schaewen. **41** Simon Scott.

Cape Canaveral, Florida, July 1991. *Winner of a national design competition and a 1989 P/A Award, this design promoted an emerging firm.*

37 Paramount Theater
Oakland, California, Miller and Pflueger, 1931, restored by SOM, July 1974. *One of the many movie palaces that became concert halls.*

38 Union Station, Washington
Daniel Burnham, 1907, restored by Harry Weese & Associates, December 1988. *Beaux-Arts glory for restaurants, shops, and Amtrak.*

39 Castelvecchio Museum
Verona, Italy, remodeled by Carlo Scarpa, May 1981. *This brilliant adaptation was shown in the first U.S. feature article on the late master.*

40 Municipal Theater
Belfort, France, remodeled by Jean Nouvel, February 1985. *For a stuccoed addition to the original structure, a provocative reinterpretation.*

41 Granville Island
Vancouver, Canada, Norman Hotson Architects, coordinating, November 1982. *This district of reused industrial buildings became a model for Pleasure Island at Disney World.*

42 Asphalt Green
New York, remodeled by Passanella & Klein and HOK, November 1985. *Originally designed by Kahn & Jacobs, 1944, this landmark asphalt plant became a community center.*

43 Furness Building, University of Pennsylvania
Philadelphia, Frank Furness, 1891, restored by Venturi Scott Brown & Associates, 1991. *This glorious library has been restored for its original use.*

Déjà Vu All Over Again

A number of landmarks have gotten a second major overhaul within the same 20-year period. Notable among them are Washington's Union Station (above), whose earlier transformation as a visitor center was a P/A cover story in November 1977, and the Cincinnati Union Terminal, featured in November 1980 P/A, then re-revamped this year (November 1991 News Report).

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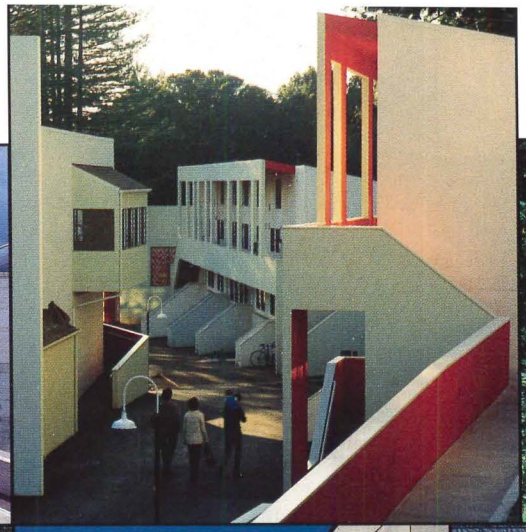

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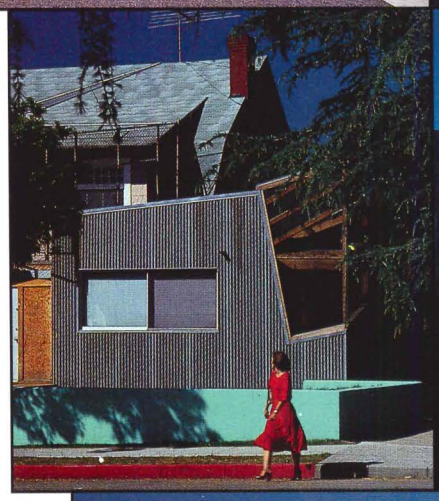

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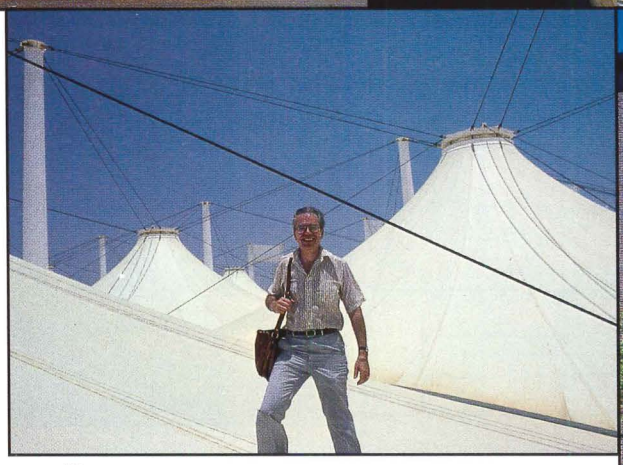

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SEEN FOR P/A PUBLICATION

Among the many works featured in P/A, one editor gets to visit only a fraction. Shown above are some that I found most gratifying to experience firsthand (though I did not in all cases write the P/A article). Other buildings that strongly impressed me include: Jahn's United terminal, Chicago; Pelli's Herring Hall and Piano's Menil Museum, Houston; Rossi's cemetery at Modena; Tschumi's Parc de la Villette, Paris. Tops among landmarks yet to see: Stirling's museum at Stuttgart; Erskine's Byker Wall, Newcastle; Meier's museum in Frankfurt; recent housing in Berlin and in Fukuoka.

44 Kimbell Museum
Fort Worth, Texas, Louis Kahn, November 1972.

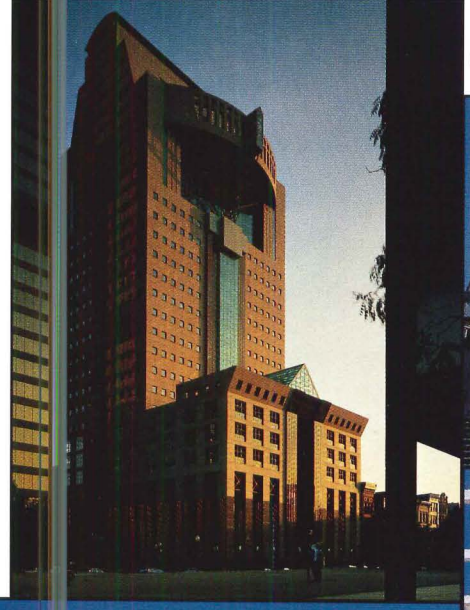
45 Kresge College
University of California, Santa Cruz, by Moore and Turnbull, May 1974. *A winner in the P/A Awards program, as were MLTW's unforgettable Sea Ranch condominiums (May 1966).*

46 Tucker House
Westchester County, New York, by Venturi & Rauch, October 1977. *An essay in vernacular forms, like the Trubek and Wislocki houses on Nantucket Island (May 1973).*

47 Gehry House
Santa Monica, California, by Frank O. Gehry, March 1980. *In this P/A cover shot, the figure is not a P/A editor.*

48 South Side Settlement
Columbus, Ohio, by Studio Works, February 1981. *This finely conceived and crafted building deserves to be better known.*

49 Vietnam Memorial
Washington, D.C., by Maya Lin,



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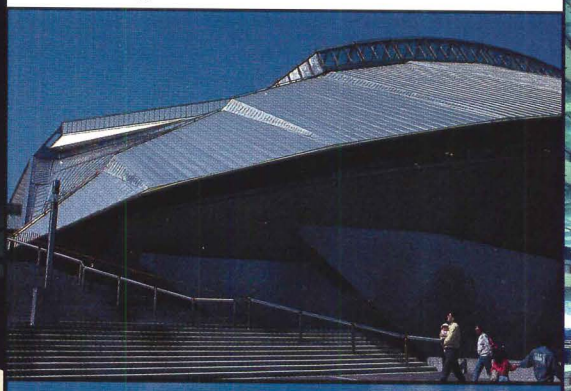

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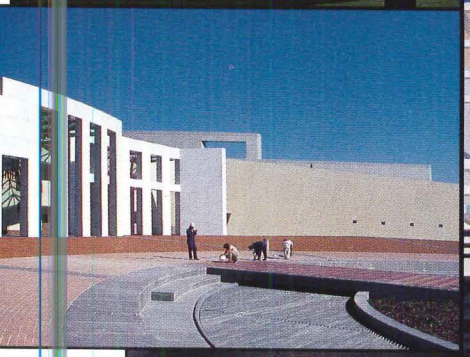

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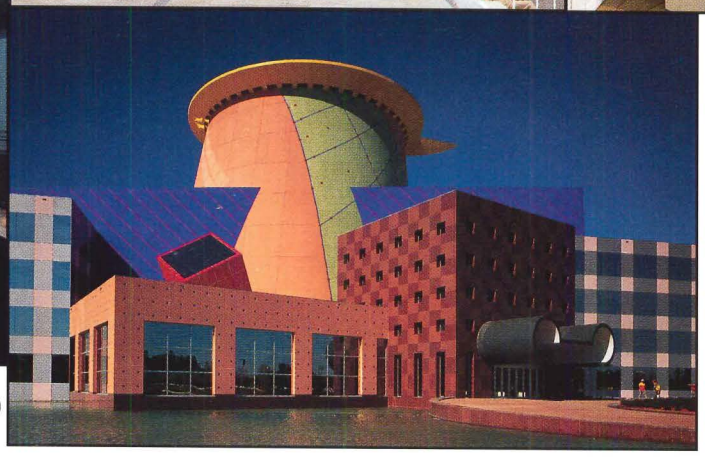

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Photos: **45** Morley Baer. **46** Thomas Bernard. **47** Tim Street-Porter. **48** ARTOG. **51** Tim Hursley. **52** Peter Aaron/Esto. **54** Ian Lambot. **56** Jeff Goldberg/Esto. **57** Steven Brooke. **59** Peter Aaron/Esto. **Others**: J.M. Dixon.

Editorial, March 1983. *This clear and ingenious statement of its times had to overcome irrational opposition.*

50 Haj Terminal
Jeddah, Saudi Arabia, S.O.M., February 1982. *A P/A Award winner by the elderly Gordon Bunshaft with the engineer Fazlur Khan; that's me on the roof.*

51 Sulzer Library
Chicago, by Hammond Beeby & Babka, December 1985. *A finely crafted melding of Classicism and Modernism that graces its urban setting.*

52 Humana Building
Louisville, Kentucky, by Michael Graves, July 1985. *Graves's best work, the building is innovative in its planning, meticulous in detail.*

53 Gym at Fujisawa
Japan, by Fumihiko Maki, June 1985. *The first and best of Maki's sculptural long-span envelopes.*

54 HongkongBank
Hong Kong, by Foster Associates, March 1986. *P/A gave a special issue to this tour de force.*

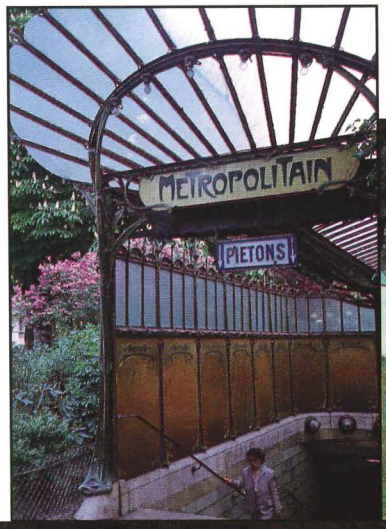
55 Parliament House
Canberra, Australia, by Mitchell/Giurgola & Thorp, August 1988. *Another full-issue subject, this proves that grand-scaled Modernist planning can accommodate rich incident.*

56 Wexner Arts Center
Ohio State University, Columbus, by Eisenman Architects, October 1989. *In this competition-winning P/A Awards design, abstractions become vivid experience.*

57 Krier House
Seaside, Florida, by Leon Krier, December 1989. *Krier's first built work joins other fine Seaside buildings.*

58 Galleria [akka]
Osaka, by Tadao Ando, February 1990. *In a set of shops on the narrowest of sites, brilliant spaces and details.*

59 Team Disney building
Lake Buena Vista, Florida, by Arata Isozaki, April 1991. *A cluster of bright forms around a stunning cylindrical void.*



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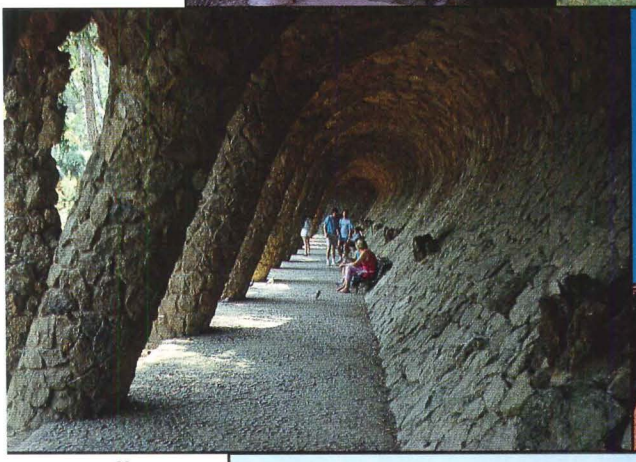

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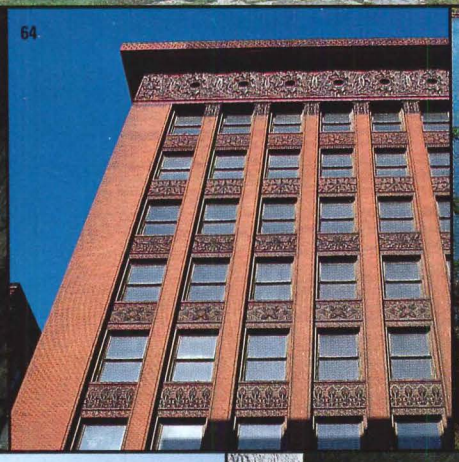

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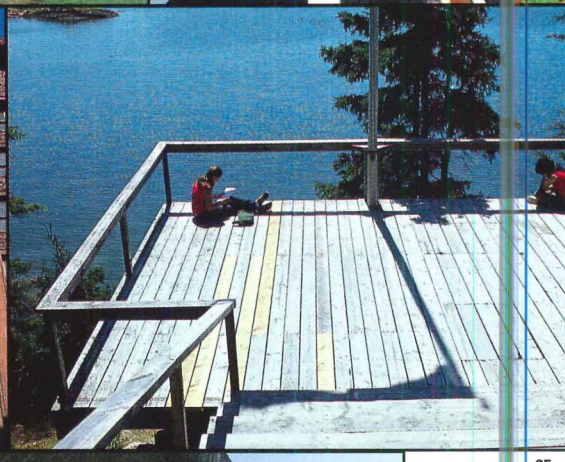

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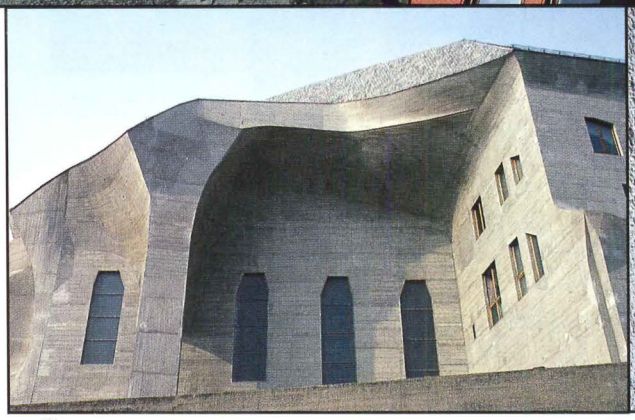

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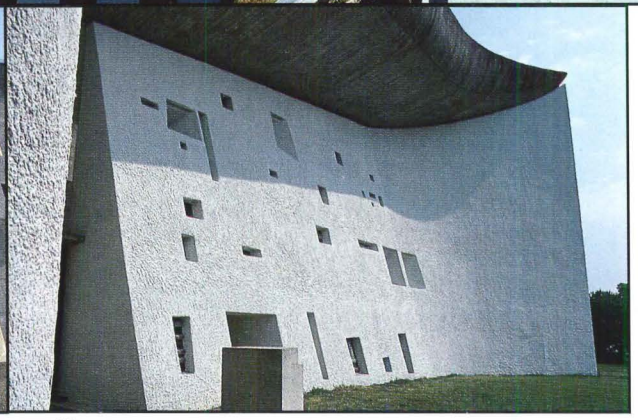


67

SEEN ALONG THE WAY

One of the great gratifications of a job like this is the opportunity to savor some of the great architecture of all time. The selection here has been limited to Modernist works (Borromini some other time), but even so, dozens of other high points could be cited, including: many Wright buildings; the Louisiana Museum in Denmark by Bo and Wohlert; Maybeck's Chick house; Goodhue's Honolulu museum; Rudolph's chapel at Tuskegee; Weese's Washington Metro. High on the yet-to-see lists are the Eames house in L.A., Wagner work in Vienna, Mackintosh landmarks in Glasgow, Fay Jones's Thorncrown Chapel.

60 Porte Dauphine Métro station
Paris, by Hector Guimard, 1900. *New materials, organic forms, to open the century.*

61 Woodland Crematorium
Stockholm, by Gunnar Asplund, 1936–1940. *The path to the distant portico is unsurpassed for its integration of landscape and building.*

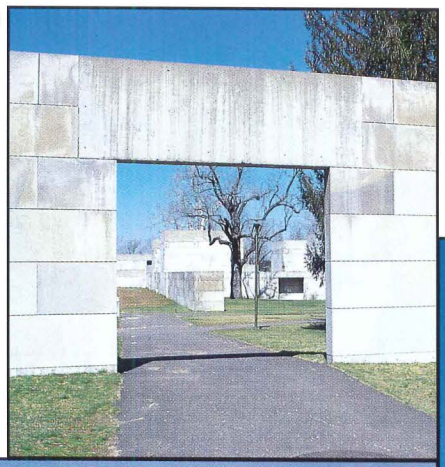
62 Villa Mairea, Noormarkku
Finland, by Alvar Aalto, 1939. *One example of Aalto's laid-back perfection.*

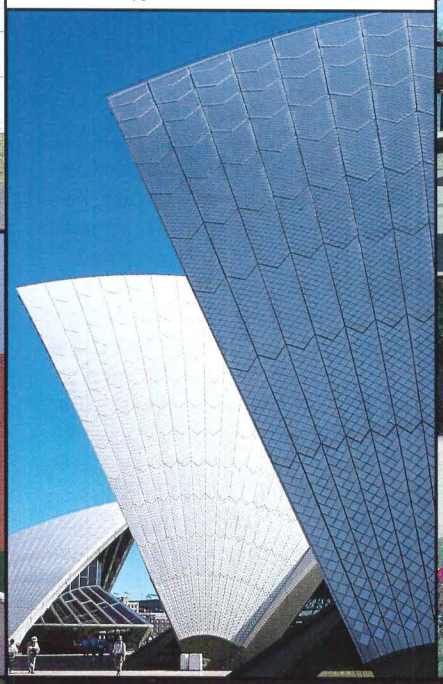
63 Parc Güell, Barcelona
by Antoni Gaudí, 1900–1914. *Structural invention, as in this grotto, alternates with exuberant ornament.*

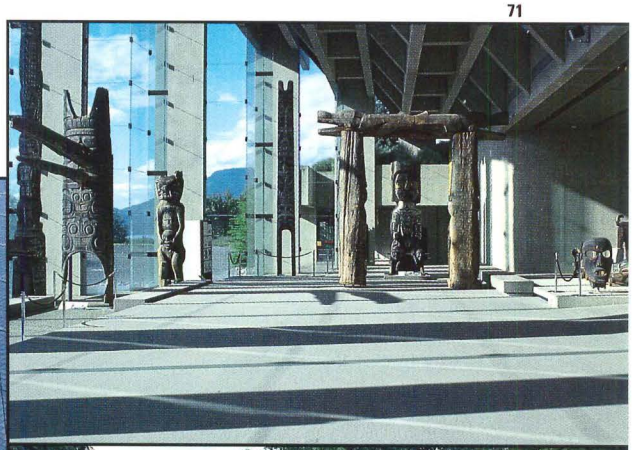
64 Wainwright Building
St. Louis, by Adler & Sullivan, 1891. *Ornament here graces the most rigorous of forms, as in Sullivan's other landmarks.*

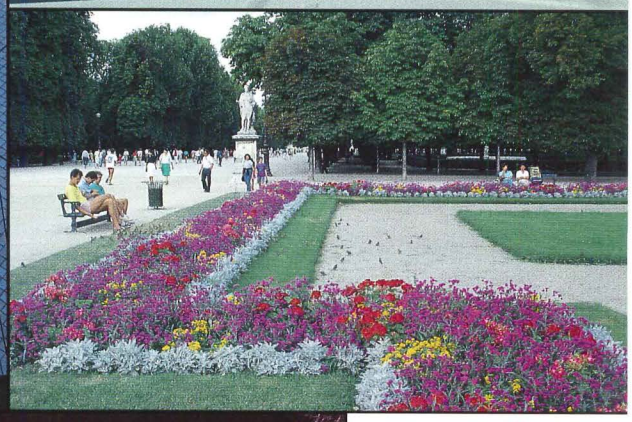
65 Haystack Mountain School
Deer Isle, Maine, by Edward L. Barnes, 1962. *Vernacular and Minimalism fuse beautifully with the Maine coast.*

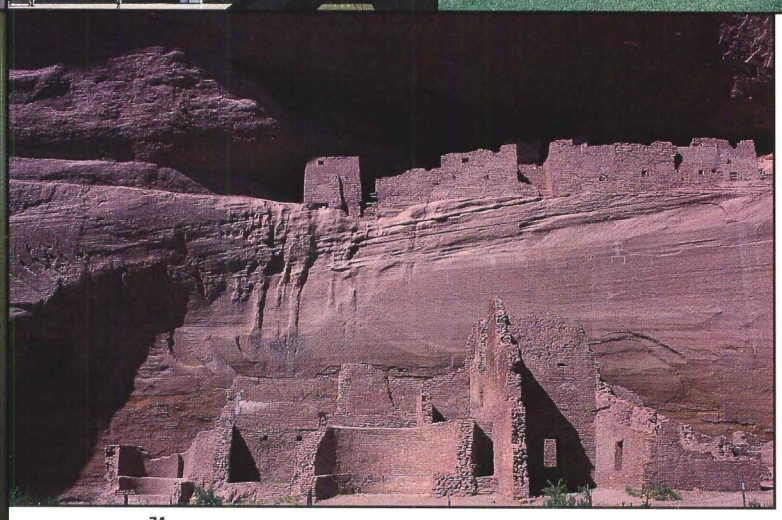
66 Goetheanum
Dornach, Switzerland, by Rudolph Steiner, 1925–1928. *These*











Photos: J.M. Dixon, except **73** Nick Merrick/Hedrich Blessing.

Expressionist concrete forms, by an inspired amateur designer, stand only 50 miles from Corbu's Ronchamp.

67 Chapel at Ronchamp
France, by Le Corbusier, 1950–1955. *No photos can prepare you for the swooping forms or the magical lighting here.*

68 Arts Center
Wesleyan University, Middletown, Connecticut, by Roche Dinkeloo, 1966–1972. *Minimal stone forms with an archaic quality differ sharply from the firm's other output.*

69 Stables near Mexico City
by Luis Barragán, 1968. *Abstract planes of color are somehow at home with horses and dogs.*

70 Opera House, Sydney
by Jørn Utzon, 1956–1973. *Bold roof forms and brilliantly detailed glass envelopes shape fine gathering places.*

71 Anthropology Museum
Vancouver, by Arthur Erickson, 1977. *Erickson's nearby Simon Fraser University (1963–1972) is another high point of his work.*

72 Tuileries Gardens
Paris. *The space is magnificent, but the municipal gardens all over France are models of not-so-innocent visual delight.*

75 Marriott apartment
Chicago, by Krueck and Olsen, 1983. *Gossamer metal screens, layered between the observer and the lake; comparable elegance was seen in an earlier Chicago house (November 1981).*

74 Canyon de Chelly
Arizona. *The erosion that made the canyon wall purifies the works of man.*

Nature's Architecture

Some of the most inspiring form-making – and the ultimate in contextual response – is produced by the eternal forces of geology, weather, and life. Among my favorite examples of this kind are the folded slopes of California's Death Valley, the rim of Crater Lake in Oregon, and the scored surfaces of Enchanted Rock in central Texas.

Books

Foster's Articulate Sheds

Reviewing an ambitious monograph, **Mary McAuliffe** analyzes the spatial nature of Foster's structurally explicit buildings.

Books of Note

El Lissitzky 1890–1941: architect, painter, photographer, typographer *Municipal Van Abbemuseum, Eindhoven, Thames & Hudson, New York, 1990, 220 pp., illus., $55, paper.*
Lissitzky's creative genius and utopian goals are generously documented in this exhibition catalog.

Robert Maillart and the Art of Reinforced Concrete *by David P. Billington, Architectural History Foundation, New York, and MIT Press, Cambridge, Mass., 1990, illus., 151 pp., $60.*
This analysis of Maillart's marriage of technology and form, written in layperson's terms, includes an essay that calls for "parallel" status for engineering (structural art) and architecture.

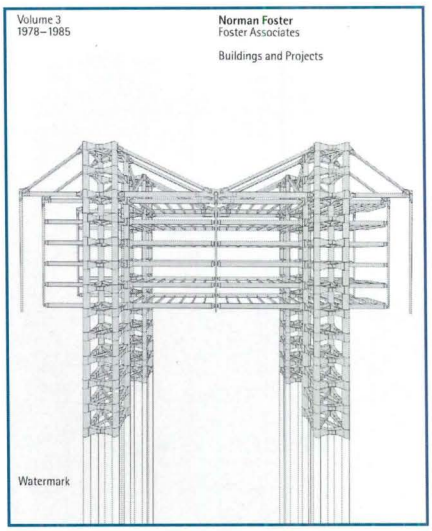
Emerging Concepts in Urban Space Design *by Geoffrey Broadbent, Van Nostrand Reinhold, New York, 1990, illus., 380 pp., $99.95.*
Twentieth-Century urban planning projects are complemented by a discussion of pre-modern urbanism.

On Architecture, the City, and Technology *edited by Marc M. Angelil, Association of Collegiate Schools of Architecture, Washington, D.C., and Butterworth Architecture, Stoneham, Mass., 1990, illus., 151 pp., $39.95.*
Papers from the 8th Annual ACSA Technology Conference by an international field of academics cover technology's relationship with landscape and the built environment.

To study Norman Foster's meticulous projects is to discover a consistent and long-lived design exploration. The interest in long-span structure and lightweight technology throughout his 28-year career can be traced in the evolution of "sheds," from early buildings for light industry to projects of increasing scale and sophistication. Indeed Foster's work, with its intimations of industrial design as a model for architectural practice, has retained an increasingly rare progressive cast. Frequent allusions to aviation (the architect is a former air force engineer and a trained pilot) aptly convey the discipline and frontier spirit that propel his projects.

The work is now being documented in an exceptionally thorough monograph, providing a comprehensive chronology from Foster's years with Team 4 in the early 1960s to the design of the HongkongBank (P/A, March 1986) in 1985. The three volumes contain consistently excellent photographs of built work, documentation of alternatives, and early sketches, all offering insights into the firm's *modus operandi*. The text is a mix of project description, anecdotal contributions from Richard Rogers and other former collaborators, and more critically focused essays. Nevertheless, the array of voices tends towards the monotone, much of the commentary coming from a position of willing complicity rather than critical distance. While enthusiasm is often accompanied by insight, as in Martin Pawley's analysis of the work's technological sources and operations, other contributions dissolve into hero worship. Exceptions to this partisan context are Francis Duffy's examination of systems thinking and its influence on the firm, in Volume 1, and Chris Abel's broad critical perspective on the technological context of the work, in Volume 3.

The inclusiveness of the monograph presents difficulties in editing and layout at two levels. At the scale of the page, captions for photographs are not clearly organized nor sufficiently differentiated from the main text. At the scale of the volume, there is no clear hierarchy in the order of the more general essays; they seem haphazardly interspersed among the chronological descriptions of projects. If the main strength of a comprehensive monograph lies in the provision of a *catalogue raisonné*, here the sheer extent and uneven quality of the commentary tends to interrupt rather than facilitate an encounter with the work. However, the participatory nature of the publication demonstrates the importance of teamwork in the office's design process. The firm's close cooperation with engineers and with industry is rare and almost inconceivable within the American construction industry.



Norman Foster: Buildings and Projects *(3 of 5 volumes published) edited by Ian Lambot, Watermark, Godalming, Surrey, England, 1989–1992, illus., $60–$68 per volume.*

Foster's collaboration with product manufacturers in component design has increased with the complexity and scale of his projects. While early industrial sheds for Reliance and IBM extended the capacity of stock components, almost all construction elements of the HongkongBank were fabricated to order. The increasingly customized aspect of Foster's work has led to accusations of "nostalgic hand-craft," which Chris Abel's essay attempts to defuse. He suggests that if nostalgia exists, it lies in the architectural fascination with the mass production assembly line in these times of hand-craft by robots.

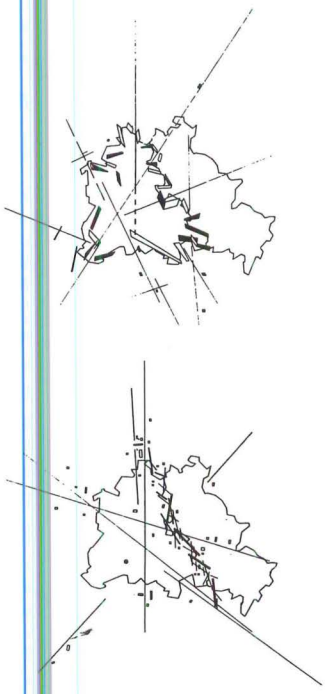
Given the palpable energy devoted to issues of fabrication and assembly in the monograph, it is interesting to note Foster's frustration with critics' concentration on technique in his work. His firm's drawings perhaps encourage this tendency. The obsessive refinement of elements and joints in assembly axonometrics and detail sections provides a stark contrast to the underworked reticence of the plans. Nevertheless, these pale diagrams offer

(continued on page 123)

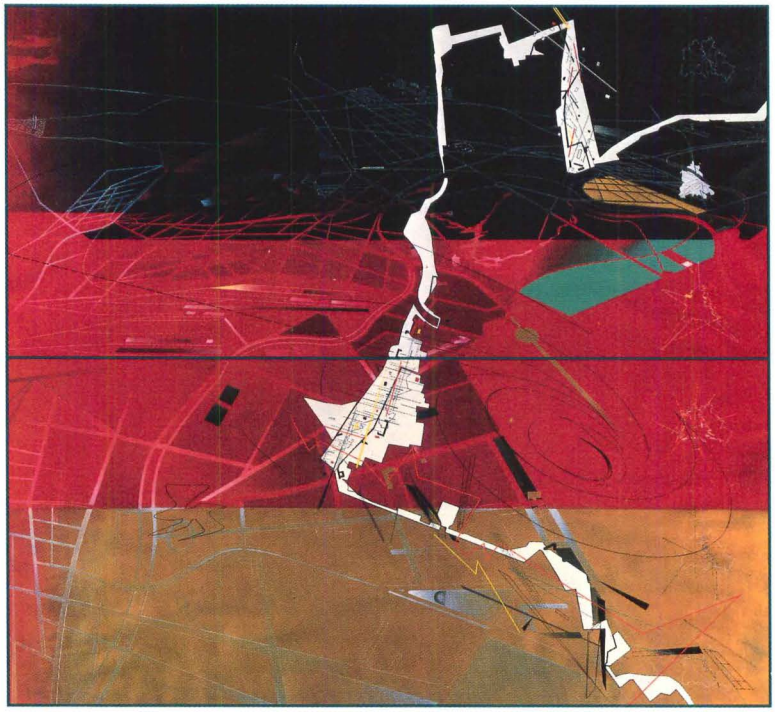
Projects Post-Wall Berlin

No longer divided, Berlin is astir with conceptual projects and committed building campaigns.

Four projects indicate the possibilities ahead.



NEW DESIGN GEOMETRIES FOR THE SITE OF THE BERLIN WALL



"THE DEAD ZONE," A PROJECT FOR THE SITE OF THE BERLIN WALL BY ZAHA HADID

PROJECT FOR SKYSCRAPERS AT POTSDAMER PLATZ BY HANS KOLLHOFF; COMPUTER SIMULATION

How does the architect deal with a city split into two parts for 30 years? What should one do with the raw physical gash that is left when the wall that once segregated the city has been torn down? In short, how do you deal with Berlin, whose halves have begun to grow together, even though a strip of wasteland still runs through the former (and future) center of the capital? These questions were put to 20 world-class architects by the Architecture Museum in Frankfurt am Main; the results were presented in *Berlin morgen* (Berlin Tomorrow), an exhibit of new strategies for the design of the city's center.

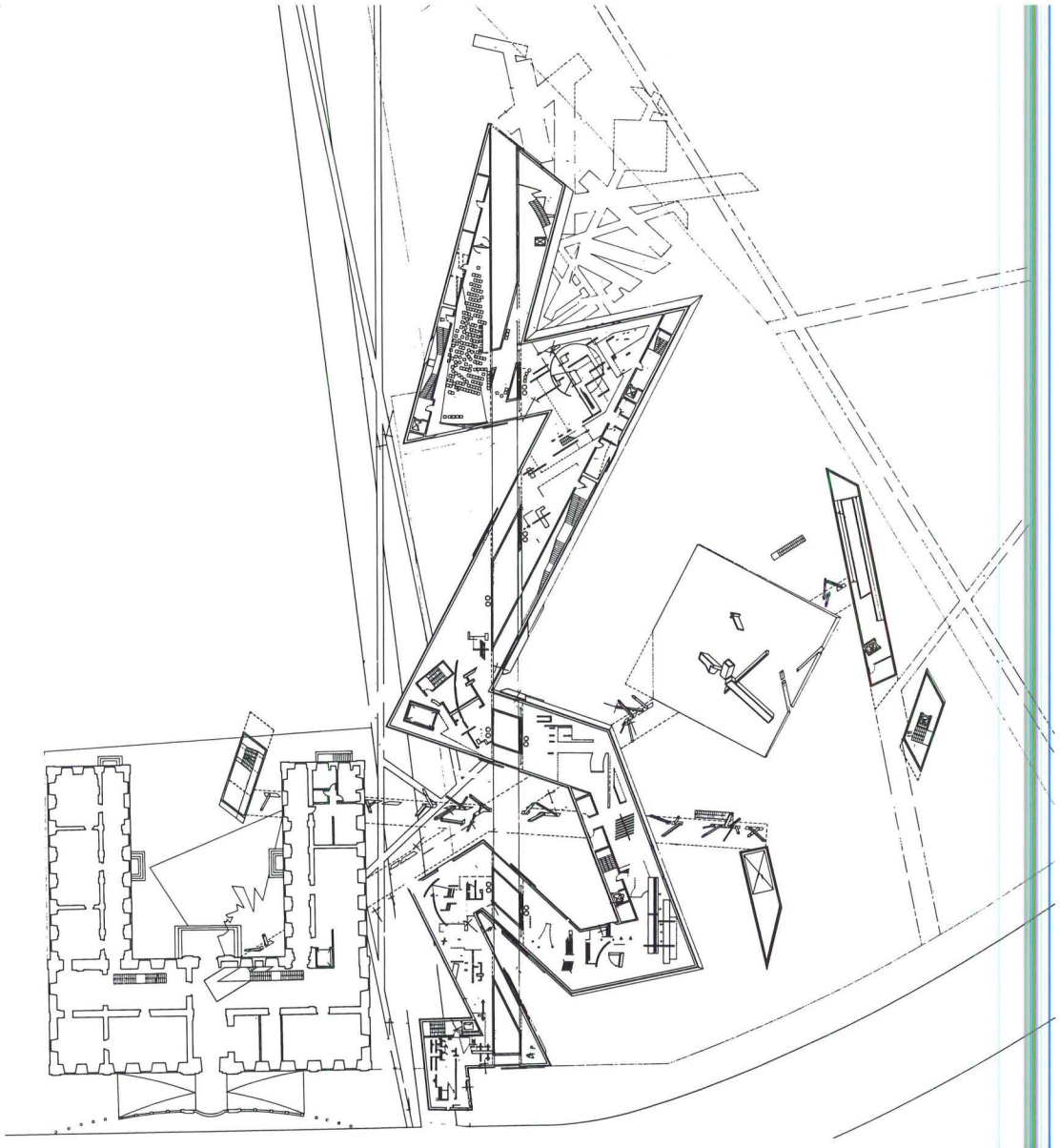
The ideas presented covered an enormous spectrum, from leaving-well-enough-alone to all-encompassing master plans. Many projects touched on the raging controversy about high-rise architecture in Berlin, where buildings have traditionally been limited to a height of 22 meters (72 feet). One such project was presented by Hans Kollhoff, a Berlin architect who admires the functionalism of American skyscrapers. He proposed skyscraper clusters for the Potsdamer Platz and Alexander Platz in central Berlin, and maintains that only with skyscrapers will Berlin become a world-class city. Others, including Himler & Sattler, the winners of a recent competition for Potsdamer Platz, take cues from Berlin's unique polycentric structure and advocate more "European" solutions.

Zaha Hadid designed a minimal-intervention proposal, one of the few to deal directly with the void left by the removal of the Wall. This former *Todesstreifen* (death strip) should remain empty of commercial buildings, she argues, to serve as a memorial to an important epoch in Berlin's history. Ever

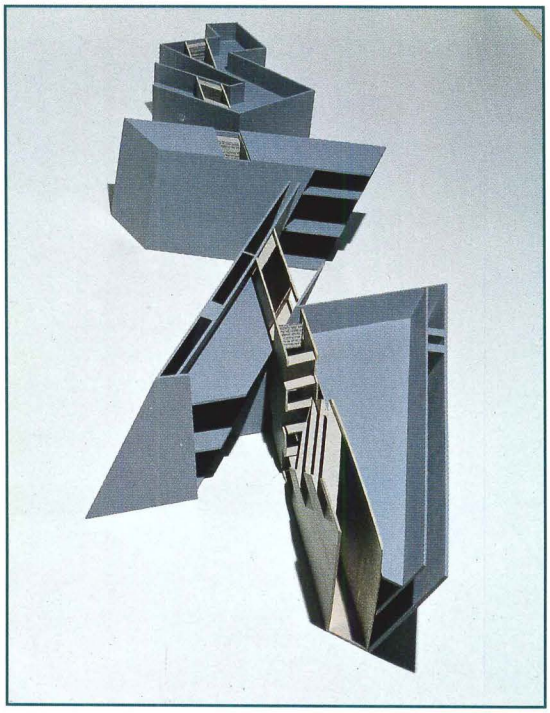
changing public programs and functions could be installed there and could lead to new interpretations for this important site.

In 1993, Berlin will be culturally enriched by two new buildings: The Berlin Museum Extension and its integrated Jewish Museum by Daniel Libeskind (who now resides in Berlin), and the extension to the American Memorial Library by Karen Van Lengen, a New York architect. Both projects were winning entries of competitions held in 1988. (Award of the library commission was not determined until after an unforeseen third round of submissions by finalists; P/A, Feb. 1990, p. 21.)

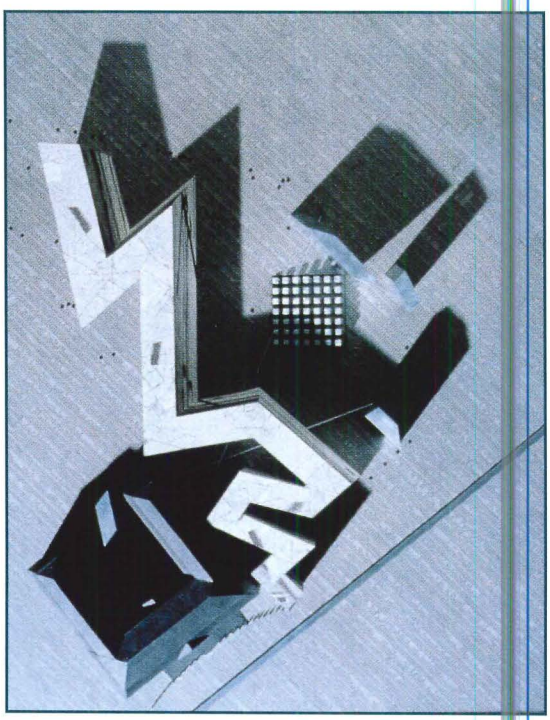
Libeskind's building will adjoin the Museum's baroque building, which is too small to house adequately its collection on Berlin's cultural heritage. The city's history is closely linked with that of its Jewish community, which, though diminished, continues to be very active. To emphasize this relationship, the museum extension comprises two lines: one straight but broken into fragments (the Jewish Museum) and one wildly zigzagging and infinite (the Berlin Museum). The two lines are closely interwoven in a complex dialogue of defined spaces and voids, yet the Jewish Department maintains its independence within the whole. The voids within the building are referenced outside in the form of line-fragments sprinkled across the site. A plaza with a sunken sculpture garden completes the ensemble. With the immense financial strain that Germany's reunification imposed on Berlin, there were indications that the Museum Extension might be postponed indefinitely. A flood of protests stressed the importance of this building for Berlin, and it is back on track.



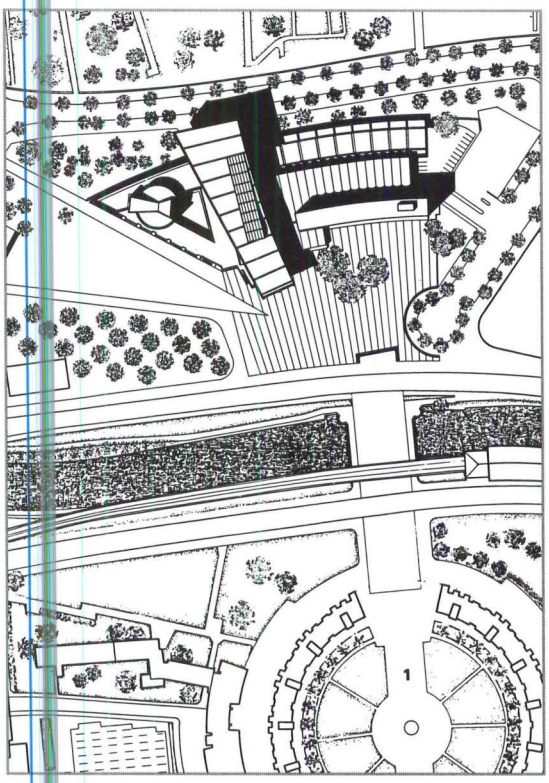
BERLIN MUSEUM WITH EXTENSION BY DANIEL LIBESKIND; FIRST FLOOR PLAN (EXHIBITION SPACE)



MODEL DEPICTING INNER STRUCTURE OF BERLIN MUSEUM EXTENSION

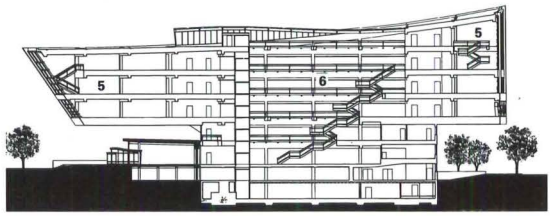


MODEL OF BERLIN MUSEUM AND EXTENSION: AERIAL VIEW

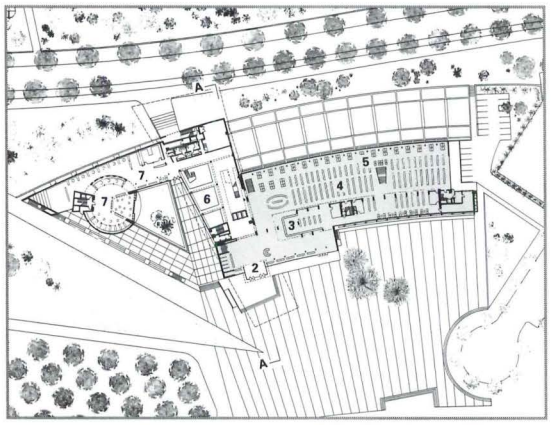


AMERICAN MEMORIAL LIBRARY EXTENSION BY KAREN VAN LENGEN; SITE PLAN

N ↓ 300'/100m



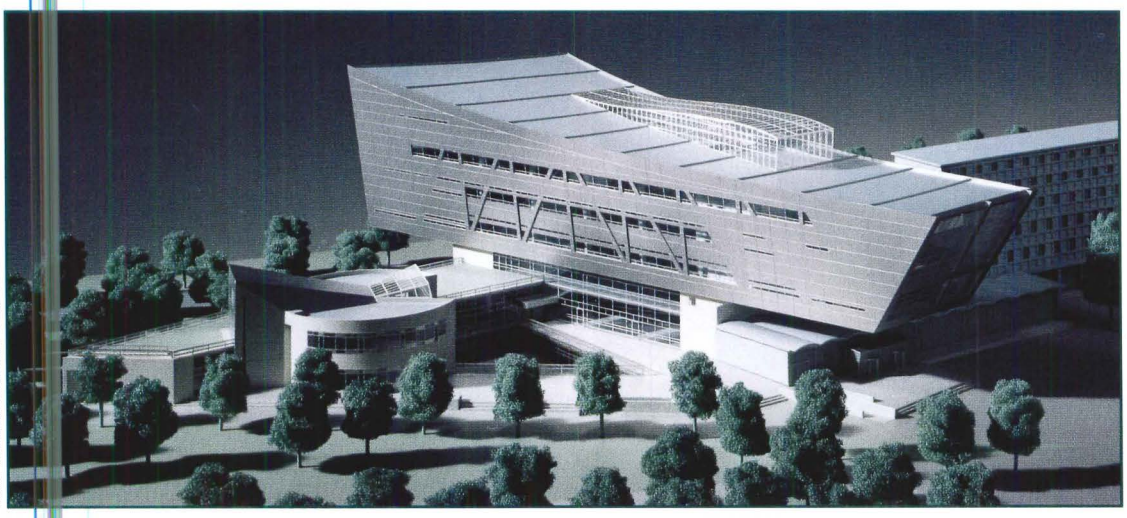
SECTION AA 100'/30m



FIRST FLOOR PLAN; EXISTING LIBRARY SHADED N ↓ 100'/30m

1 MEHRINGPLATZ
2 ENTRY
3 CIRCULATION DESK
4 OPEN REFERENCE STACKS
5 READING AREA
6 ATRIUM
7 CHILDREN'S LIBRARY

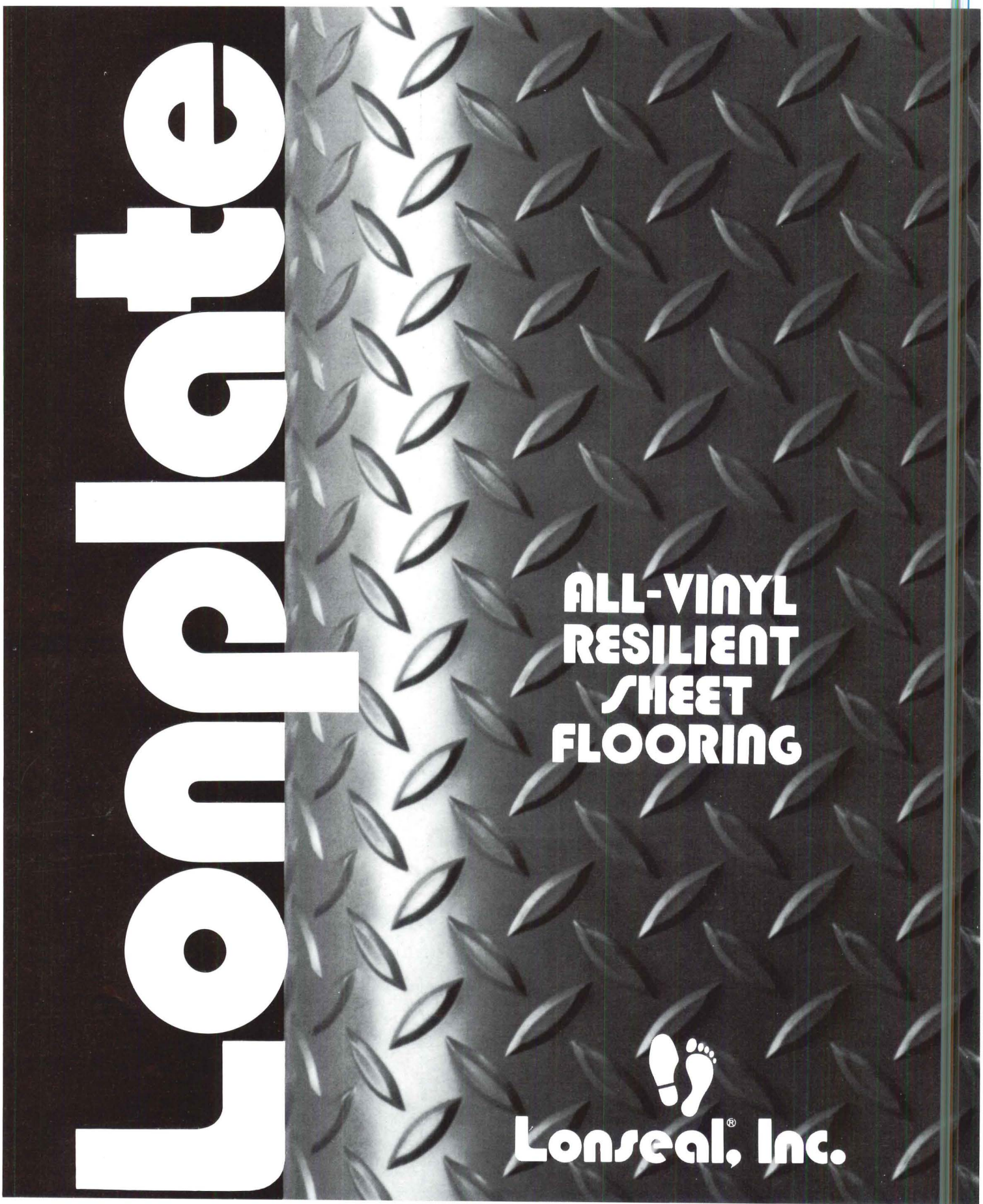
AMERICAN MEMORIAL LIBRARY EXTENSION AS SEEN FROM MEHRINGPLATZ; MODEL



AERIAL VIEW OF LIBRARY, WITH CHILDREN'S LIBRARY IN LEFT FOREGROUND

Karen Van Lengen's American Memorial Library extension has likewise become more important since the opening of the Wall. The original building (1954) was the first open-stack library in Germany; its informal nature doubtlessly contributes to its great popularity. To maintain the Library's openness, Van Lengen designed a large "floating" addition roughly perpendicular to the original, slightly curved slab. Two trussed walls enclose the long sides of the extension and support four floors of open stacks. The short, glazed sides offer a visual connection to the city. Stairs and an elevator are placed in a long thin atrium that runs the length of the building. On the first floor, exhibition space, a cafe, and a periodicals area are grouped around a triangular courtyard flanked by a three-story cylinder that houses the Berlin collection and the children's library. Van Lengen's urban concept, developed before the fall of the Wall, shows great foresight. Her building points to nearby Mehringplatz, the southern endpoint of Friedrichstrasse. This street, which for West Berliners once ended at Checkpoint Charlie, will certainly become again a major north-south axis in the unified capital. Van Lengen's concept opens the southern edge of Mehringplatz; the Library points the way to the historical center of Berlin and beyond. **Alexandra Staub** ■

The author, a freelance architect based in Berlin, is a frequent contributor to European architecture magazines.



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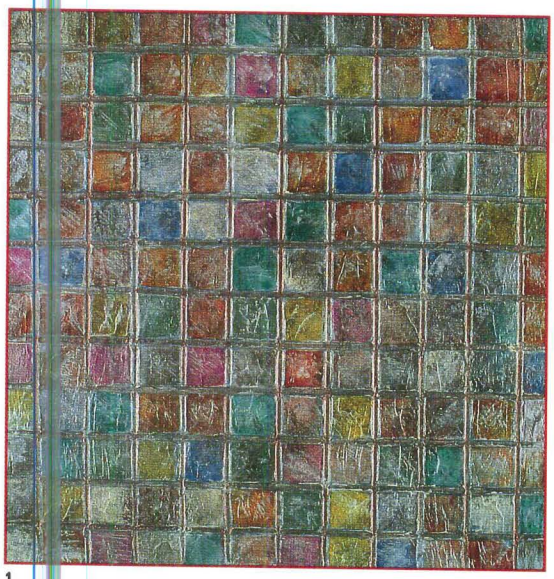
New Products and Literature



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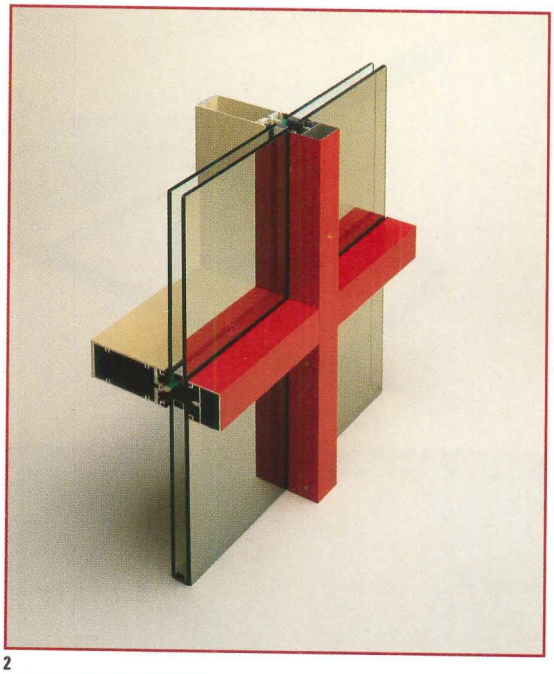


2

3

Building Products

1 Acrylic Paints for Interiors

"Golden Iridescent/Interference" acrylic paints, originally produced for artists, are suitable for interior surface finishes. "Golden Iridescent Metallics" are paints composed of metallic flakes that reflect light; "Golden Iridescent Pearl" produces "pearlescent effects"; "Golden Interference Colors" offer a "flip" in color – different colors are perceived in direct and indirect lighting conditions. Golden Artist Colors.

Circle 100 on reader service card

2 Hybrid Glass Wall

The "960 Wall" is engineered to fill "the void between storefront and curtainwall framing systems." Billed as an affordable alternative, the system is stronger than storefront framing and offers the thermal performance of a curtain wall. Frame depths from 2¾- to 7¾-inches are available; glazing materials from ¼-inch to one-inch can be accommodated. EFCO.

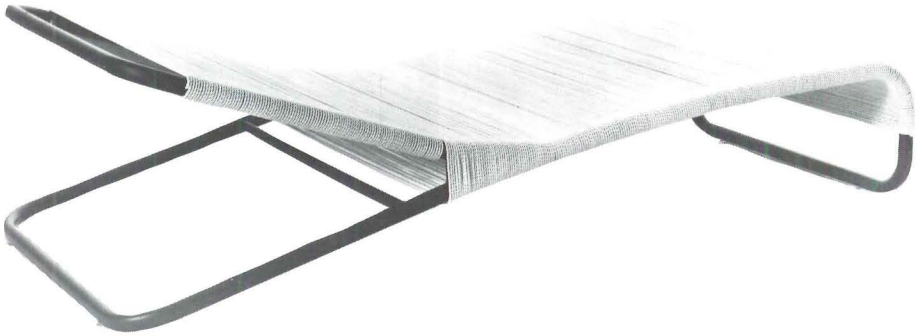
Circle 101 on reader service card

3 Panel Core Material

"P-CEL"™, a core material of thermoset polymer composites, is a lightweight substrate providing moisture-resistance and "superior flatness and internal bond strength" suitable for curved panels. It is available as a standard core material for "Mirage Premier" panels (an architectural canopy and signage system) and is optional with the "Envelope 2000" panels (an engineered wall system). Weyerhaeuser.

Circle 102 on reader service card

Fixtures and Furniture



Marvin Rand

1

1 Van Keppel-Green Classics

Van Keppel-Green's cord-wrapped steel tube designs, originally sold in the 1950s and 60s, are now being reproduced. Though the originals were constructed of cotton cord and painted steel tubing, this collection (based on a 1972 revival by Van Keppel) have polypropelene marine tow line fabric and powder-coated epoxy and plated metal finishes. The tables and chairs are weather-resistant. DNS International.

Circle 103 on reader service card

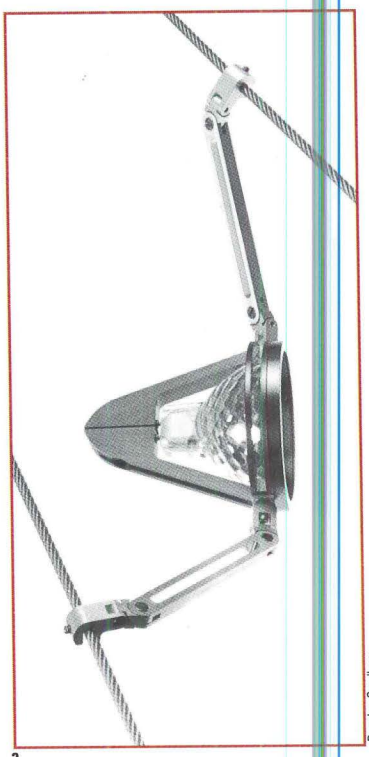
Onno Stranos

2

2 Freestanding Wash-table

The "Free-Standing Wateringplace," designed by German architect Elisabeth Lux, includes: a translucent glass basin with a satin-frosted surface area, a swiveling cupboard with a brass door, six glass shelves, and an electrical outlet. The stainless steel support post houses wiring and piping. Elisabeth Lux Architektin.

Circle 104 on reader service card



Douglas Snadberg

3

3 Flexible Low-voltage Fixture

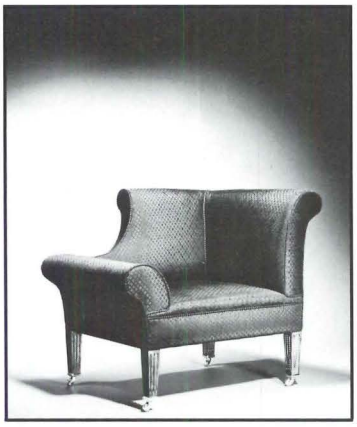
"Byrdy," designed by Damon Peterson, is an aluminum fixture with two universal joints in each arm. It takes a 12 volt MR-16 lamp in 20 to 50 watt sizes; optional diffuser lenses and honeycomb and dichroic filters may be attached to a threaded ring cap. "Byrdy" is mounted on the "Halogen Bridge," two horizontally tensioned conductor cables running six-inches on center, wall to wall, wall to ceiling, or floor to ceiling. SF 12V.

Circle 105 on reader service card

(continued on page 101)

(continued from page 100)

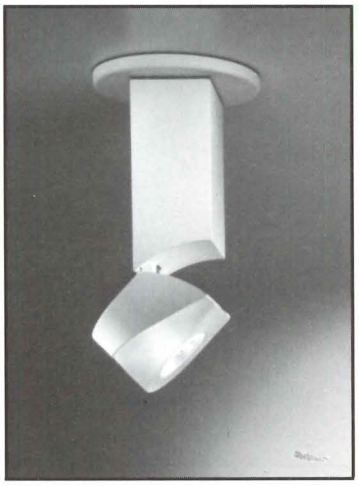
Concrete Block Wall System
Continuously insulated cellular concrete blocks are dry stacked without mortar beyond the first course and coated on both sides with a minimum ⅛-inch layer of fiberglass-reinforced surface-bonding cement to create the "Sparfil Wall System." R-values up to R33, modular design flexibility, and up to four-hour fire-resistance ratings are among the product features. Sparfil International.
Circle 106 on reader service card



Lutyens Revival
Inspired by an early 19th-Century drawing of Napoleon in his study at the Tuileries, Sir Edwin Lutyens designed this assymetrical chair in 1919; it is now being reproduced by Lutyens Design Associates Limited, a company owned by Candia Lutyens (a granddaughter). The chair is 30 inches high, 37 inches wide, and 28 inches deep. Arkitektura.
Circle 107 on reader service card

Mini Split A/C Brochure
This product brochure includes new ductless mini-split and heat-pump systems for commercial and residential applications. Indoor floor-, wall-, or ceiling-mounted "High Seer" units can be matched to outdoor units for one- to four-zone service. Enviro Master International.
Circle 200 on reader service card

Reroofing Literature
APA/SPMC Case Histories: Roof Alterations and Renovations, from the American Plywood Association and the Southern Pine Marketing Council, illustrates 11 reroofing projects – from houses to industrial buildings – using lumber and structural wood panels. American Plywood Department M325, P.O. Box 11700, Tacoma, WA 98411–0700. Cost: $1.



Wall/Ceiling Fixture
"Land Wall" is an adjustable wall/ceiling fixture with a white or blue etched Murano glass diffuser; the mounting bracket rotates 360 degrees and the fixture head pivots 90 degrees. It takes a 50-watt MR16 lamp, and is available with a matte white or metallic charcoal-gray finish. Leucos.
Circle 108 on reader service card
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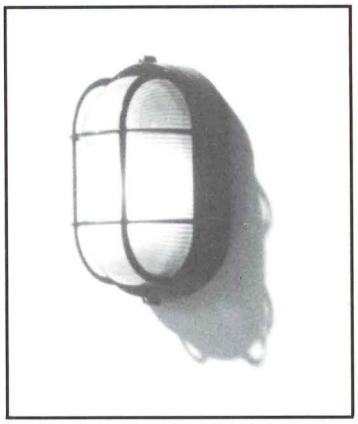
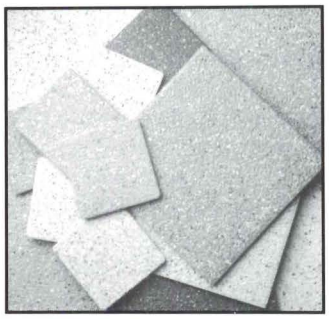


Indoor/Outdoor Luminaire
"Euroluxe"™ luminaires, in round or oval models, hold high pressure sodium, fluorescent, or incandescent lamps. The one-piece, die-cast aluminum housing is finished with Lektrocote® polyester powder paint in seven color options. Hubbell.
Circle 109 on reader service card

Joint Sealant Data Sheet
A data sheet on the "THC-900" self-leveling expansion joint sealant includes basic product uses, features and benefits analysis, surface preparation, joint design recommendations, and typical performance characteristics. Tremco.
Circle 201 on reader service card



Commercial Tile
The Pompeii porcelain tile series has a "lava-like" appearance available in seven colors. It may be ordered in 4″ × 4″ or 8″ × 8″ modules. KPT USA.
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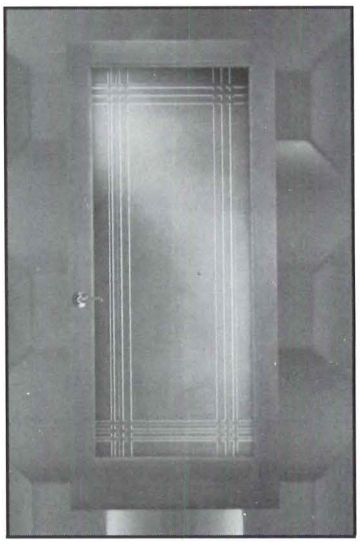
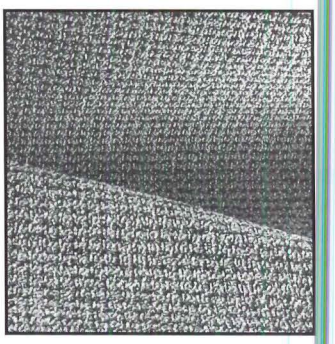


Radius-cut Glass Doors
Crystal View Series glass doors have "delicately polished," radius-cut grooves, producing a divided lights affect. Western Hemlock or Douglas Fir doors with single-glazed or insulated glass may be specified. Simpson Door Company.
Circle 111 on reader service card

Metallic Laminates Brochure
This line of decorative laminates, each featuring abstract patterns embossed in aluminum or solid brass, is described in this brochure. The October Co.
Circle 202 on reader service card



New Carpet Collection
"Patrician," one of eight lines in the "Nobilis Lees Collection," is a tufted, textured loop carpet constructed from DuPont's "Antron® Legacy BCF Nylon." Ten standard colors are offered. Lees Commercial Carpet.
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Digitizer Tablet
A new 12″ by 12″ tablet can be used with a variety of pointing devices, and offers user-definable function, pen, and cursor buttons. Kurta.
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Intergraph to AutoCAD
"Cellblock," a new translation utility for AutoCAD users translates Intergraph Microstation™ cell libraries into AutoCAD block libraries. Decision Graphics.
Circle 122 on reader service card

Financial Management System
"Win2-Bill," a graphics-oriented billing program, is the first Windows release of the "Wind-2 Financial Management System" for architects and engineers. Wind-2.
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Project Scheduler
The "SureTrak Project Scheduler" can help schedule construction projects with up to 4,000 activities, allowing a user to track costs, evalute scheduling scenarios, and coordinate resources with tables and charts. Primavera.
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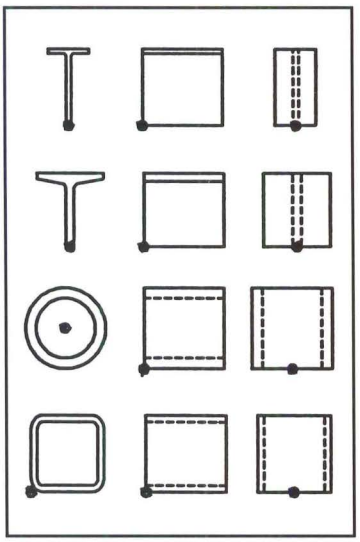

Steel Shapes
New software draws structural steel shapes parametrically in AutoCAD release 10 or 11. Design dimensions and properties are taken from the American Institute of Steel Construction (AISC) computer data base. AISC.
Circle 125 on reader service card

Drawing Conversion Service
A nationwide scanning service translates paper drawings into either raster image files or vector CAD files. Each drawing is "manually verified and major anomalies corrected" before it is sent out. Scanning America.
Circle 126 on reader service card

Fee Costing Software
"Professional Fee Costing – Level II" is IBM-compatible accounting software that features a windows interface and a relational database. BluePrint.
Circle 127 on reader service card

Heating Systems Software
New PC software calculates building heating needs, helps design appropriate under-floor tubing layouts, and provides an itemized list of components needed for a system. WIRSBO.
Circle 123 on reader service card

(continued on page 107)

ANDERSEN HELPS A PAIR OF ARCHITEC

"To honor the past, we used a gable-ended pitched roof design for this city hall," said architect John Weidt. "For the days ahead, a contemporary entry/wing was defined using a crisp, clean curtain wall design."

And fenestration? They used the Andersen CADD-I® software program to explore options. "Andersen® windows were the logical choice," said architect Jon Thorstenson. "Their wood interiors were historically correct and you don't have to maintain their vinyl exteriors."

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DESIGN	HICKEY,
ARCHITECT:	THORSTENSON,
JOHN WEIDT.	GROVER, LTD.
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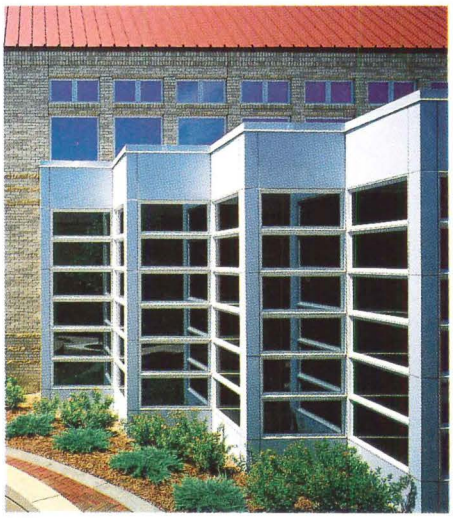
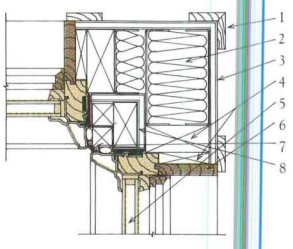
GROUP.	
CHASKA, MN.	





INSIDE CORNER DETAIL

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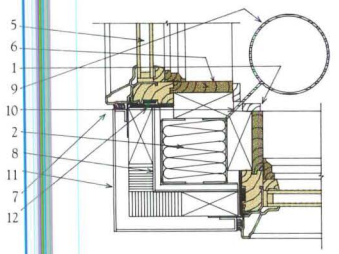
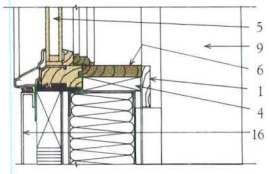
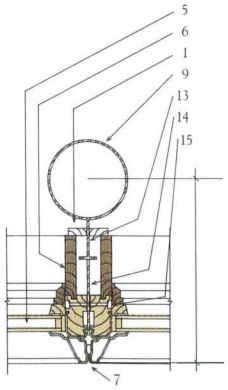


OUTSIDE CORNER DETAIL



SILL DETAIL



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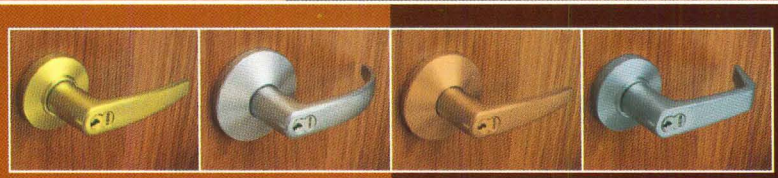

Available in three lever and four rose designs. The Best interchangeable core is standard.

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Technics-Related Products

1

3

2

4

Exterior Wood Finishes

Items in this section complement the Technics article on paints and stains (p. 29).

1 Color Stains

The computerized Accumatch® color system can create custom tints. A line of weather-resistant oil and latex paints and stains is available. PPG.

Circle 113 on reader service card

2 Exterior Stains

Exterior latex and alkyd solid color stains and oil-based semi-transparent are available in a variety of colors. Color samples and a specifications guide, which includes a V.O.C. compliance table, is available. Sherwin Williams.

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3 Exterior Stains

A line of exterior stains and wood conditioning products includes Semi-Solid™ stains that "provide twice the hiding power of semitransparent stains" and are available in 30 colors. V.O.C. compliant products are available. Cabot.

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4 Environment-Friendly Strippers

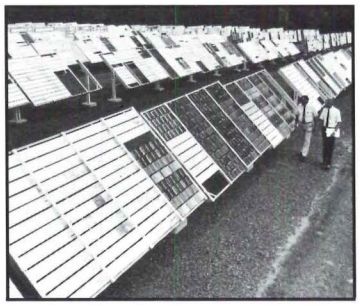
"Woodfinisher's Pride Stripping Gels™" contain no methylene chloride or other harmful chemicals usually found in paint strippers; it is biodegradable, water soluble, and removes polyurethane, varnish, shellac, or latex and oil-based paints. Woodfinisher's Pride.

Circle 116 on reader service card

(continued on page 108)

(continued from page 107)

Technics-Related Products



Paint Information
The "Paint Quality Institute™" tests paints on 25,000 outdoor panels on a six-acre site for durability, adhesion, and color retention. Literature is available. Rohm and Haas.
Circle 117 on reader service card

Finishing Guide
A new guide provides information on choosing and applying finishes for exterior wood products. National Forest Products Association.
Circle 203 on reader service card

Wood Finish Software
Complete articles and recent technical publications are provided on a PC-compatible floppy diskette. National Wood Products Extension Service.
Circle 118 on reader service card

Clear Finishes
CWF® Clear Wood Finish, CWF-UV® Ultraviolet Resistant Clear Wood Finish, Seasonite® Stabilizing Treatment, and Dekswood® Cleaner and Brightener are "for use on quality exterior wood such as redwood, cedar, mahogany, and cypress." CWF-UV can be specified with pre-mixed toners in "redwood" or "cedar" as well as the standard clear finish. Flood.
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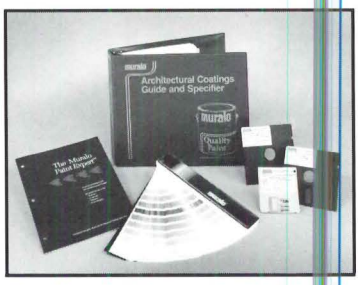

Paint Specifier
The "Paint Expert™" includes specifications software, a binder of technical information, and a color sample fan. Muralo.
Circle 120 on reader service card

Building Materials

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

Project: Cleary Gottlieb Steen & Hamilton, New York (p. 73). *Architects: Kohn Pedersen Fox Conway Associates, New York.* Partitions: Glenn. Treads and rails: Burgess; John Langenbacher. Stone treads: F. Lanzilotta & Son. Lighting: Linear; Edison Price; Lightolier. Carpets: Edward Fields. Lamps: Artemide; Luten Clarey Stem. Seating: Harter; Atelier International; Neidermaier. Chairs: Bernhardt Mills.

Project: Investment Banking Partnership, New York (p. 73). *Architects: Kohn Pedersen Fox Conway Associates, New York.* Grid ceiling: Estey. Ceiling tiles: USG. Carpet: Mort West Mills. Caledonia granite: Miller Druck. Fabric wall panels: Stretchwall; Larsen; Jim Thompson/Rodolf Thai Silk. Cementitious finish on plaster: Omega. Fluorescent lighting: Visual Comfort. Incandescent lighting: Norbert Belfer. Reception desk and benches: Ed Giza & Sons. Desks, tables: Rick Wrigley. Casegoods: Knoll; Donghia; HBF; Bieffe. Seating: ICF; AI; Knoll; Dakota Jackson. Leather upholstery: Spinneybeck. Textile upholstery: Larsen; Ian Wall; Unika Vaev; Donghia; HBF; Yoma. Treads and handrails: Duvinage.

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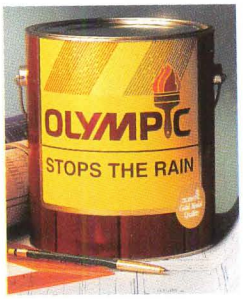

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Progressive Architecture 1991 Annual Index

Subject Index

This index lists the issue and page number of articles that have appeared in P/A in 1991. It is organized alphabetically by subject, and by architects and designers. P/A's special Mid-October Information Sources issue, which includes alphabetical listings of references by subject, is not included in this index

Architects and Designers

Building the Future

In 1984, a few individual architects and engineers challenged themselves to find a better way to practice the AEC professions.

Better than spending hours with an electric eraser.

Better than using valuable time to color a site plan for a presentation.

Better than redrawing a detail taken from a manufacturer's catalog.

Better than cutting and pasting a specification.

Better than entering building geometry into an analysis program, reading the printed results, and then hand-drafting the data back into the drawing.

Better than manually counting all the components of a building.

In short, they would build
the architectural, engineering, and contracting technology
of the future.

Soon, the few individuals had become a large ensemble of some of the best minds in the CAD and AEC industries, whose work influenced tens of thousands of AEC professionals. Their unique interface—the "Core" of the Integrated CAD System—had become the AEC industry standard, supplying a link between designer, software, client, and final construction that has proved revolutionary. Before long, their flagship architectural CAD product became the industry standard, too: today more architects use it than any other in the world.

In the coming years we will fortify the ASG System, finding new ways to increase speed and precision. We will let you design, draw, and document even better. We will give you better access to all critical drawing data. And we will introduce more elements of the design-build-manage process into our self-contained, unified, integrated system—so you can produce better, more accurate, *more complete* drawings.

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SITUATIONS OPEN

DEAN

COLLEGE OF ARCHITECTURE AND URBAN PLANNING

UNIVERSITY OF WASHINGTON

The University of Washington, the largest university in the Northwest, located in Seattle, invites applications or nominations for the position of Dean of the College of Architecture and Urban Planning. The deanship will become vacant in the summer of 1992.

The College consists of four departments -- Architecture, Building Construction, Landscape Architecture and Urban Design and Planning. Undergraduate degree programs include a college-wide interdisciplinary and preprofessional degree and professional degrees in Building Construction and Landscape Architecture. Graduate degree programs lead to the Master of Architecture, Master of Landscape Architecture, and Master of Urban Planning. Approximately 600 upper-division and graduate students are enrolled in the College. There are 54 permanent faculty members, and approximately 36 part-time lecturers. The College is one of 16 schools or colleges in the University, which has a total enrollment of more than 33,000 students.

Candidates for the deanship should possess an advanced professional degree or equivalent qualifications in one or more of the fields represented in the College and prominence in the profession.

Submissions will be considered until the position is filled, but initial review of applications and nominations will begin in December.

Dr. Gene L. Woodruff, Chair
Committee on the Deanship of the College of Architecture
and Urban Planning
301 Administration Building, AH-30
University of Washington
Seattle, WA 98195

The University of Washington is an equal opportunity, affirmative action employer. Women and minorities are encouraged to apply.

The University of Maryland School of Architecture seeks applications for a tenure track faculty position in architectural science and technology, with a specialization in environmental controls systems (ECS) design (HVA, Illumination, Acoustics). Candidates must possess a terminal degree in the discipline and have related research and/or professional experience. Previous activity in environmental control systems analysis and design, and energy-efficient architectural design is desirable.

Duties will include teaching in an integrated architectural-technology curriculum, coordinated with an architectural design studio. As the senior faculty member in ECS for architecture majors, the successful candidate will be expected to take the lead in the further development of this area of instruction.

Rank and compensation commensurate with experience. Applicants should submit a signed and certified curriculum vitae, and the names of at least three references by February 15, 1992 to: Chair, Search Committee, School of Architecture, University of Maryland, College Park, MD 20742-1411. **The University of Maryland at College Park is an equal opportunity/affirmative action employer. Women and members of minority groups are encouraged to apply.**

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Full information prior to application should be obtained by contacting the Human Resources Manager, Human Resources, Curtin University of Technology, GPO Box U1987, Perth, Western Australia 6001. Telephone (61 9) 351 7060 or Fax (61 9) 351 2401.

Closing date for applications 17 January 1992.

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EDITORIAL POSITION

Penton Publishing has an editorial position open immediately for a person with construction and/or architectural technology experience. Writing and editing experience a plus. Send resume and writing sample to:

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The UNC Charlotte's College of Architecture, announces the following visiting/non-tenure and tenure track positions:

Architectural Theory and Design: Teach studio and seminar on Architectural Theory as it relates to technology in undergraduate and new graduate research programs. Must be able to connect the subject area with design and pursue research.

Architectural Materials Science and Design: Teach fundamental and advanced courses in architectural materials and design studio. Emphasis is upon integration of materials/design and emerging materials through research.

Architectural History/Theory: Teach survey and advanced courses in architectural history and studio.

Human Behavior/Perception and Building Design: Teach studios and seminars on the relationships between building design and human behavior/perception.

Second Year Studio/Seminar Visiting Assistant Professor: Teach a design studio and a seminar course.

The College is composed of 25 diverse and dedicated faculty members, an extensive distinguished visiting architects program, 275 students within a professional program and a graduate research program focusing on Theory of Architecture and Theory of Technology. Applicants should have professional and teaching experience and terminal degree or equivalent.

Send cover letter describing approach to teach and subject with vita and names of five references to **Charles C. Hight, Dean, College of Architecture UNC Charlotte, Charlotte, NC 28223. Closing date is February 15, 1992.**

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University of Tennessee, Knoxville. The School of Architecture is seeking candidates for the following positions:

(1) One assistant professor, tenure-track. Candidates should be prepared to teach design as a rigorous inquiry holistically addressing both cultural and environmental influences impacting the built environment. In addition, they shall be expected to teach in a related field of expertise with preference given to those with background in environmental systems or computers.

Applicants shall have an M. Arch degree or equivalent. Preference will be given to those holding professional registration and having experience in teaching and/or practice.

(2) Up to three (3) full-time visiting and four (4) to six (6) part-time lecturers for one-year appointments, academic year 1992-93. Candidates shall be prepared to teach design as a rigorous inquiry holistically addressing both cultural and environmental influences impacting the built environment. Applicants must hold an accredited professional degree. Candidates with experience in teaching and/or practice will be given preference. Senior faculty or practitioners seeking to extend their experience, as well as recent graduates, are encouraged to apply.

Please send a curriculum vitae, portfolio and the names, addresses and phone numbers of three references to: **Faculty Search Committee, c/o Dean's Office, College of Architecture and Planning, 217 Art and Architecture Building, 1715 Volunteer Blvd., The University of Tennessee, Knoxville, Tennessee 37996-2400.** Applications will be accepted until March 1, 1992. The University of Tennessee, Knoxville is an EEO/AA/Title IX/Section 504/ADA employer. We encourage applications from women and minority candidates.

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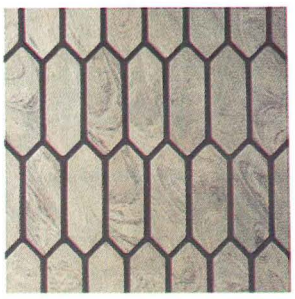
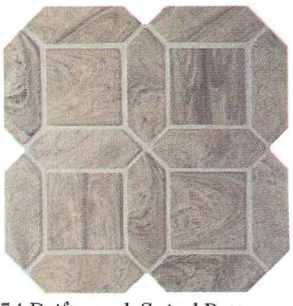


54 Driftwood, 3″ x 9″ Hex

54 Driftwood, 6″ x 6″



54 Driftwood, Spiral Pattern

54 Driftwood, 3⅞″ x 8″

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