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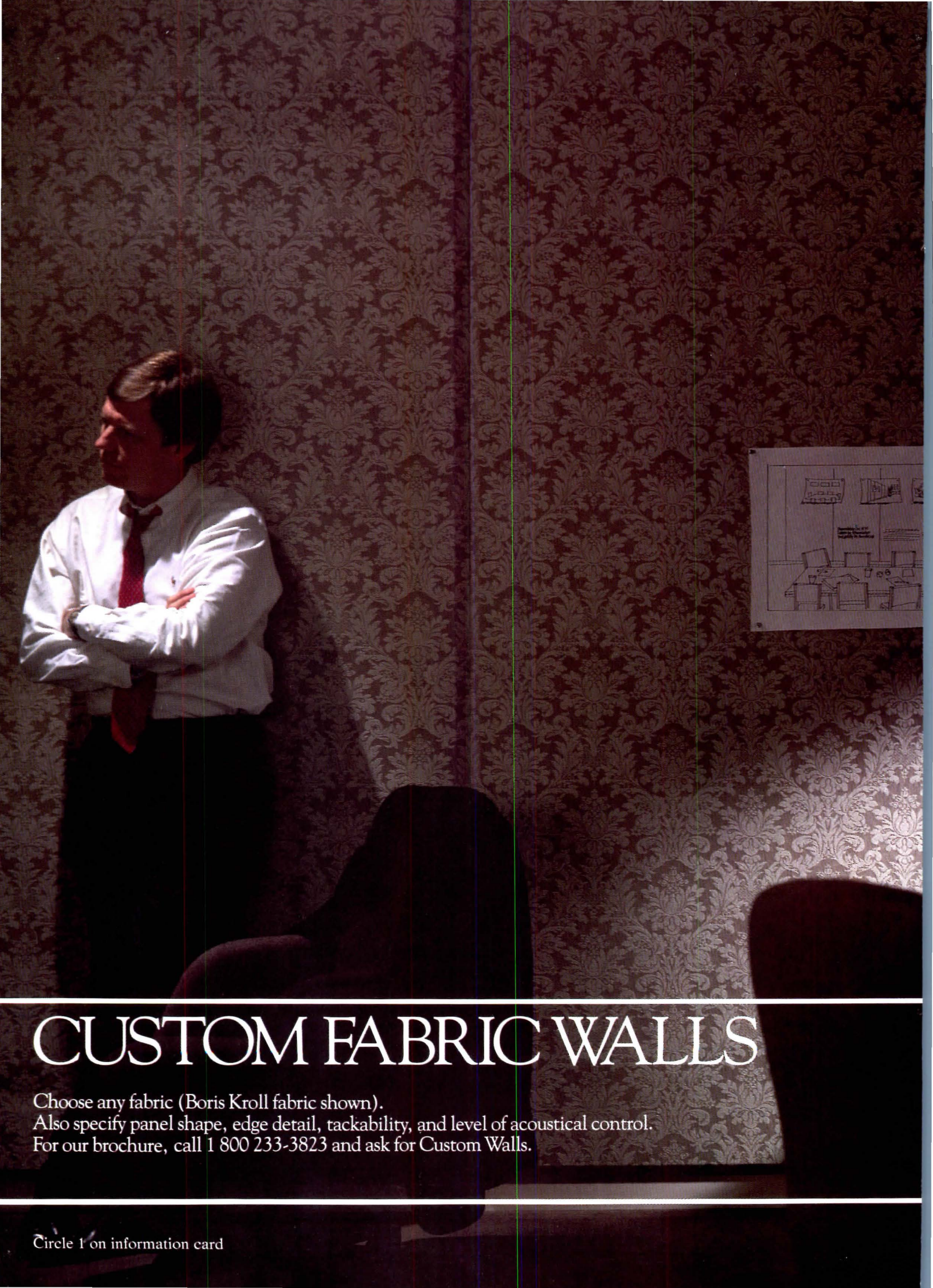

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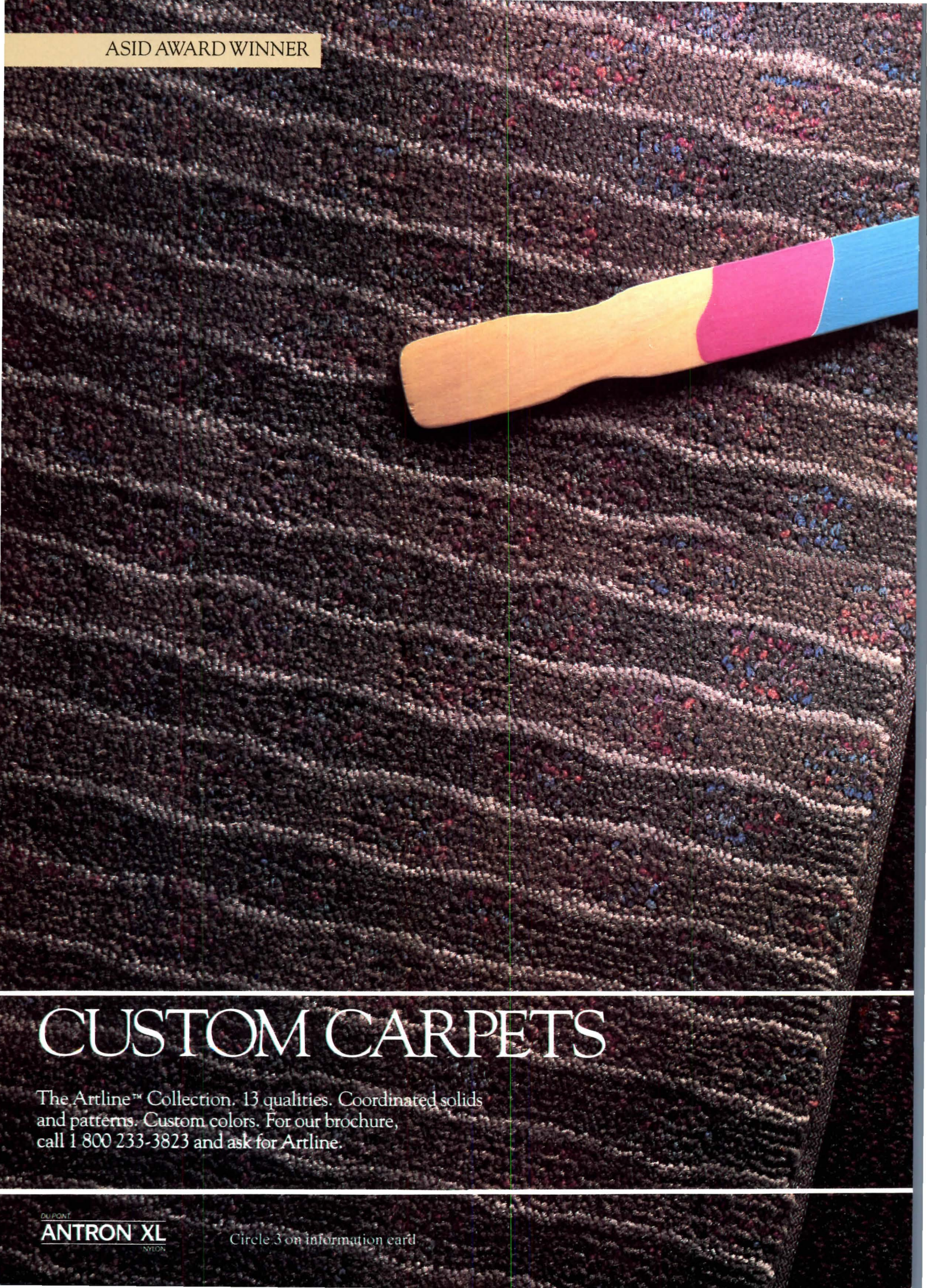
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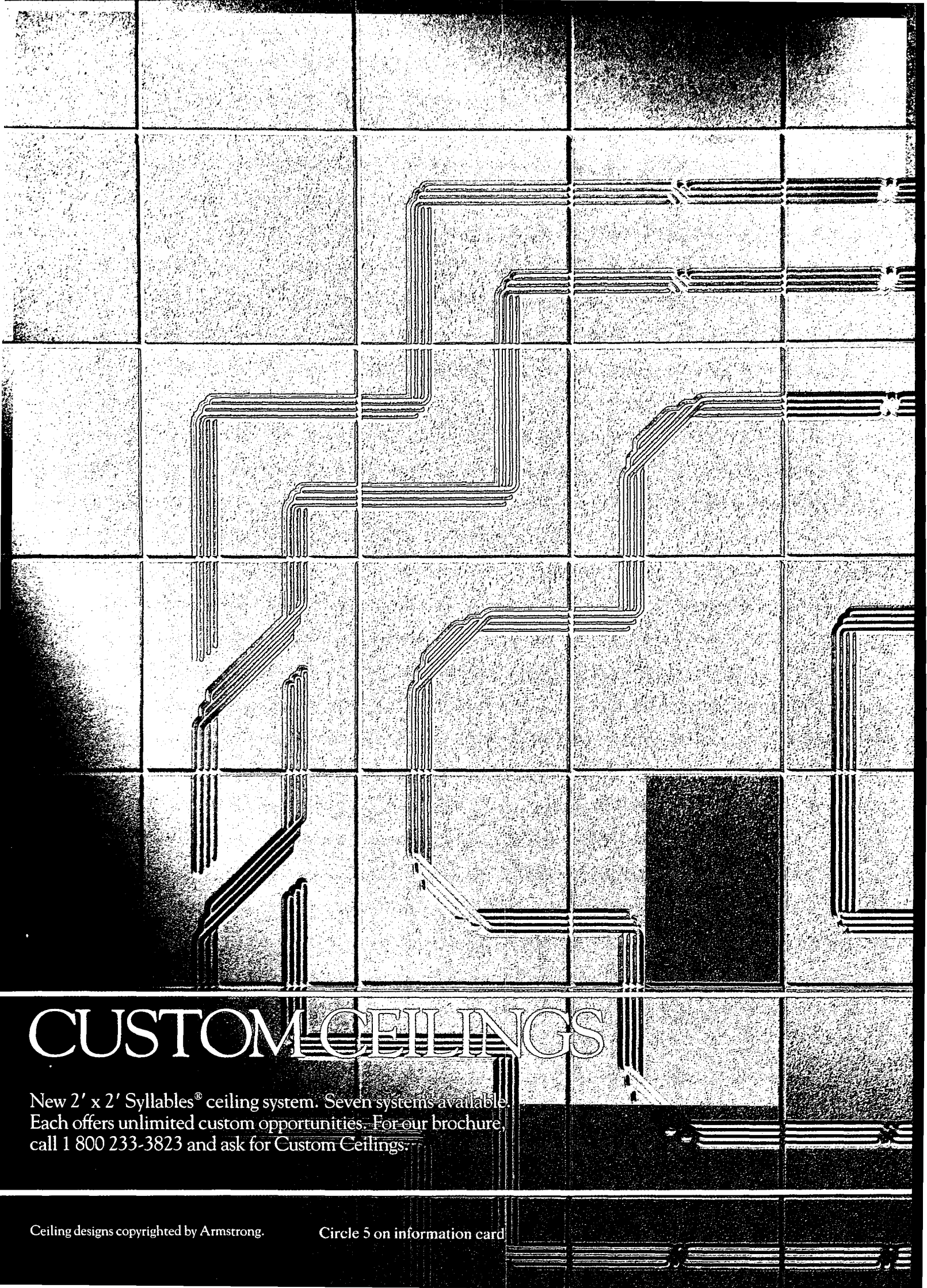
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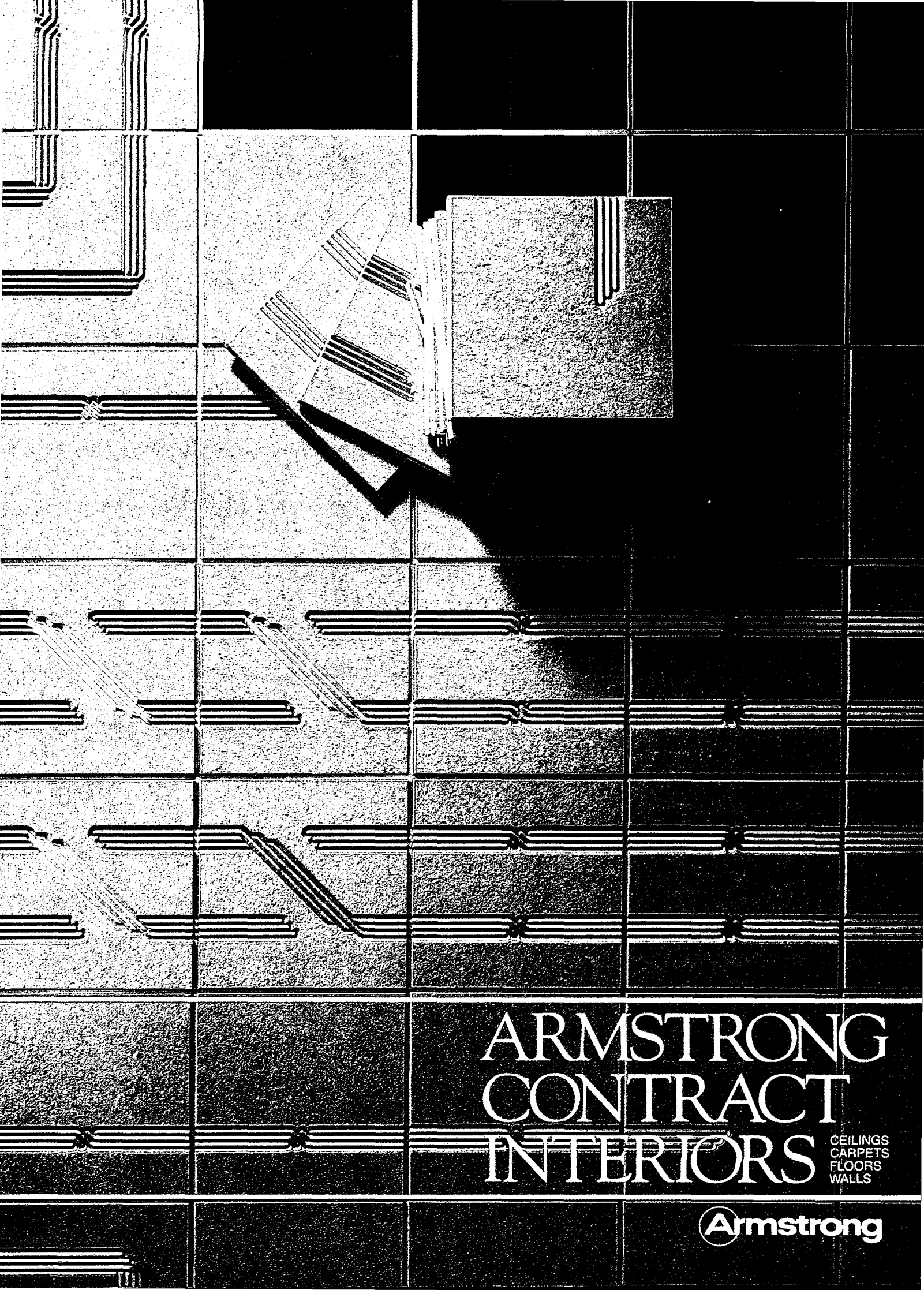

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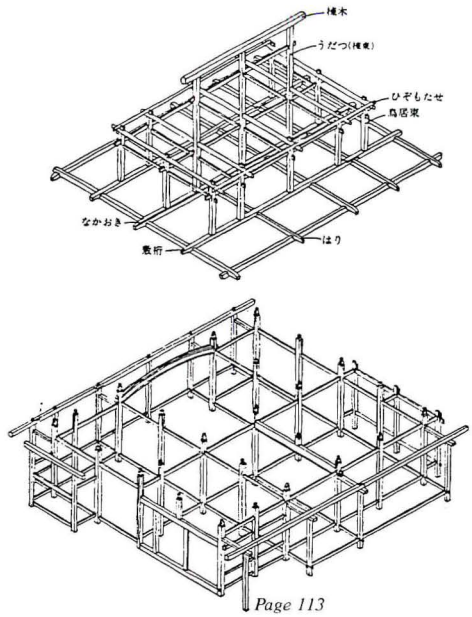

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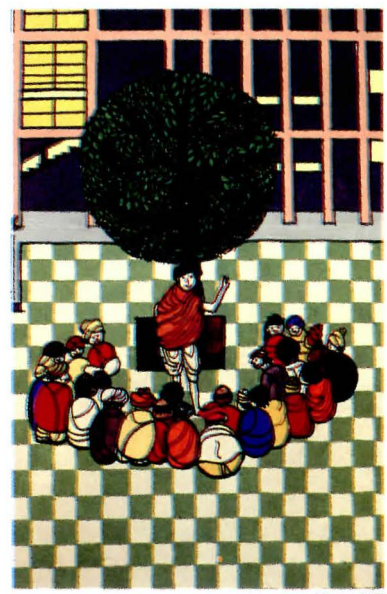
Cover

The National Gallery of Canada (Moshe Safdie, design architect; Parkin/Safdie, architect), built on a promontory overlooking the Ottawa River and Parliament Hill in Ottawa (see page 98). Photograph by Allen Freeman.

News

Technology and Practice

Architect Utam C. Jain's depiction of a citizens' town meeting outside the new Balotra City Hall, designed by his firm in Bombay, India.



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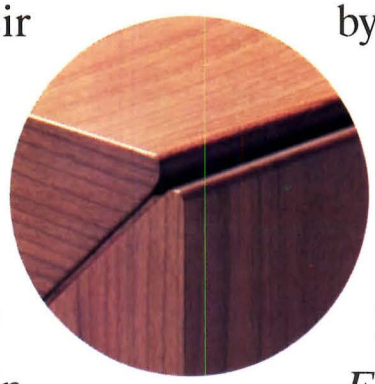
"I don't want to put something on the market that can be easily copied. I want people to scratch their heads and wonder how on earth it's made. Edgewood's miter detail—the chamfered edge—is as old as wood joinery itself. But here it is reinterpreted on new equipment, so technology is achieving a precision not possible when furniture had to be hand-made. And you get absolutely no clue as to how it's held together by looking at it.



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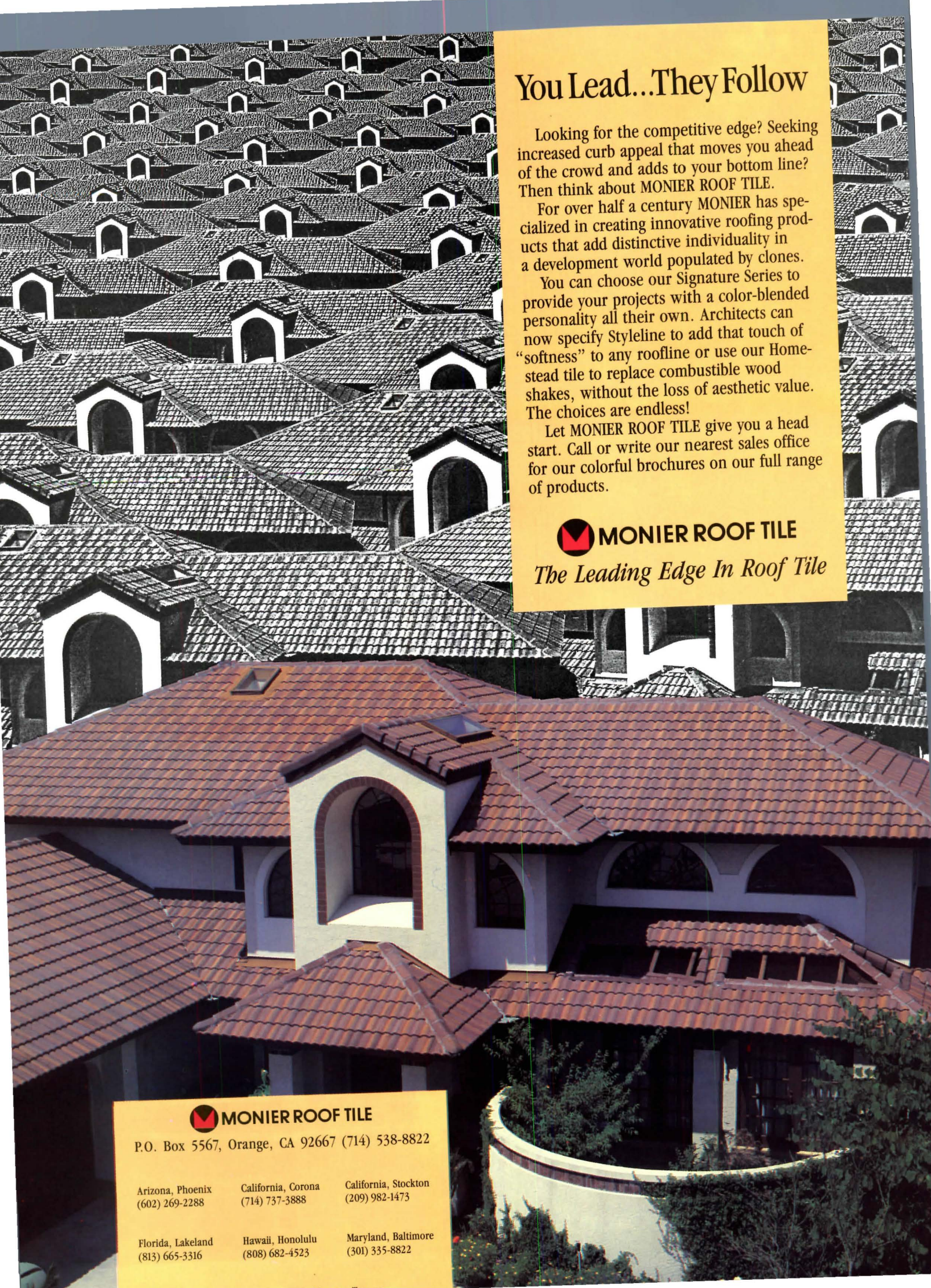

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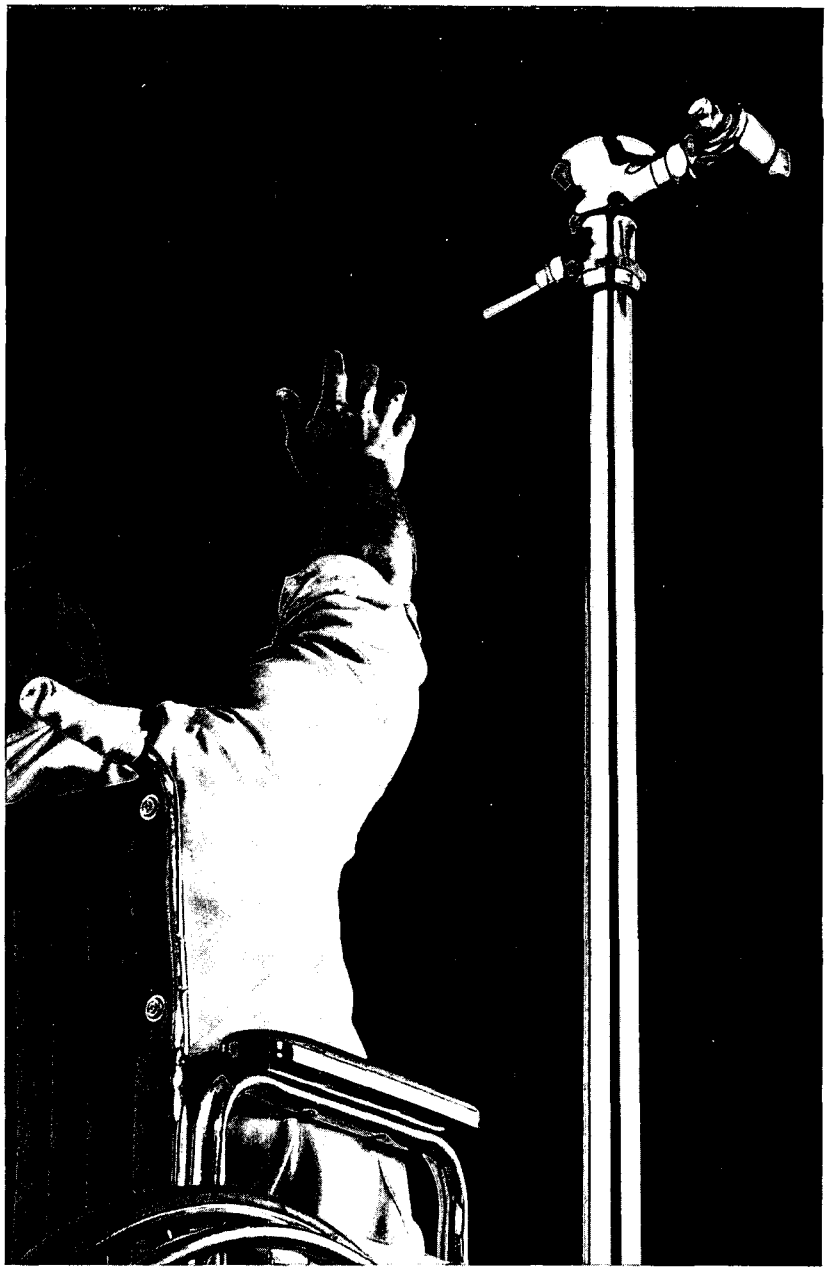
From Whose Perspective Are You Designing?

For a handicapped person, accessibility to the flush valve handle on a fixture can be extremely difficult... a point often overlooked in the design.



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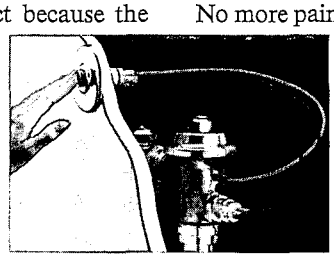

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The Evans & Sutherland building, which contains millions of dollars worth of sensitive computer equipment, is located within a mile of the Wasatch Fault in Salt Lake City.

AFE FROM EARTHQUAKES MPANIES THE SHAKES.

That was essential because the building, which was constructed for Evans & Sutherland Computer Corporation, is located within a mile of the Wasatch Fault in Salt Lake City. What's more, Evans & Sutherland is a leading designer of special-purpose digital computers, software systems and display devices — products extremely vulnerable to damage from seismic tremors.

To plan for maximum protection, Vulcraft was asked to join with the architects and engineers at the design stage of the project. Already, they'd decided to use a "base isolation" system, the most advanced buffering method available. But using our steel joists and joist girders was also an important decision. The joists and joist girders are much lighter in weight than wide flange beams, so the entire building required less steel, lighter columns and less foundation. And this not only lightened the load for the base isolators, it saved appreciably on building costs.

Throughout construction, Vulcraft remained constantly involved, tailoring our delivery of materials to the exact erection schedule and meeting deadlines without fail. What's more, our joists and joist girders helped the steel erectors meet their deadlines. That's because our products are fast and easy to erect — a fact that saves time and money on virtually any job where they're used.

The design team chose a "base isolation" system to accommodate seismic loads. They also specified Vulcraft steel joists and joist girders for the building.

So whether you need Vulcraft's help to protect your building from earthquakes or you want to stay out of the hole when it comes to construction costs, contact any of the plants listed below. Or see Sweet's 05100/VUL.

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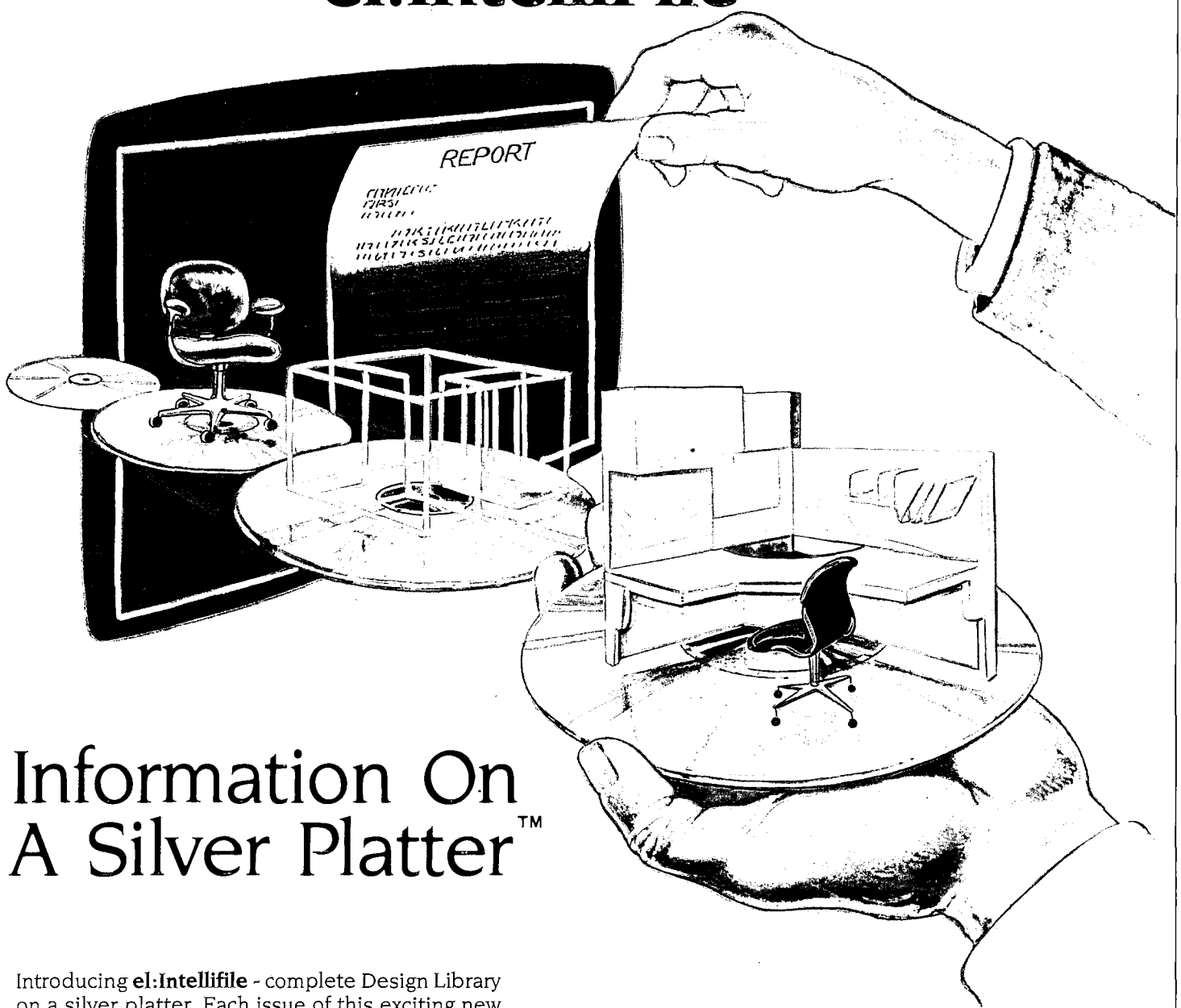

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EVENTS

Oct. 2-4: American Society for Engineering Management Conference, Knoxville, Tenn. Contact: Charles P. Frew, ASEM, P.O. Box 1411, Oak Ridge, Tenn. 37831.
Oct. 2-5: Sheet Metal and Air Conditioning Contractors' National Association Convention and Exposition, Las Vegas. Contact: Rosalind Price Raymond, SMACNA, 8224 Old Courthouse Rd., Vienna, Va. 22180.
Oct. 3-6: Course on Electrical Systems Design for the Non-Electrical Engineer, Madison, Wis. Contact: E.K. Greenwald, Dept. of Engineering Professional Development, University of Wisconsin-Madison, 432 N. Lake St., Madison, Wis. 53706.
Oct. 4-9: International Ceramic Tile and Bathware Trade Show, Bologna, Italy. Contact: Italian Tile Center, 499 Park Ave., New York, N.Y. 10022.
Oct. 5-15: The Interfaith Forum on Religion, Art, and Architecture Seminar on "The Art and Architecture of Mexico," Mexico City. Contact: IFRAA '88, 7702 Braesridge Court, Houston, Tex. 77071.
Oct. 6-8: Conference and Exhibition entitled "Composed Order: The Architecture of Alden B. Dow," Midland, Mich. Contact: Carol Coppage, Northwood Institute Alden B. Dow Creativity Center, Midland, Mich. 48640.
Oct. 9-12: National Computer Graphics Association Conference on Computer-Aided Design and Manufacturing, Boston. Contact: Sharon Sutton, NCGA, 2722 Merrilee Dr., Suite 200, Fairfax, Va. 22031.
Oct. 9-12: Prestressed Concrete Institute's Annual Convention, Philadelphia. Contact: Tressa Ferrella, PCI, 175 W. Jackson Blvd., Chicago, Ill. 60604.
Oct. 16-Nov. 22: "The Art of Design," an exhibition of international designers' photos, drawings, and models, Milwaukee. Contact: Harry J. Wirth, School of Fine Arts, University of Wisconsin-Milwaukee, P.O. Box 413, Milwaukee, Wis. 53201.
Oct. 17-21: Course on the Application of Infrared Scanners to Detect Building Energy Losses, Burlington, Vt. Contact: Paul Grover, Infraspection Institute, 33 Juniper Ridge, Shelburne, Vt. 05482.
Oct. 19-23: 42nd National Preservation Conference, Cincinnati. Contact: National Trust for Historic Preservation, 1785 Massachusetts Ave. N.W., Washington, D.C. 20036.
Oct. 20-21: "Interface '88," Annual Humanities and Technology Conference, Marietta, Ga. Contact: Rex Recoulley, Humanities and Social Science Dept., Southern College of Technology, Marietta, Ga. 30060.
Oct. 22-23: Symposium entitled "Emerging European Architects," Harvard University Graduate School of Design, Cambridge, Mass. Contact: Office for Special Programs, Harvard University Graduate School of Design, 48 Quincy St., Cambridge, Mass. 02138.
Oct. 23-26: Associated Landscape Contractors of America, Interior Plantscape Division, Conference and Trade Show, Los Angeles. Contact: Martha Lindauer, ALCA, 405 N. Washington St., Falls Church, Va. 22046.
Oct. 23-26: American Fire Sprinkler Association Convention and Exhibition, Marco Island, Fla. Contact: AFSA, 11325 Pegasus, Suite S-220, Dallas, Tex. 75238.

LETTERS

Chicago Theater: The structural solution described in the March article about the Chicago Theater Center [page 106] solved many problems for us—most notably the fact that the project would not have been financially feasible without it. The Coffey/Belford structural work was exemplary.

This project, however, did require considerable teamwork to be realized. One very major component of this team was the W.E. O'Neil Construction Co., the general contractor and construction manager of the project. Because of the project's innovation and complexity, new problems arose daily at the site and had to be solved swiftly. O'Neil worked collaboratively with Coffey and Belford, often initiating solutions. Many solutions required special efforts from everyone.

The theater also required many on-the-site solutions. In the case of the theater's interior decoration and color scheme, we were quite privileged to have the services of A.T. Heinsbergen, the individual and firm responsible for similar work in the Carnegie Hall renovation. The palette emerged gradually from scores of painted samples.

Marery al Chalabi
Chicago Theater Restoration Associates
Chicago

Surrounded by Plastics: Very nice article on plastics ["Plastics, Past and Future," April, page 104]. I realize now that, as I read it, I was drinking coffee from a plastic cup. I'm writing this letter on a word processor, which is plastic. I'm sitting in a plastic chair. My phone, stapler, Rolodex, floor mat, binders—everything within reach here—is plastic. Maybe I'm working for the wrong association. Or I showed up at the wrong building for work this morning. Not a stick of wood in sight.

I went through the Monsanto plastic house in Disneyland when I was a kid, which was only a few years ago. I was fascinated by it, this large, mushroomlike thing on a stem. You took an elevator up through the center to get in. The house was divided into four sections and everything was white, except for some red furniture cushions. And everything was made of plastic. They called it the house of the future.

I wanted a house just like it, when I was a kid. Now I'll settle for most anything rather than to continue paying rent. A couple of refrigerator boxes even.

Pete Kent
Western Wood Products Association

'Good' Tips: Your Technical Tips article on "Inspecting Cast-in-Place Concrete" [June, page 125] is just the kind of information that we practitioners need but don't often get either in our formal education (and why not!) or in practice (working for others or ourselves).

Please keep up the good work and write more such "inspecting" or "site observation" articles on other materials. They'll help us do a better job.

G. Gregory Dovey, AIA
Chambersburg, Pa.

'Save the Gehry': The word "incredibly" as used in your July editorial speaks volumes, and the word "folly" borders on tragedy. On behalf of the trustees of the National Training Fund, may I extend our congratulations and appreciation for your editorial [calling for preservation of Frank Gehry's structure housing the centennial exhibit of the Sheet Metal Workers International Association at the National Building Museum in Washington, D.C.], plus the outstanding article "Deconstructivist Construction" carried in the June issue [page 64].

We are, of course, devastated by the thought of scrapping this metal colossus. Both the Sheet Metal and Air Conditioning Contractors' National Association and the Sheet Metal Workers International Association have taken steps to try to extend the exhibit's longevity by at least one year.

The controlling factors in this case are of a political nature, and exhibits of this type do not readily fall within the definition of political achievements and/or concerns. To the contrary, interest in this type of exhibit is usually confined to those of the architectural, art, and museum communities, plus the industry that erected the structure.

When preliminary discussions commenced pertaining to celebrating the Sheet Metal Workers International Association centennial, no one conceived the magnitude of the exhibit in its final form. In those early discussions it was made very clear that dismantling would have to take place by September 1988.

But those discussions were followed by a chain of events that soon changed from the unknown to enthusiasm and, yes, to an obsession. When we were advised that Frank Gehry would be the architect, it became obvious that the end result would be far from routine; be it controversial or not, there was no question that it would be spectacular.

Gehry's impressive and monumental construction warrants something far more than public view for a mere 10 months and, subsequently, destruction at the hands of a junkyard scrap metal dealer.

W.L. Fillippini
Administrator
National Training Fund, Sheet Metal and Air Conditioning Industry
Alexandria, Va.

World Architecture

Mixed Reviews for New Construction In London's Docklands Redevelopment

London is in the grip of an enormous development boom. A few years ago, land that had lain derelict and worthless since the war suddenly became immensely attractive to developers eager to cater to the explosion of business activity that Thatcherism and the 1986 deregulation of London's finance houses brought to the capital (and to the whole southeast of England). Yuppie housing, massive office blocks, and dealing floors now are being built on former industrial and railway land and, above all, in the Docks where the boom started.

Until World War II, London's Docklands was the biggest in Europe, if not the world. With the decline of empire trade and the modernization of cargo handling, the whole vast area was virtually emptied. A few wharves continued to trade (the odd one still does), and a few enterprising young architects and developers colonized some of the warehouses nearest the city. But the remainder of Docklands was left as an enormous rotting maze with dusty streets bounded by the high, impenetrable brick walls of the wharves, here and there studded by (still occupied) public housing estates, for the inhabitants of which little or no work remained in the area.

To loosen the stranglehold of the past and reverse the stasis of the present, the government made a radical move. In 1980 it set up a new corporation to promote development and act as a lever to activate the whole mass. The London Docklands Development Corp. (LDDC) was revolutionary in a country that had produced more planning theory than practice since the war.

The LDDC was to be a facilitating agency, as opposed to the usual planning authority, which developers regard as inhibiting. The LDDC was required to provide infrastructure (roads, light railway, fiber-optic mail, a small airport) and, above all, to market the idea that the Docks could be developed. It was not to be concerned with dull, restrictive matters like zoning, appearance, or even democracy. In Britain, planning power usually resides in local councils, but the LDDC's powers override those of the local authorities, and it reports directly to the government, fundamentally in terms of financial achievement.

Dave Bower

Top, Shadwell Basin housing by MacCormac Jamieson Prichard & Wright. Above, Lacey, Jobst & Hyatt's mixed-use Heron Quay.

Extraordinary things already have been done through this instrument. One branch of the light railway now is working, and, as you whiz in the automated little trains on the overhead tracks through the Isle of Dogs, the center of Docklands and up to now LDDC's main stamping ground, a weird jumble of new buildings is revealed. Virtually all of them are not even second-rate. Poor copies of American commercial architecture are strewn around and against the overhead tracks.

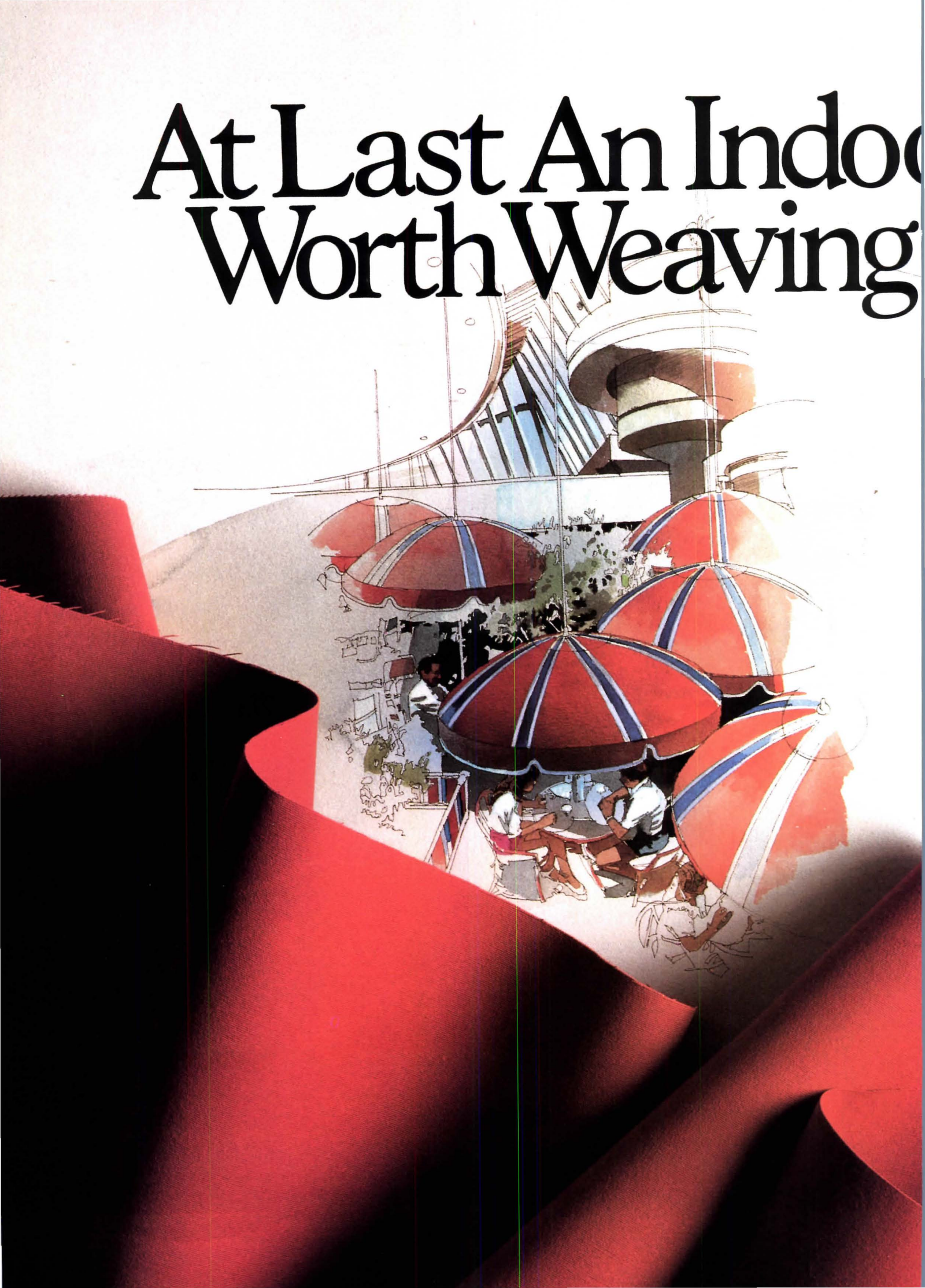
Compared with the lumpen grossness of the commercial buildings, the housing looks at first to be almost delicate. But closer inspection reveals that most of it is a kind of muddled neo-vernacular style (consciously fostered by the LDDC) that brings suburbia to the heart of the great city. In earlier schemes you can find debased cottagelike housing within view of Tower Bridge. As land values have risen—from zero in 1980 to more than £2 million an acre in well-favored spots now—developers have had to tighten up their act and produce terraces and courtyard condominiums that give at least some semblance of urban feeling. Still, there are no shops, very few restaurants, no small businesses, nor streets, nor squares, nor entertainment, nor public buildings. There is none of the glue that binds a real city together socially and environmentally.

Can anyone escape the Curse of Docklands and generate architecture that is authentic and humane? Precious few can, partly because of the tendency of developers to use good architects to make designs and then throw them out once the designs have been approved by the LDDC and other authorities.

One scheme that seems to have survived this process and even triumphed is MacCormac Jamieson Prichard & Wright's work at Shadwell Basin, where the archi-

continued on page 22

At Last An Indoo
Worth Weaving



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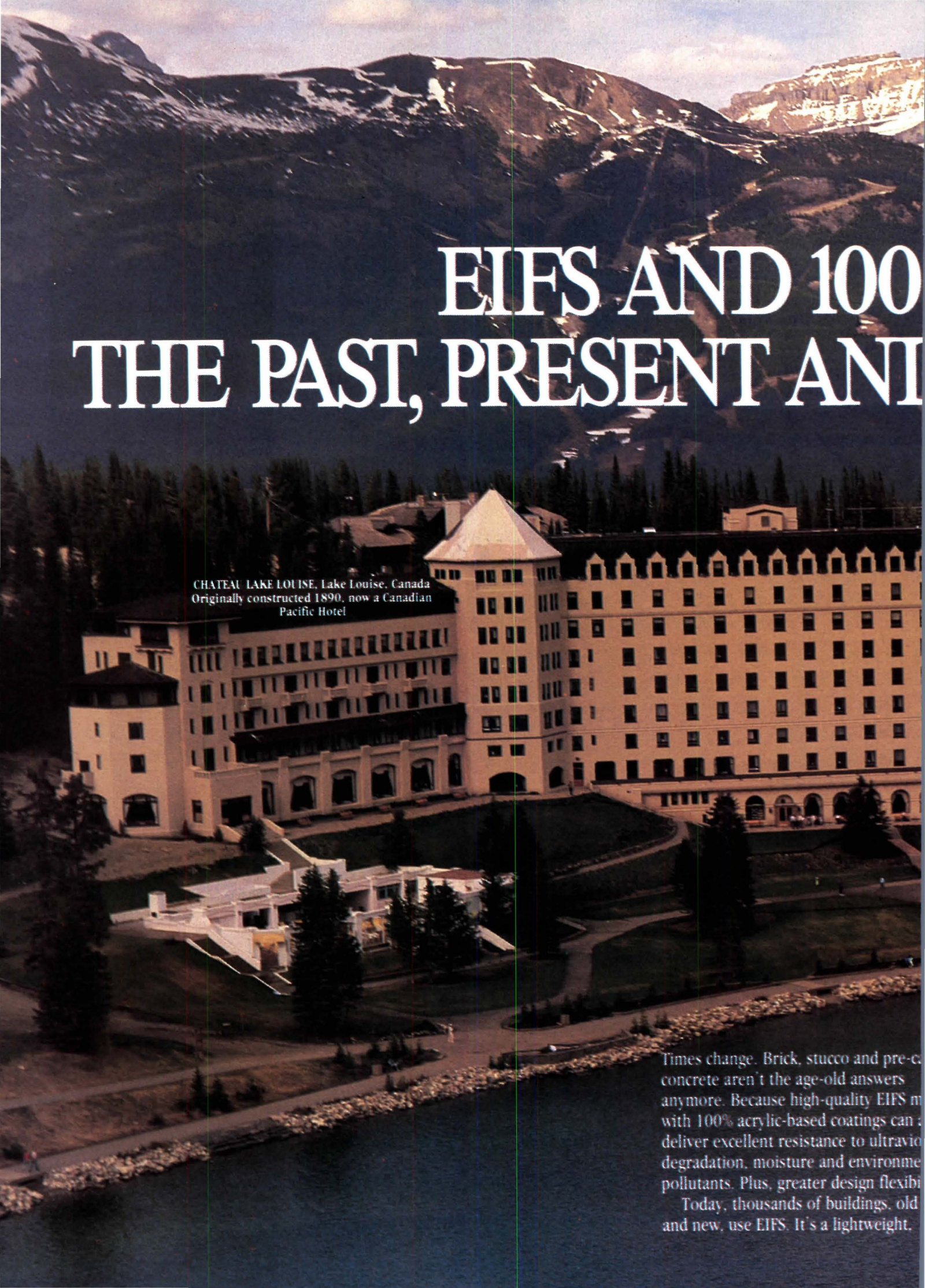

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Canary Wharf: SOM in foreground, Pelli's tower in middle, and Royal Docks beyond.

World Architecture *from page 17*

tects have imagined a form that reflects the heavy Victorian nature of old dockland and yet produces modern, decently scaled housing. The development also engages creatively with the water—something that surely should have been part of the challenge every Docklands architect had to confront, yet far too few did. (Indeed, in the stolid heart of the commercial center of the Isle of Dogs, the shedlike office buildings actually seem to turn their backs on one of the most dramatic urban waterfronts in the world in favor of facing dreary little service roads.)

Two other schemes that have the courage to face their waterside setting are Heron Quay by Lacey, Jobst & Hyatt and the Cascades building on the edge of the Isle of Dogs by Campbell, Zogolovitch, Wilkinson & Gough.

At Heron Quay, Nicholas Lacey has created a series of spaces and flexible buildings that could form a varied pattern of uses and interaction of the public and private realms that might form a basis for a civilized city. Sadly, Heron Quay is immediately south of Canary Wharf, and, if that project succeeds, its gigantic and simplistic scale undoubtedly will replace Lacey's gentle, fragile, red-metal-clad vision of multifarious urbanity.

The Cascades building fronts the river and is altogether a tougher proposition. Ranging from two to 20 stories high, this mainly residential building suggests the scale that riverside housing in a great city could now have. It does not try to ape past patterns like Canary Wharf or the neo-vernacular estates, but tries rather to express the potential variety and individuality of its inhabitants.

In the mid-1980s, a completely new ball was bowled into the game by a group of North American developers led by First Boston and Credit Suisse. They proposed a giant new business center at Canary Wharf on the top end of the Isle of Dogs. This is to be the biggest new financial development in Europe, and both a receptacle for overflow from a city hard-pressed by development and a rival to it. After many vicissitudes, the scheme now to be developed by Olympia & York has started on the site to a master plan by Skidmore, Owings & Merrill with I.M. Pei and British architect YRM.

Compared with what has gone before in Docklands, the SOM schemes (the firm has produced several designs since its involvement with the first developers) have been admirable in many ways. They allow for an element of public open space in squares and boulevards. There is an intention to include shopping, entertainment, and even some housing in the predominantly commercial mass.

But the detailed design of Canary Wharf gives as much cause for dismay as that of the rest of Docklands. SOM has tried to reinterpret the traditional pattern of London's West End with squares and streets—but on a gargantuan scale. The public open spaces may look very good on plan, yet seen in section they are far too high and create spaces that will, compared with their models in Bloomsbury and Mayfair, be dark and mean. The genius of the Georgian square is that the buildings that surround it are about the same height as the great trees in the center. There is an extraordinarily sensitive balance between the works of man and the works of nature.

At Canary Wharf man will monstrously dominate nature because not only are the buildings far too high for the plan but they also are to be carried out in a kind of architecture that is a travesty of the real London classicism with which the scheme purports to resonate. Enormous hulks of modern corporate office space are to be dressed up in precast pomo classicism with vestigial pasteboard cutout pediments, overscaled entrances, and twiddly little details in a desperate and pathetic effort to put flesh on a grinning skeleton.

Now, much of the design in the Isle of Dogs is finished, and the great challenge of the Royal Docks opens to the LDDC and the developers. These vast tracts of waterfront, downriver to the east of the Dogs, already contain the airport (a short-takeoff affair that offers relatively quick flights to the Continent). The Royals are at least to be developed to a master plan, originally by Richard Rogers. Yet, even in its most recent form, the plan is sketchy, with huge segregated chunks being devoted to a shopping center, a "high-technology development," and a sports complex. Very little interstitial glue here—particularly as the area is to be carved up among a few very big developers, each of which will generate a tract. As usual, the LDDC wants to see "swift development." But local pressure has caused the LDDC to increase the housing element and to mix up uses.

Just possibly, the Royals will have time to become what Docklands as a whole ought to have been—a demonstration of how to make a humane, lively, and, of course, commercially successful city in the last years of the 20th century.

—PETER DAVEY

Mr. Davey is editor of London's Architectural Review.

Conference Explores Unfinished Journey of Australian Design

Billed as "the largest architectural conference in the southern hemisphere," the annual meeting of the Royal Australian Institute of Architects was indeed "an international feast." It began in June at Darwin with a journey through the center of the land from the origins of Aboriginal settlements of 40,000 years ago. It culminated in a tour of 1,000 architects through Romaldo Giurgola's new Parliament House in Canberra, followed by four days of meetings in Sydney.

The 200th anniversary of European settlement in Australia, the completion of Parliament House, and the invitation of major international speakers contributed to setting the theme, "reflections on unfinished journeys." Organizer Lawrence Nield declared that "Australian architecture has arrived at an uncertain civilization, a balancing act between power and sensitivity. This conference is to look at what we have achieved and how to keep going."

The opening reception was held at the Exhibition Center by architects Philip

continued on page 26

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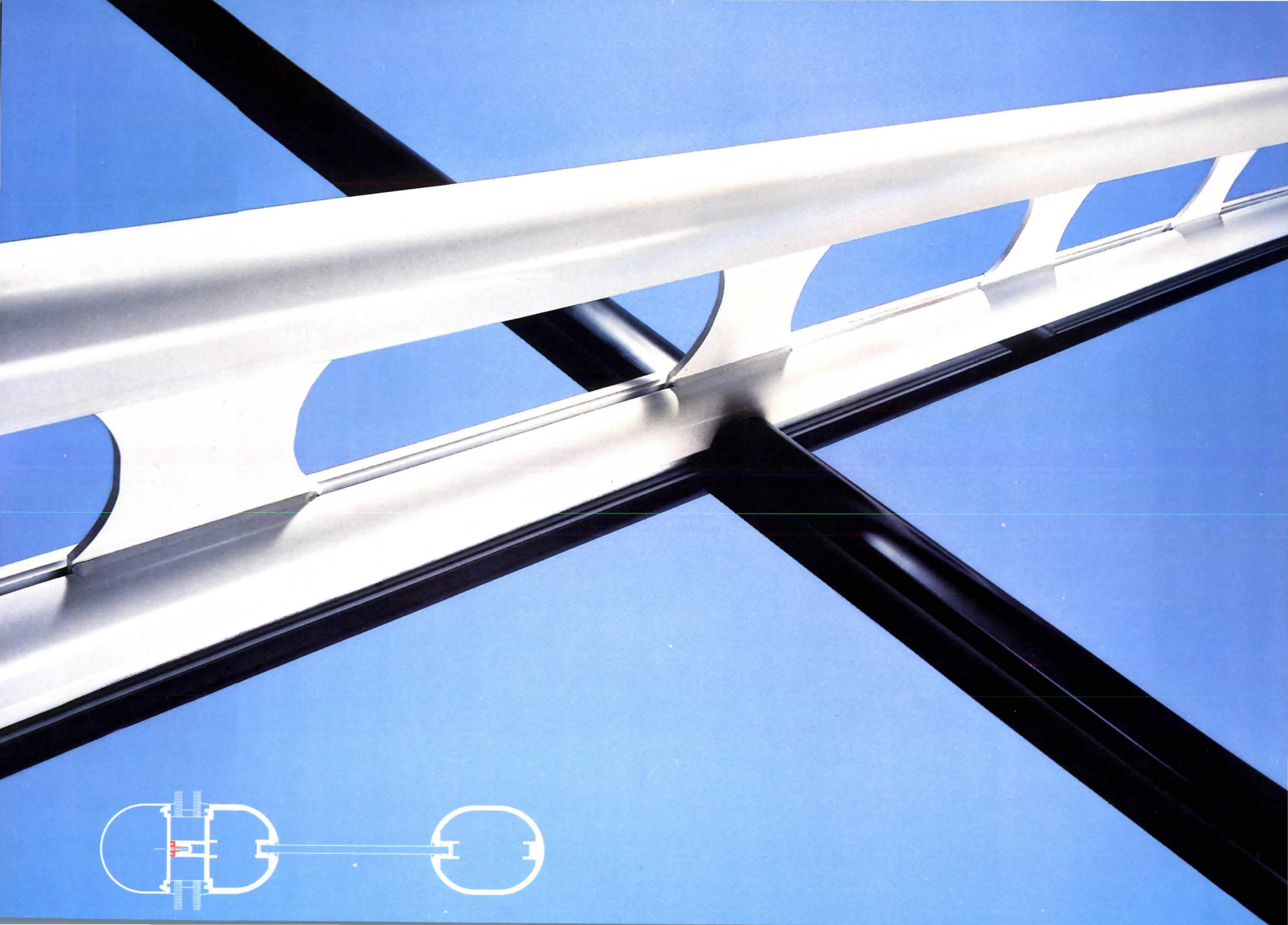

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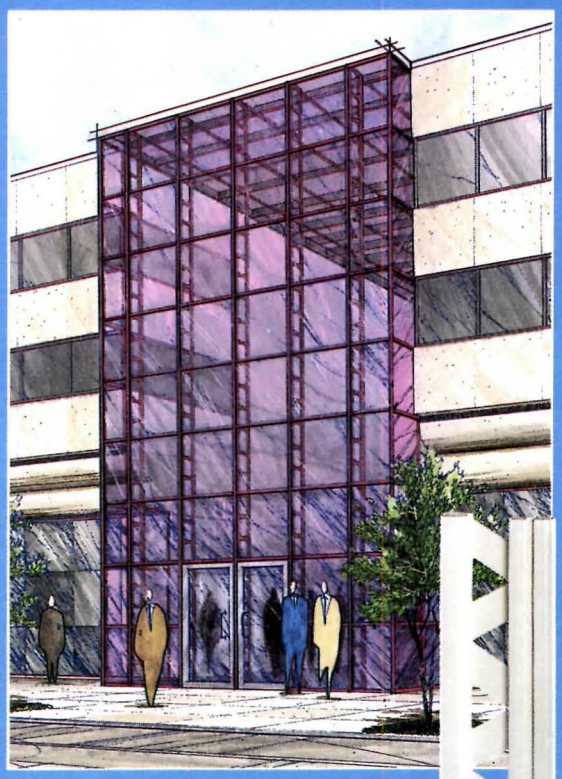

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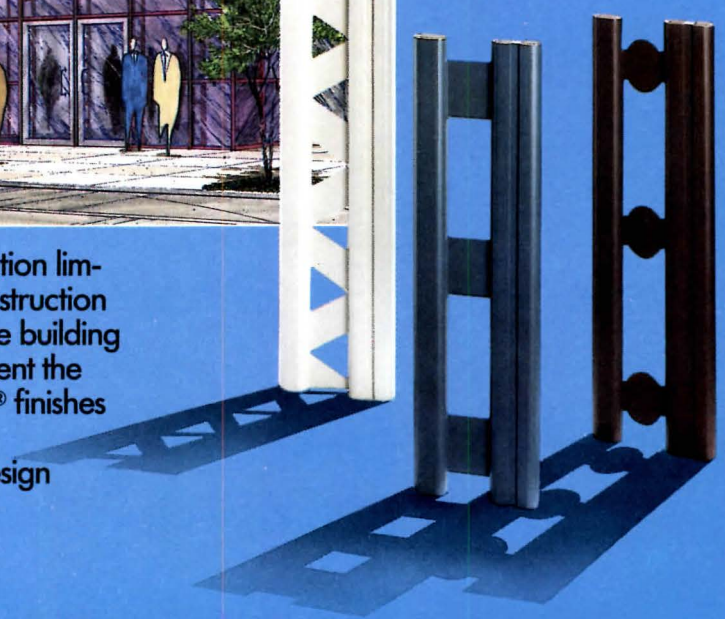

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World Architecture *from page 22*

Cox, Richardson Taylor & Partners, a tensile masted and cabled celebration of diaphragm enclosures. Similar glamour and unabashed style was evident along the refurbished Circular Quay that leads to the Sydney Opera House, where the inaugural ceremony took place.

Kenneth Frampton of Columbia University attacked the Manhattanization of the great cities of the world, which he called "rampant ecological monstrosities." Yet he acknowledged the growing urban improvements of Sydney and the reputation of the Opera House as provocateur and popular success of place making. Frampton was less generous with suburbs, a settlement form in Australia that rivals its endless proliferation throughout the United States.

Melbourne architect Daryl Jackson insisted that modernist mottoes and other stylistic creeds are now defunct, to be replaced by "critical intelligence" and an attempt to impart meaning and clarity.

How this can be accomplished even by a one-man office was enthusiastically shown by Glenn Murcutt. A prize-winning architect without employees, he explained that by typing his own letters he knew precisely what he had said and that by being responsible only for himself he had gained the "freedom to give time." His attempts to produce "an architecture of place" are based on "a species of buildings" tailored to the local ecology. Steel frame and corrugated metal, they are sensitive and serene passive climatic modulators that sit lightly on the land.

Without embarrassment Arata Isozaki, Hon. FAIA, spoke of his own constant and irregular learning—a personal journey that has not been a single straight road. His own work he characterized as sometimes "schizophrenic eclecticism," a "reflection of confused times." He said his architecture is becoming more grounded and less naive and cited as an example his building for the new Bond University, which will be his first building in Australia.

Daryl Jackson, master planner of Bond University, compared it to a city. As Australia's first private university, it will serve the rapidly expanding Gold Coast. Planning will stress public access.

The almost seamless quality of the conference presentations was ruptured now and then by three-minute pitches from national manufacturers who, as conference cosponsors, flashed slides of steel beams and water closets at the conclusions of major talks. Also of substandard quality were the packed concurrent sessions of the International Committee of Architectural Critics. Certainly the globe-trotting Frampton had the most impressive list of important recent buildings. In every continent he looked for "realism . . . , poetics of tectonics . . . , and typologies from culture that have presence." Perhaps the most jarring of the critics' reports was that of Sam Hall Kaplan of the Los Angeles *Times*. To reach 3 million readers, he said, he "must be rude. Take them and shake them," he recommended, as the "ringmaster in a circus between architects and the public."

The concluding session was on the unfinished journey of Australian architecture. Jackson best expressed the optimism of Australian architects when he recommended the "fertility of double-headed hybrids. Art wedded to science should take command, not technological dummies." He applauded the "multi-vectors" of "an identifiable Australian view. . . . The Australian innovation is toward yet another condition of modernism."

—Jeffrey Cook, AIA

Below, Sydney's new exhibition center by Philip Cox, Richardson Taylor & Partners.

Mr. Cook is a professor of architecture at Arizona State University.

The Institute

Vision 2000: The Architectural Profession's Outlook on the Future

Vision 2000 is a multiyear program established by AIA "to assess and ultimately shape the future of architecture." In late June in Chicago, 20 architects, educators, and allied professionals gathered for a two-day workshop to address a complex array of forces in society that will affect architecture. The open discussion touched on issues including the rise and/or demise of the architectural profession, the changing global economy, "the marching demographics" and the housing crisis, "smart" and "sick" buildings, "the death of the American corporation," and the differences between Western and Eastern cultures.

In conjunction with the conference, AIA published preliminary findings of a survey predicting that the most influential trend in 21st-century architecture is the "urbanization of suburbia," followed by the "architectural challenge of renovating built America."

In response to Vision 2000's survey of future trends, architecture critic John Pastier said, "I found some predictions are perennials. I have been hearing since the early '50s that we are going to have more leisure time and less work, and I was shocked to read a few weeks ago that people are putting in longer work hours than ever before. Also since the early '50s I have been reading about lightweight materials, state-of-the-art building techniques, and how they are going to revolutionize the world. That still is as far over the horizon as it was then."

The Vision 2000 program was organized to gather information and opinions from a broad range of groups involved with architecture, including public officials, clients, educators, the building and real estate industries, and the general public. Information is being collected through conferences and workshops, surveys, and independent research. Published reports are available from AIA for a fee.

As part of the first stage of Vision 2000, the Institute for Alternative Futures outlined 27 social, technological, economic, environmental, political, and professional trends that are expected to influence the built environment and the profession of architecture in the future.

The picture that emerges shows the architectural profession facing major changes, including shifting residential and work patterns, an aging urban landscape and deteriorating infrastructure, large-scale demographic changes, an information revolution, and the need to compete in a global economy. These initial findings presented an overall sense of optimism and "clearly do not subscribe to the current intellectual fashion of anticipating the decline of America." In more specific predictions, some with the tone of science fiction, the report foresaw that in the early 21st century home buyers may use computers to design their own houses and then transmit the plans to computerized factories for customized assembly by robots. Developments in biotechnology may eliminate the need for indoor plumbing as we know it, the report added.

Such diverse issues were narrowed to 14 societal trends, which served as the basis for a survey of 201 persons in the design and building industries. According to the survey participants, the trend most likely to have a major impact on architecture at the beginning of the next century is the creation of a new kind of cityscape through the urbanization of the suburbs. The growth of so-called emerging cities in what were until recently suburbs is being driven mainly by private-sector decisions about the location of new office space.

The study reported that between 1979 and 1986 the suburban share of national

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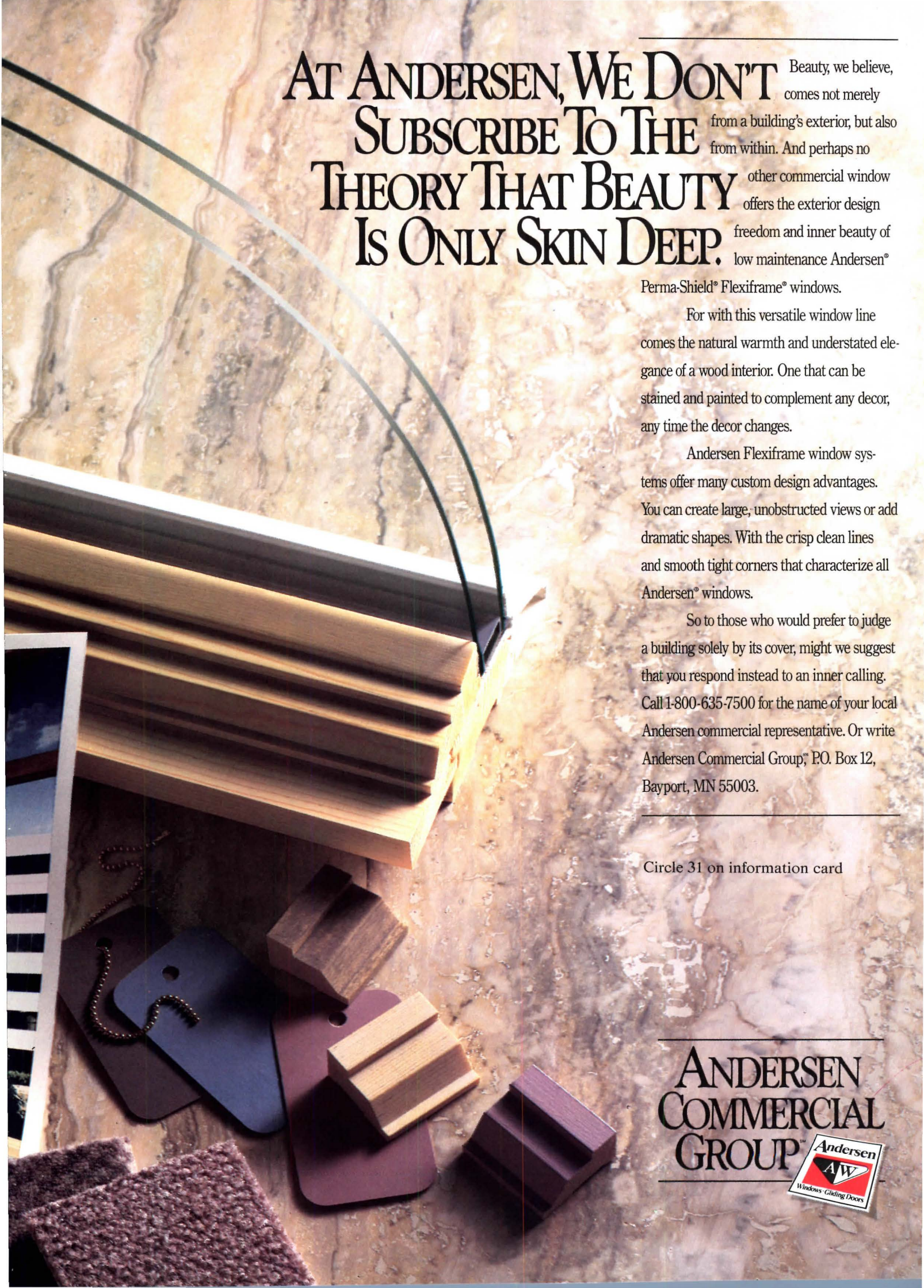

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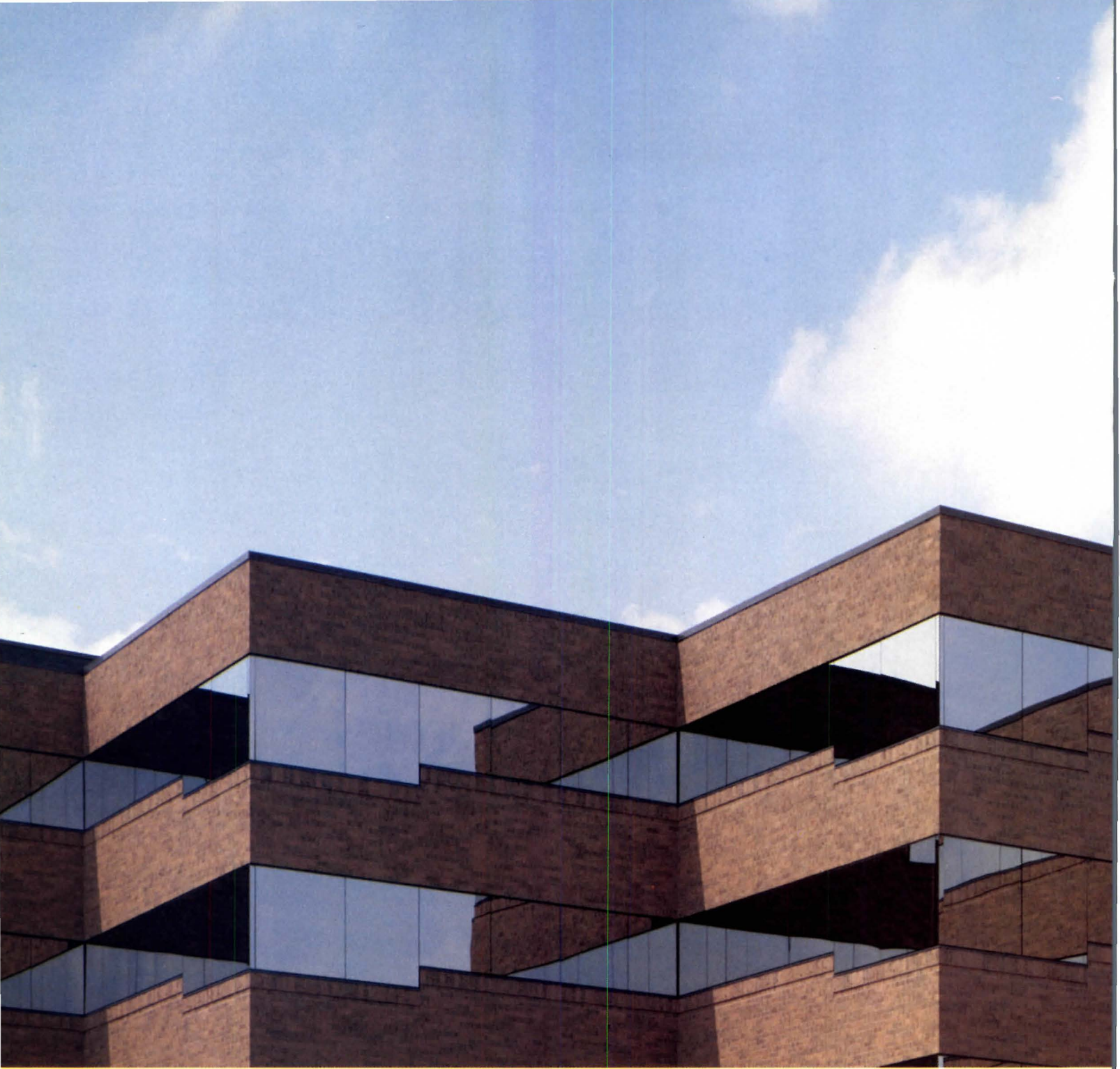

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The Institute *from page 27*
office space inventory rose from 46 to 57 percent. This unprecedented shift in the location of white-collar employment is redefining the traditional city. In California, the Newport Beach/Irvine area is the state's third-largest concentration of office space, while Tysons Corner outside Washington, D.C., is now Virginia's largest commerical office center and contains one-quarter the office space of downtown Washington.

The trend is likely to continue, driven by economic forces and fundamental preferences, according to the study. Land costs are significantly lower in suburbs than in downtowns, and the U.S. economy continues to shift toward a service and information base (jobs in manufacturing are expected to drop from 20 percent to 10 percent by the year 2000). The IAF study reported that suburb-to-suburb automobile commuting has become the predominant national commuting pattern.

The report said that traditional terms like "city" and "suburb" are inadequate for describing these emerging urban structures that have come to be known as "urban villages," a term popularized after it appeared two years ago in an article in *The Atlantic* entitled "How Business Is Reshaping America." However, at the Vision 2000 workshop John Pastier faulted the term. "Both halves of the expression don't apply to the phenomenon. These places are not urban. They are not villages." Pastier calls the trend "the Sun-Belt-ification of development. . . . The hot growth areas have taken on a form of development that is auto-oriented, dispersed, segregated in both the physical land use sense and in a social, cultural, ethnic sense. It is anti-urban. It is disconnected. It is anti-pedestrian. It is not going to go away."

The IAF report also outlined serious problems that already plague these emerging "downtowns in the suburbs." Growing traffic congestion has become the most visible development issue of the 1980s, water and sewer infrastructure are being stretched to the limit in high-growth areas, and office vacancy rates are high.

The second most influential trend affecting architecture is the challenge of renovating the built environment. According to the report, between 1981 and 1986 nonresidential rehabilitation grew on the average by almost 14 percent per year, substantially exceeding the average growth rate of 8.3 percent for new nonresidential construction. Based on this growth pattern, the rehabilitation market is likely soon to outgrow the entire nonresidential construction sector. The lack of prime new urban sites, the general interest in preserving architectural landmarks, and tax laws will all continue to contribute to this shift. In this era of rebuilding, there will also be a critical demand to reconstruct America's decaying infrastructure in older cities, as is already evident in the Northeast corridor.

The only other of the 14 trends that a majority of the survey participants believed will have a major impact on the built environment in the year 2000 is the changing demographic composition of America. The IAF report addressed eight major demographic shifts including a slower population growth, an aging society, a proportionate decline in the number of young adults, a "baby boom echo," more women entering the work force, growing minority groups, increased immigration, and a decline in the formation of households.

Over the next 12 years the U.S. population will grow more slowly than at any time in history except for the decade of the Great Depression. By the year 2000, the number of people between the ages of 35 and 47 is expected to rise by 38 percent, and the number of people aged 48 to 53 will rise by 67 percent. The report stated that the population over age 65 actually will grow more slowly between now and the year 2000 than it has in recent years, but those 85 and over will be the fastest-growing segment of the elderly population for the next 30 years. The most significant implication of the changing demographics will be the creation of affordable housing.

Two technological trends ranked high in the survey. Forty-seven percent of the respondents believed the information revolution (high technology storage, access, and transfer; increased technical capacity

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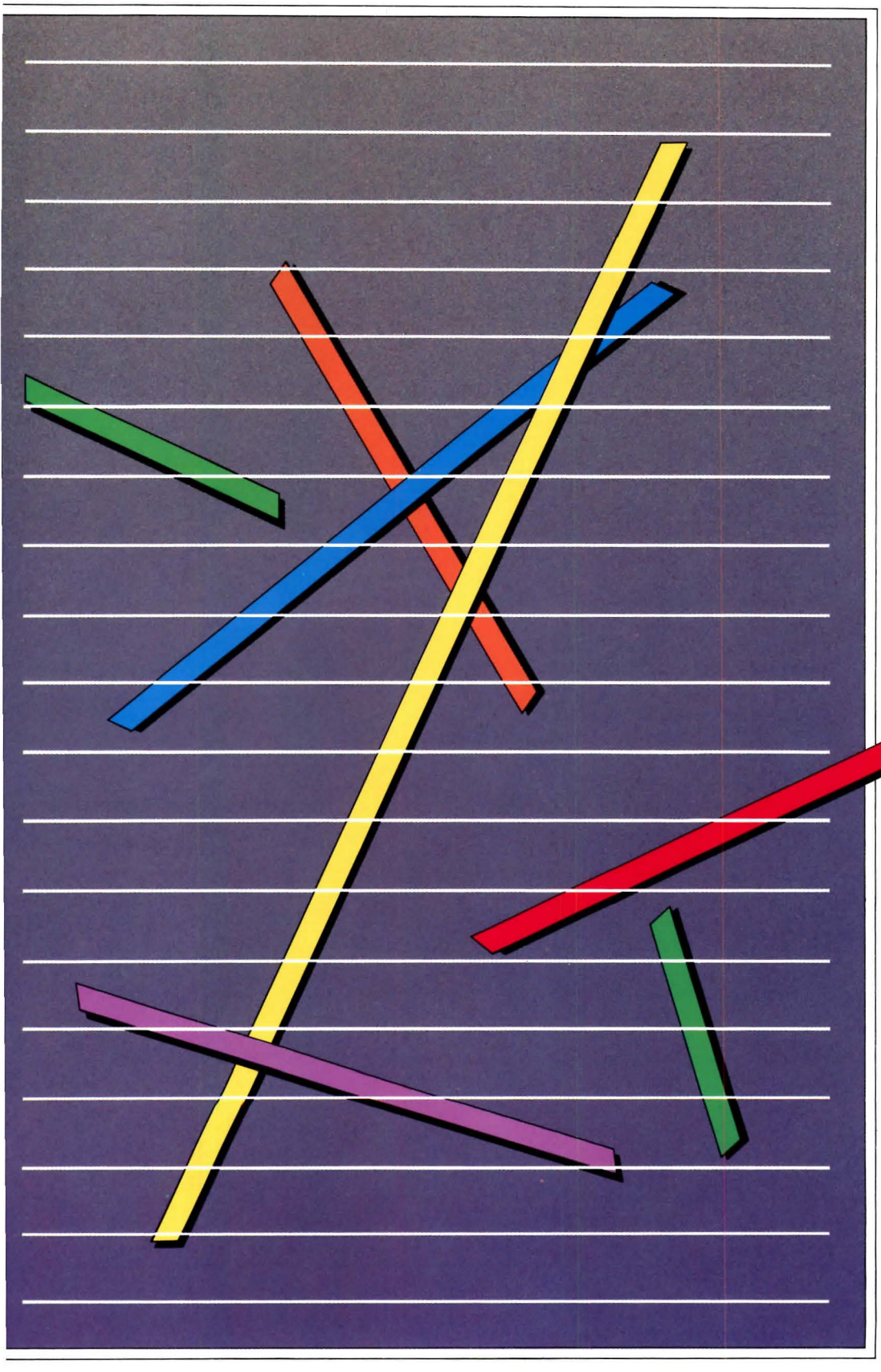

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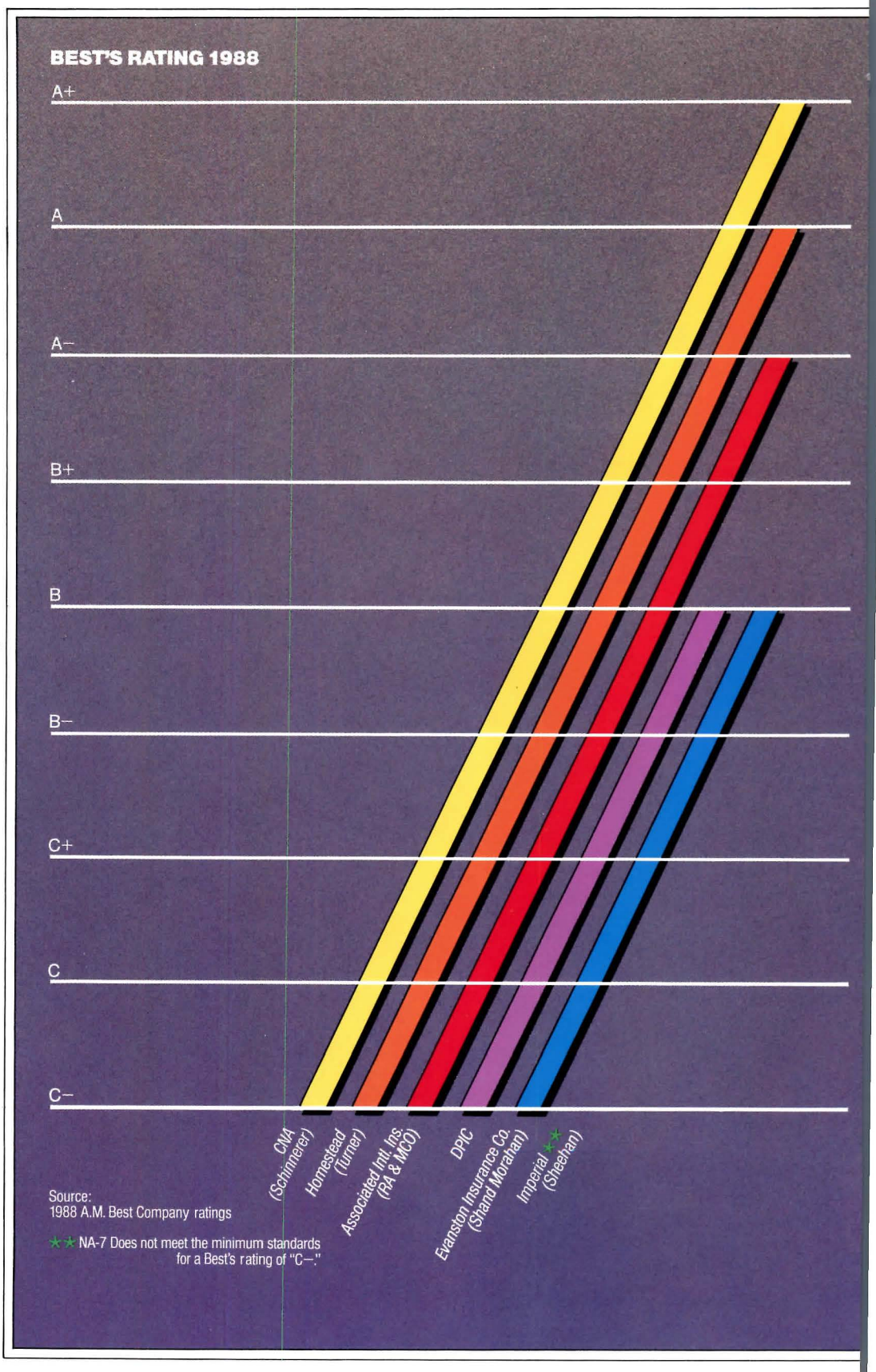

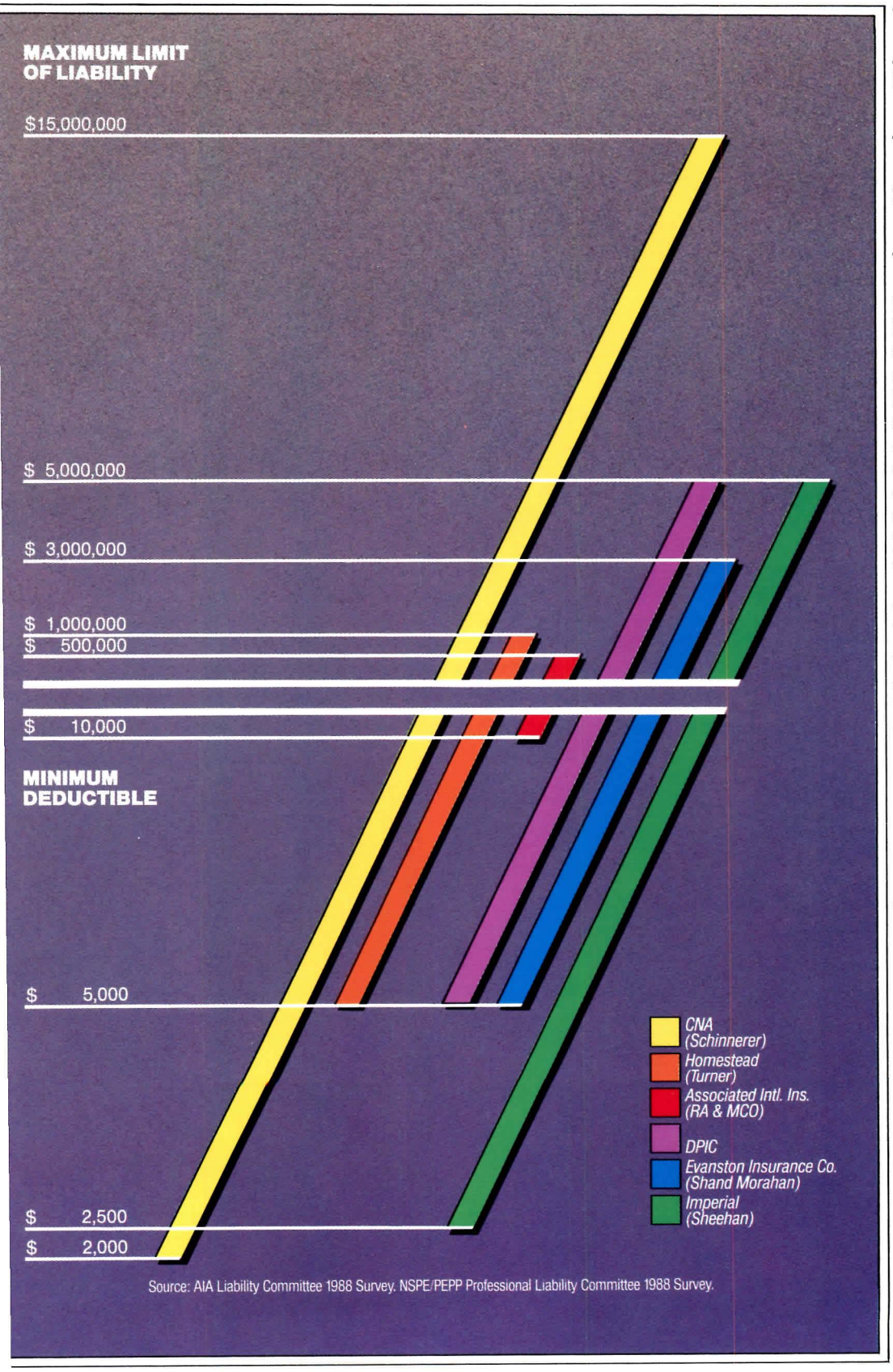

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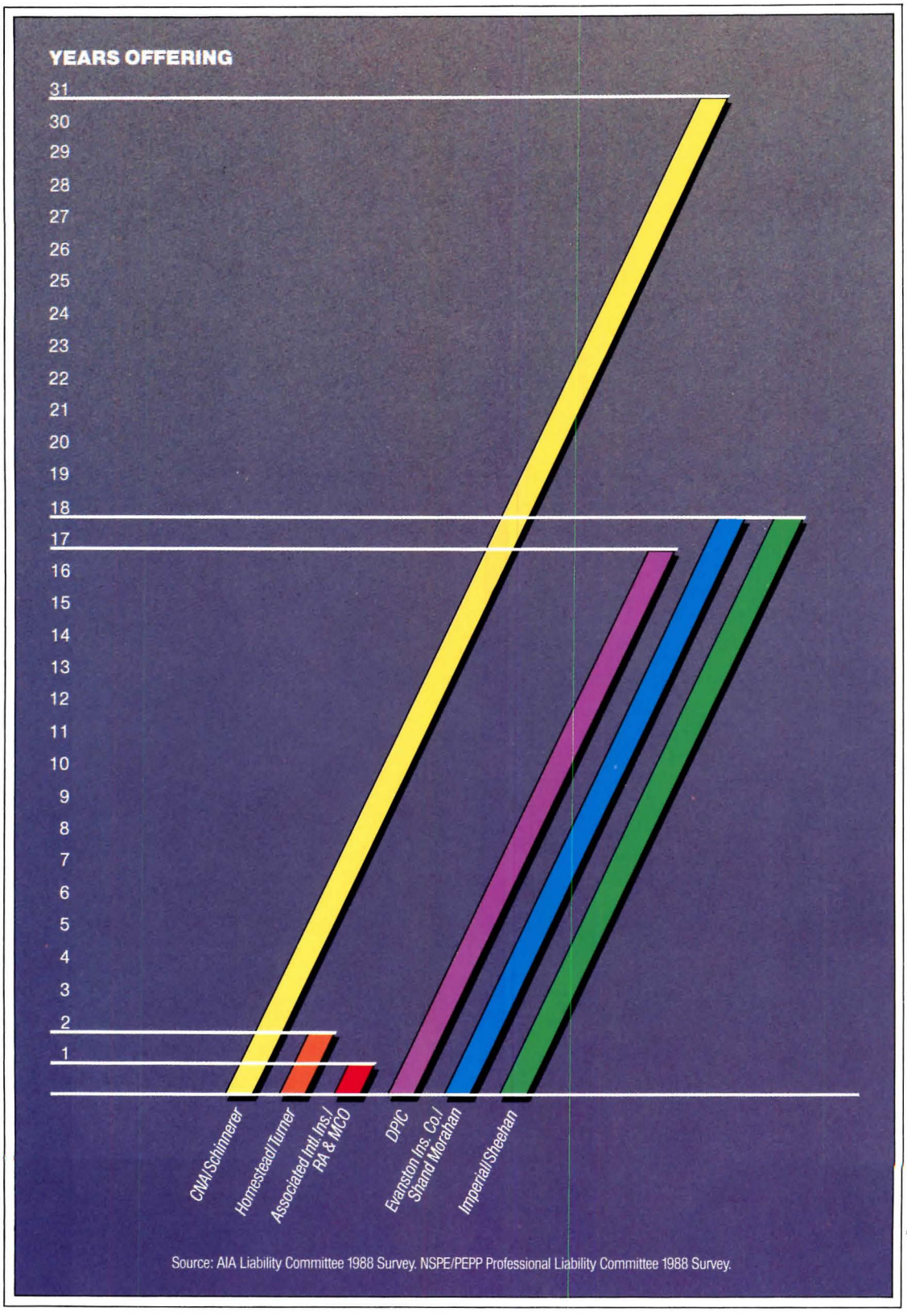

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The Institute *from page 32*
to link people and ideas across distances; the effect of technological advances on decision-making) would have a major impact. According to Duncan B. Sutherland, considered by AIA to be an "expert on the office of the future," the greatest challenge in the information revolution is to understand the role of the human being in the informational process. "This madness that we call the office today is absurd. It is a function of a set of constraints which existed in the 1600s and 1700s. Those constraints don't exist anymore," said Sutherland.

The respondents to the survey did express the opinion that the most important factor of this information revolution will be the requirement to integrate technology and human needs of the workplace.

The survey also found that only 37 percent saw the automation and materials revolution as a major factor affecting the built environment. The IAF report states that the built environment will almost certainly be transformed by the "materials revolution" during the 21st century. However, based on the approach of the building industry—limited research and development, corporate aversion to risk, resistance of the labor force to change, the difficulty of predicting the lifespan of materials over long periods—the report predicts that changes in materials are more likely to be "evolutionary rather than revolutionary during the 1990s."

The fifth-highest-rated trend was America's need to be competitive in a global economy. The survey found that 43 percent of the respondents saw this as a major factor. They believed the most significant impact of shifts in the world markets would be that more foreign architects and firms will become involved in American construction.

The impact of energy issues was believed by less than one-third of the participants to be a major factor. This is surprising, since America was in the middle of an "energy crisis" just 10 years ago and it was common to hear predictions that we would deplete the world's renewable energy sources by the year 2000.

There was a similar response to the issue of the deteriorating environment. Only 31 percent of the respondents saw this as a problem having a major impact.

The indoor environment—the quality of indoor air, the effect of building materials, asbestos, radon gas, and the "sick building syndrome"—was believed by fewer than a quarter of the respondents to be a major factor. The survey found that, although 48 percent of the technologists/scientists thought the indoor environmental issues would have a major influence, only 16 percent of the architects agreed.

In response to this finding, at the roundtable discussion, Paul Teicholz, a scientist and engineer from Stanford, Calif., said, "It is staggering to me to think that only 16 percent of architects felt that concern for the indoor environment would have a significant impact on the nature of the built environment. . . . What are they doing if they are not worried about the indoor environment? People live in their structures, right?"

Professional trends related more directly to architecture also evoked relatively low responses. Growing client sophistication and the changing nature of professional liability both were charted in the bottom half of trends identified as likely to have a major impact. As might be expected, architects viewed liability as more influential than did other professionals, but only 30 percent of architects said it would be a major factor. More the a third of all participants said that the professional issues would have either slight or hardly any impact on the built environment.

On a relative scale, governmental and social trends were not seen as having prime consequences by survey respondents. Twenty-seven percent believed that the economic polarization of America would have a major effect, while only 19 percent said that a national resolve to tackle social problems would have a major impact. The fewest respondents in the survey said that architecture will be influenced in a major way by a demand for accountability and efficiency in government.

The survey also questioned the role of the architect in the next century and suggested areas in which architects could make the greatest contributions. When given a list of seven such possible areas, the most frequently cited was designing livable cities, followed by designing good

continued on page 37

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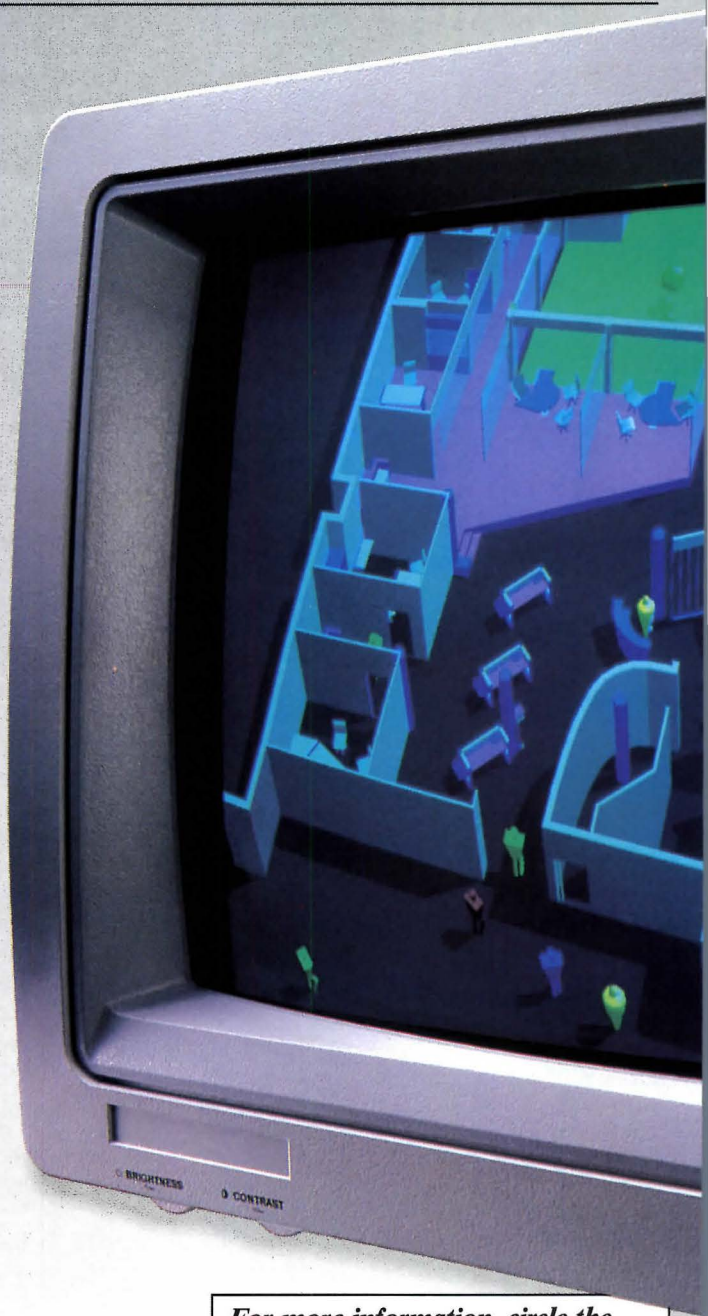

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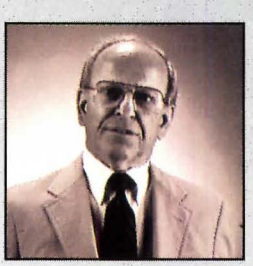

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The Institute *from page 33*
buildings and making housing available to everyone.

The survey revealed a general lack of consensus among respondents on changes they foresaw in architectural services by the beginning of the next century and on changes in the role of the architect. At the roundtable meeting, Fred Bell of Stow & Davis furniture company said that architects are experienceing a severe identity crisis. "There must be a core activity that professionals are known to be responsible for," said Bell.

Sutherland further questioned the purpose of architects. "Is it AIA's responsibility to ask the question, 'Is there a legitimate role for architecture'? That is the hardest question for a profession to ask itself, always. Do we have a legitimate role? Because the immediate answer is in self-preservation, we say, yes, of course we do. We are beautiful, wonderful, and needed. But there are an awful lot of professions throughout history that have disappeared. Lots of them. I am not sure that architecture might not be one of them eventually."

Addressing issues of change in the practice of architecture, social scientist Robert Gutman, Hon. AIA, called "the professions" relics of the organized way of answering the questions of society and dealing with its problems. Gutman also questioned the profession's committment to self-regulation. "What is happening and is likely to happen for a long time to come is that there is a kind of battle going on between the established professions and the way they carve up the territory and all these new fields and types of expertise that are emerging outside of or near to the professions," said Gutman.

According to Pastier, "the profession is dividing itself into design architects with a capital D and people who are more bread-and-butter practitioners. It is both good and bad. It is good in the sense that there has been in the last five to 10 years much more attention being paid to architectural design by the general public and by the profession itself. It is bad in that it has created a sort of elite class of people who perhaps by opening up an umbrella in New York will send people to opening up umbrellas in Los Angeles—or maybe the direction is the other way."

At the meeting in Chicago, the participants also focused on the necessity for architecture to define its mission. "And by that we mean recapture values by returning to an understanding and promulgation of spiritual and philosophical principles," said educator and social activist Amy Freeman Lee.

Benjamin E. Brewer, FAIA, reaffirming the importance of this social concern, asserted, "Nat Owings said that Skidmore, Owings & Merrill was not founded to do brick and mortar building. It was founded to produce an impact on society."

—Lynn Nesmith

St. Louis Hosts Conference On 19th Century Architecture

American architecture's 19th-century equivalent of "form follows function" could well have been "style signals purpose." So argued Alex Krieger, Boston architect and Harvard professor, in a keynote speech to the AIA national design committee meeting in St. Louis in July.

This was the second of three design conferences the committee scheduled for this year, each to meet in a different city to study American architecture of a different century: Annapolis, Md., (April) for the 18th century, St. Louis for the 19th, and Los Angeles (Nov. 4-6) for the 20th. Michael Dennis, architect and author, is serving as a consultant to help plan the year for the committee, which is chaired by Glenn Garrison.

Krieger suggested that the 19th century was not an arbitrary style war. He decried what he called "the Great Regression theory" of Lewis Mumford and Sigfried Giedion—the notion that a nascent modernism was crushed at the time of the Chicago World's Fair by timid reactionaries. "History was used polemically in the 19th century to express the purpose and importance of the building," he said.

Krieger also pointed to Copley Square in Boston as an example of what Americans did well and did badly in the 19th century. The individual buildings—Trinity Church, the Boston Public Library, and others—were superb, he said, but the ensemble was a failure. As did Dennis in an earlier talk, Krieger argued that American architecture has always been more interested in the individual building than in the idea of collective urban form. Dennis traced that bias back to Thomas Jefferson. "The Paris Jefferson knew," Dennis said, "was that of the new villas, freestanding pavilions out beyond the boulevards. He saw them as the ideal language for an agrarian republic, a language ideally suited to an emerging nation of individuals." Dennis noted that an urbanism of individual freestanding buildings facilitates changes of style and eclecticism, in contrast to the more orderly and continuous influence of attached buildings that is characteristic of European urbanism.

Krieger suggested that the "private streets" of St. Louis, like many other 19th-century suburban places, achieve an ideal balance between European order and American individuality. "A regular colonnade of trees controls the idiosyncrasies of the individual houses," he said. He called this model Elm Street but noted that it is also Live Oak Street, Sycamore Street, Palm Street, and Banyan Street.

Historian Peggy Darnell, in a slide lecture on landscape and one on architecture, placed the history of St. Louis within the larger context of the 19th century.

—Robert Campbell, AIA

News continued on page 39

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Practice

Design Risk Retention Group Issues First Liability Policies

The first design industry risk retention group to be established under the 1986 amendments to the 1981 Risk Retention Act began issuing policies this year.

The act and its amendments, which Congress passed to make easier the formation of "captive" insurance companies that offer policies nationally, require that such companies be licensed in at least one state. The Architects & Engineers Insurance Co., Northbrook, Ill., met final qualifications for licensing in Delaware on April 29, according to an AEIC spokesman, and had issued 23 policies by the end of June.

Captive insurance companies are owned by the insureds and typically are reinsured by an established insurer. Until the 1986 amendments, captive insurance companies were often established "off-shore" (a term referring to the practice of incorporating within the jurisdiction of Caribbean island nations). Captive insurers are, in effect, creating a corporation through which they insure themselves.

To make liability insurance available in a restrictive market, and to counter state insurance laws that hamper the formation of interstate captive insurance companies, the 1981 act established that a "risk retention group," licensed in one state, may act interstate as a domestic captive insurance company. The 1981 act was aimed at product manufacturers. The 1986 amendments opened the act to others.

In the case of AEIC, all insureds become shareholders, investing capital at the rate of 2.5 percent of gross revenue. Minimum capital investment is $50,000; maximum is $1 million. To reduce collective risk, prospective shareholders first must meet AEIC prequalification requirements.

A major benefit of the self-insurance approach is an open system of premium setting, said C. Roy Vince, a consultant who assisted in the formation of AEIC. The AEIC base premium ranges from 0.4 percent of annual gross revenue per $1 million policy limit for firms with $50 million in fees to 1.75 percent for firms up to $5 million. This basic rate varies from minus 25 percent to plus 35 percent, depending on individual company risk characteristics that are determined by the qualification process.

A one-time charge of up to 100 percent of the base rate provides prior-acts coverage. The minimum premium is $35,000. Limits up to $5 million are available with an additional $5 million on a case-by-case basis.

AEIC has a 50-50 quota share agreement with Progressive Casualty, which is licensed in all 50 states. Progressive issues policies and is responsible for all obligations under a policy. AEIC reinsures Progressive for 50 percent of liability insurance up to $3 million; Progressive underwrites the balance of the risk. Progressive was interested in AEIC because of Progressive's success with risk retention groups within the banking industry, Vince said.

Premiums charged thus far range from 2.16 percent to 4.37 percent of the design firm's gross fees, with the purchase of prior-acts coverage, Vince said. "The prime motivation for any A/E firm coming into the program should not be rate saving," he stressed. "Instead, the AEIC-Progressive program offers the design community the opportunity to control its own destiny."

"Because we are not tied as much to the financial market as is brokered insurance, our rates stay relatively constant in good times and bad," said Joseph S. Brown, AIA, a managing partner of Everett I. Brown, Indianapolis. "There is a possibility, too, that our presence will result in lower liability insurance costs in general because of the competition we represent for the open market."

"Control is a key drawing point to joining a risk retention group," said Frank Lebman, senior vice president of Ewing Cole Cherry Parsky of Philadelphia, an AEIC member. "Insurance companies seem to have arbitrary ways of setting fees and penalties. With AEIC we know exactly how our premiums are established. For that reason alone, even if rates were higher than we could get on the open market, I'd want to stay with AEIC."

"There is a lot of skepticism in the marketplace because risk retention groups represent a new approach," said Brown, who is also chairman of the AEIC qualifications committee. "The evaluation process involves an extensive qualification form and a visit by an AEIC loss-prevention expert. High risks are well known in the building industry. So we identify and control these risk areas. When we accept a firm, we follow with a letter of suggestion, pointing out what could make the firm better. Each year we follow up with another visit. Lower premium rates are the incentive for members to follow the recommendations."

"We are interested in AEIC's promise of improved claims management and the ability to have some say in the quality of the attorneys," said Robert E. Stauder, AIA, of Hellmuth, Obata & Kassabaum, San Francisco. "Our main concern with AEIC is that it is targeted to smaller firms, and has yet to issue a policy with the 'additional $5 million on a case-by-case basis,' which we would need. We have an independent consultant studying our liability-insurance options now, including AEIC."

The amended 1981 Risk Retention Act, renamed the 1986 Risk Retention Act, allows businesses, professionals, associations, and governmental units to join together either to secure group-rate insurance or, as in the case of AEIC, to form a self-insuring risk retention group.

continued on page 41

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Practice *from page 39*

The risk retention approach allows some self-control of risk and increases the availability of liability insurance in a tight market, but it also requires a substantial commitment and investment by each member of the risk retention group.

One notable off-shore captive insurance company was that set up by members of the Association of Soil and Foundation Engineers. Once one of the highest-risk professional groups, soils engineers became one of the lowest-risk groups largely because of risk control measures built into their captive firm's insurance requirements.

Laws governing interstate insurance made establishing an off-shore captive insurance company almost impossibly difficult, however. The 1986 Risk Retention Act was intended to quickly open new avenues of insurance to "those affected by the insurance crisis," noted Sen. Bob Kasten (R-Wis.) in the legislative history of the act. The act was not intended to be a solution to the liability crisis, according to the legislative history.

—Douglas E. Gordon

BRIEFS

Asian Architecture Conference
The third biennial Asian Conference of Architects will be held Nov. 7-11 in Seoul, South Korea, with the role of architects in Asia as its theme. The conference is being organized by the Korea Institute of Registered Architects in conjunction with the Architects Regional Council for Asia. Contact: Asian Conference of Architects, 3 Secretariat, Korea Institute of Registered Architects, 1603-55, Seochodong, Seocho-gu, Seoul, Korea.

Chattanooga Design Competition Winner
Schwartz-Kinnard Architects with John Meder-Architect of Charlottesville, Va., have been selected in a two-stage invited competition to design a mixed-use riverfront development along the north shore of the Tennessee River in Chattanooga, Tenn. The main component of the complex will be a 75,000-square-foot building that will include a new 500-seat proscenium theater, an experimental theater, and a renovated 350-seat theater. The development will also include 80,000 square feet of office space, 20,000 square feet of retail, and 40 housing units.

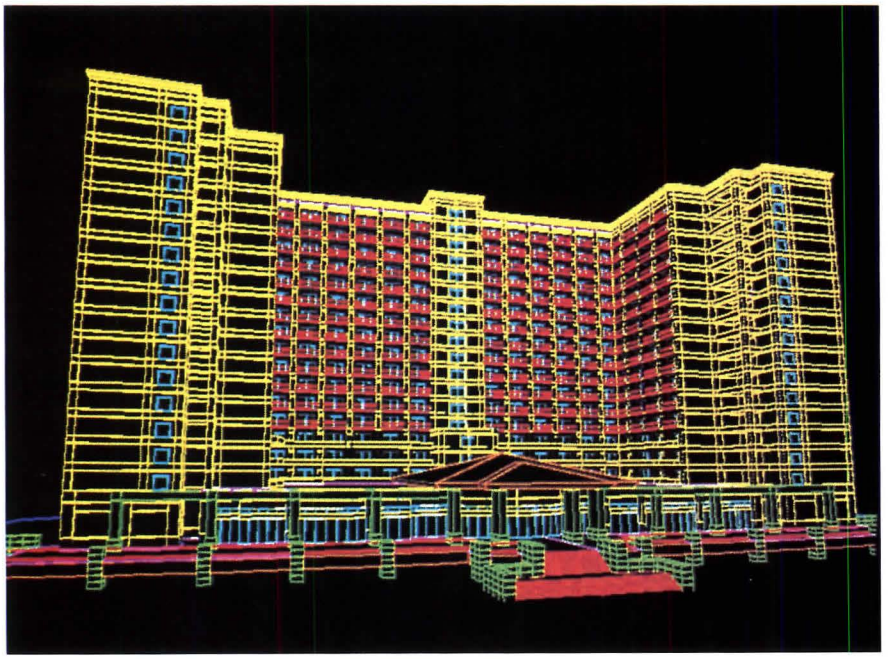
Glass Block Design Award Winners
The Pittsburgh Corning Corp. has announced the winners of the first "PC GlassBlock" architectural design competition for projects using Pittsburgh Corning's products. Prizes in three categories totaled $20,000. First place for a completed project went to Charles F. Rogers II of Perry, Dean, Rogers & Partners, Boston, for the Seeley G. Mudd chemistry building at Vassar College; second place, Krueck & Olsen Architects, Chicago, for a glass and steel residence in Chicago; honorable mentions, EDAW Inc., Alexandria, Va., and Leers, Weinzapfel Associates, Architects Inc., with Alex Krieger Associated Architects. In the category of planned, pending, or in-works projects, first place went to George E. Brewer of Boston, for a vacation house in the Bahamas; second place, Allan P. Shope of Greenwich, Conn., for a residence in Connecticut. In the category of conceptual projects, a class of 16 architecture students at the University of Texas at Arlington won first prize for a design for renewal of derelict urban walls into living spaces. Honorable mentions in this category were awarded to James Carpenter, New York City; Craig D. Newick and Linda Lindroth, New Haven, Conn.; and Douglas Oliver, Houston.

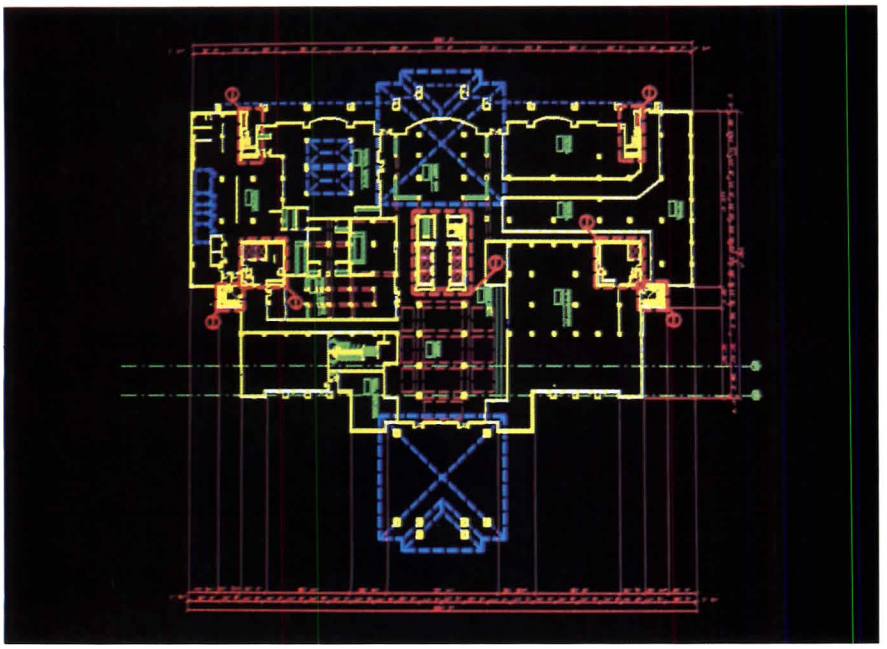
Jurors for the competition were James Ingo Freed, FAIA, of I.M. Pei & Partners; Thom Mayne of Morphosis; Terrance Sargent, AIA, of Lord & Sargent Architecture; Craig Taylor, AIA, of Skidmore, Owings & Merrill; and Stanley Tigerman, FAIA, Chicago.

Rome Prize Fellowships
The American Academy in Rome has announced the 1989-90 Rome prize fellowship competition in the fields of architecture, landscape architecture, and advanced design arts (urban planning and design arts including interior, industrial, graphic, fashion, and set design). The deadline is Nov. 15. Fellowships provide winners with a stipend, travel allowance to and from Rome, housing, most meals, and a studio/study space at the academy's facility in Rome. No courses are offered; winners pursue independent study. Applications are available from the Fellowships Coordinator, American Academy in Rome, 41 E. 65th St., New York, N.Y. 10021, (212) 517-4200.

Veterinary Hospital Design Winners
A design by Gregory R. Miller, an architecture student at Kansas State University, and Tracy Ann Carlile, a veterinary medicine student at KSU, won first place in a student design competition for a veterinary hospital sponsored by Hill's Pet Products.

Architectural Research Conference
The Architectural Research Centers Consortium will sponsor a research conference in Champaign, Ill., Nov. 13-15. The conference is intended to establish networks of researchers, determine long-term research agendas, and lay the groundwork for a second conference on the role of architectural research in international construction competitiveness. Topics for the November conference are materials and structures, environmental systems, representation and simulation, construction automation, and building economics. For more information contact: Carolyn Dry, Architectural Research Center, University of Illinois, 24 E. Green St., Suite 18, Champaign, Ill. 61820. □





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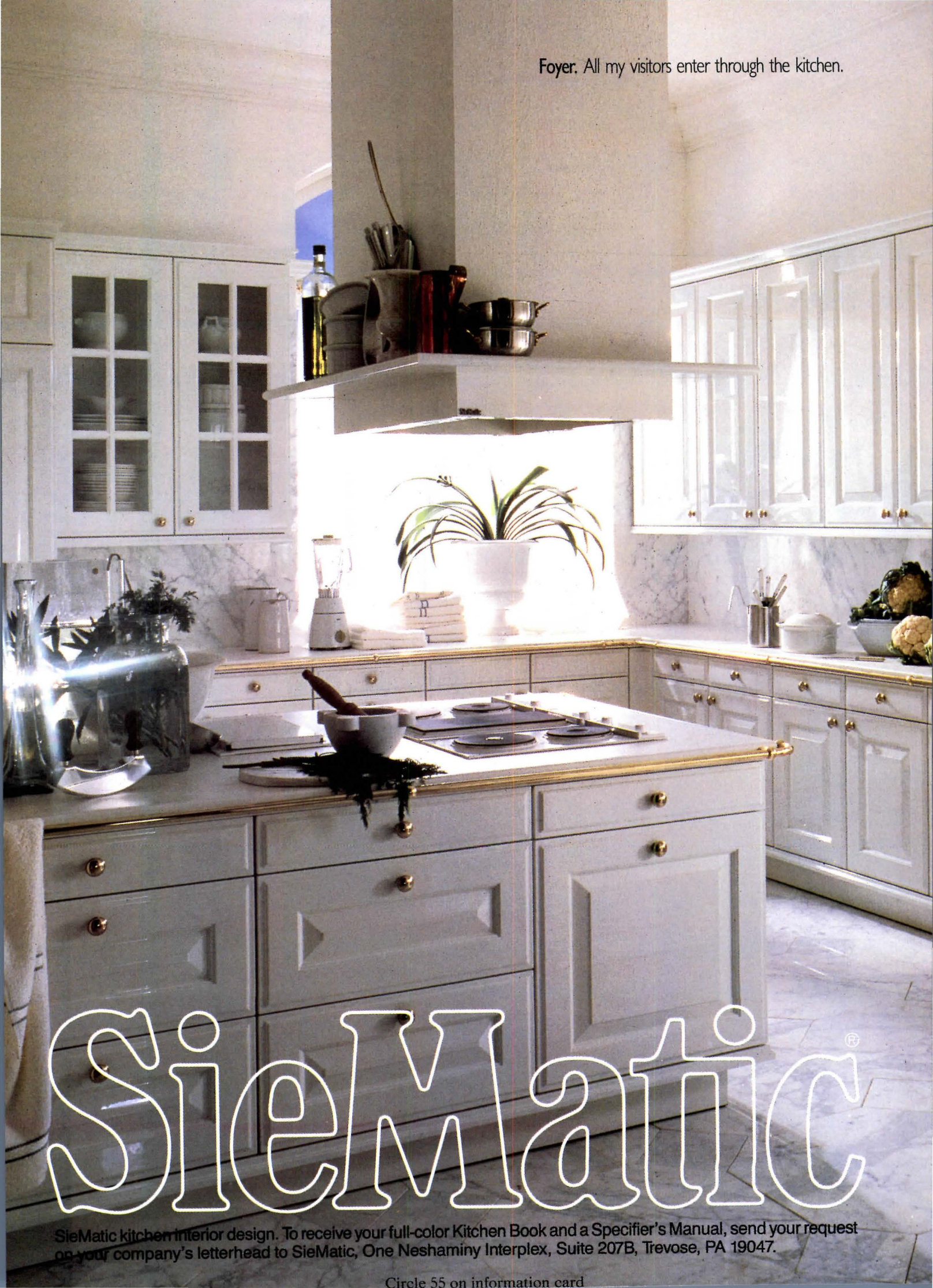

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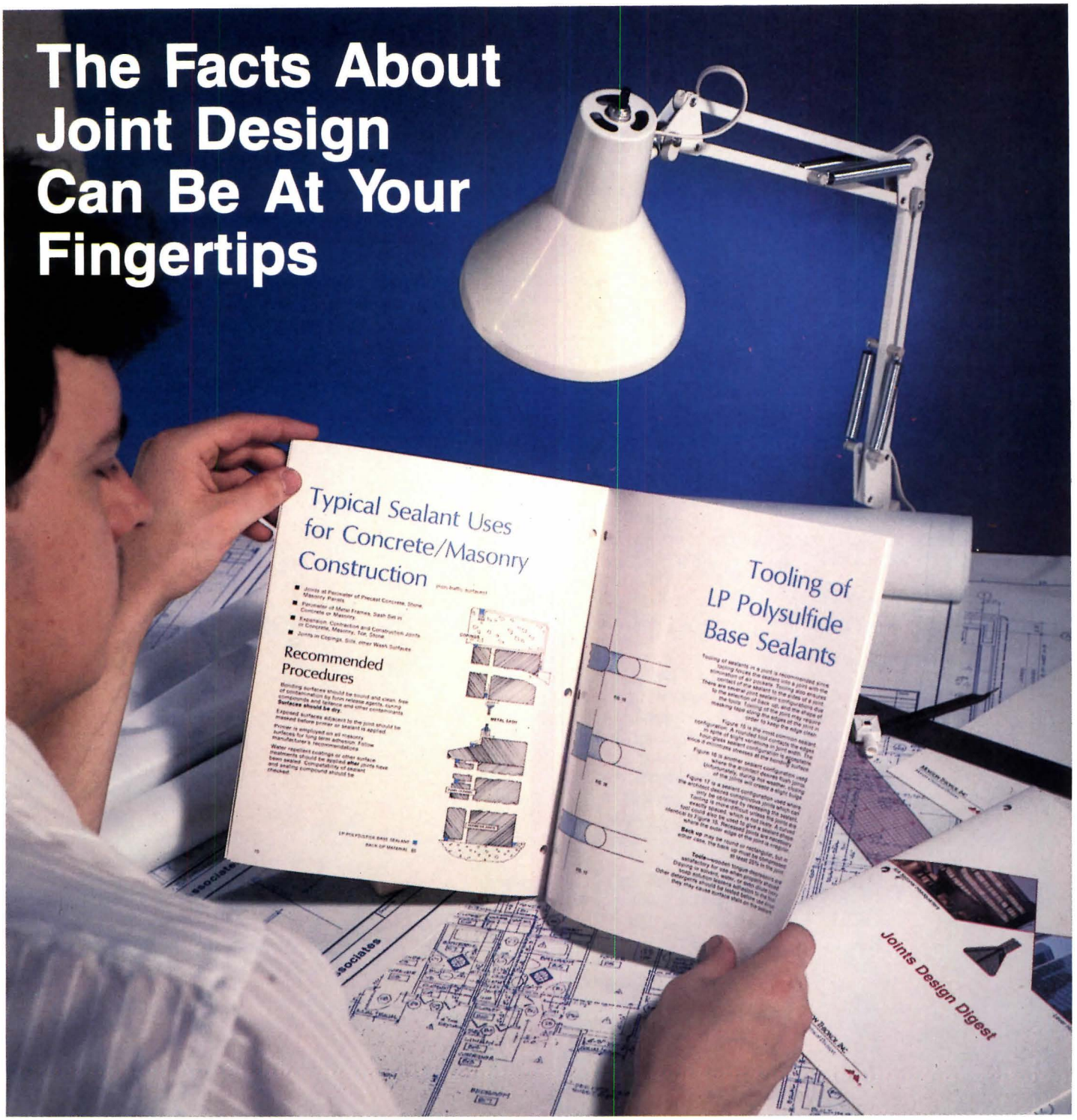

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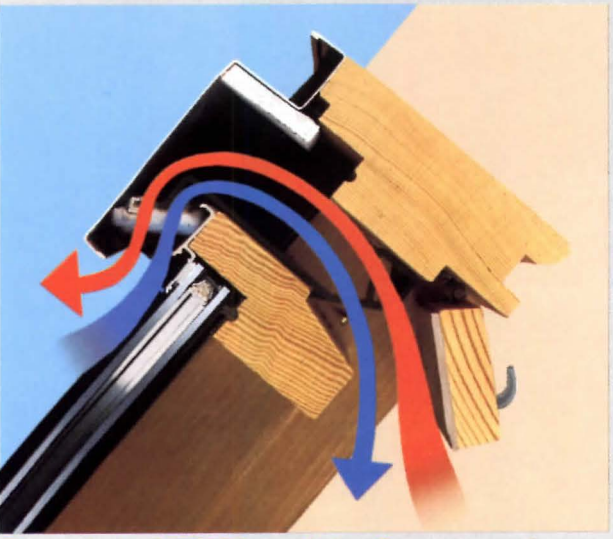

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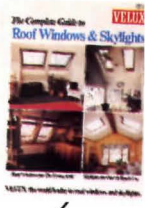

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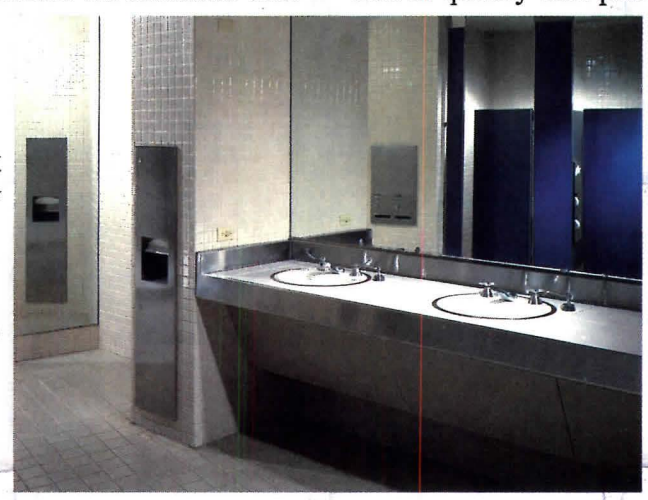

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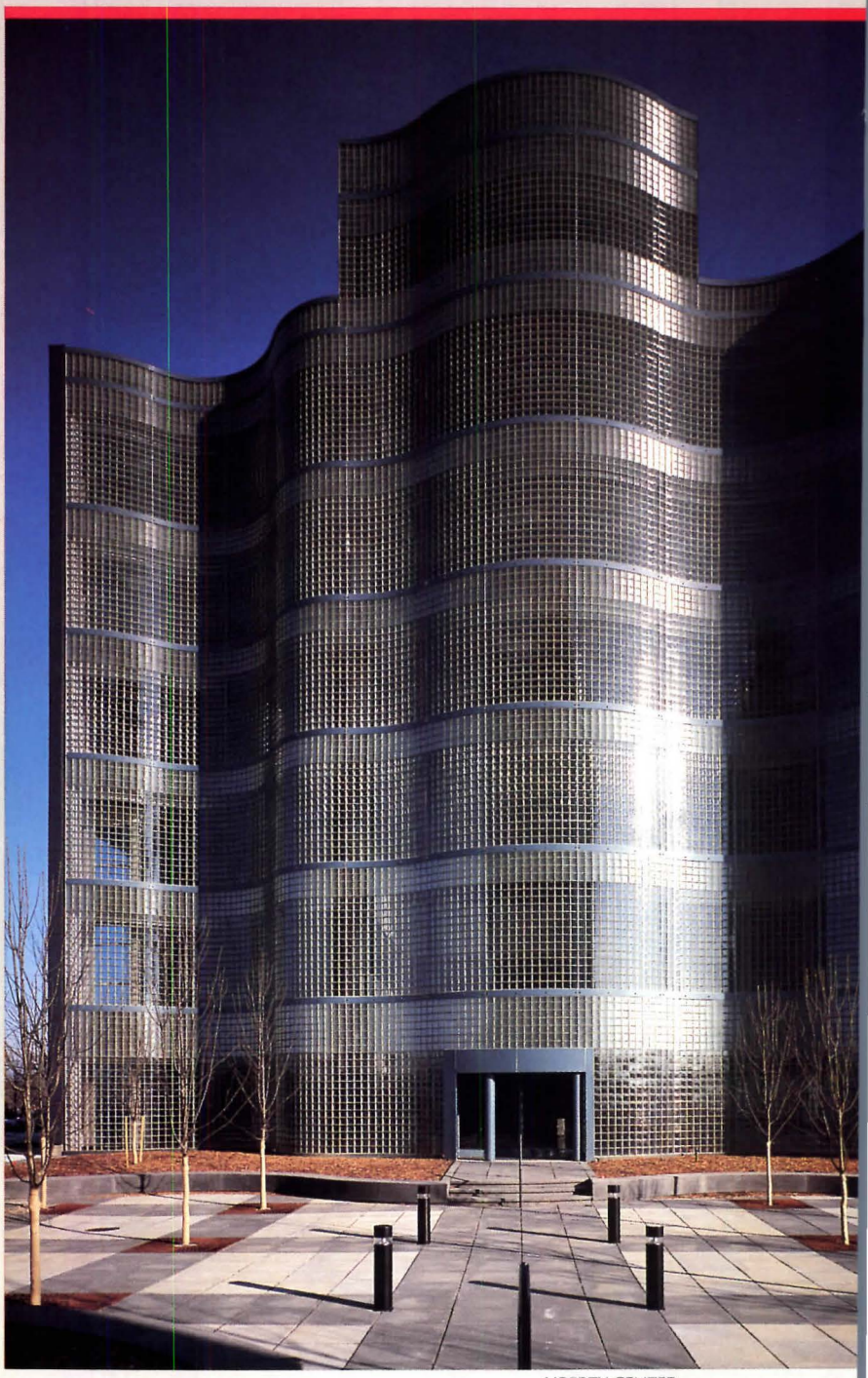

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ARCHITECTURE

This seventh annual issue on recent world architecture stands apart from its predecessors for its unusually fecund crop of prominent, large-scale, and complex buildings. Our lead article concerns Norway's most costly and ambitious post-World War II building to date, the Norges Bank. Our final building is Moshe Safdie's new, "furiously ambitious" National Gallery of Canada, which attempts, writes Robert Campbell, "to create a truly public and monumental building symbolizing a nation and its aspirations."

Other projects are only slightly less ambitious, and, with minor exceptions, each could be commended for reflecting a particular genius loci and the kind of "urban restraint and sensitivity" that Nils Finne finds in the Norges Bank. In Barcelona, a sensitive urban design and building program is transforming the entire city; in Berlin that vast German public housing and public works program known as IBA (International Building Exhibition) has produced a new harvest of buildings, the most satisfying yet; in Stockholm, a block-sized library/archives/housing complex combines old and new, modern and postmodern elements; in Prague, 40 years of controversy have yielded a huge, glassily modern addition to the historic National Theatre; outside Matara, a major new Sri Lankan university has sprung up combining vernacular and modern design elements; in Lyon a new, sleekly sophisticated French architectural school recently opened.

This year more buildings—both large and small—are rooted in modernism than in some form of historicism. Overall, however, style seems less an issue than in years past. In several cases, the same writer recommended to us two or more buildings of different styles, sometimes by the same architect. Good horse sense and sensitivity, rather than polemics and posturing, seem—mercifully—to be the order of the day.—ANDREA OPPENHEIMER DEAN

Norway

'Structuralist' Bank Shares a Block with Historic Buildings

The most expensive and ambitious building in postwar Norway is also one of the most difficult to find. In a distinctly Norwegian reaction to the hype of international architectural currents, the Oslo firm of Lund & Slaato has created a new headquarters for Norges Bank that is a remarkable exercise in urban restraint and sensitivity. The building, located in the oldest section of Oslo, is decidedly antimonumental, an irony considering its $416 million cost, 16-year gestation period, 645,000-square-foot area, and symbolic representation of Norway's overflowing, oil-supplied coffers.

The most compelling image of the building is the aerial view, the three-dimensional representation of the plan. Kjell Lund, the principal in charge, has described the design as a three-dimensional fabric imposed upon the site, an entire city block including two groups of historic buildings, dating from 1624 to 1860. The structure of the new building is a tartan grid system with a primary module of 10.8x10.8 meters combined with secondary zones (for structural and technical support) that are 90 centimeters center to center.

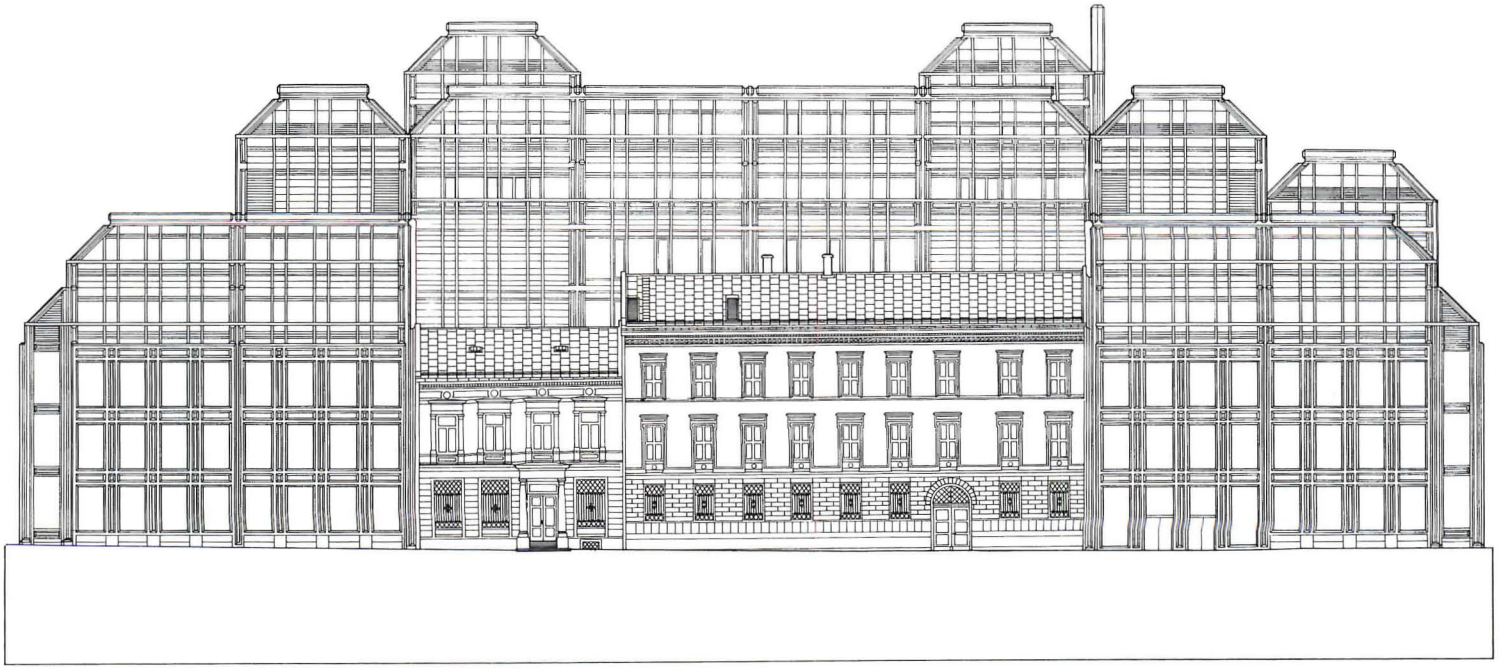
Having established the parameters of the grid, Lund developed the building form as two concentric layers, separated by courtyards. The outer layer, mostly three stories high, is articulated into four corner blocks connected to each other by historic buildings on two sides and by new construction on the other two sides. The inner layer is higher, six to eight stories, and is punctuated by two tower elements

Above, aerial view shows contextual fit. Facing page, new bank square, with main public entrance in corner building.

placed centrally rather than at the corners. The building figure, a double "O," brings natural light into every office, with a building depth that is often only 38 feet.

Kjell Lund is a proponent of structuralism, which he defines as "a method of composition based on additive primary geometric units with secondary zones that vary in size and character." In the Norges Bank building, the 10.8-meter-square unit supported by four octagonal precast columns—the "house," as Lund calls it—is joined to other identical units, maintaining the 90-centimeter zone in between units for mechanical, electrical, and other systems. The resultant construction is "overstructured" in the sense that four columns are employed in many locations where one column would suffice.

Photographs by ARFO Fotostudio

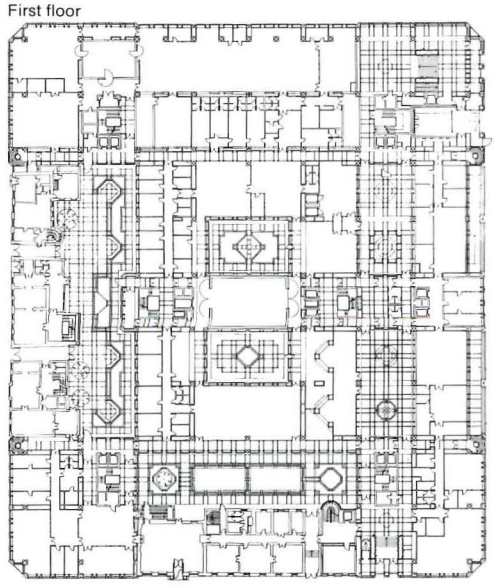


Lund argues that at Norges Bank the magnitude of technical systems required for each module justifies surrounding each "served space" with clearly defined "servant spaces," thus allowing easy access for program changes. Lund's motivation is therefore at least partly functional. However, he also is clearly enamored of the sense of "room" created by each aedicular unit, as well as the idea that the structural unit is somehow the key to the building's esthetic.

How do the pieces of the neutral building fabric acquire specificity and meaning? Lund answers that site relationships transform individual building elements. For example, adjacent to each corner pavilion stands either historic construction or new or some combination. The north corner is flanked by historic buildings on both sides. The west corner, the main entry, has a historic building on one side and new construction on the other. The entry corner also neatly terminates a new public square that Lund has created in front of the old Norges Bank headquarters. Thus, the new and old Norges Bank buildings are diagonally adjacent, a fact that may have influenced the diagonal leitmotif in the new building's structural system. More obvious is the commonality of materials and roof forms: the old building's robust Richardsonian granite walls and sloping copper roofs are precisely echoed in the new building's trabeated granite panel system and in the use of copper for roofs, some wall panels, and the basic window system.

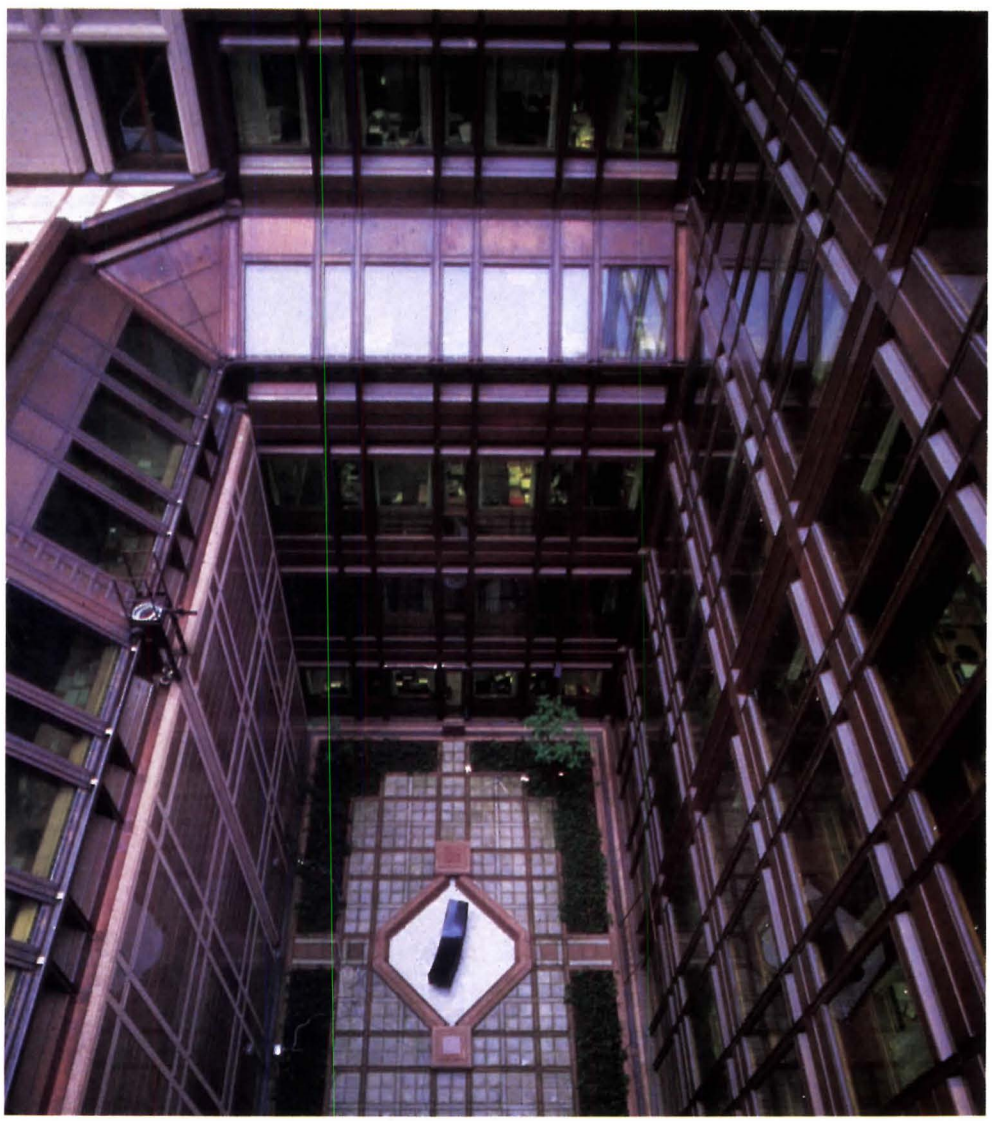
The idea of structuralism, then, centers on a revelation of function and a revelation of structure. In Norges Bank, the logic of structural frame, whether concrete or granite, and infill panel, whether glass, copper, or wood, can be read clearly on both the exterior and interior of the building. This internal logic is simultaneously

First floor



Above, one of several courtyards. Facing page, interiors are marked by 'diligent manipulation of surfaces and materials.'

Photographs by ARFO Fotostudio



Right, a courtyard on the building's west side, with sculpture by Kristian Blystad. Facing page, a rooftop view shows similarities and contrasts.

the building's most successful and weakest aspect. It lacks drama but has tremendous solidity.

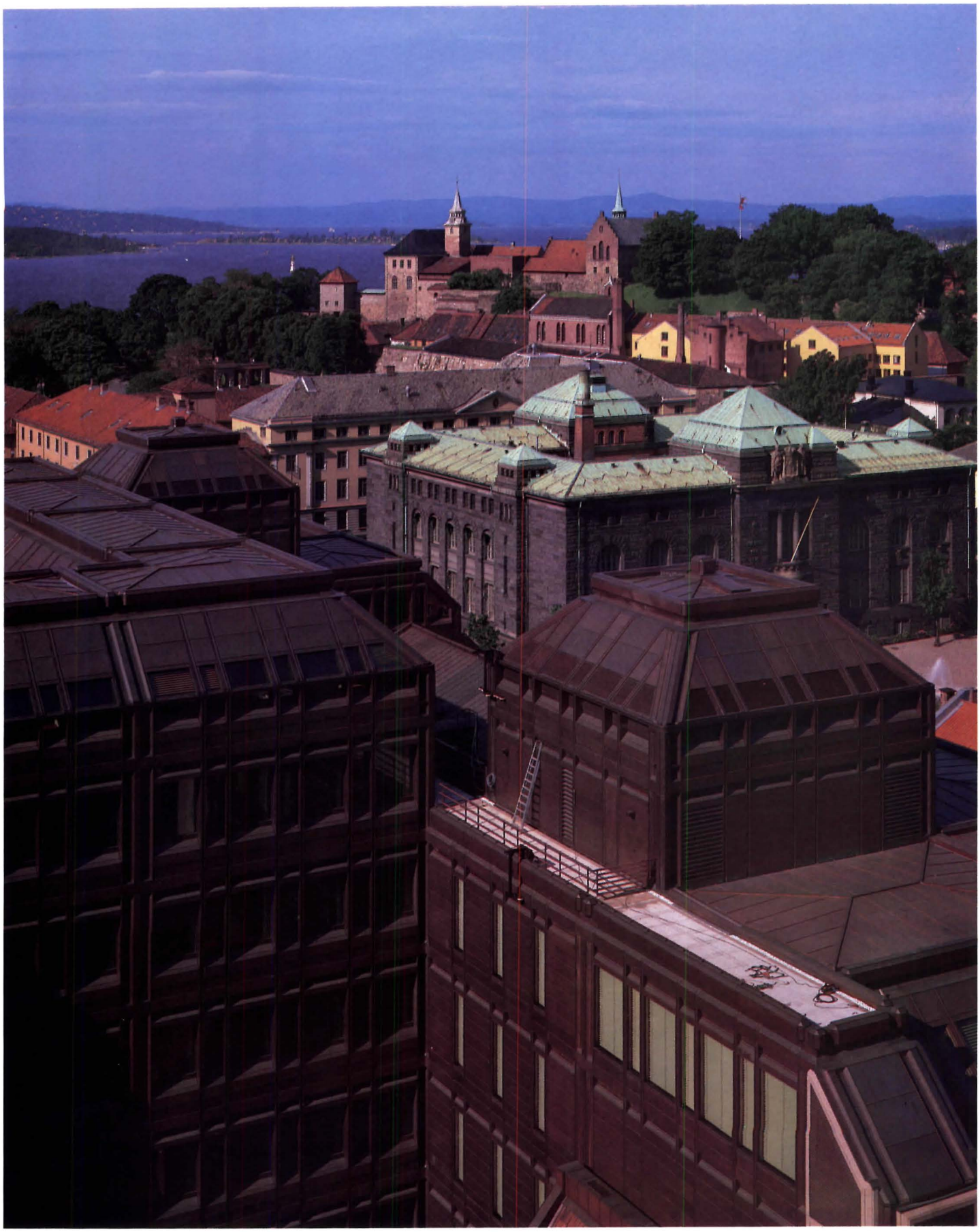
On the interior, zones of stone and metal alternate with zones of wood and carpet. The main banking hall, for example, with large grilles of stainless steel and brass, creates a vivid image of the interior as a giant cash register. Courtyards of course are differentiated by the various building walls, new and historic, that enclose them, and also by subtle changes in landscape and paving. However, even given the most diligent manipulation of surfaces and materials, the visitor is confused by too many similarly shaped spaces, both interior and exterior. One wonders whether a larger space, a grand cloister, could have served as a common point of reference for the building's inhabitants. The plan has the complexity of a small city, but the town square unfortunately is missing.

After establishing a three-story-high cornice line at the street edge, Lund clad the entire upper structure in copper. It is, as he describes it, "a mountain of copper that has given a particular image and identity within the larger context of the city." It is a compelling image when viewed from above.

At street level, however, the building seems intentionally episodic, a series of pieces carefully scaled to the surrounding context. Norges Bank responds directly to Alberti's notion that the building is a small city, and the city a large building. The quiet geometric rigor of the site organization locks this building into its urban context. Its walls mediate beautifully between past and present Oslo, a small and finely scaled European capital.

—Nils C. Finne

Mr. Finne, a 1985 Fulbright fellow in Helsinki, now works for Richard Meier & Partners.



Photographs by ARFO Fotostudio

Sri Lanka

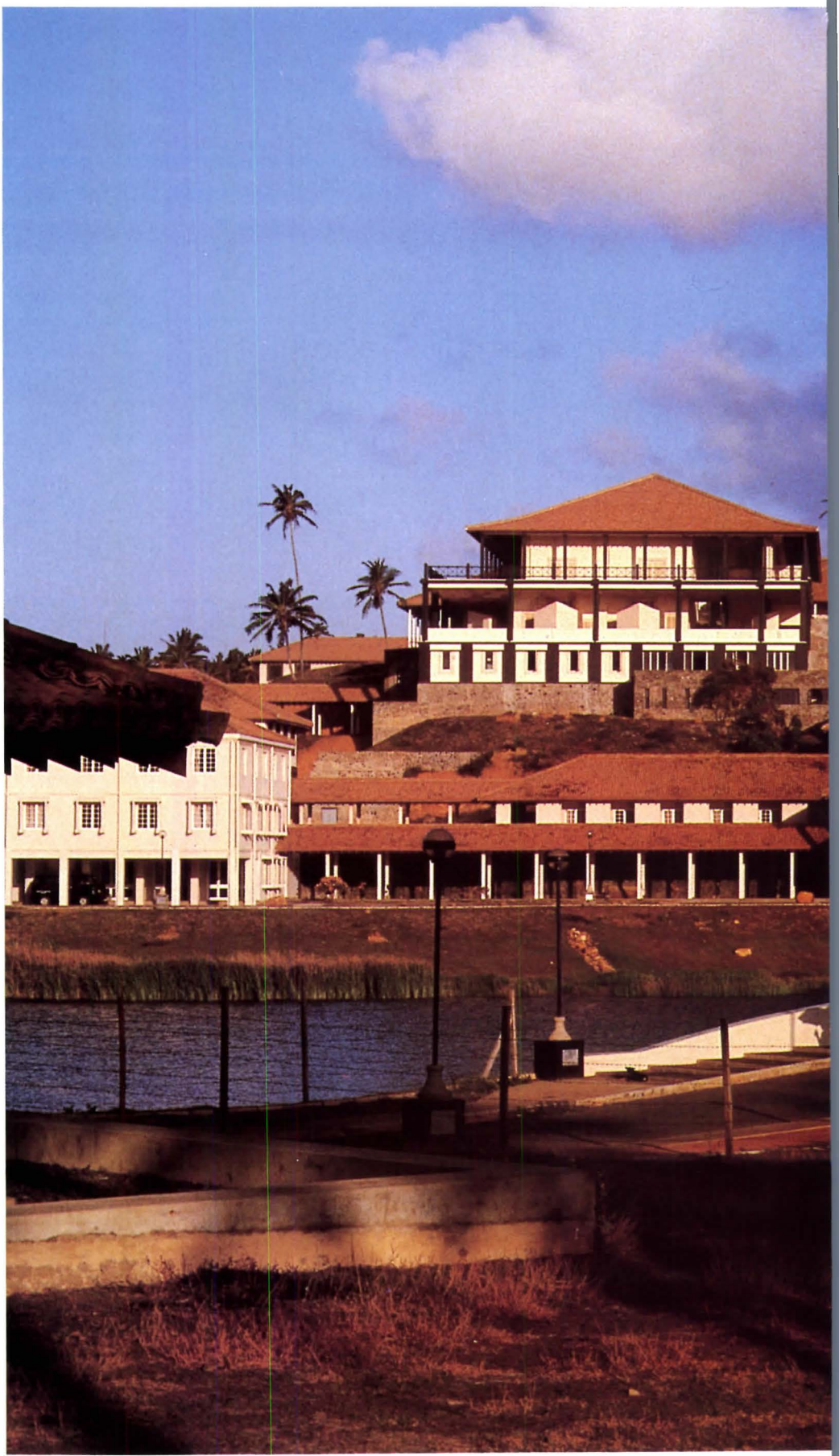
Gracefully Horizontal University Buildings Overlooking the Sea

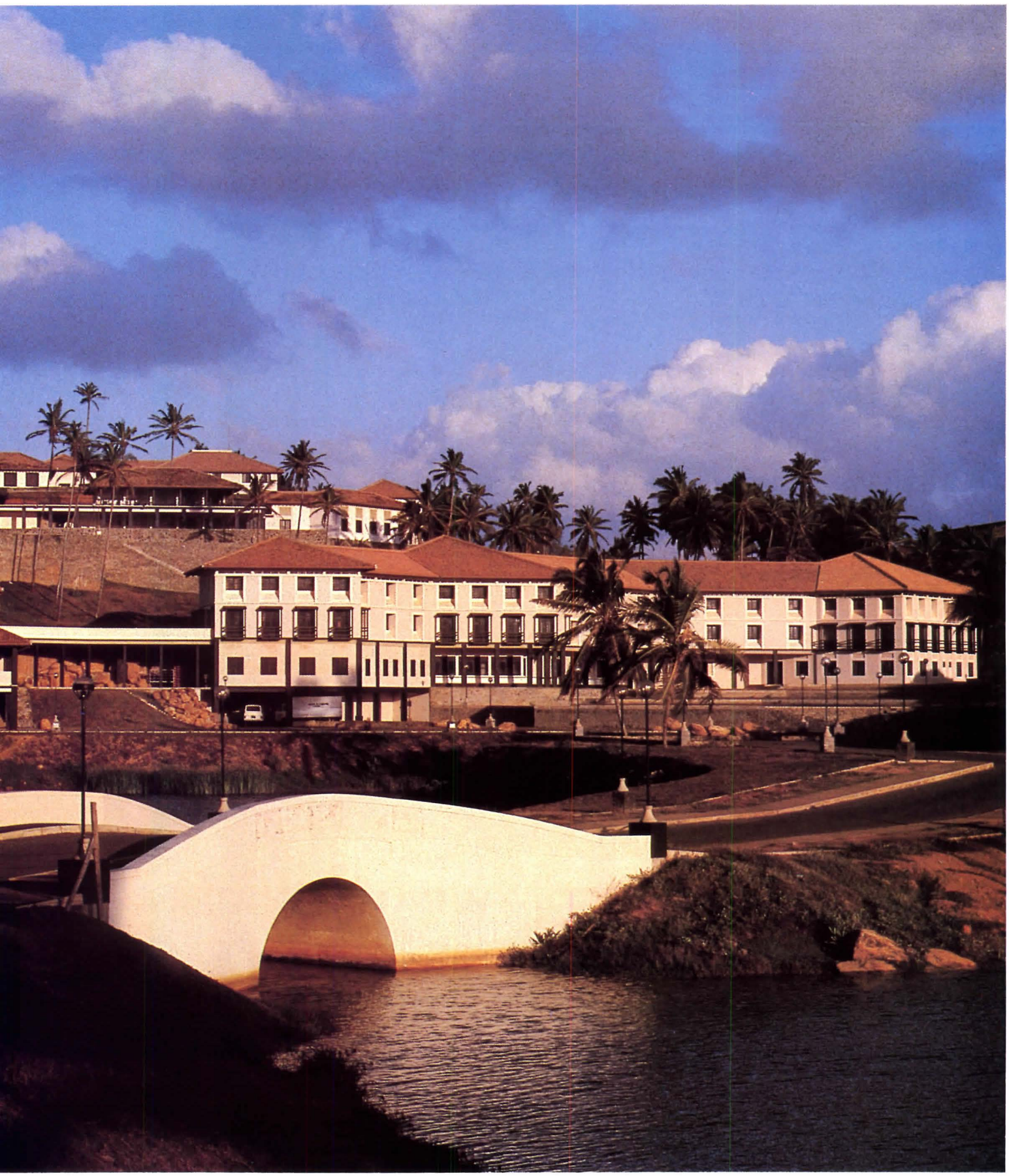
Architect Geoffrey Bawa writes as follows about his new University of Ruhunu in Matara, Sri Lanka.

The 75-acre site on the southernmost coast of our island consists of three hills overlooking the sea to the south and high enough on the northern and eastern slopes to have splendid views inland as well. The site itself was an overwhelming influence on the plan. We sought to accentuate certain views, frame others, and give delight and surprise at every turn through the buildings and landscape. The landscape was to be as important as any building placed in it.

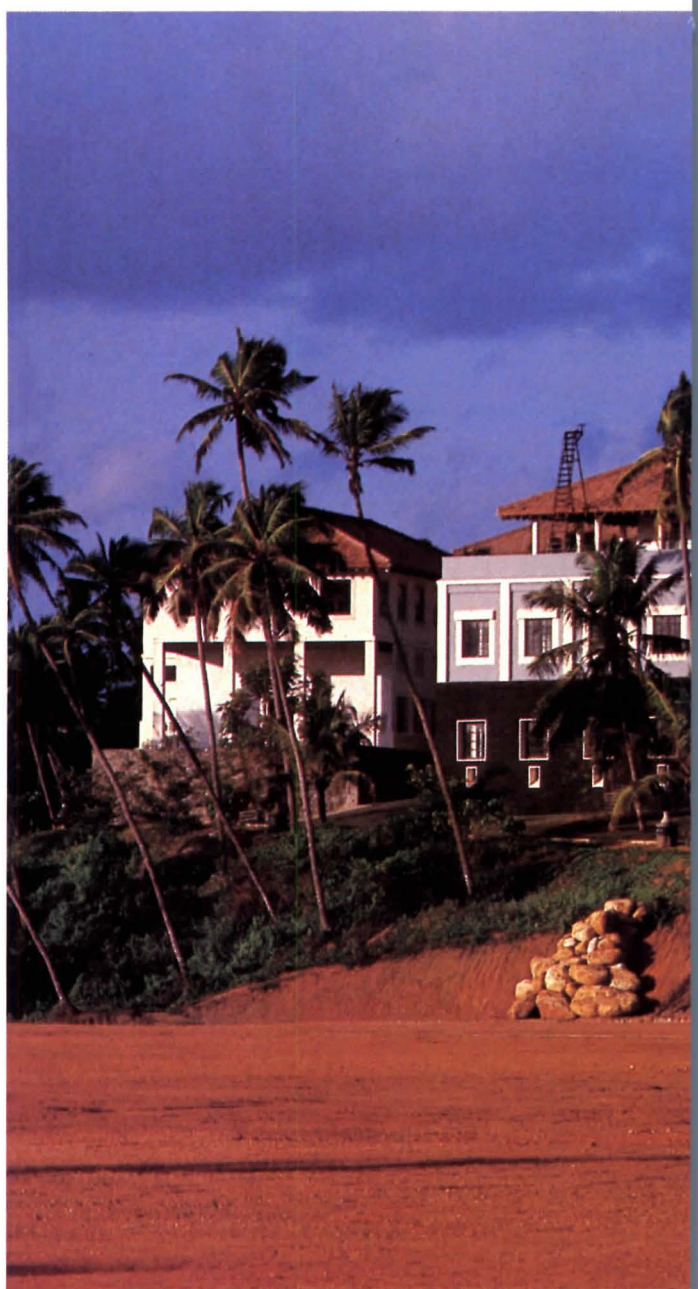
The lowest slopes, nearest the sea, were designated for residential use, including rooms for single professors and lecturers, an academic guest house and club, and the vice chancellor's residence. On the hill with wide views of the sea are the arts buildings, while the science building is on the hill further inland. The buildings on both hills tumble down to the valley between, which houses shared facilities such as the students' coffee shop, the library, and an open-air theater.

This new university, perched on a hillside overlooking the Indian Ocean, re-creates in form a traditional Sri Lankan Village.





Photographs by Dominic Sansoni



The buildings are organized into groups, linked by covered walkways. The plan follows the pattern of a village or small country town and is easily accepted and understood by the students. The connecting walkways allowed us to use pavilions and gazebos with built-in seating and verandas, which provide varied spaces for pause, contemplation, and visual enjoyment of the landscape.

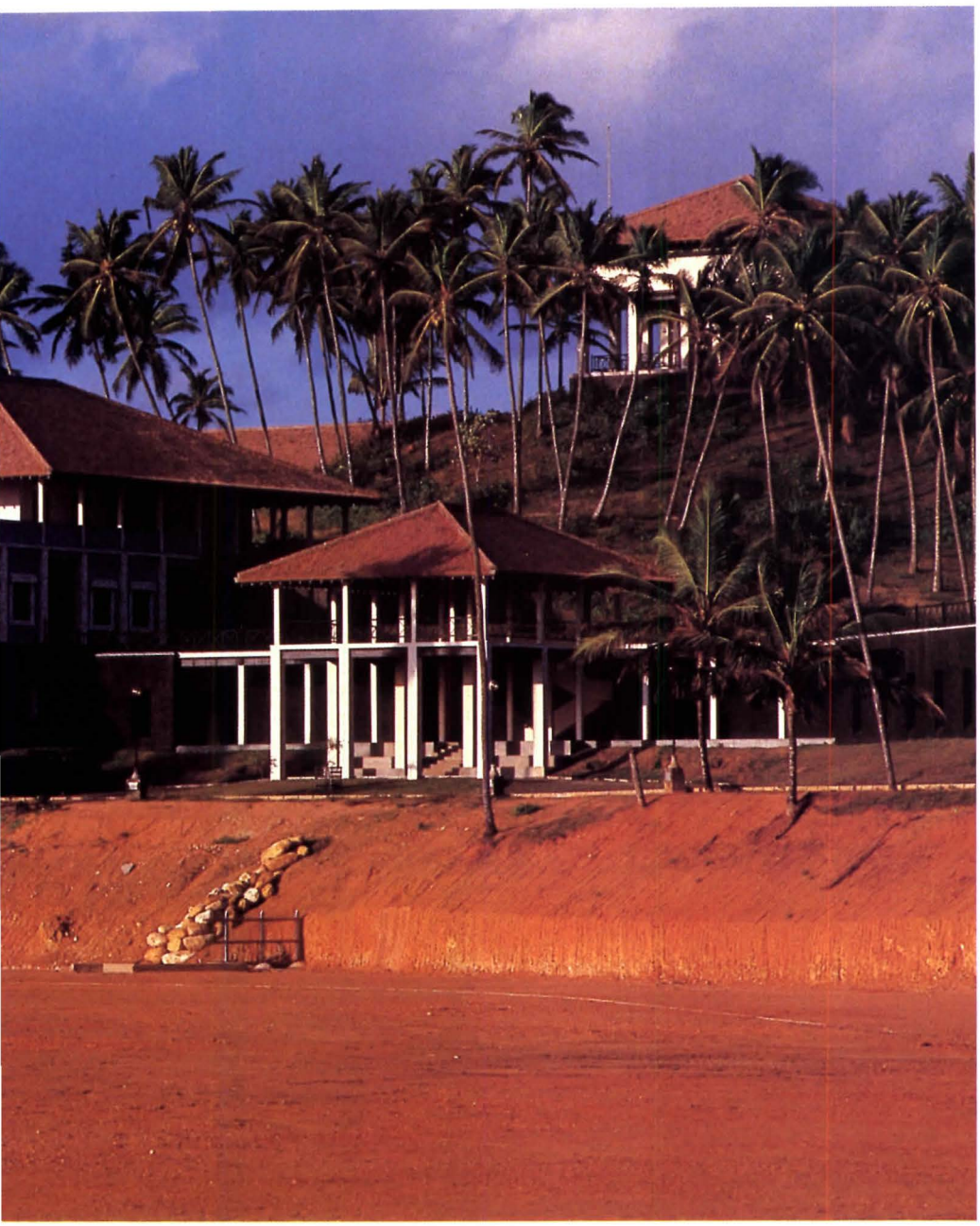
Buildings and landscape are given equal emphasis, neither overwhelming the other. There is no great change of mood and feeling as one steps into or out of a building. The major change is a gradation of light, as in moving from the shelter of a large roof to that of a large tree. This slight change is further softened by an intermediate open veranda.

Regional materials—brick, stucco, timber, and tile—are used exclusively to unify the campus design. Wide verandas and large overhanging roofs, typical of the region, provide a subtle transition between interior and exterior spaces.

All the materials are local. The larger buildings are reinforced concrete frames and brick walls, stucco finish, timber framing for the tile-clad roofs, and wide overhanging eaves.

The same materials and methods of building were used throughout—brick walls sheltered by wide verandas and large overhanging roofs. The last have been the dominant architectural elements in Sri Lanka from earliest times.

Ronald Lewcock of MIT wrote in the February 1986 issue of the *RIBA Journal:* "The apogee of Geoffrey Bawa's work so far is undoubtedly his new University of Ruhunu at Matara. Here he has created a skein of stairs and walkways draped over a steep hillside. He has captured every conceivable view, and where there was none, created his own. One climbs up through the buildings and looks down over incredible orange tiled roofscapes below and, beyond, the Indian Ocean. Modern and traditional materials match and blend perfectly." □



Photographs by Dominic Sansoni

Spain

Brightening a City With a Web of Modest Interventions

Barcelona has changed dramatically in its first few years of democratic city government. The city council has launched an urban development program that challenges most of the methods and principles of traditional city planning. The massive program, with more than 200 new squares, parks, gardens, avenues, and other public works approved or completed in the last seven years, aims to transform the public face of the city in time for the 1992 Olympic Games.

The program's chief strategist is Oriol Bohigas, the well known architect and former editor of *Arquitecturas Bis.* In place of "abstract planning based on idealized models," he says, he has promoted a project-by-project series of decentralized interventions. This strategy has produced a complicated web of projects, developed by planners and other professionals with community participation.

The most daring and controversial aspect of the Barcelona planning program has been its concentration of limited funds on improving the city's public spaces, relatively inexpensive ventures, "which will produce an immediate and tangible political return," says critic Ignacio Sòla-Morales, and, it is hoped, attract and shape private growth and rehabilitation.

Many of the new projects are traditional urban monuments, homages to heroes and symbols of the city. With the new political climate, statues held in city warehouses since the civil war are re-emerging, and new works have been dedicated to persons such as Pablo Casals and Picasso, who is honored with a sculptural fountain by Antoni Tàpies in the new Passeig de Picasso. The former grandeur of Barcelona's boulevards is commemorated by the ornate turn-of-the-century streetlights brought out of storage for the new pedestrian promenade on the Avinguda de Gaudi.

Barcelona's planners also have sought urbanity at a more fundamental structural level. Locally, their aim has been to reassemble from the multiple disciplines of public works (traffic control, drainage and sewage, electrical and lighting, paving, planting, etc.) the idea of the public space as an integrated local project, with a specific author and an identifiable character. "A street is not a highway," says planning director Josep Acebillo. "And when a highway enters the city, it must be converted into a street—it must be given a geometric structure and signification."

In the new districts, Barcelona's planners have not been able to use street-and-square, figure-ground concepts, but have had to accept existing configurations of development. A useful model has been the site-specific sculpture of Richard Serra and other artists, in which the work of art is conceived as a critical intervention in an existing context.

Serra was invited to design one of the first of the new public spaces, the Plaça de las Palmeras. The roughly rectangular site is divided in two by long, curving con-

Photographs courtesy the City of Barcelona Planning Department

Facing page, turn-of-century light standard in L'avinguda de Gaudi (Màrius Quintana and municipal architect Pere Falqués). Above, La Plaça de Sóller (municipal architects Josep M. Julià, Josep Lluis Delgado, Carme Ribas)—view of Xavier Corberó's sculpture 'Homentage a les Illes.' Right, La Plaça de las Palmeras (municipal architects Pedro Barragán and Bernardo de Sola, sculptor Richard Serra); below, view of wall with bandstand.

crete walls. One side is a playing field with a monumental light tower; the other contains a grove of trees and a bandstand. The park was developed by city architects from Serra's sketches. The curving walls lack the tension of Serra's "Tilted Arc" in New York—the immediate surroundings have been too sympathetically rendered—but the park works well as a public space, and Serra's gesture functions at a critical, or "significatory," level at the larger scale of the building blocks around it.

Many other artists have collaborated on designs, including several Americans, most notably Ellsworth Kelly, whose powerful sculpture "Totem" has been erected in the new Plaça del General Moragues not far from Serra's work.

The greatest challenge is more modest projects, where limited intervention—often a simple repaving—is intended to draw out an implicit but undeveloped structural character that distinguishes the space. In the old suburban town of Sant Andreu, for example, the repaving of several streets has produced a pedestrian axis that links all the important elements of the quarter, from the train station to the market, and gives a new focus to a district lost in the city's expansion.

The Plaça de Sóller, by members of the city's Public Space Design Department, is an example of the most direct means of defining urban space—the traditional urban park. The large paved plaza at the lower end of the park is enclosed on three sides by a covered arcade. Another border of trees encloses the terraced gardens on the upper half of the site, which surround a large pool. Xavier Corberó's sculpture "Homentage a les Illes" is situated in the middle of the pool.

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David Cohn

The most interesting designs make use of the inherent ambiguity of enclosure when objects rather than borders are used to define space. Like many projects, Daniel Freixes's Parc del Clot uses monumental light towers as space-defining elements: four towers mark the park's precinct, which has no firm or regular physical boundary. The park is cut diagonally by a walkway, which bridges part of the lower recreation plaza. This space is also defined by a line of arches for artificial illumination.

The flamboyant light towers at Luis Peña-Ganchegui's Parc de l'España Industrial, a water park (or modern Roman bath, as he calls it) were also designed as platforms for fireworks and public festivals. The towers stand in a monumental line between the new Sants railroad station and the park, above a mammoth grandstand overlooking the lake. On the opposite side of the park, the water forms an intimate canal to establish the border of the park with the smaller, more ragged blocks of the suburban town of Sants.

Also at Sants, Helio Piñón's and Albert Viaplana's Plaça dels Páisos Catalans is the most intriguing of all the projects completed so far. The architects were given as a site the entrance to the new railroad station—a deck built over the railroad tracks, unable to support anything heavier than a layer of pavement. They decided to develop the bleak potential of the site, emphasizing the confrontation between the vast empty space and the long, low profile of the station, designing on the horizontal, as they cryptically note, "like water poured out on the ground." The space is anchored by two metal structures: a tall pavilion and an undulating arcade. The two stand carefully on the delicate pavement (the columns of the pavilion all have shoes), which is subtly arched across the site. The solution is implicitly critical, and the discomfort it causes is a chilling antidote to the gaiety of Peña's nearby water park.

The two projects embody opposite visions of the role of public space in the city. Peña's park is descended from Wright's Midway Gardens, the old Madison Square Garden, and Robert Moses's Jones Beach bathhouses, to cite a few American pre-

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David Cohn

Facing page: far left, La Via Júlia (sculptors Sergi Aguilar, Antoni Roselo); top,' El Parc del Clot (Daniel Freixes, Vicente Miranda); middle, La Plaça dels Páisos Catalans; bottom, light standard. This page, El Parc de l'España Industrial Luis Peña-Ganchegui, Fransesc Rius).

cedents. Piñón's and Viaplana's Plaça, on the other hand, points back to the austere clarity of the great paved space surrounding Juan Hererra's Escorial.

The rehabilitation effort has begun to crystallize around the open-ended project Del Liceu al Seminari, directed by Lluis Clotet with the help of Oscar Tusquets. This proposal eventually will see a cluster of new cultural facilities in the renovated quarters of several old ecclesiastical institutions in the Raval, the district directly west of the Barrio Gótico. The project includes a new museum for contemporary art by Richard Meier in the former Casa de la Caritat, a city cultural center, and a new library in the former Convent dels Angels. Clotet also proposes a Gran Plaça to give a public face to the new institutions. The elaborate scheme, which includes several other plazas, a garden, underground parking, and a new pedestrian network, aims to open the district to the rest of the city, ending its long period of isolation and decline.

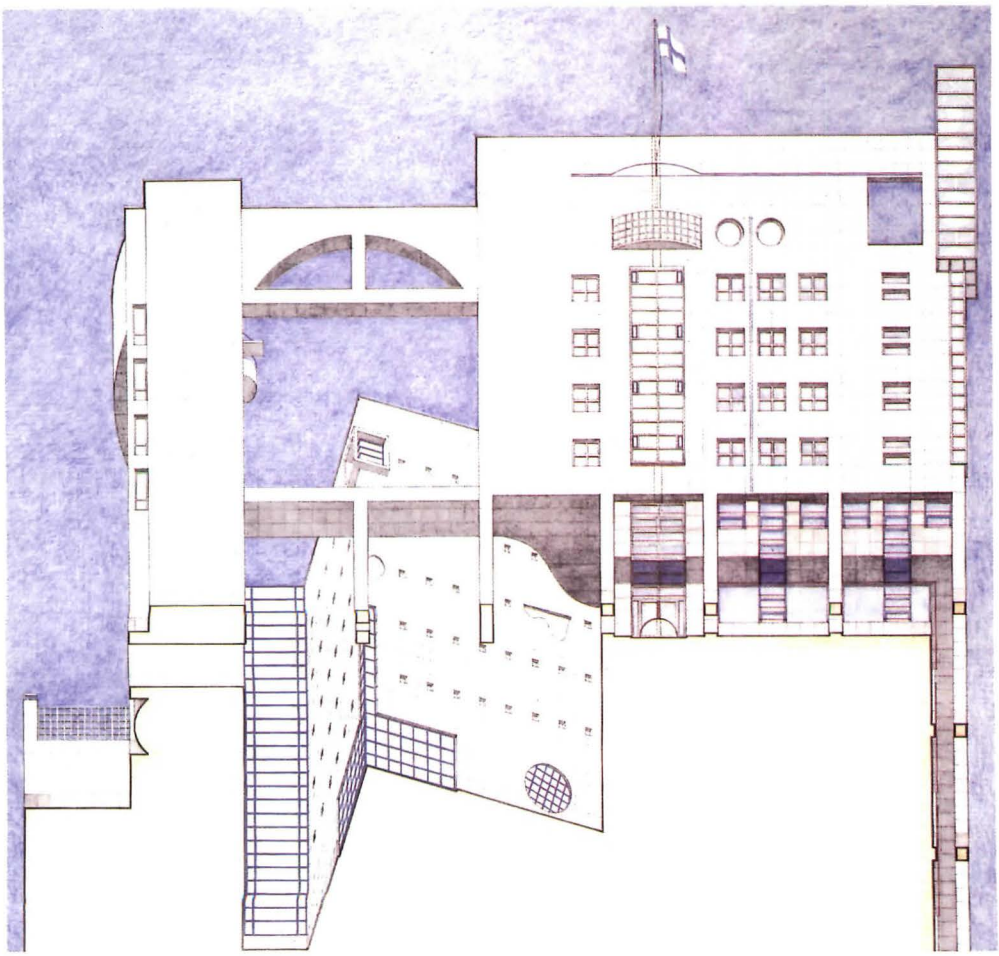
With the selection in 1986 of Barcelona as the site of the 1992 Olympics, city planners are facing for the first time the prospect of substantial private development. Master plans have been initiated to focus and shape development under the city's control. The Olympic Village, for example, will be built largely on land leased from the city, using designs approved by the city and following a master plan developed for the city by the firm of Martorell Bohigas & Mackay.

In its effort to return the city to the service of its inhabitants, the Barcelona city council has done much to restore architecture to the service and aim of improving everyday life in the city.

—David Cohn

Mr. Cohn is an American writer based in Madrid.

Finland



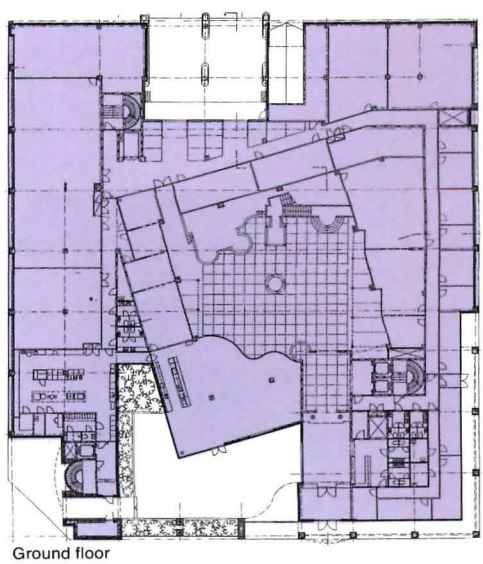
Office Building of Cubes, Curves, and Processional Spaces

The company is a publisher of magazines on culture, politics, and other special interests. In a nation of 5 million, 300,000 Finns read one of the company's weeklies.

Architect Ilmo Valjakka was given three design criteria: the building should have a personal image, should represent quality modern architecture, and should have an atmosphere that stimulates creativity. The building program called for editorial staff offices, an auditorium, library, three photographic and video studios, a photographic laboratory, two testing kitchens, and the inevitable saunas and a bar in a total of 12,600 square meters.

The basic geometry of the building consists of two squares, one inside the other. The inside square, forming a solid cube, is rotated 16 degrees from the building's primary mass, the outside square, which has a building-height cutout facing the street. This cutout forms an oversized gateway that provides a clear view from the street of the inside cube and the building's spatial order and composition. In addition, the building's facades were articulated and detailed to be in harmony with neighbors in this high-density, mixed-use area of Helsinki.

The building is organized as a procession from small to large places, whether from the street to the heart of the building or from private workstations to the most public center of the building—the heart of the building being like a town



Ground floor

square. Along these processional routes, one passes through a number of transitional spaces—active, leisurely, semi-public, among others. The placement and detailing of openings makes wall elements look transparent and increases spatial flow in the building.

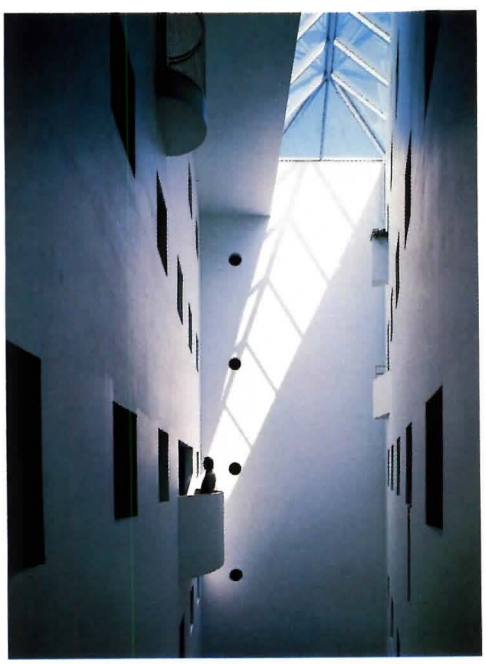
The editorial offices are single loaded in the inside cube around the multistory atrium of the "town square" and also wrap around the perimeter mass of the building. The irregular void between the inside and outside squares serves for circulation and brings natural light and fresh air into the building. The communal spaces are on the ground floor; amenities, such as the sauna with its terrace, are on the top floor.

The design approach, as explained by the architect, resembles cubist esthetics. The geometry is limited to cubes and circles and their parts. The objective was to create a spatial order that would make its imprint on the mind and senses in many different layers to elicit memories and a sense of uniqueness.

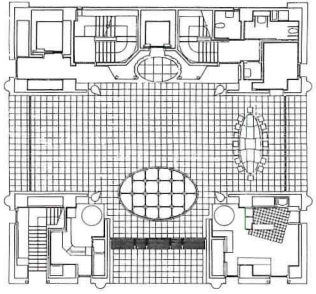
The building was completed in June 1987. For its inauguration, the Finnish composer Harri Wessman wrote a concertino for piano and chamber orchestra. Said the composer on his work in relationship to the building, "I was given a very unusual commission: compose a piece on this building. As I was wandering around the construction site it became clear to me that the reliefs in the central court, the 'town square,' are like melodies drawn onto the walls, giving birth to arches, pianolike curves."—Peter Lizon, AIA

Mr. Lizon is an architect and planner and teaches architecture at the University of Tennessee, Knoxville.

Facing page: above, a side view of the exterior; below, a drawing of the front elevation. This page, two views of the interior 'town square.'



Clockwise from above left, detail of an interior balcony in the Finnish publishing house; space between inside cube and perimeter mass; an interior entry. □



First floor

Japan

High-Rise Beacons Mounted on a Mysterious Black Box

Hiroshi Watanabe

Shinsaibashi-suji, a street in a major commercial and entertainment district in Osaka, is crowded with people most days and nights of the week, and competing for their attention are countless signs and neon lights. In a daze from information overload, one might easily fail to register another addition to this visually aggressive environment, but an establishment that opened last year on a spot where the street meets the Dotonbori River manages to make its presence known to even the most befuddled pedestrian. Kirin Plaza, by architect Shin Takamatsu, is hard to miss because he does not play the game as everyone else does. Instead of lights and signs added to a facade, his building has huge beacons that account for half the building height. These are mounted on what is quite literally a black box, possessing an aura of faintly sinister mystery that is in sharp contrast to the cozily obvious images projected by its neighbors.

Kirin Plaza is a commercial complex with a dash of culture thrown in. On the first floor are the entry hall and a cafe/bar; the basement, second, and third floors are occupied by restaurants; an exhibition space is on the fourth and fifth floors; and a theater is on the top two floors. Takamatsu was responsible for the interiors on the first, third, sixth, and seventh floors; Kazuko Fujie designed the fourth and fifth floors.

The owner of Kirin Plaza is the hotel and insurance arm of a group of companies probably best known for beer. Today Japan is undergoing what social commentators refer to as a "diversification of values"; that is, the Japanese, now having the wherewithal, are starting to embrace many different life styles and develop many different tastes. Kirin Plaza seems intended for a specific group within this now segmented market: the young Japanese who have grown up with computer games and throwaway digital watches and who feel comfortable with, not threatened by, the prospect of automation.

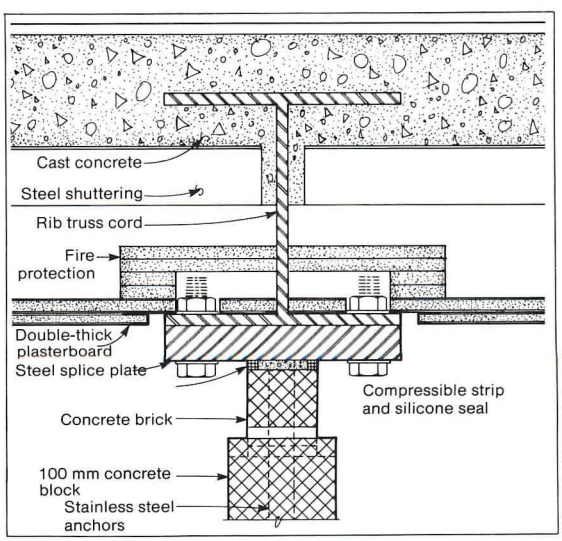
The main structure of Kirin Plaza is steel-framed, reinforced concrete. The building proper is clad in granite, both polished and matte, and is articulated by cylinders and panels of stainless steel and aluminum that suggest the parts of a complex machine. This provides a base from which rise four slabs wrapped in green, translucent panels formed of a film printed with a *washi* (Japanese paper) pattern and sandwiched between glass. Such panels have been used to striking effect by other Japanese architects including Fumihiko Maki in his Museum of Modern Art in Kyoto. Kirin Plaza's four slabs light up at night, recalling the *andon,* the traditional Japanese floor lamp, and become a helpful landmark for late-night revelers disoriented by darkness and drink. The lights, however, are so intense that they are lighted to only 40 percent of their full power. Three times a night there is a short, computer-run show, but otherwise the lights are steady.

Kirin Plaza suggests an oversized Gobot, the hit Japanese toy of a few years ago that by twisting and turning its interlocking parts could be transformed from, say, a dump truck or a fighter plane into a fighting automaton. Even when sober, one half expects this fancy beer hall at any moment to turn itself into a looming mechanical warrior ready to wreak havoc.

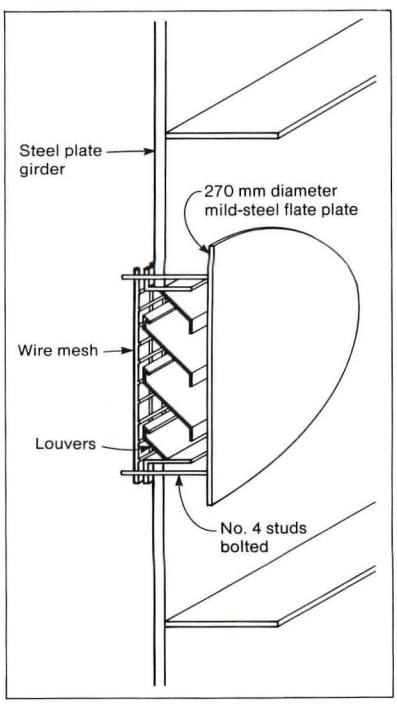
—Hiroshi Watanabe

Mr. Watanabe is an architect in Tokyo. He has been a correspondent for Architecture Plus *and is a frequent contributor to* Architecture.

England



This large addition to a 19th-century cricket stand in the heart of London combines tradition with engineering technology. The new upper tiers provide sheltered seating beneath a series of marquee-like fabric tents.



An 'Elegant Tent' Provides a Festive Setting for Cricket

While squalid commercial pastiche has been spreading like a fungus over Docklands (and much of the rest of London's decayed industrial areas), one building of great quality and *firmitas* has emerged—curiously—from the heart of the British establishment, which at present seems only too happy to sell off everything it owns for a quick return.

Lord's is the world center of cricket. At Thomas Lord's in the middle of London, the rules of the game have been formulated for 175 years, and many of the most important games have been played.

The grass is surrounded by haphazard buildings, built over the last 90 years. Architect Michael Hopkins was quick to see that this mix resembled the jumble of buildings that surround the village greens on which cricket is supposed to have been played in the 17th century. What Lord's lacked was the festive atmosphere of the marquee that still enhances the best country games. So, when Hopkins was asked to provide a new covering for the Mound Stand, he used fabric roofs to create an elegant tent. With fluttering yellow and orange pennants, it evokes both nautical imagery and the simple temporary structures of a Saturday afternoon's cricket.

The pennants fly from the tops of two of the six circular steel columns that support not just the tentlike roof but also two whole new floors of raked seating that greatly add to the capacity of the 1898-99 stand by Frank Verity over which Hopkins was building. The columns carry a great plate girder on which the whole top-hamper is carried. The girder forms the spine of a continuous box of private rooms, on top of which the upper layer of seating projects forward. The section is heavily weighted toward the grass side, and the whole of the new structure is prevented from toppling over onto the green by thin steel straps that anchor it at the back.

These ties follow a brick arcade that Hopkins and his associates have extrapolated from arches of the beginning of an arcade designed by Verity. (In the relatively impoverished period after the Boer War, the arcade had been supplanted by a ramshackle steel structure, so only the well-made arches existed.) The Hopkins firm, using its high-tech expertise in brickwork, extended the Verity arcade around the substructure of the stand, thereby creating a sunlighted internal street with an arched facade that would, appropriately, face the classical buildings across the road.

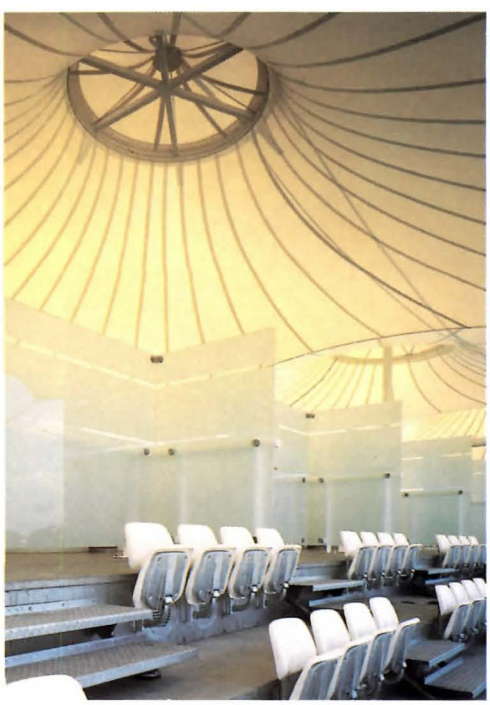
The great ingenuity of the whole lies in the way metal and masonry act together. The heavy brick base prevents the light steel top from falling over forward; and, in a master stroke by engineer Ove Arup Associates, when the ties are forced into compression as the wind comes from across the pitch, they are prevented from buckling by straps that hold them back to the brickwork.

It is easy to say that this is not a proper building: Lord's is crammed to capacity just six days a year. The whole place is, by definition, used only during the summer, so Hopkins did not have to come to terms with insulation; therefore, detailing could be simple and shipshape.

But in its extraordinary and elegant marriage of the great potential of modernism (on top) with urban *gravitas* (at the bottom), Lord's shows a way of uniting high-tech and rationalism that could wield enormous power. The only factors common to the two approaches are appreciation of craft and of engineering. In Britain, we look to Hopkins and a few others to extend the potential of the relationship.

—Peter Davey

Mr. Davey is editor of The Architectural Review *of London.*



Hungary

A Regional City Becomes the Capital Of a New Architecture

It is unusual for a country's architecture to be infused with new blood from a regional city rather than its metropolitan center. It is even less usual to see two such creative waves from the same region in a single generation. Since 1975, the city of Pécs has replaced Budapest as Hungary's architectural center.

Pécs's first innovative architectural phase began in 1972 when 40-year-old Robert Mischl, a liberal and spirited director of the regional planning office—a rarity, especially in a rigid bureaucracy—began his tenure. Mischl hired a bright, young architectural instructor, György Csete, plus his best students from the University of Budapest and, most important, gave them an unusual degree of design freedom. These designers, tired of the souless, prefabricated-concrete-panel buildings that dominated the country, took their building forms from local folk art, nature, myth, and ritual, in the tradition of Csete's friend Imre Makovecz in Budapest (see Sept. '84 and Sept. '85). The group's mentors were Herbert Green and Bruce Goff, its touchstones Rudolph Steiner's Gothenaeum and Bruno Taut's Glashaus pavilion.

Group Pécs, as it became known, has disbanded, but its members serve as mentors to a younger generation of architects who not only work in Pécs but, unlike their elders, come from Pécs and are committed to it and its liberal leadership. The charming, hilly city, home to Hungarians, Germans, and Slavs, was founded by the Romans whose presence is still keenly felt. Pécs's cathedral is Romanesque, and the city has numerous Gothic remains and a well-preserved mosque from the period of Ottoman rule. Baroque and neoclassical urban dwellings still stand, and ubiquitous turn-of-the-century art nouveau architecture is being restored. As significant as the city's rich history and archeology is that it was spared from 1950s and '60s urban renewal by lack of funds.

Because of Pécs's heterogeneous architectural inheritance, the work of the second wave of Pécs architects, including Sándor Dévényi, Árpád Weiler, and Péter Várnagy, is eclectic. It is a synthesis of forms from the past adapted to present uses, a thoughtful translation that appears

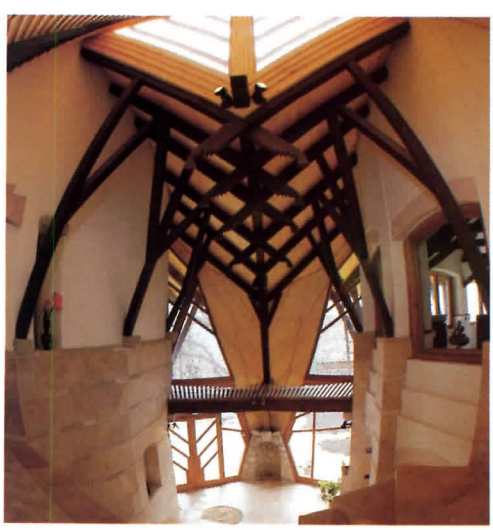
Photographs by Istvan Panyik

Opposite page, adjacent buildings determined the form and fenestration pattern for Sándor Dévényi's highly individualized residence. Above and right, Dévényi's 1988 mountainside villa with its art nouveau qualities makes reference to the surrounding landscape in form and material.

vigorously new while it fits effortlessly into the existing fabric of this old city.

The best known of this new generation of architects is Sándor Dévényi (see Sept. '87, page 68). At 40 he has just quit his job as studio head in the regional planning office and has formed a private architectural cooperative. His single-family house on Pécs's István Street (winner of Hungary's most coveted residential design award) is a small infill building that follows the form, eave line, and fenestration rhythm of the existing buildings along the street. However, the contextual faithfulness soon stops and inventiveness begins, as seen in the shape of openings, in the warm Mediterranean palette, and in the playful patterns formed by window and door mullions.

Dévényi's hillside villa of 1988 in the Mecsek mountains just outside Pécs establishes a dialogue with nature. Its fieldstone, slanted walls, roof shapes that echo the contours of the hills, wooden supporting members, and treelike subdivisions of doors and windows make it appear to be an element of nature that has grown out of the side of the mountain.



Above, Arpád Weiler's 1985 Katalin Street apartments redefine an urban corner site. Facing page: Weiler's Déryné Street apartments (above) and Péter Várnagy's Citrom Street building (below) reflect a new vernacular modernism responsive to tradition.

Arpád Weiler, 40, held the position of studio head in the regional planning office until this year when he joined Dévényi's cooperative. Weiler is especially interested in the challenges of urban conditions, particularly of corner sites. His Katalin Street building of 1985, containing six apartments, had to fit on a sharply angled lot, which generated the sawtooth plan. Since the building's immediate neighbors are covered in stucco, a material that in Weiler's opinion lacks the precision of masonry, the architect decided to repeat instead the brick of a nearby landmark factory. The exuberant silhouette created by his rooftop bay windows, dormers, and oriels recalls the roofline of the 1852 building that used to stand on the site.

The Déryné Street lot had been vacant since 1963 when the original building of 1728 was hopelessly damaged by the collapse of part of the network of old cellars crisscrossing the city beneath the building's basement. Here the adjacent 19th-century homes of the city's rich burghers called for a continuity of eave line, materials (brick), and fenestration type. Weiler's ingenious solution matches the neighbor's eave but creates three floors plus an attic that "disappears" behind the roof, where the old building had only two stories. The 10-unit new building has stores on each side of the entrance lobby and below-grade parking.

Péter Várnagy, 45, still directs a studio at the regional office. His 1985, mixed-use project at Citrom Street, unlike Weiler's buildings, is freestanding. It was constructed on a long-vacant no-man's-land where densely built houses once stood and paid homage to both history and archeology. Várnagy's building is long, with a straight side that parallels the reconstructed ancient city wall, and an undulating side that follows the curved facade of the old Citrom Street row houses. As a result of the curve, the building bulged and became

Photographs by Istvan Panyik

too fat for the proposed double-loaded corridor scheme, so Várnagy created a tiny interior court of serendipitous charm. The use of brick on the exterior continues an old Pécs tradition, as do the high roof and pronounced band at the eave. The pointed end of the building directs attention to the richly ornate entrance of the main post office, which it faces.

While a similar spirit imbues the work of these three architects, they belong to no formal group. Their most abiding professional tie and design commitment are to their city and its history.—JOHN MACSAI

Mr. Macsai, a native of Hungary, has his own firm and is a professor of architecture at the University of Chicago.

Holland

Seemingly Sculpted But Highly Rational Bank Headquarters

From a distance, the NMB bank headquarters in the dull and rapidly developing southeast perimeter of Amsterdam rises like a mountain range above its flat-roofed neighbors. Closer up it inevitably brings to mind images of castles, caves, and other loci of fantastic creatures.

It is a set of 10 interconnected brick towers, each plastic, seemingly leaning, and topped by a glass pyramid. It seems to have been sculped out of clay by the hands of its architect, Ton Alberts.

It brings to mind images of the work of Gaudí and the disciples of Rudolph Steiner, and, most appropriately, the remarkable and idiosyncratic buildings of the Amsterdam school of the early decades of this century.

Mention these allusions to Alberts and he expresses thanks for each. But when he gets down to describing the genesis of the design, he speaks in terms of pragmatic, functional concerns. Chief among them are the saving of energy and the provision of a stimulating environment for the bank's employees. Alberts describes his approach as "organic." His definition of "functionalism" is broad enough to encompass a good deal of humanism and environmentalism, and he regards energy conservation as an ethical as well as an economic imperative.

The program was partially drafted by a committee of employees, and among other things called for a high degree of control by individuals over their environment and a healthful indoor climate. So health-conscious were the employee representatives that they suggested a minimum of elevators, climbing stairs being conducive to fitness.

The program called for division of the office space into units of 40, later increased to 50, workstations. This was the genesis of the tower concept. In plan, rising from three to six stories, the towers resemble gingerbread cookies with holes cut out of their centers. The holes are atria, and the angular work spaces surround them.

The glass-topped atria play an important role in the building's energy performance: they and south-facing windows admit heat that is stored in the towers' unusually thick walls for use in cold weather. The appearance of massiveness is accurate. There is nearly a half-million cubic feet of concrete in these walls.

There is no airconditioning system as such. Cool air is admitted at night, put through a thermal energy transfer device, and circulated within the building in the heat of day.

Nor is there a mechanical humidifier; a profusion of indoor planting provides the humidity. The planting, in turn, is sustained by rainwater, collected and sent through a series of sculptural pools and watercourses.

Alberts even explains the towers' chamfered walls in environmental terms. Their angle deflects winds in desirable directions and helps with sun admission. Alberts speaks of the energy and other consultants as virtual collaborators in the design.

The towers are linked by a continuous pedestrian "street" at second level. The street describes an eccentric "S" in plan. Its ceiling sometimes undulates and it offers a pleasing sequence of views.

The street is punctuated by public spaces such as lounges and eating areas and by the 10 soaring atria. At each atrium center on "street" level is a piece of sculpture. Otherwise the art is integral.

There is an abundance of decorative touches. Some are striking, such as the wonderfully crafted doors along the street. Others are less so, such as the flaring, overscaled sconces at the main entrance that, with the slanting columns, create an atmosphere of early movie-set moderne.

But, in all, the street is a bright, cheerful, changing experience, the antithesis of the long, sunless corridors that characterize conventional office buildings.

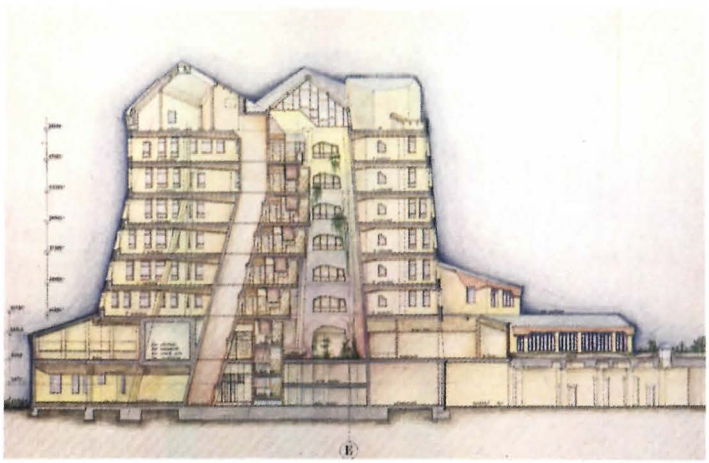
And the work spaces are even more unusual. The angular plan makes them highly individualistic, and no one is more than six meters from daylight.

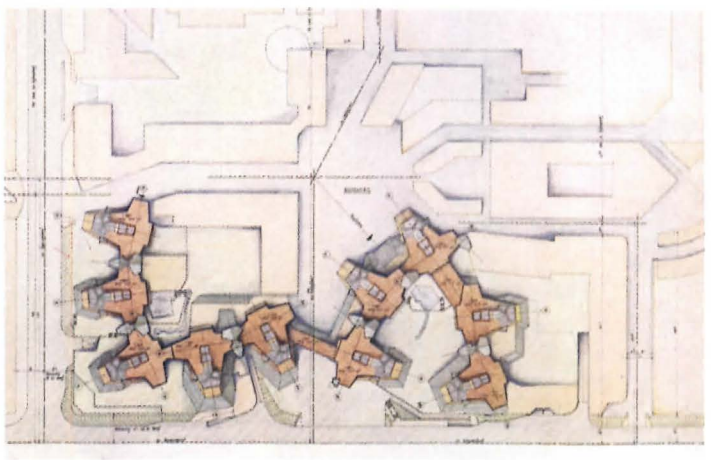
And the workers have their desired control: task lighting supplements ambient, and all windows are operable and have individually controlled interior blinds (there are also exterior sunshades operated by computer).

The building was more economical to build than conventional counterparts, thanks to varied use of repetitive, prefabricated elements. Its energy features virtually guarantee low operating costs.

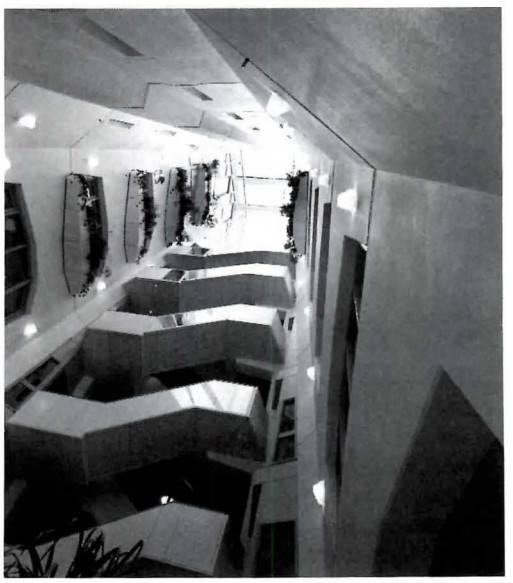
In all it is a successful office building from both management and employee viewpoints. It is also a striking, apparitional presence in an otherwise stupifying setting.

—Donald Canty, Hon. AIA





Facing page, the complex's peaks and valleys arrayed along the street atop a parking podium. Above, it faces a shopping plaza.



Top left, the second-level pedestrian 'street.' Middle left, characteristic decoration. Bottom left, a typical work space. Above, view upward in an atrium. Above right, decorative wall panels at the crest of an atrium. Note slit windows. They are used in the bearing wall of each atrium to the full extent that its structural function allows. Lower right, an entrance lobby. □

Photographs © Jan Derwig

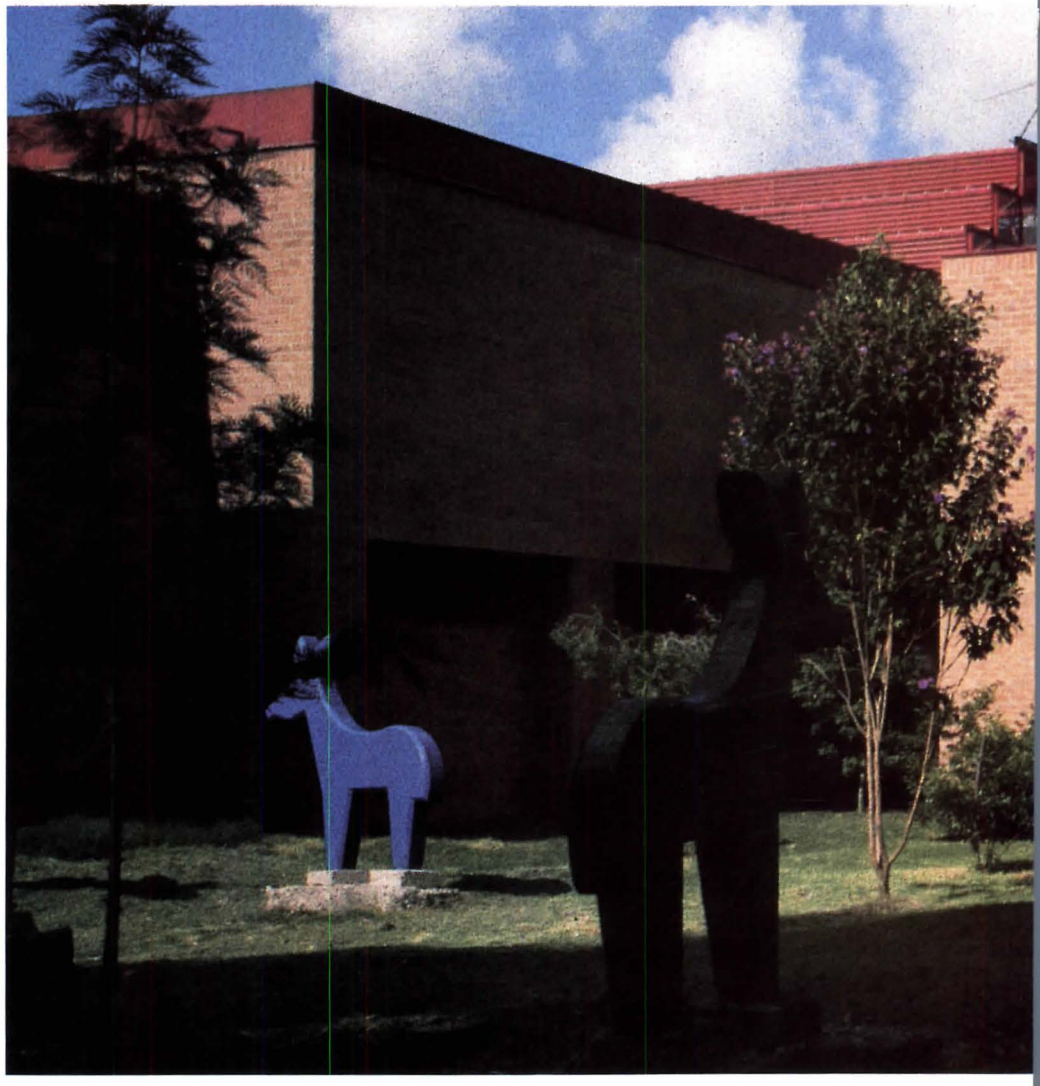
Colombia

Triangulation Gives A Children's Museum A Sense of Discovery

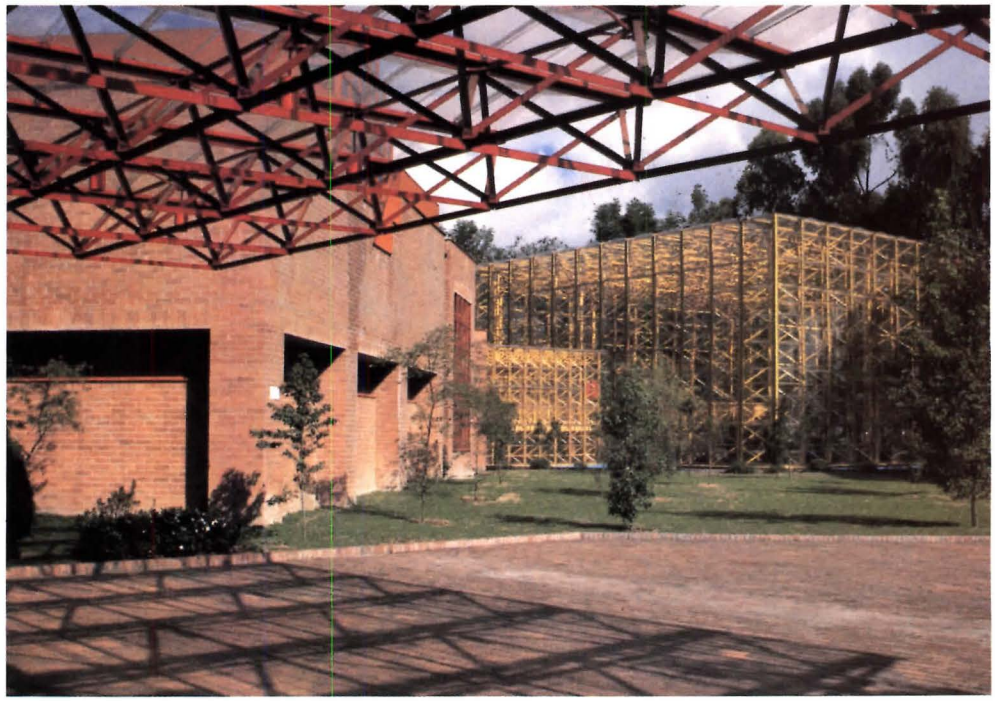
The idea of building a children's museum in Bogotá was enthusiastically promoted by Belisario Betancur, president of Colombia from 1982 to 1986. This was his favorite personal initiative, and he gave full support to its planning and design and raised funds for it from private donors. A private building company donated design services and hired Willem Goebertus, one of the finest young architects in Bogotá. The museum thus was born of a marriage of public initiative and private support. It is now in the hands of a nonprofit organization, especially created to manage it.

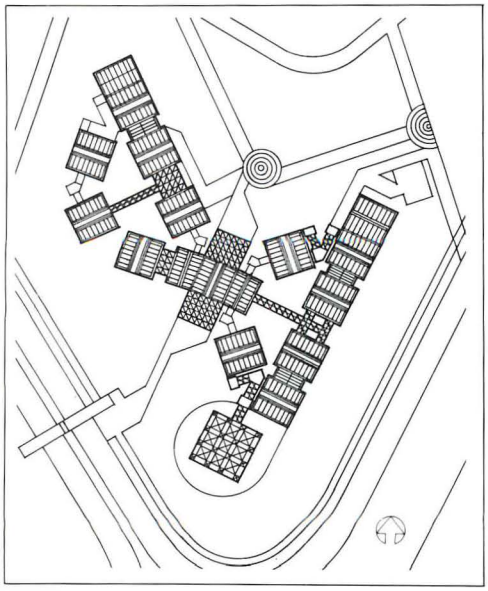
The land, donated by the city government, is a triangular corner in the core of the Simon Bolívar park project, the largest open space now under construction in the metropolitan area of Bogotá. This special location and the regulations imposed by the master plan for the park were two of the guidelines for a design that also takes into account two neighboring public facilities, a large amusement park with a variety of structures, and the main civic square.

The triangular grid that regulates the master plan is projected onto the layout of the museum, which links two main tri-

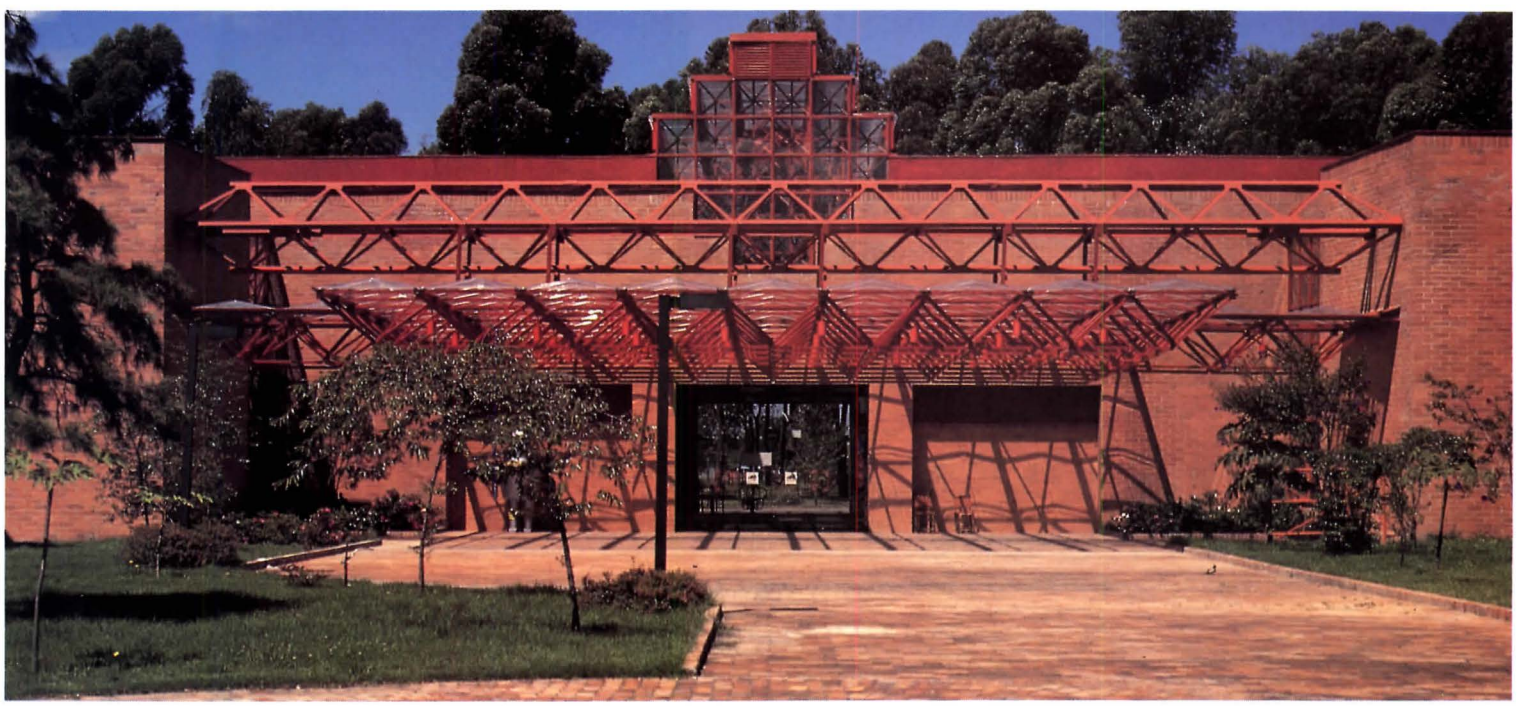


A series of masonry blocks linked by multicolored metallic bridges and metal frame roofs form Bogotá's new museum.





Photographs by Alberto Saldarriaga Roa



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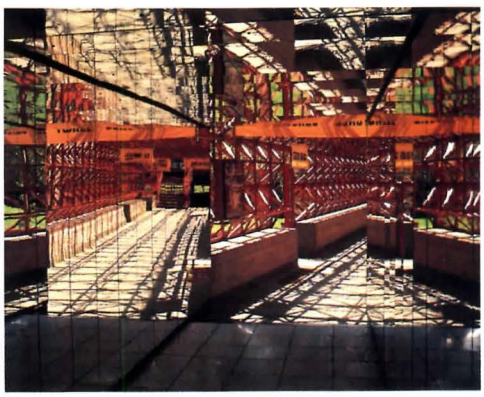

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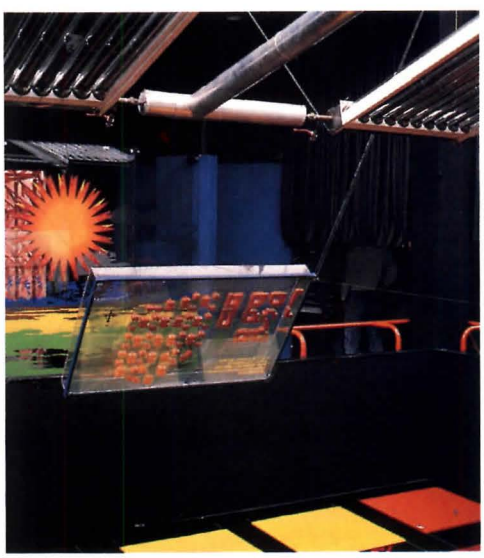


Alberto Saldarriaga Roa

angles (each with a courtyard) via a central hall containing the entrance. The whole plan also forms a triangle, with a square greenhouse at the vertex, the site's focal corner. This irregular layout seems slightly confusing at first, but it allows a certain degree of mystery and discovery and interesting perspectives of the different spaces and forms.

Goebertus chose to design small, varied spatial units, or modules, instead of one massive building. Each module is at once part of a family and individual, designed for a special purpose. The modules' interior spaces are shaped in basilical form, with a high, central nave, two rows of columns, and two smaller (and lower) aisles. Light enters through clerestories, in this case skylights protected against direct sunlight. The interior walls are painted black to provide a background for the objects on display and to create a neutral space.

The interior, with its irregular layout, black walls, and clerestory lighting, achieves an element of mystery and intrigue.

The neighboring amusement park, with all its characteristic metallic structures, gave Goebertus the idea of using metal frames as another architectural theme. Each unit displays its roof structure above the solid brick walls. The units are linked by metallic bridges and passageways. The buildings thus are endowed with the spirit of the fairground, increasing a sense of playfulness appropriate to the museum. Colors that identify each module range from primary to complementary tones. The surrounding areas are still unfinished, but, when the park is completed around 1992, the site will be filled with all sorts of native plants.

Children's museums in Europe and the United States tend toward high-tech assemblies. A happy consequence of Colombia's technological limitations is that this museum depends on human beings to function—a large group of young people specially trained to guide the children and work with them. The architecture has proven its quality by its flexibility and suitability for daily activities.

—Alberto Saldarriaga Roa

Mr. Saldarriaga is a critic and architect with his own firm in Bogotá.

Australia

Sturdy, Neoclassical Monument Shelters a Symbolic Stone

On Jan. 1, 1901, the English Lord Hopetoun was sworn in as governor general of the new Commonwealth of Australia, created by the federation of six colonies. The plaster pavilion erected to mark the spot in Sydney's Centennial Park (named for the centenary of settlement in 1788) was a quixotic, pseudo-classical, circular temple topped by a sugar-icing cupola. The monument lasted only about four years.

Alex Tzannes's design of a permanent tempietto over the original Commonwealth stone recalls the earlier pavilion in its austere neoclassical evocation of the Pantheon type of structure, but he has attempted to give the type a simplicity and lightness, especially in the treatment of the dome, which hovers above rather than bears down on the sandstone rotunda base.

The Federation monument has an outer colonnade of Doric columns in six pairs to signify the six Australian states of the Commonwealth. The hypnotic solar reflector disk on top of the dome has been supplemented by a series of regularly spaced slits in the drum to admit rays of sunlight to successive areas of the interior. The gentle incline of the ground surrounding the monument is echoed in the stone paving, which rises as it approaches the central Commonwealth stone.

The monument combines landscape architecture with the contribution of Imants Tillers, who designed and executed the artwork covering a portion of the underside of the dome. It consists of images applied to some 1,440 vitreous-enamel-coated steel panels. The remainder of the underside of the dome is left white, as if to draw attention to the apparent emptiness of much of Australia, to its lack of content, and to its comparative youth.

The dominant motif on the north side is a slouching cowboy-convict figure who blunders into a field of Aboriginal imagery made up of interconnected centers—meeting places in the landscape linked by paths. This scene fades out and is opposed on the other side of the dome by a spectrum of colors representing Western analytical consciousness. Thus the mural symbolizes the two poles of Australian identity, European and Aboriginal.

The Federation monument's copper dome is raised above the sandstone entablature on slender metal stilts. In its lightness, the dome is a deliberate contrast to the temple below it—a contrast that is utterly unclassical in expression and sets up a dichotomy in the monument between old and new, past and future. Hovering in the air like some alien flying saucer, the copper dome is the new above the old, the past giving way to the future.

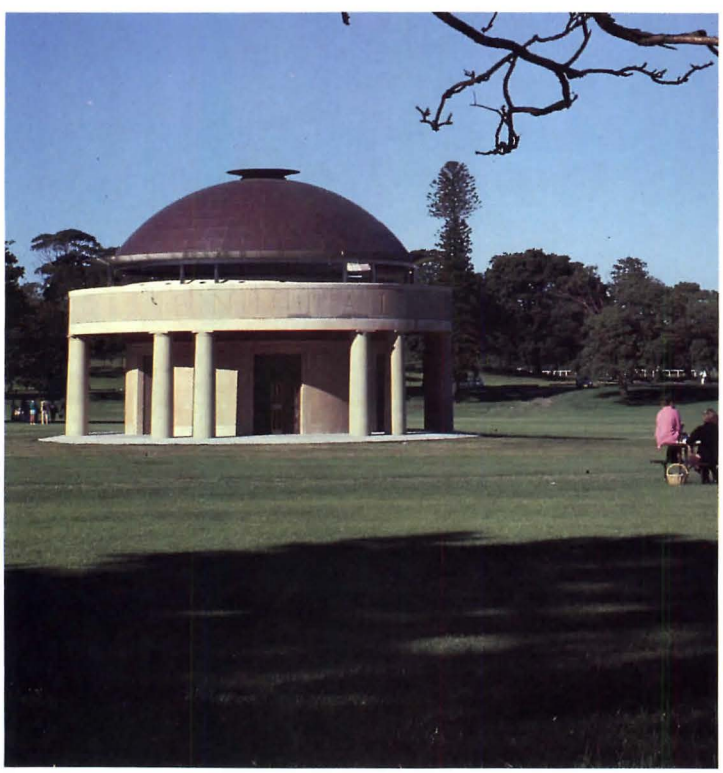
A pond around the perimeter under the upturned lip of the dome bounces dappled light onto the underside of the dome that registers the quality of the day. This is one of many instances of the care and attention to detail that has been lavished on the monument.

But for all this care and conscientious attempt to give the Federation monument a contemporary meaning, it remains tied to the Pantheon type on which it was modeled, a closed, self-contained symbol of an empire ruled from Rome.

The inscription on the entablature, MAMMON OR MILLENNIAL EDEN, is from the poem "Australia" by Bernard O'Dowd, who as a young man cherished the ideal of an independent, republican Australia. It is hard to see how the imperial vocabulary of the Federation monument conveys the same sentiments as O'Dowd's poetry.

At this moment, Australia's future is open inasmuch as Australia is a young country finding its place in the world, shaping an identity for itself that as yet remains fluid, unresolved, and, in some sense, primitive.—PHILIP DREW

Mr. Drew is an architectural historian and author of Leaves of Iron, *a study of the work of Glenn Murcutt.*



Robert Wilson

Robert Wilson

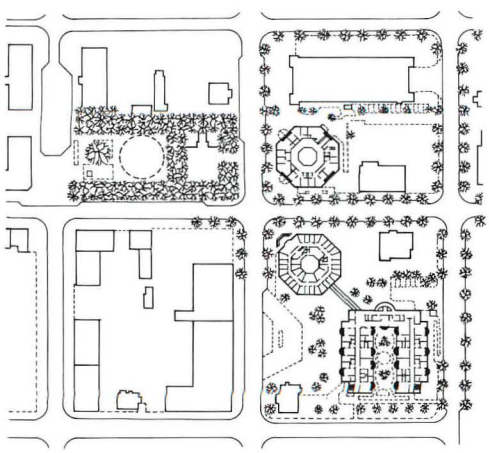
Sweden

Skillful Blending Of Buildings of Varying Types and Ages

Carl Nyrén (born 1917) is one of the indisputable masters and grand old men of Swedish architecture today. Though he studied with Peter Celsing, the great Swedish mannerist, Nyrén's work and his personality are of a more modest and rationalist kind.

Nyrén's work has always been marked by well-studied typical sections and details, mostly structuralist in the '60s and '70s. During the last 10 years, his interest in historical building types has increased, and his work has included a gamut of classical figurative idioms for windows, oriels, skylights, and eaves and for whole building volumes. But the architect has not abandoned the rationalist principles that guided his earlier work. His approach shows the balance and freedom that comes with long experience, as evident in this recently completed block of buildings in Uppsala, containing a city library, archives, and housing.

The exterior is shaped by the complex's



Photographs © Sune Sundahl

Facing page, Uppsala's new complex employs polochromatic brick. Right, the library with its basilican hall.

focal space, the basilica-shaped, two-story main hall of the library. (Making libraries richer in experience than the flat, one-story cultural supermarkets of the '60s is a general tendency in Sweden today.) Around the Uppsala library's light-filled, simple main hall its secondary rooms are placed like small chapels in a church.

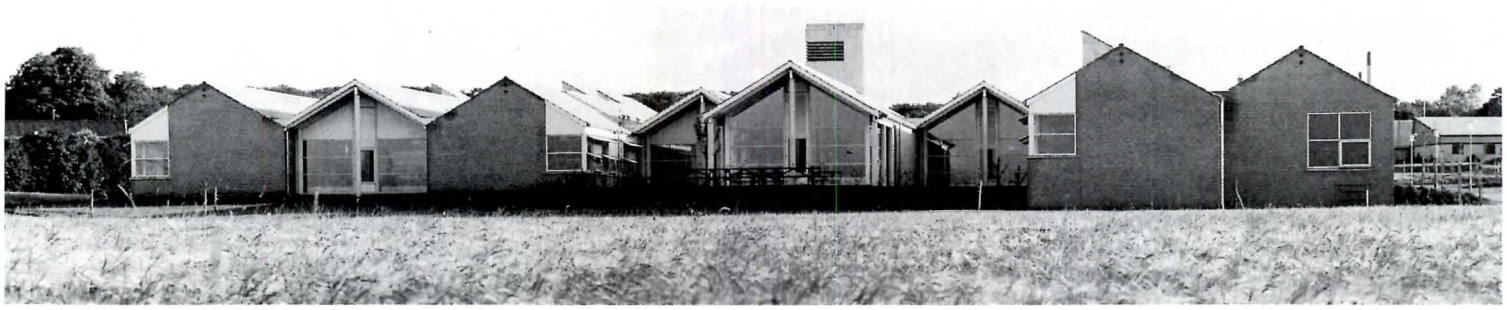
The exterior of the central space has the conspicuous, slightly oversized skylights that make it look like the city halls or guild halls of the northern European baroque. The library's offices continue the simple and repetitive architecture of the two old, paneled, wooden town houses remaining in the block. The dense housing that was added to help finance the whole project has been broken down into four traditional house shapes with gables facing the street.

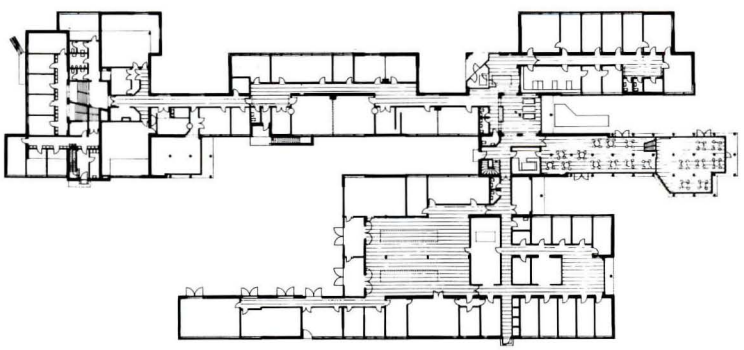
Nyrén's virtuosity in meshing the needs of building type and place is evident in his handling of the library's entrance. Four-fifths of the facade on the main, pedestrian street was occupied by the two old town houses. The challenge was to design an entrance that would respond to this context but also prepare the visitor for the experience of the big library hall. Nyrén's solution was a flight of stairs to the street and an oversized rose window protruding over the roofline. These mark the entrance with means familiar to traditional, vernacular architecture. The stairs lead to a narrow passage into a very small courtyard from which the huge hall is glimpsed. It is an almost Sitteanesque staging that puts rational parts together to form a rich and complex whole. As one of the librarians put it, "Everything is so well thought out and yet you keep discovering new nooks and angles all the time."

There are also more symbolic or literal references. The black and red brick, for example, is an homage to the great Gothic cathedral of Uppsala, which, in its 19th-century dress, has the same mixture of different brick. More important, though, the complex in its richness and complexity responds to a complicated program and to its role as a block between a pedestrian street and a thoroughfare consisting of old low-rise and new high-rise buildings. Nyrén's design choices clarify and explain the situation.—Claes Caldenby

Mr. Caldenby is an editor of Arkitektur *in Stockholm.*

Denmark





Photographs this page by Arkitekgruppen I Arhus

A Cheerful and Uncomplicated Working Environment

Located within a residential area, this Danish workplace adapts to its surroundings.

As interest in the environment of the workplace increases, so does the number of conferences on the subject. At one of these the English psychologist Alan Hedge called for creating "manageable buildings on a human scale that are healthy, that give occupants pleasure, that foster positive feelings toward the workplace, that facilitate productivity, and that are adaptable to change." Hedge's words came back to me recently when I visited Purup Electronics A/S in Denmark. The building does not fit his bill completely, but it comes close.

The Purup building was designed by Arkitektgruppen I Arhus and completed in 1985. Situated near a residential area, it mimics not only the domestic scale but also the forms and materials of the neighboring single-family houses. Thus the building's spaces, forms, and materials are familiar to people working there. Added, though, is excitement from lofty communal areas, sophisticated use of color and detail, and some inspired ideas about movement, views, and vistas.

People who work for Purup's may be less self-directed in their jobs than their grandparents were, but what a stimulating place they have to go to every morning. It is also healthy: materials have been chosen with care, and air quality is good. Everybody works near daylight with operable windows and views outside. Nobody is in doubt whether there is rain or sun outside, whether it is early or late. From the communal meeting space and canteen there is an endless view over farmland, on which employees can feast their eyes.

Moving through the building is uncomplicated. It is easy to find the way but never boring. Surprises turn up around each corner: unexpected wall treatments, sudden strong color effects, stark geometric shapes embedded in the linoleum floor, balconies jutting out or recessed, short views, long vistas, continual variety.

An east-west access spine runs from the front reception area to a rear exit. Along the spine lie administration offices and the large canteen with meeting space to the south, and to the north the sales department, reached through demonstration and training areas. The spine continues through a waiting area (with a near view of a small, still pond and a long view toward the sea), past rest rooms and a kitchen into the production spaces. Apart from the sales department, which is housed in a two-story section, the rest of this building complex consists of narrow, interconnecting, one-story blocks with extension possibilities at either end. They are built of yellow-gray brick with yellow-gray tile roofs, supported on concrete columns.

—Bodil Kjaer

Ms. Kjaer is a Danish architect and critic who has practiced and taught in England, France, and the United States.

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West Germany

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Some Big Names Show Their Stuff At Berlin's IBA

Although the images of West Berlin's International Building Exhibition (IBA) have been filling the pages of architectural magazines for years, many of the most intriguing projects are only now being realized.

One of the first completed IBA projects, Viennese Rob Krier's Ritterstrasse social housing (see Sept. 1983), needed facade renovation scarcely four years after it was finished. And Krier's rigid adherence to the historic block structure, resulting in some static and monotonous urban spaces, seemed slightly contrived. But now that the scheme has been fully completed, with Phase 2 finished this year, Krier's network of courtyard, square, and street spaces is full of the life of children and elders in shady arcades and has other place-making qualities.

Also, the elegant brick detailing of Phase 2 bespeaks Berlin's long-standing fascination with fine brick craftsmanship and helps integrate the complex with historic Berlin. Perhaps best of all, the awkward, glued-on ornament of Krier's earlier work is absent here.

Right around the corner in the Lindenstrasse housing complex of 1987, Dutch architect Herman Hertzberger tried an approach more closely linked to the esthetic tenets and social vision of 1920s modernism. The light-filled, transparent, and dynamic quality of Hertzberger's work contrasts sharply with the static blocks of Krier's Ritterstrasse across the street.

By treating stairwells as semipublic rooms linked by a stair, Hertzberger accommodates an essential in-between level of publicness.

The glassed entry doors to each apartment give views into foyers that many inhabitants have turned into a kind of display space for their way of life. Indeed, user participation in the design and building process was encouraged here by having the first occupants complete their own tilework, carpets, colors, and other decoration as they wished. The result is a close-knit neighborhood.

Two views of Phase 2 of Rob Krier's Ritterstrasse housing, which creates a web of lively, open spaces.

Some 300 yards west of Hertzberger's experimental neighborhood is John Hejduk's 48-unit housing and artists' studio complex of 1988. A slender, 14-story tower of studio loft apartments forms an urban landmark more reminiscent of San Gimignano and Manhattan than the traditional six-story blocks of Berlin. Hejduk skillfully employed two butterfly-roofed wings to flank the tower. Together the three elements define the street and step back to create a square. By mixing high- and low-rise elements Hejduk sought to create a dynamic urban place offering more than the existing block-type structures. Unfortunately, detailing of the tin-hat balcony enclosures and entrances is primitive and ad hoc, and the complex shows insufficient respect for its tenants.

A few blocks away is Aldo Rossi's Koch-

strasse housing of 1987, offering a vivid example of the strengths and weaknesses of the architect's seductive yet chilling brand of theoretical architecture. In his desire to create a coherent street space for the Kochstrasse, Rossi has managed to eliminate all feeling of human scale and the messy vagaries of existence. He has created an impenetrable wall on the Kochstrasse, reminiscent of the neighboring Berlin Wall.

Rossi's well-crafted brick facades, steel lintels, and glass winter-garden balconies, facing the side street, allude to the industrial architecture of turn-of-the-century Berlin. The result is a cold, industrial sense of place that recalls train stations, bridges, and industrial architecture, images of which have been influential in creating Berlin's nostalgic, somewhat mysterious genius loci.

Leaving Kreuzberg's southern Friedrichstadt behind, we encounter in the Tiergarten district many projects under way near the "Kulturforum," which includes Scharoun's Philharmonic Hall and State Library. Right next to Mies van der Rohe's cool National Gallery of 1968 is James Stirling's Science Center of 1988. One of the IBA's few public buildings, it provides office and research space for visiting scientists and scholars and comprises primarily cell-like office spaces. A Beaux-Arts building on the site was preserved and five new ones added with walls of alternating blue and pink stucco. The new buildings differ in form, but "windows are applied like wallpaper" on each, in Sterling's words. They are grouped around a garden with four glassed loggias around it. The loggias have triangular concrete columns set in stonework drums.

By combining architectural quotes from many sources, Sterling sought to make a statement about late-20th-century society. But next to the dignity of Mies this building speaks mainly of affluence.

The most important achievement of the IBA, in contrast to other building exhibitions (such as Berlin's legendary 1957 Interbau), is that it adheres to no single architectural position. Instead, it has experimented with a wide spectrum of architectural solutions. Growing out of the democratic process that created it, the IBA's sense of plurality and freedom of expression stand as its pervading and enduring achievements.

—Casey C.M. Mathewson

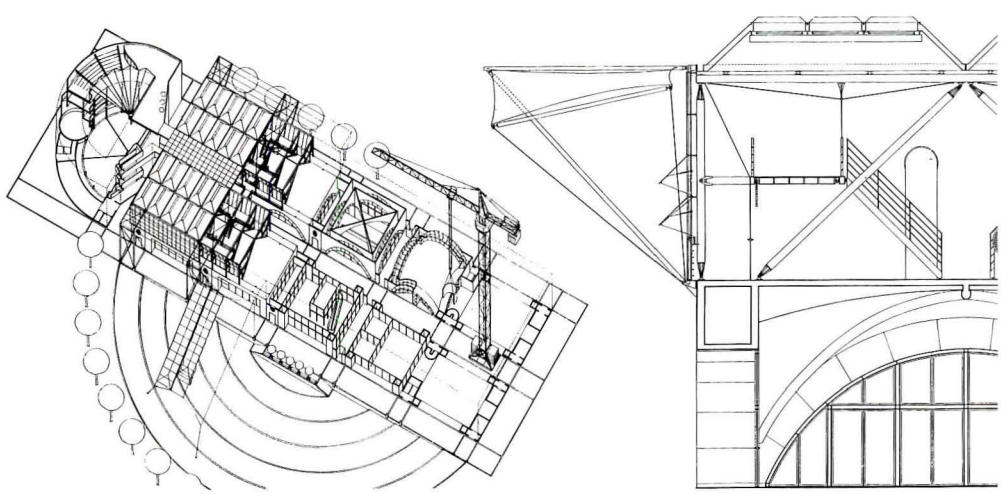
Mr. Mathewson is a photographer and writer based in Berlin.

Facing page: above, a view of Herman Hertzberger's housing based on 1920s modernism; below, John Hejduk's housing and artists' studio complex combining high- and low-rise elements. This page: above, Aldo Rossi's Koch-strasse housing; below, James Stirling's Science Center.

France

'Sensitive, Ingenious' Design for a School Of Architecture

Photographs by S. Couturier



The new school of architecture at Lyon is a clear and elegant design statement, the result of a major competition launched in 1981 following a fire that destroyed the original school buildings. Submissions were invited from several French architects as well as internationally known designers including Lucien Kroll and Mario Botta. However, the winners were two young architects, Françoise-Helene Jourda and Gilles Perraudin, who were already working in Lyon.

Their scheme established a distinctly urban building in an otherwise suburban setting in Vaulz-en-Velin. The campus there is a random collection of educational buildings, sports facilities, and parking areas built up over the last 20 years or so and set among a mixture of recent housing developments on the outskirts of Lyon.

The designers were required to provide the full spectrum of educational spaces, from design studios, laboratories, and workshops to classrooms and administrative offices. The client also desired a "limpid, clear vessel floating in an etheral space," with a budget of about $60 per square foot.

The designers divided the facilities between two linked buildings. The school itself is housed in a long, low, rectangular block, planned for up to four floors and linked to a second, semicircular building that accommodates the administrative offices. As if to emphasize their different functions, these two blocks are quite different both in plan and form.

The offices, seen as spaces relatively unlikely to change, have been planned on four levels in a crescent enclosing a toplighted entry court and stair hall. Built of finely detailed concrete and with narrow slot windows in the outer wall, these spaces look into the court and the school beyond.

By contrast, the school is a series of large open spaces. The design differentiates between classrooms and studios by locating the more formal teaching spaces—seminar rooms, library, and laboratories—at ground level within a series of double-height rooms. As if to reflect the permanence of the knowledge base, this part of the building is two wings of solid and elegantly detailed concrete. The studios are above, in double-height open spaces with a series of mezzanine galleries.

The school and the office building have clearly delineated anatomies and are linked by a circulation spine. The semicircular, daylighted entry hall, enclosed by the offices and designed for school gatherings, connects directly to the single, central, toplighted "street" that provides access to all the classrooms and studios.

This clear, rational organization of the buildings, both in plan and section, extends throughout the scheme to the design of the structural and servicing systems, the choice of materials, and the smallest details of their assembly. It is an approach that makes reference to the work of Louis Kahn. Classrooms are within concrete vaults separated by thick walls that not only provide structural stability but also define service distribution, staircases, lavatories, and storage.

By contrast, the studios are planned within an open framework of timber. Glued, laminated columns and beams are joined by cast steel ties. Each of these specially designed connections is a beautiful object, shaped to express its role in the overall pattern of the building's structural system. The system is completely exposed internally, and the fully glazed external walls ensure that the bones of the building are also clearly visible from the outside. These light, glassy facades

The school is divided into a rectangular classroom block shaded by fabric sails (right) and an administrative section in a crescent structure (below) linked to it. Left, studios occupy double-height open spaces marked by exposed wood framing and a series of mezzanine galleries.

along the length of the building are shaded by silver-gray fabric sails that are bracketed delicately off the facades by tubular steel compressive struts and tension cables. Along the facade fronting the main campus, this system of supports has been extended with a colonnade along the edge of the school.

As well as clearly expressing the structural systems, the designers have thoughtfully developed the environmental control systems in the school. The studios' external walls, for example, consist of two leaves of single glazing, separated by a wide cavity. Not only does this define a route for people walking through the studios, but it also allows naturally warmed air to be extracted from the cavity and used elsewhere in the conditioning of the building. Natural light is generously provided by clear glazing over the "street" and entry hall, admitting direct sunlight that is supplemented by carefully screened toplighting within each of the coffered structural units forming the roofs of the studio spaces.

In its making, this new school of architecture by Jourda and Perraudin is a demonstration of the sensitive and ingenious use of materials. In its realization, it not only creates a fine place for learning but also inspires those designers who will visit and use it.—Brian Carter

Mr. Carter is a design critic and architect with Ove Arup Associates in London.

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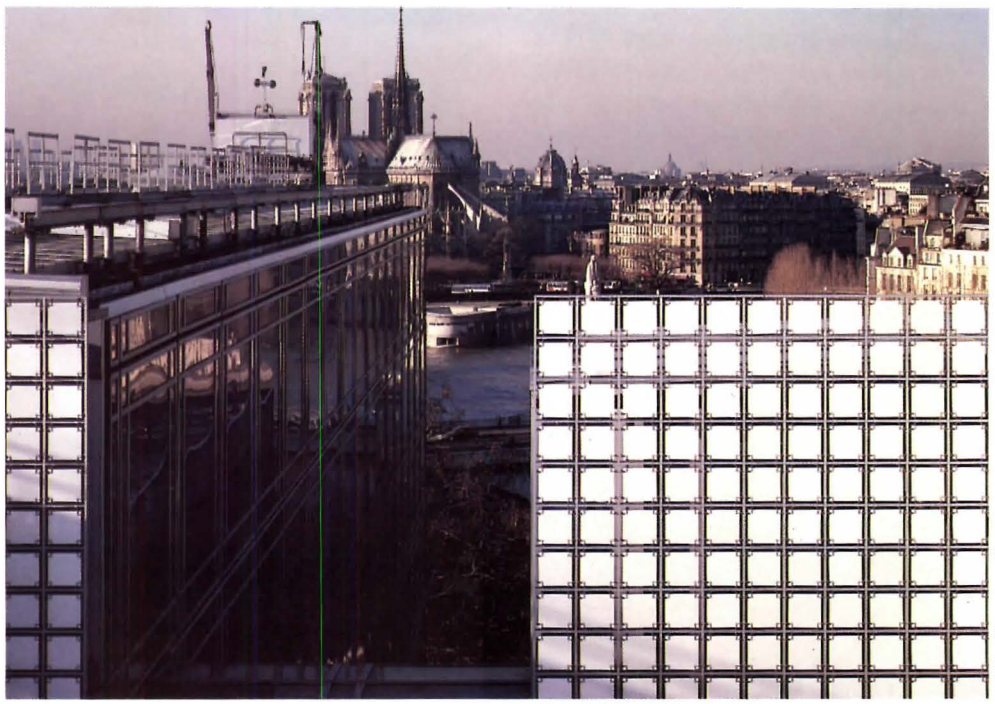
France

A Composition of Window Walls Above the Seine



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The Arab World Institute, on the left bank of the Seine just upstream from Notre Dame Cathedral, is the first major new public building in a very long time to have been completed on a prominent central Paris site to designs by French architects.

The architecture is itself instrinsically French, for, in contrast to major Parisian projects by non-French architects, from Piano & Rogers's Beaubourg to I.M. Pei's pyramid at the Louvre, the Arab World Institute reflects peculiarly French architectural preoccupations. Its urban form is finely honed to its specific Paris location while its imagery has been adapted from high-tech (for want of a better term) to evoke the confluence and contrast between Arab and Western culture, ancient and modern, in a vocabulary entirely in tune with the France of the 1980s.

The Arab World Institute was founded in 1980 by France and 19 Arab countries to foster knowledge of the Arab world, its languages, cultures, and spiritual values; to promote cooperation and exchange between France and the Arab countries (especially in science and industry); and to enhance relations between the Arab countries and Europe.

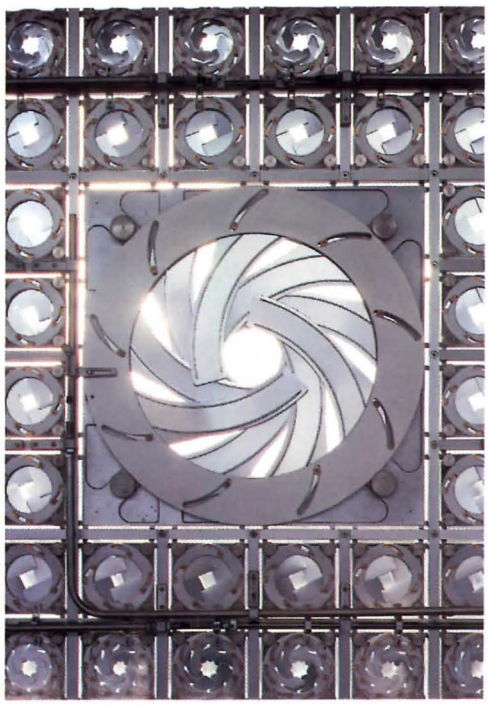
Jean Nouvel, Pierre Soria, Gilbert Lezenes, and Architecture Studio won a limited competition and were commissioned to design the building, which President Mitterrand made one of his *Grands Projets*. The building's completed public facilities include a museum, a library, a 360-seat auditorium, spaces for temporary exhibitions, a roof terrace, a rooftop restaurant, and a battery of glazed, high-speed elevators. There are also staff offices, a chamber for the high council, underground parking spaces, and the like.

According to Nouvel, the basic design concept has remained unchanged since the competition, despite cost-cutting exercises and numerous amendments to details of the internal layout. The building is composed of two parallel, interconnected ranges, separated to the west by a dramatically narrow chasm. The great sweeping curve to the lower, northern range is intended to imply urban continuity between the Seine frontage and the Boulevard St. Germain, while the garden front to the taller, rectilinear range lines through with the rear elevation to the neighboring university block, from which it is separated by a modest gap. The focal point, designed to be seen from afar, is the spiraling "tower of books," visible through clear glazing to the northwest corner of the rectilinear block.

But by far the most eye-catching element of the detailed design is the "diaphragm wall," which occupies almost the entire length of the institute's garden front. Visitors approach this front obliquely, through the garden, from a white-marble-clad portal designed to resemble a shattered cube. As one gets closer, it becomes apparent that the south-facing glazing to this elevation is protected internally by panels made up of variously dimensioned diaphragms, arranged symmetrically within borders of pierced metalwork.

The diaphragms, operated electronically, open and close like camera irises to control the passage of sunlight into the building. As seen from the outside, the apparent density of this facade varies subtly, depending on daylighting levels. The effects are more marked within the building, where changing patterns of light and shade are highly evocative of those cast by the pierced screens traditional to Arab culture—an analogy consciously created, as a symbol of the building's purpose, with a form of present-day Western technology chosen as much for its geometric similarities with Arabic decorative motifs as for its efficiency in controlling sunlight.

If the south-facing facade draws paral-



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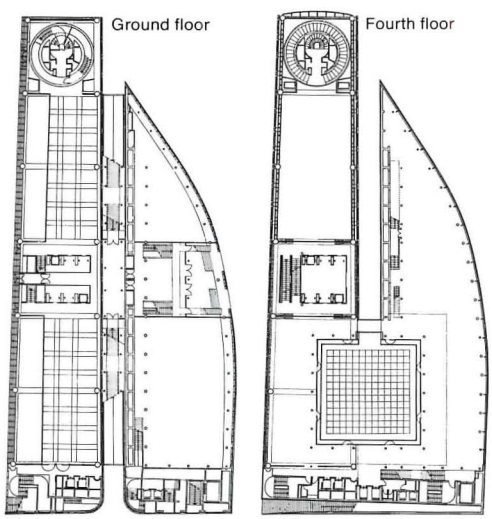

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Facing page, views showing relationships with the Seine and Notre Dame, and two-story museum space. This page, the diaphragm wall and a closeup from inside.

lels between Arab and Western cultures, the window wall overlooking the Seine is designed to emphasize the institute's central Paris location. Splendid views over the city are exploited to form the backdrop for the works of Arab art displayed in the museum. But, whereas the museum display cases were designed by Nouvel to be as unobtrusive as possible, the views of Paris are seen through what he has described as "a 60-meter-long venetian blind"—fixed horizontal baffles, intended to suggest a degree of separation between the modern city and the museum's objects.

Yet a third, and distinctly different, approach to window-wall design has been used for the elevations surrounding the inner court (where a fountain of mercury is planned, if funds can be found). Here, relatively conventional glazing to offices and part of the museum is supplemented by a screen consisting of slightly translucent squares of white marble, suspended a catwalk's width away from the windows, on the outside of the building. The marble squares are set far enough apart to allow glimpses into the court, but close enough together to prevent any internal space being overlooked, or losing privacy from any other.

The environmental variety within the building extends to still greater extremes, from the totally enclosed subterranean auditorium to the roof terrace, with its breathtaking views, and from the almost oppressively low ceilings in the entry foyer to the play of light penetrating the building's full height through the top-lighted glazed elevator well.

Moreover, the building exudes confidence, and rightly so, for it provides tangible proof that the French can produce a monumental building worthy of their capital with home-grown talent and in an idiom all their own. For that reason, the Arab World Institute is the most significant architectural achievement of President Mitterand's first term in office. Now elected to a second term, what will he do for an encore? —Charlotte Ellis

Ms. Ellis is an architect living in Paris.

Taiwan

A Firm's Modernist Works Enriched by Traditional Touches

For quite some time after World War II, Taiwan's architecture was, as a whole, rather mundane and uninteresting. Other than some housing, few new buildings were built, and most of them were derivative of the West or reinterpretive of the past.

The dramatic change in Taiwan's architecture came with its improved economy and with the return of many talented Chinese architects in the 1960s and '70s from the United States. Some came back because of the U.S. recession, others were lured by new opportunities on the island, and still others felt a sense of responsibility to their homeland.

Among those who returned, C.Y. Lee has been one of the most productive and innovative. He was born in China, earned his B.S. in architecture from Cheng-Kung University in Taiwan, and went to the United States in 1962. After completing studies at Princeton, he worked for several years for the Boston Redevelopment Authority as an urban designer and for William Pereira, I.M. Pei, and others as an architect. Back in Taiwan in 1978, he asked his friend C.P. Wang, a graduate of Washington University in St. Louis, to join him as partner.

One example of the many modern buildings by Lee and Wang is the San Shong building in Taipei, a dramatic office building with an interesting flow of interior and exterior spaces. Lee said he was inspired by Henry Moore's sculpture in designing this building. The Tung Wang Han Kung project has a similar flow of interior and exterior spaces; however, its motif is derived from Chinese architecture.

In the Ta An public housing project, Lee has made a new attempt to integrate traditional Chinese architecture into his design. The project, located next to an elevated highway, is on an L-shaped site that runs north-south about 660 feet and east-west about 800 feet. Two local streets had to be incorporated, so the site is divided into three parcels.

The architect put taller buildings, of 13 to 18 stories, next to the elevated highway to maximize building volume under a given floor area ratio of 4.2. Seven-story buildings are in the back. The size of apartments varies from 864 to 1,224 square feet, and there are 1,429 of these units, plus a small amount of retail space on the ground level. The towers, dramatically clustered on the edges of a large block, surround a secure, innovative Chinese garden planted on the top of one story of parking.

All units are oriented south, the preference of local residents. Each has three balconies. The elevator lobby has natural lighting. For the taller buildings, reinforced concrete structure, shearing walls, and flat slab construction were used; the lower buildings are reinforced concrete structures. Exterior walls were surfaced with brick, mosaic, and artificial stone. The total building area is approximately 1.5 million square feet, and total construction cost was $25 million in U.S. dollars, or about $17 per square foot.

Although Lee used Chinese motifs extensively throughout the building and garden designs, he broke many classic rules. Thus, his design shows a certain freshness when compared with the classic. At the same time, his efforts to draw from his heritage set this project apart from ordinary Taiwan public housing projects.

Lee's critics say his designs are no different from the current postmodern fashion in Western countries, except for his use of the Chinese motifs. Nevertheless, his interest in integrating classic Chinese tradition with contemporary architecture creates some exciting new possibilities. His attempts to inject Chinese spirit into his architecture do not depend solely on exterior expression. In his design for a research laboratory for the Academia Sinica, the outward form is no different from any Western architecture but the flow of space is derived more from Chinese courtyard houses.

Since his return to Taiwan, Lee has spent considerable time reviewing Chinese culture. He studied philosophy under the renowned Mo Chun-San. He practices Tai Chi regularly. He has found new expression in Chinese ink painting. In rediscovering his heritage, he is not bound by the traditional rules of Chinese architecture; he still is influenced by his Western training.

C.Y. Lee, among others, is struggling to integrate Western techniques with an understanding of his own heritage.

—Weiming Lu

Top right, the San Shong building. Top left, Ta An public housing project. Above, research laboratory for Academia Sinica.

Mr. Lu, a native of China, is executive director of the Lowertown Redevelopment Corp. in St. Paul, Minn.

Malaysia

Spaces for Betting And Monitoring Races Remotely

C.S. Lim, of the firm Lim Cheok Stang in Kuala Lumpur, Malaysia, writes as follows about his new Sungei Besi off-course racing center near the Malaysian capital.

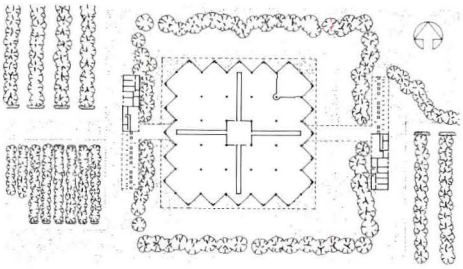
This building type is a first in Asia. In almost all race courses, the spectator's view of horses is from the grandstand. However, in this off-course center, the only means of watching a race is closed-circuit television. Television sets are located in each of four tote-hall quadrants.

There are separate, airconditioned betting enclosures for ordinary members and owners, each with full betting and viewing facilities and an area providing refreshments. The ordinary members' enclosure has a specially designed and landscaped private garden betting enclosure where members can enjoy a paddocklike atmosphere. The public is served by two large open-air kiosks on the eastern and western side of the complex.

The building is steel and covered with a metal roofing system. There is no wall along the periphery of the building. However, the roof around the periphery is lower than the central roof to form a skirting and prevent rainwater from splashing in. The main roof is 24 feet high and the skirting roof 18 feet high. The roof design allows for cross ventilation and convection air movement and gives the building a machine-esthetic image, resembling an airplane about to take off.

A garden surrounding the main building will be heavily landscaped and has many outdoor television sets and monitors to encourage the punters to enjoy this new concept of "garden betting."

The finishes require minimum maintenance, and the structural system was chosen to allow conversion of the building into a sports complex. □



The architect describes his building as 'a horizontal reposing structure with a crowning center and extended fingers terminated by rectangular pavilions.'

Czechoslovakia

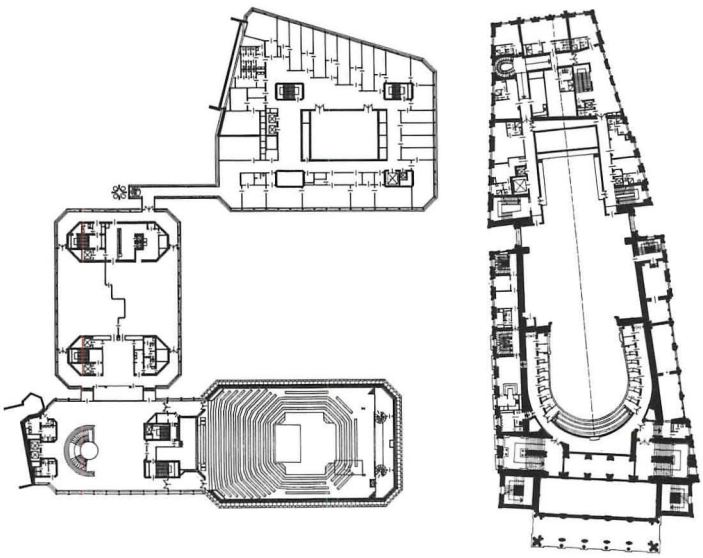
Crystalline Cube Added to Prague's National Theatre

It took some 40 years to crystallize ideas for expansion of the National Theatre in Prague. Though it is now completed, the polemic continues. The issue of the relationship between old and new remains the main topic of debate.

The National Theatre has been a symbol of the Czech National Revival of the 19th century. Located on the Vltava River, the original building was designed by Josef Zitek, financed by a nationwide collection, and completed in 1881. After a mere three months of use, however, it burned down. Another collection to rebuild raised the necessary funds in 47 days. The rebuilding by Josef Schulz, an associate of Zitek, was finished in 1883. Since then, the patriotic Czechs have demonstrated strong feeling toward their National Theatre and any proposed changes to it or its surroundings.

The most visible and controversial part of the expansion is the portion called the New Scene. Side by side with the historical building, it faces the important National Avenue (Narodni Trida). In general, the buildings of the expansion complex and the historical theater share comparable proportions, scale, cornice heights, tapered tops, vertical articulation, horizontal layering, and a ground-level treatment that respects the pedestrian. In addition, the light brown exterior finishes of the additions attempt to relate to hues of the historical theater.

Nevertheless, controversy remains on how the design literally crystallized into the form of a glass cube, which is in direct contrast to the neo-Renaissance charac-



Facing page, National Avenue (Narodni Trida) with the glass facade of the New Scene building and the historical National Theatre beyond. This page: top, New Scene building from the Theatre Plaza; above, its lobby; right, its auditorium.

ter of the historical theater. Chief architect Karel Prager explains: "The vertical and horizontal tapering of the walls optically reduces the closed compact mass. The outside envelope made of hollow glass blocks mirrors, shimmers, and reflects the light and the surrounding objects, thus helping to dematerialize the building mass to become a pendant of the historical building of the National Theatre."

The historical theater is connected with the expansion buildings underground where actors, stage workers, props, air, water, and other services circulate. The historical building actually consists of three parts: the theater of Zitek; the so-called temporary theater (which was there before the National Theatre was built in 1881 by Zitek); and the Schulz House. In the reconstruction project, these three parts were united to extend the original stage, the stage services, mechanical equipment, and dressing rooms. The reconstruction architect of the historical building was Zdenek Vavra with Frantisek Flasar.

The expansion's urban design concept was created by architects Pavel Kupka and Ivo Loos. The new complex consists of four buildings: (1) the 80x85-meter, six-story podium under the Theatre Plaza, including the energy center for all the buildings, storage, workshops, services, and parking for 219 cars; (2) the seven-story restaurant building, with two restaurants, a cafe, snack bar, kitchen, and services; (3) the seven-story rehearsal building, containing a two-story ballet/opera rehearsal hall, a theater rehearsal hall, and meeting rooms; (4) the New Scene building, with a flexible stage for a proscenium theater of 405 seats or an arena theater of 563 seats. The foyer features a circular monumental stair.

The glass enclosure of the New Scene building provides both acoustic and thermal insulation. Especially crucial is the acoustic muffling of the street noise, which is reduced from 95 decibels to 35 decibels by several layers of the perimeter wall and the hollow glass blocks of 80x60x40 centimeters, weighing 40 kilograms. Each of the 4,306 glass elements installed on the facade was individually blown (like a big rectangular bottle) and exposed to gamma rays that colored the glass light brown to match the sandstone facade of the historical building.—PETER LIZON, AIA

Originally from Czechoslovakia, Mr. Lizon is an architect and planner and teaches architecture at the University of Tennessee, Knoxville.

Canada

National Gallery That Is a Symbol Of National Pride

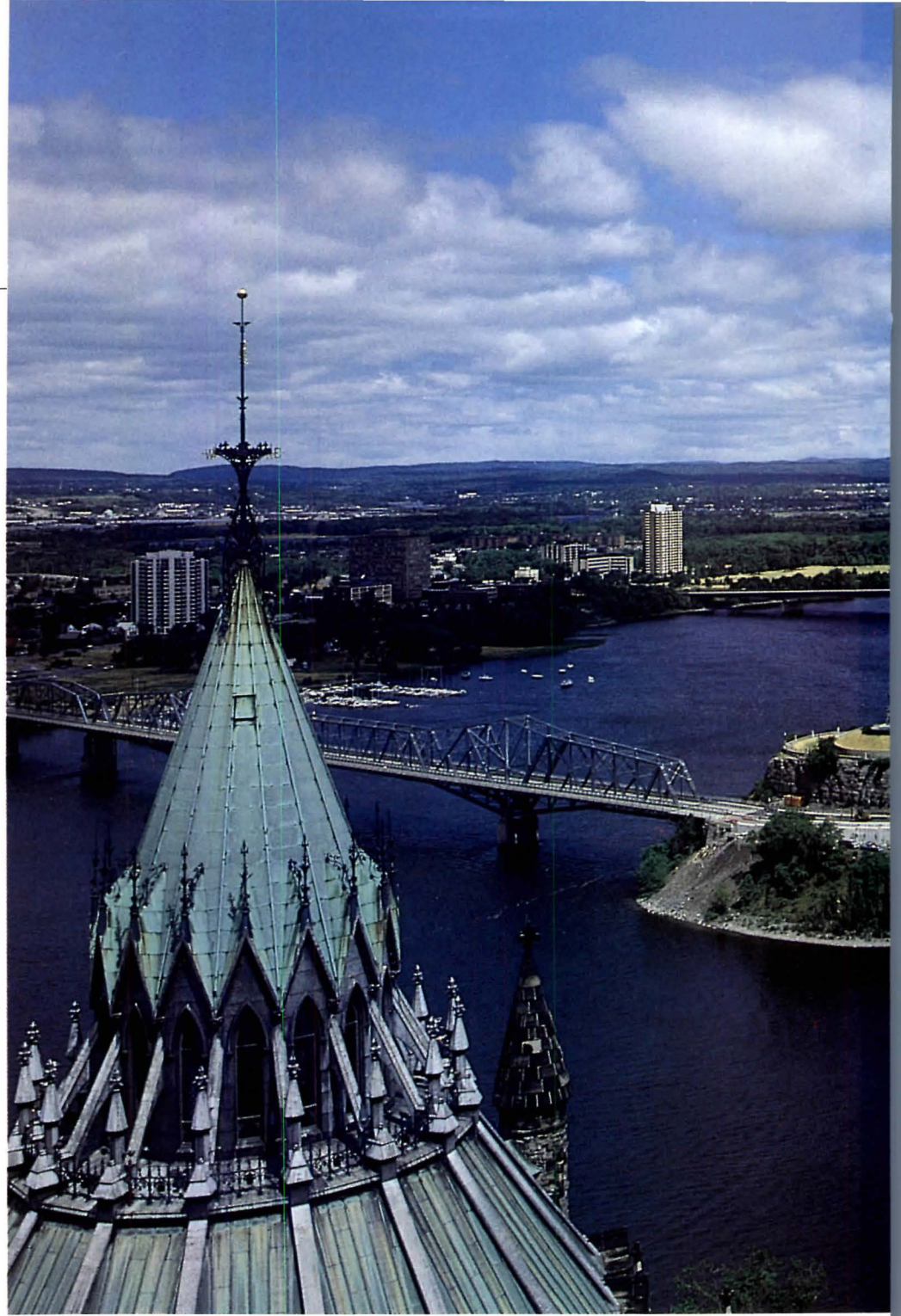
The new National Gallery of Canada in Ottawa by Parkin/Safdie has been the most heavily publicized Canadian building since Moshe Safdie's own Habitat housing pyramid at Expo 67 in Montreal.

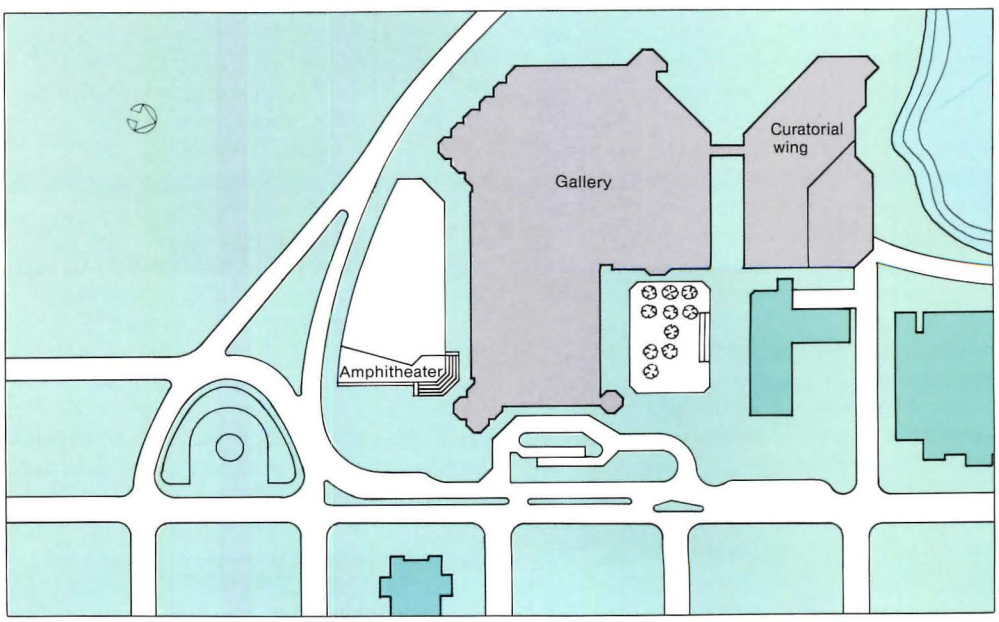
Safdie, the Israeli-Canadian whose home now is in the Boston area, hasn't had an altogether good year. His vast project for Columbus Circle in New York was shot down by a citizen lawsuit, and Safdie was replaced by another architect.

The National Gallery, however, is a different story. Safdie and his gallery were featured on Canadian television and on the cover of *Maclean's,* the Canadian equivalent of *Time* magazine, with the headline "Triumph of an Outcast." The nine-page article informed us that the casters-out were the members of the "Canadian architecture establishment."

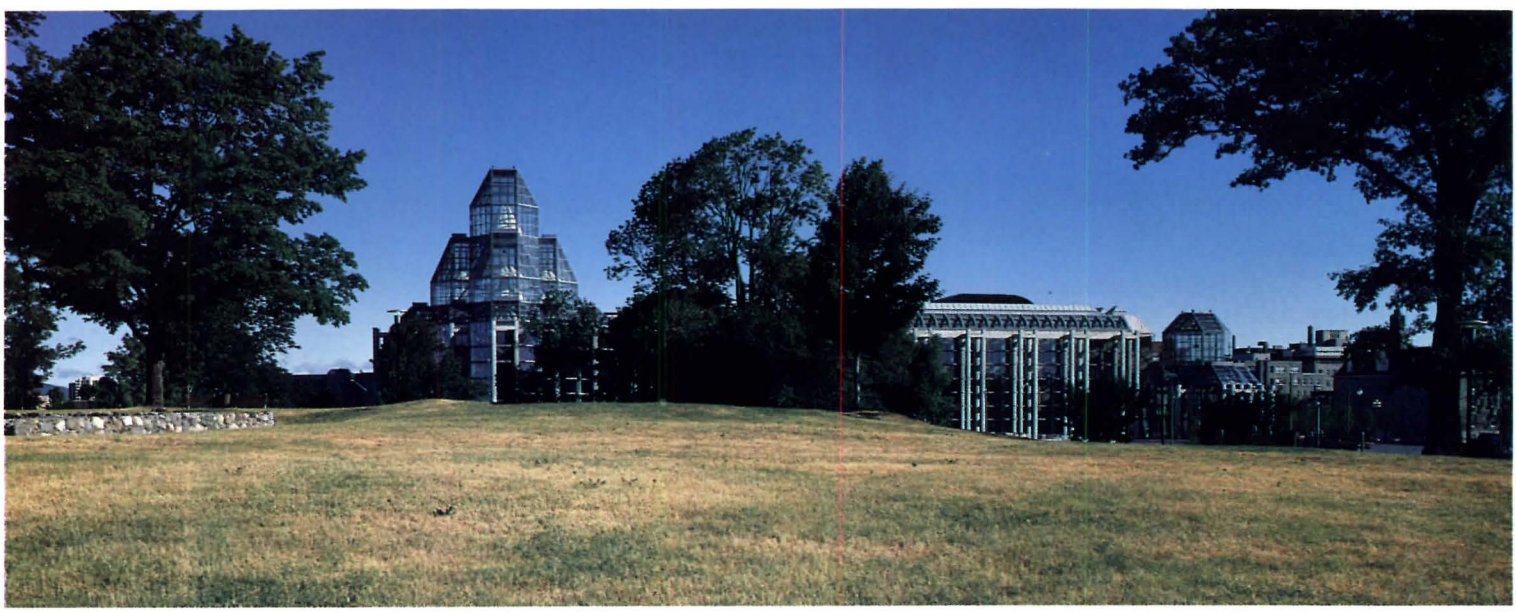
For Canada, one senses from all this, the new gallery is more than a building. It marks a rite of passage for a nation whose image abroad, fairly or unfairly, has been that of a likable but unsophisticated society notable for vast empty plains, healthful outdoor living, nasty hockey players, aggressive real estate developers, and boring politicians. Certainly it has not been a culture thought of as particularly artistic. Going to see a show of Canadian art has been, until recently, about as probable an activity as going out for Irish food. The Canadian pride in the new National Gallery is a pride in the emergence of a new and more urbane Canada that is joining the ranks of great nations. Canada itself, one guesses, may be feeling like a triumphant outcast. Or perhaps it is only Ottawa, the small capital of a nation that also has Montreal, Toronto, and Vancouver, that feels the triumph.

Such concerns are heavy baggage for architecture, and, not suprisingly, Safdie's gallery is a furiously ambitious building, an attempt to create a truly public and monumental building symbolizing a nation and its aspirations and also functioning properly as a home for art. Brilliant in conception, the gallery largely succeeds at both these major goals. But it is often disappointing in details.





Above, gallery from atop Parliament.



Photographs by Allen Freeman

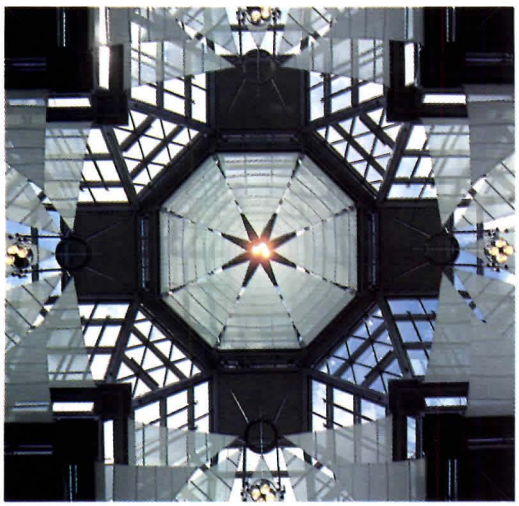
It is set on a bluff high above the Ottawa River, just across from a similar bluff on which stands the magnificent Gothic-revival Parliament House, one of the great public buildings of North America. Parliament House, covered with spires, has a prickly surface and silhouette. The new gallery imitates it by means of an exterior skeleton of concrete framing and a roofline broken by faceted glass-domed pavilions.

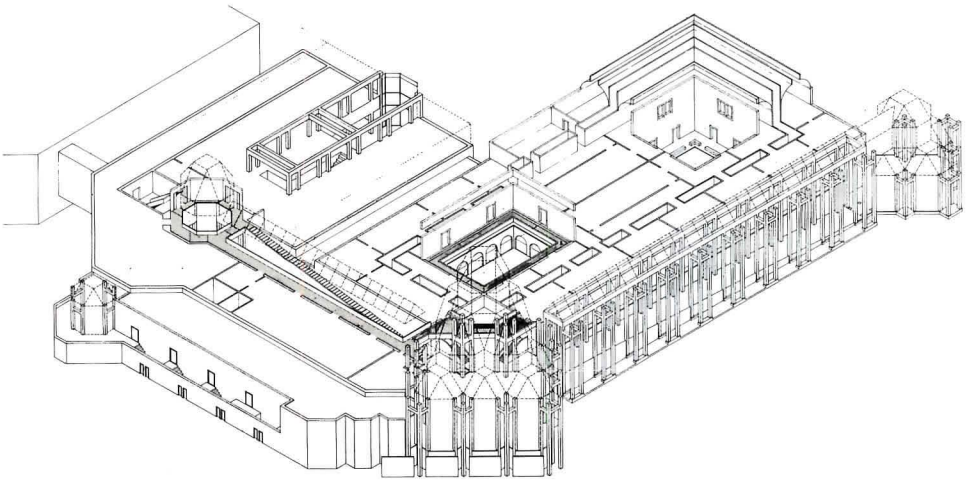
Seen from any distance, these devices work well. The gallery is bold on the skyline, but not so bold as to upstage Parliament House. Up close, the devices are less satisfactory. There seems no reason for the concrete exoskeleton except its looks. The glass domes with their many facets do not suggest a clear or convincing geometry, and they lack a definite shape. Nor do they seem well related formally to the solid museum walls—too solid?—of flame-finished, pink Quebec granite from which they rise. Coming closer yet, one is confronted at the base of the main glass pavilion by a clumsy skirt of fire stairs hidden behind blank walls. The grand conception still holds up, but the gallery lacks the compulsive attention to resolving form and detail that so important a building needs. One recalls, by contrast, James Stirling's Staatsgalerie in Stuttgart, where another strong urban idea is complemented by an impressive command of detail.

Inside, Safdie's gallery has drama and a powerful sense of public procession. The ground floor is dark and somewhat disorienting, a character emphasized by the many ugly little signs the management has found it necessary to post. But this floor is devoted mostly to secondary uses—auditorium, coat check, cafeteria, gift shop, offices. The museum really begins as you start to walk up the great "Colonnade" ramp that leads from the small entry pavilion toward the largest of the glass pavilions—the so-called Great Hall—one flight up.

The Colonnade, framed in concrete columns, floored and edged in the same pink granite as the exterior, is flooded with light from a glass wall on the left that opens to a panorama of Parliament House on its bluff. Procession through the museum becomes a procession through the city as well. This is a building, Safdie says, that is "curious about its surroundings." At the top of the Colonnade the extraordinary interior of the Great Hall unfolds as you approach. Its interlocking octagonal geometry is much more *intelligible inside* than it was outside, and it soars to an impressive 140 feet, articulated by fabric sun-

Photographs by Allen Freeman





Facing page, above, the long, glassy, buttressed south elevation, with entrance pavilion at right, Great Hall at left, and ramped Colonnade extending between. Left, from inside the Great Hall, the 1876 Italian-Gothic dome of the Parliament Library is prominent in the distance. Motorized, triangular fabric sunshades at the top of the space are seen again at top of this page in straight-up view. Right, the Colonnade is topped by a linear, peaked skylight, as is the second circulation spine (above) extending from the Great Hall at a right angle to the Colonnade.

shades that open and close like the petals of a flower.

The Great Hall is a major public space for Ottawa and Canada, used for various functions and ceremonies. It, the Colonnade, and a so-called Concourse that also leads into and out of the Great Hall, possess a civic character, like the streets and squares of a traditional city. The Great Hall is a chunk of new public realm that in no way trivializes the art, to which it remains the grand entrance. And at night, lighted from within, it is a lantern high in the sky over Ottawa.

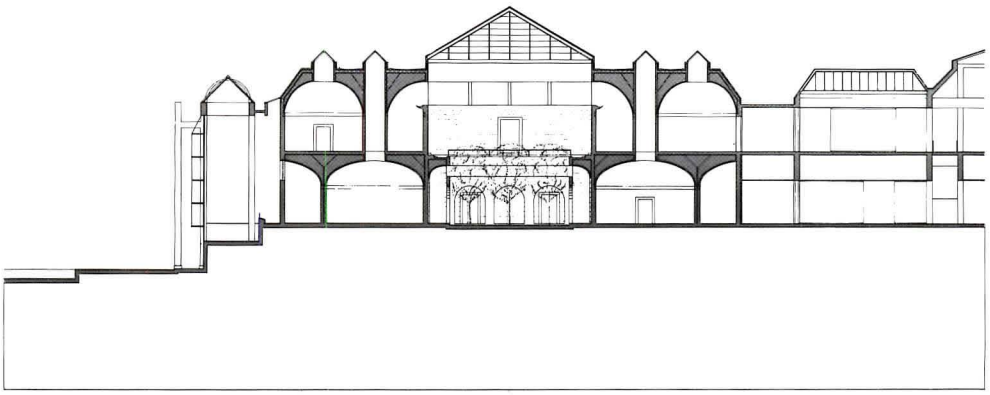
From the Great Hall, visitors filter off in various ways into the galleries themselves, on two levels. Those on the top level are directly skylighted, while those on the lower level receive natural light through a series of unique light shafts. These shafts are lined with reflective silver mylar, and, even though they must penetrate down one whole story through the building, they still provide an astonishing amount of daylight. On an overcast day, the artificial lights can be turned off and the galleries will continue to glow at a perfectly acceptable light level.

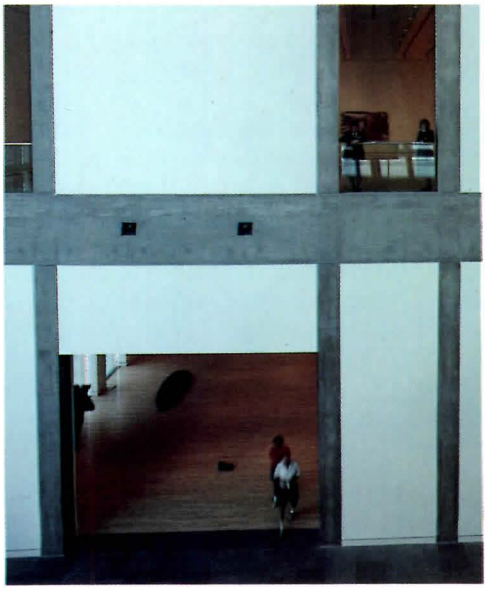
Most of the galleries on both floors have vaulted ceilings down which the daylight washes evenly to illuminate the walls. Pleasant in scale, gently alive with ever-changing natural light, these are among the best gallery spaces of recent years.

The National Gallery is enormous, 600,000 square feet in all, so it isn't surprising that circulation sometimes becomes confusing. But there are benefits to things not being perfectly clear. You stumble unexpectedly, for instance, on two lovely courtyards and a Victorian-Gothic convent chapel interior, saved and transported from another site. One courtyard has in its center a shallow, glass-bottom pool of water kept in constant motion by a small pump. Below the pool, on the ground floor, is a lobby space for which the pool functions as an ever-changing skylight.

The National Gallery is full of such inventions—some of them risky, most of them successful. If everything about the gallery isn't a complete triumph, it is nevertheless a major building and one that, perhaps by the very scope and shortfall of its ambition, seems already to have become a symbol for Canada.

—Robert Campbell, AIA





Section shows light-shaft system. Photos at near right and above, two of the vaulted galleries; far right, view across corridor. Facing page, the Great Hall at twilight.

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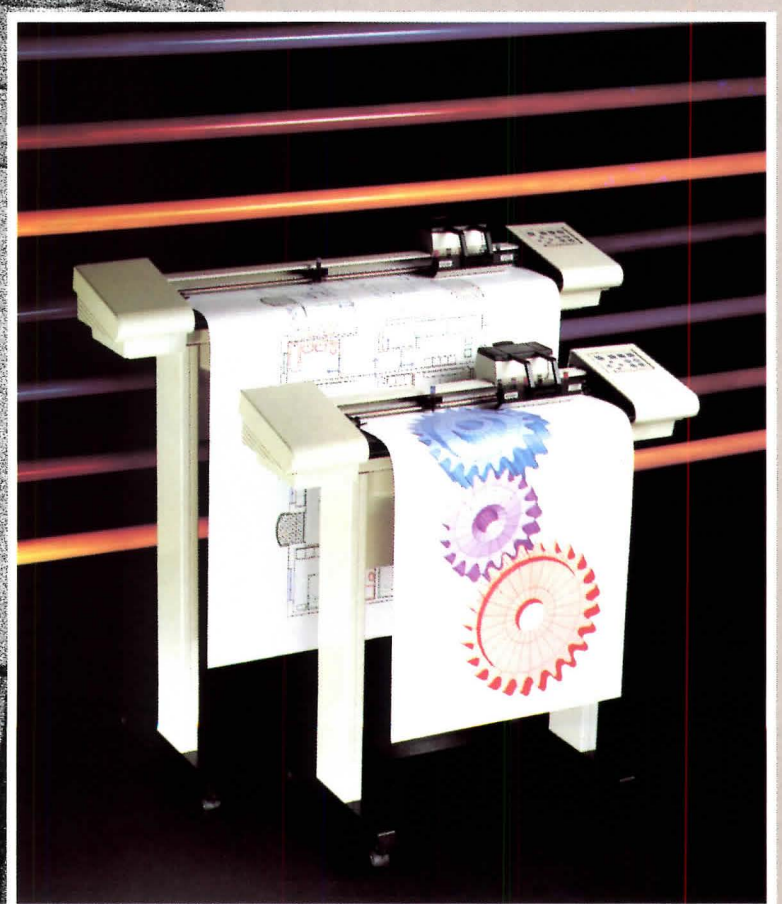

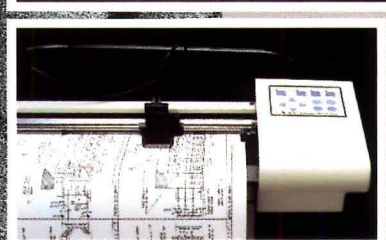

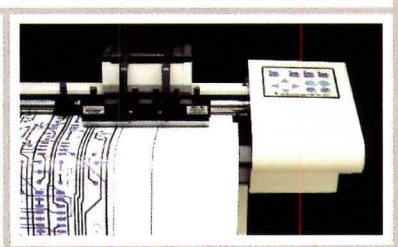

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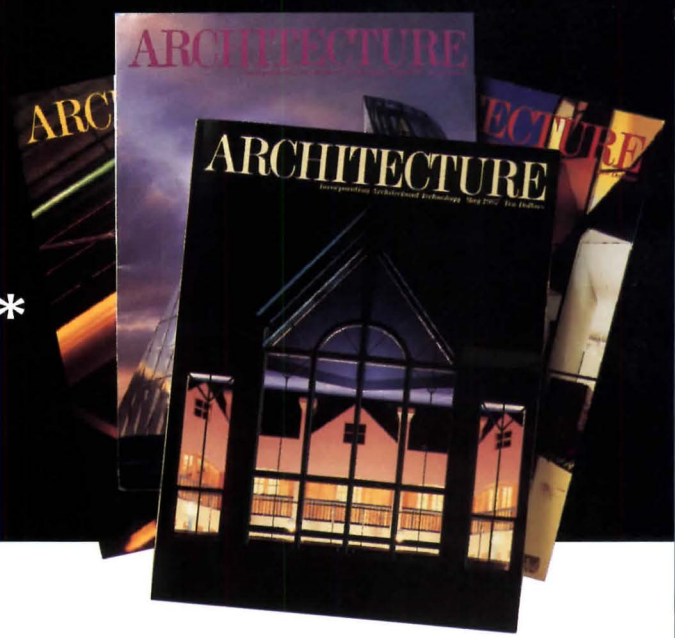

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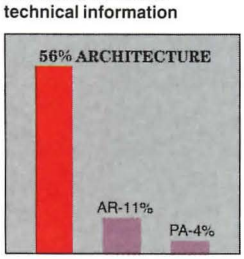

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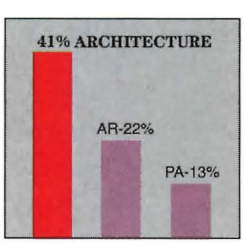

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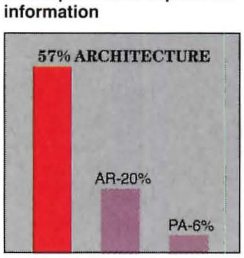

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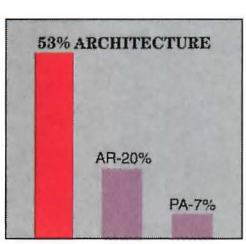

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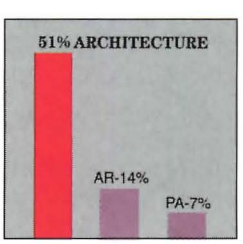

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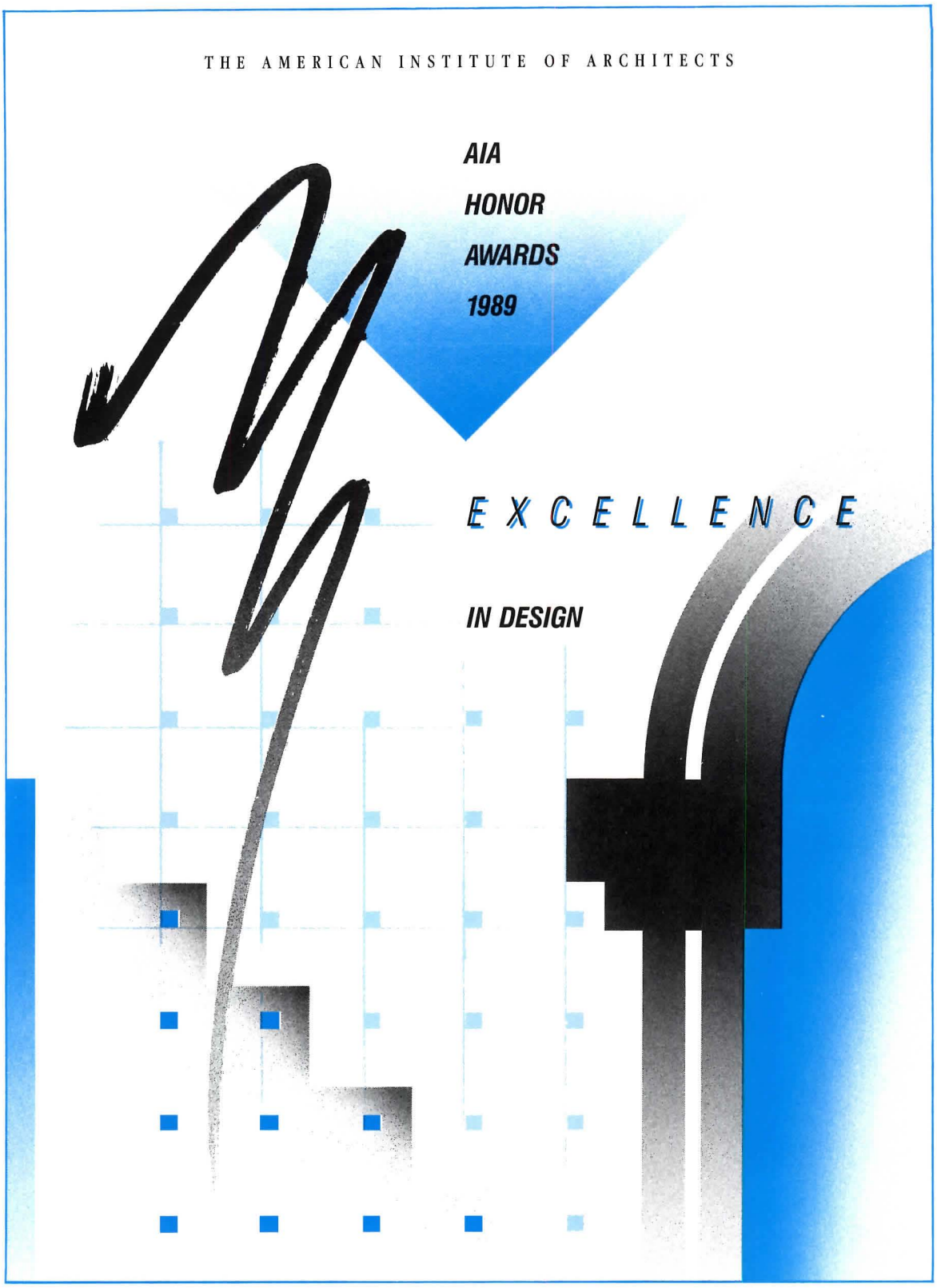

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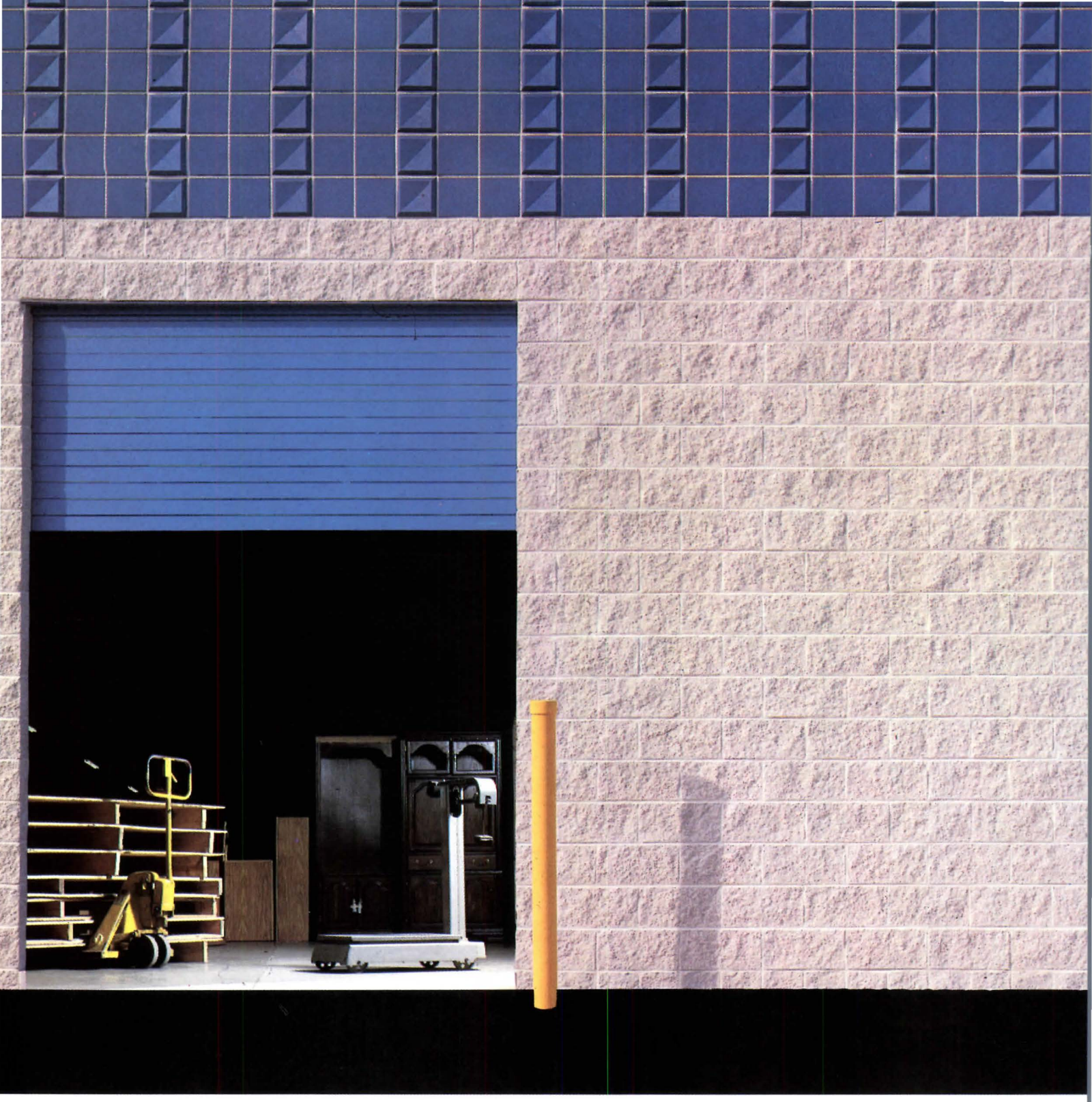

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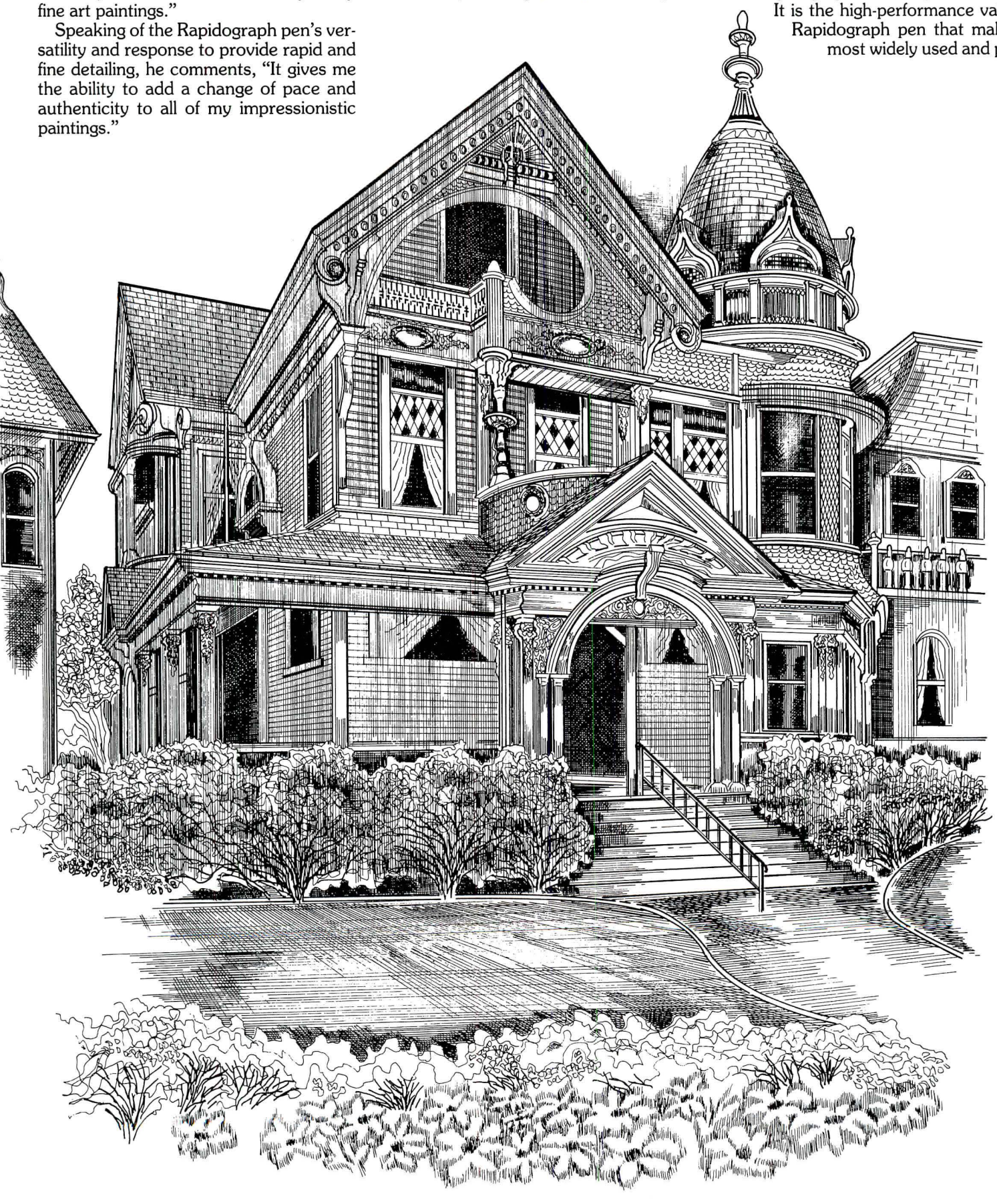

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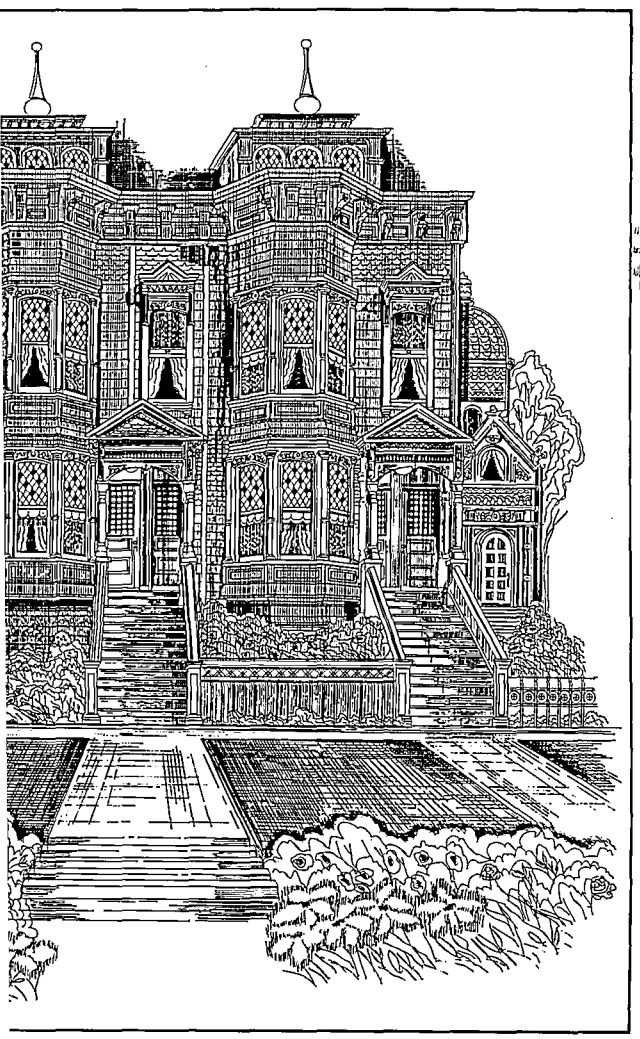

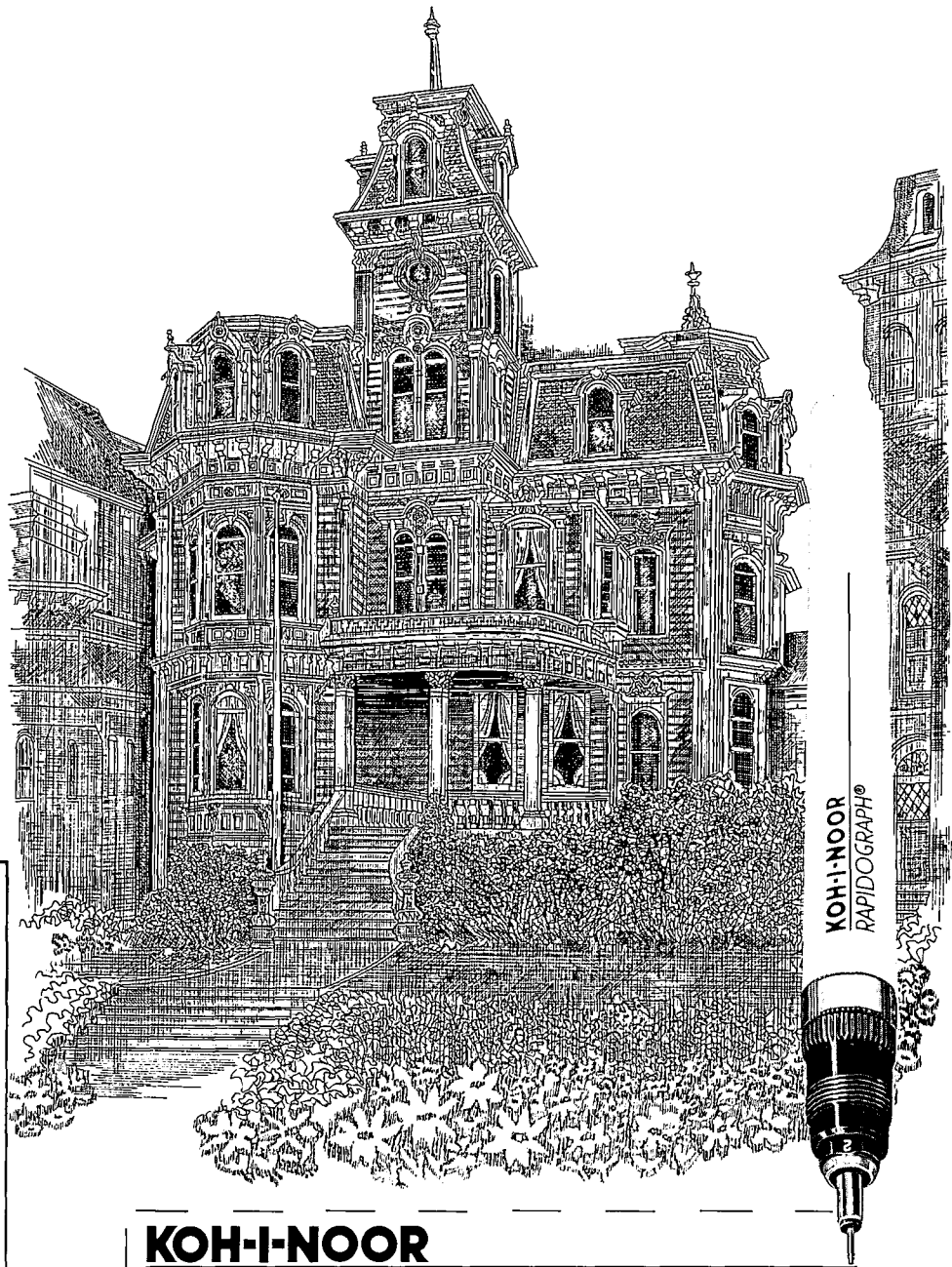

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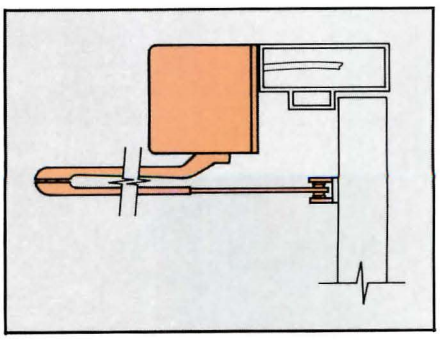

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Myths and Realities of Japanese Building

By William H. Coaldrake

Beauty may lie in the eye of the beholder, but in Japanese architecture what is seen is frequently not there, and far more is present than is actually seen.

Japanese buildings have become a source of fascination to us all, both as icons of tradition and as symbols of modernity. Traditional architecture, as found at the Katsura Imperial Villa, readily seduces the visitor with its graceful forms and subtle nuances of materials and surfaces. Monuments like the Tōshōgū mausoleum at Nikkō stun the senses with their gilded grandiloquence. Soaring high-rise buildings in Tokyo's Shinjuku subcenter defy earthquakes with innovative flexible-frame technology. Names of Japanese architects such as Tange, Maki, Isozaki, and Andō are on the lips of students of architecture the world over, much as those of Le Corbusier, Wright, Mies, and Gropius were a generation ago.

Japanese architecture may be fashionable, even faddish, but enthusiasm has not necessarily been matched by understanding. At best, interpretation is superficial or stereotyped. At worst, it is patently incorrect. What, then, are some of the prevailing illusions about Japanese architecture, and what is the reality that lies beyond them?

Mr. Coaldrake is a research fellow in Japanese history in the school of Pacific studies at the Australian National University in Canberra. Born in Tokyo, he received his doctorate from Harvard University in 1983 and taught history of Japanese architecture there until 1986. He has been a visiting research fellow of the University of Tokyo department of architecture. In 1980 he received the first membership in the Kyoto Association of Traditional Master Builders ever offered to a non-Japanese.

Figure 1

Figure 2

Illusion No. 1: The Japanese house is built of thin paper and wood. Traditional Japanese buildings are thought to be fragile structures, their interior spaces subdivided by rice-paper-covered screens called *shōji.* In reality, *shōji* screens are covered not with rice paper but with much stronger mulberry paper, and they do not subdivide any Japanese interior at all. These important and attractive translucent fittings are used around the periphery of the living and working areas to admit light from outside the building, as is evident at the Katsura Villa with its rows of *shōji* lining the major exterior walls (Figure 1). The functional subdivision of the interior of a Japanese house is provided by *fusuma,* sliding panels covered with thick paper similar in consistency and texture to our wallpapers. Customarily decorated with paintings and design motifs, *fusuma* are the major feature of many Japanese rooms and the backing for some great works of Japanese painting (Figure 2).

Wood also is of paramount importance, not, however, as frail matchstick construction but as some of the most durable building components in the world. Particularly notable are certain softwoods. Historically, the straight-grained Japanese cypress, (*hinoki*), a long-lasting softwood highly resistant to weathering, was the preferred structural timber for major building projects until the 13th century, when forest supplies became depleted. Parts of the great 7th-century temple complex of Hōryū-ji that were built of cypress are still

Figure 3

standing (Figure 3). Scientific tests have shown that cypress actually becomes stronger for 300 years after it is cut down. Then during the next 700 years it merely returns to its original cut strength. This performance has rarely been equaled by any building material, traditional or modern.

But wood, for all its importance and durability, does not dominate the traditional Japanese building. Terra-cotta roof tiles have been used conspicuously on many of the most important buildings. These baked clay tiles are beautiful and resistant to both fire and time—a building with a tile roof can endure more than a thousand years.

The main method of tiling uses pan or trough tiles laid in rows down the roof; the interstices between the rows are protected from rainwater by semicircular cover tiles (Figure 4). Ridge end tiles are veritable works of sculpture of some size and presence. Symbolism is often used in their design; for instance, the character for

Figure 4

water, *mizu,* used on the end faces is an invocation to the deities for protection of the building against fire.

Illusion No. 2: The importance of stone is minimal. It is true that the Japanese do not use stone in the same way as European masons. However, stone, in small or large blocks, hewn or unhewn, roughly piled or intricately interlocked, plays a vital role in Japanese building. Masonry—that is, the manipulation and mastery of stone for building—is one of the most important aspects of many Japanese buildings, and the stonemason historically has been one of the most venerated professionals (Figure 5). Buddhist temples, such as the main hall of Hōryū-ji, customarily are set on carefully constructed stone podiums in the manner of classical Greek buildings. Even the more modest traditional residences have timber-framed walls set on stone footings. Stone is also one of the chief materials used in the major art of the Japanese garden designer, whose

Figure 5

role is inextricably bound to that of the builder.

Castles of the 16th and 17th centuries had massive walls of hewn granite. The sophistication of castle drywall engineering, with the walls' subtly curved lines, constitutes one of the highest achievements of Japanese civilization. The sweeping, "folding fan"-shaped walls of Osaka Castle soar to 80 feet in height, and many of the rocks used in its barbican gate houses weigh seven to eight tons. The largest single rock is 46 feet wide and 16 feet high and must weigh more than 100 tons. It is the equal of the largest rocks used in any known structure in the world. Such stones were transported as far as 200 miles to castle sites. Rocks for the walls of Edo Castle, the headquarters of the Tokugawa shogunate, all were transported by ship from quarries in the rugged Izu peninsula. The rocks were so large that a ship could carry only two rocks on a trip.

Illusion No. 3: Japanese architecture lacks the monumentality of major European buildings. The inaccuracy of this often repeated Western misconception is demonstrated at once by the stone in castle walls. The largest castles ever constructed were those great citadels of Edo and Osaka. The main keep of Edo Castle rose to the height of a 20-story office building of today. Himeji-jō, completed in 1609, is the largest existing castle in Japan. Its inner compound alone would have comfortably enclosed the combined castle precincts of Carnavon, Beaumaris, Harlech, and Conway, the four most impressive edifices built by England's master castle builder, King Edward I.

The Japanese achieved monumentality not only in stone but also in wood. The Daibutsuden, the Great Buddha Hall of Tōdai-ji, is generally considered to be the largest wooden building in the world. Rebuilt into its present form at the turn of the 18th century, it reaches 160 feet to the ridge pole and is 185 feet wide (Figure 6). When first constructed in the mid-

Figure 6

dle of the 7th century, however, it was two-fifths wider than the present building. Even so, the existing structure is a daunting edifice, with massive internal pillars nearly 6½ feet in diameter rising to support the huge tiled roof. In the sense that monumental means colossal, these buildings are clearly monumental and outrank in size and durability many works of European architecture.

Illusion No. 4: Japanese buildings use no nails. Japanese and Westerners hold this as a tenet of architectural faith. Actually, a large premodern building project required enough nails to keep a metalsmith toiling from dawn to dusk for many months turning out nails of all varieties from pin-sized and sharpened at both ends, for securing floorboards, to foot-long nails with heavy rounded heads, for holding down tiles at the edge of the roof.

The correct premise of the incorrect conclusion "Japanese buildings use no nails" is that nails do not perform the major structural connections in Japanese build-

Figure 7

ings. Instead, the building frame is held together by an intricate system of mortise and tenon joinery (Figure 7). Angled and spliced joints have great strength and flexibility; they flex to absorb the destructive energy of earthquake vibrations. However, many of the important joints are strengthened by nails, and some, such as the interfaces of rafters and purlins, are held together by nails alone. A special chisel with a swordlike hilt had to be invented to make the nail holes, which were eight to 12 inches deep.

Illusion No. 5: The entire building is simple and restrained in character. Japanese architecture, when it appears most simple, may actually be most complex. Master builders frequently resort to the most complex means to achieve what seems in the end to be effortless. The illusion of restraint and simplicity conveyed to Western observers is mainly the result of our not knowing enough about what we are seeing.

Figure 8

A clear illustration is the cypress shingle roof of the Old Shrine of Katsura Villa (Figure 8). The guileless, rustic shingles of the roof surface are piled up intricately underneath. Eaves that seem to flow smoothly out from the walls actually are supported by a complicated internal truss that is very difficult to construct.

The typical internal truss, which supports the roof, has large, rough-hewn tree trunks layered horizontally to carry the ridge pole, and thick cantilever arms to support the eaves. Such a heavy horizontal truss system is the secret of the stability and strength of most Japanese buildings and is found universally in buildings as diverse as the traditional farmhouse and the castle tower (Figure 9). The Japanese truss stabilizes the building on its foundations and locks the joinery of the frame into place so that it can withstand the most destructive "vertical jolt" type of earthquake, which tends to shake a building off its foundation and spring apart its joinery vertically, causing structural collapse. The heavy truss beams also place the pillars and beams of the frame beneath under tension and compression, enhancing their structural strength. The entire system is far from simple in concept and execution.

Westerners also tend to dismiss outright any building with a decorative flavor not matching our own preconceptions. The prime example is Nikkō Tōshōgu, the mausoleum complex dedicated to the founding Tokugawa shogun (Figure 10). It has become fashionable among historians and

Figure 10

architects to condemn Nikkō for its extravagant ornamentation, even as they praise Katsura for its "simplicity." In the 1930s, the German architect Bruno Taut found the highest levels of architectural achievement in the "functional simplicity" of Katsura and in his next breath called Nikkō "barbaric, overloaded Baroque." We are entitled to our prejudices, but we should not let them cloud objective judgments. Nikkō is a supreme political statement by the 17th-century shogunal establishment, and as such its style is eminently suited to its function. Its immediate impact may be a profusion of detail and color that overwhelms the observer, but its details include craftsmanship of the highest order, such as painstakingly crafted bracket arms with black lacquer and inlaid gold designs used for the Yōmeimon (Figure 11).

In Japan, for every Katsura there is a Nikkō. It is erroneous to see even teahouse architecture purely in terms of restraint and simplicity. Like the tea ceremony itself, the form of the teahouse obeys complex architectural rituals that appear simple only to the untutored eye. The variety of materials used in the typical tearoom is a key to this. It is proper to remember that Toyotomi Hideyoshi (1538-1598), one of Japan's great tea patrons, had a portable teahouse built of gold and other sumptuous materials such as silk to entertain and impress the emperor.

Recent restoration at Katsura itself has revealed that the buildings originally were much more colorful and polychromed than they appear today. Their brilliance and gloss subdued by time bring to mind the initial European enthusiasm for the clean, pristine marbles of the Parthenon, which, it was believed, demonstrated the noble restraint of classical Greek taste. Later it was established that these buildings had been gaudily polychromed in reds, blues, and golds when first completed.

Illusion No. 6: The interior is designed on the basis of ma *(space-time intervals).* This is the most persuasive and seductive of all the illusions. The word *ma,* after all, has become a part of the standard Western vocabulary of Japanese architecture. It is used universally by Western commentators as well as by many Japanese architects to explain the system of design that created the subtle spatial qualities of the traditional interior (Figure 12). Here we believe we are approaching the central mystery of Japanese architecture.

Unfortunately we are not. *Ma* is a misnomer in the way it is used at present. Its significance in Japanese architectural design must be rigorously reassessed in

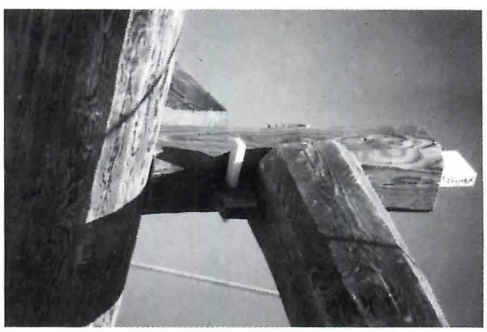


Figure 9

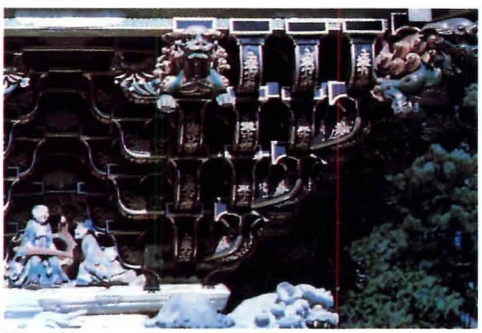


Figure 11

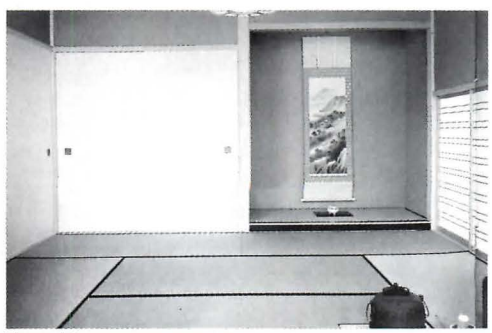


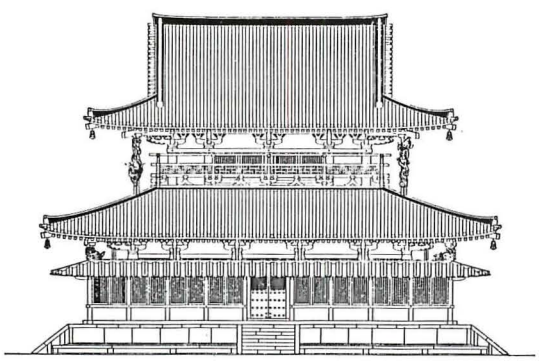
Figure 12

relation to the Western use of space as a manipulable design concern.

In my experience of living and working in traditional Japanese building practice, I have not encountered even one master carpenter who uses the term *ma* in its contemporary Western architectural interpretation. In traditional Japanese architecture, *ma* has two meanings, neither of which coincides with "space-time" design intervals.

Ma is used first to designate a room, as in *kyaku-ma, i-ma,* or *hiro-ma.* In this context it means "place"—the place for a guest, the place for living, the place for an audience, respectively. The second meaning of *ma* is "the space between," the operative word being "between." In this sense, *ma* designates the distance between two pillars, with emphasis on the role of the trabeated structure rather than the space it subtends (Figure 13). The old-

Figure 13



est existing printed carpenters' design manual, the *Designs for Samurai Architecture* of 1655, demonstrates this usage clearly. The description of proportions to be used in building an *agetsuchimon* (gateway with clay-covered roof) states: "The diameter of the pillar is to be calculated as one-tenth of the distance between the two main pillars (*ma*)." Thus, *ma* as "the distance between" is the servant of structure. It is invested with a linear character rather than a spatial quality. In fact, the more common traditional word is *ken,* another way of reading the same ideographic character. *Ken* simply means the span of the bay unit. Its linear value was standardized in 1886 at 1.82 meters (almost six feet) for international trade, but until then its actual length depended on the building and the carpenter.

The term *ma* became popular for describing aspects of Japanese architecture when, in the mid-1960s, Western-educated Japanese architects such as Arata Isozaki, aided and abetted by enthusiastic but uninformed foreign architects and anthropologists, attempted to explain Japanese architecture to Western audiences in terms that were at once tantalizingly exotic (*"ma"*) and reassuringly familiar ("space"). They invested *ma* with new architectural meaning by borrowing its medieval meaning of an interval between two actions in Nō and Kyōgen drama and of the breath or space between notes in accompanying music. They combined this usage with Western spatial interpretation to create the "space-time" interpretation of *ma* in common currency today. The medieval master carpenters who built the splendid palaces and Nō stages where these "space-time" activities occurred would be startled to learn that their modest span unit had assumed international spatial significance today.

Analysis of Japanese architecture in terms of "space" has been done primarily in the postwar era. The concept was so alien to Japanese thinking that there was no word for it in the Japanese language until after the feudal era ended in the mid-19th century. The term *kūkan* was concocted from the character for *kū,* meaning air/sky/emptiness/unreality, and the character for *ma* (read as "kan" in compound form), meaning interval or between. *Kūkan* migrated from general usage into Japanese architectural thinking only after Western books on architecture, such as Sigfried Giedion's *Space, Time and Architecture: The Growth of a New Tradition,* were translated into Japanese in the 1950s. The tendency toward Western spatial analysis of traditional Japanese architecture became pronounced in the 1960s, and fascinating spatial terminology has found its way even into analyses of old farmhouses in Japan.

Interesting as this approach is for the Western designer, it leads us nowhere but astray when we set out to understand premodern Japanese architecture in the historical context of its construction. It becomes perfectly clear as we look at the tightly interlocked framework of an

Figure 14

18th-century Kyoto-region farmhouse during its dismantling and restoration that the tangible structure was the builders' primary concern, not as a nebulous "skeleton of space" but as a solution to the practical problems of shelter and security (Figure 14). Even the contemporary timber-frame residence is a complex erection in which space was an afterthought. Historic monumental buildings, such as the large Buddhist temples, central to the tradition for nearly a millennium, did not enclose much physical space at all. Worship services and lectures were conducted outside the buildings, which served as stage or backdrop for ritualistic and intellectual activities. Much of the interior was created almost as an incidental by-product of building an impressive exterior. Even when there were large interior spaces, the most important ceremonies generally were held outside. The grand rituals to mark the completion of the Great Buddha Hall of Tōdai-ji, one of the world's largest premodern buildings, took place in the front courtyard.

It is thus more profitable to think of Japanese architecture first and foremost in terms of structure and proportion rather than space. We should use *ma* sparingly and as it was intended by the carpenters who first applied it. The spaces may be visually exciting, but the structure of the building and the tangible problems of proportional relations between its parts were more important to the traditional builders who designed them.

How have these false impressions come about, and what do they tell us about Japanese architecture and even about ourselves? The fundamental problem is that Japanese architecture needs to be seen as both "Japanese" and "architecture," but the one is interpreted only rarely in terms of the other. We may appreciate in general that any building reflects a variety of social, political, religious, economic, and technological factors, but for Japanese architecture these have not been satisfactorily defined.

In Japan, the fabric of society and architecture is closely interwoven because of geographic insularity and tightly knit group dynamics. Foreign observers seldom see beyond the sublime sense of place or materials or the exotic traditional roof styles to the living matrix that spawned them. On the other hand, Japanese specialists who understand the context may have trou-

ble grasping the minutiae of technical architectural aspects.

Western architects have limited opportunities for acquiring sufficient knowledge of Japan's history, language, and society to draw meaningful conclusions about its architecture. Views of eminent Japanese architects that find their way to the West often are filtered through a Westernized training. Many Japanese architects freely admit to being more informed about contemporary trends in the United States and Europe than about Japanese architectural traditions.

Strictly speaking, the work of many contemporary Japanese architects does not constitute Japanese architecture. Certainly these architects may have to deal with a uniquely difficult Japanese urban environment of tight, irregularly shaped sites and problems of fire and earthquakes. Yet their contextualism is rooted in an international ethic, not a Japanese one. Kisho Kurokawa's Wacoal Building, which gazes down on the Imperial Palace in the center of Tokyo, is designed like a high-tech pencil sharpener (Figure 15). From the exterior, it may be judged architecturally to be as much

Figure 15

"Japanese" as Jefferson's Monticello is "American" or the Sydney Opera House is "Australian." None of these is truly indigenous, but each has become a symbol of its context. Indeed, the visual anarchy of contemporary Japanese cities seems to have given Japanese architects license to indulge in a high level of experimentation. They no longer feel compelled to create buildings in harmony with their setting

Figure 16

because the prevailing character of the setting is chaos (Figure 16). Although much Japanese architecture today is important in its own right as design, it has ever less to do with long-established Japanese traditions.

Japanese architecture is popular in the West not only because it speaks a language that is exciting and challenging in its context but also because it is reassuringly familiar in a global perspective. However, while Westerners expect the Japanese to address their own traditions, Japan frequently expects them to address Western traditions. This is hardly surprising when we remember that the educational system established by the Allied occupation after World War II drilled into the Japanese that everything before the war was "feudal," "emperor-centered," "bankrupt," and "bad" and that everything Western was new and good. Only a handful of major Japanese universities even now offer systematic courses in the history of Japanese architecture.

This is why Western concepts of space and even of *ma* have found a ready home in Japan. Tange's gymnasium and swimming pool building for the 1964 Tokyo Olympics used a tensioned steel cable suspension system to achieve the swooping effect of the traditional Japanese temple roof. The building may resemble a Japanese temple on the outside, but inside it is more like a Gothic cathedral. Swimming in the main pool is like floating in the incorporeal sacred space of Chartres Cathedral. Tange himself says that his overall design was based on the plan of the Circus Maximus in Rome. A quarter-century later, his latest project, the new Tokyo Government Headquarters complex in Shinjuku, has been accused of resembling the twin Gothic towers of Notre Dame, while his Osaka Bioscience Institute Building, opened in October 1987, features a large pyramid on one of the roofs, invoking perhaps a Parisian motif of more recent origin.

In other words, the intellectual orientation of Japanese architects is Western as often as it is Japanese. This is not surprising in a country now buying Van Goghs and Corots as fervently as we once purchased Hiroshige wood-block prints. In general, Japanese architects are consciously internationalizing though we may still find in Japan today a consistent output of buildings formally or thematically related to tradition. In the mid-19th century, when the country dismantled its feudal system, Japan set out to beat the West at its own

Figure 17

architectural game in order to survive in a rapidly changing world, with the result that the quintessential monuments of the Meiji period are Western-style buildings such as the Akasaka Detached Palace and the Tokyo Station Building (Figure 17). These are more than imitative. They were designed to demonstrate command of Western architecture through familiarity with Western design, mastery of new technology, and ability to extend and enrich the models upon which the buildings were based—in this case Versailles and the Amsterdam Railway Station, respectively.

The purposive Western character of contemporary Japanese architecture causes confusion when we try to interpret the Japanese present. The Western bent of contemporary perception in turn distorts our view of the Japanese past. Western preoccupation with design and theory and the separation of design and construction leads us immediately astray when we approach traditional Japanese architecture, which was the undocumented practice of the master builder before it was formulated into design principles. The traditional master builder was responsible for both design and execution of a building project. Unity of design and execution is evident in the organic characteristics of traditional buildings, such as the pragmatic application of modules throughout.

We can correct obvious but pervasive errors about Japanese architecture. More important, we must recognize how our thinking about Japan has been conditioned by our own cultural and architectural experience, especially our misunderstanding of the cultural identity of Japanese architects today and of the role of Japanese master builders of the past. In both traditional and contemporary architecture, we should look with renewed vigor at the character of the builders in order to dispel illusions and understand the reality of the buildings. □

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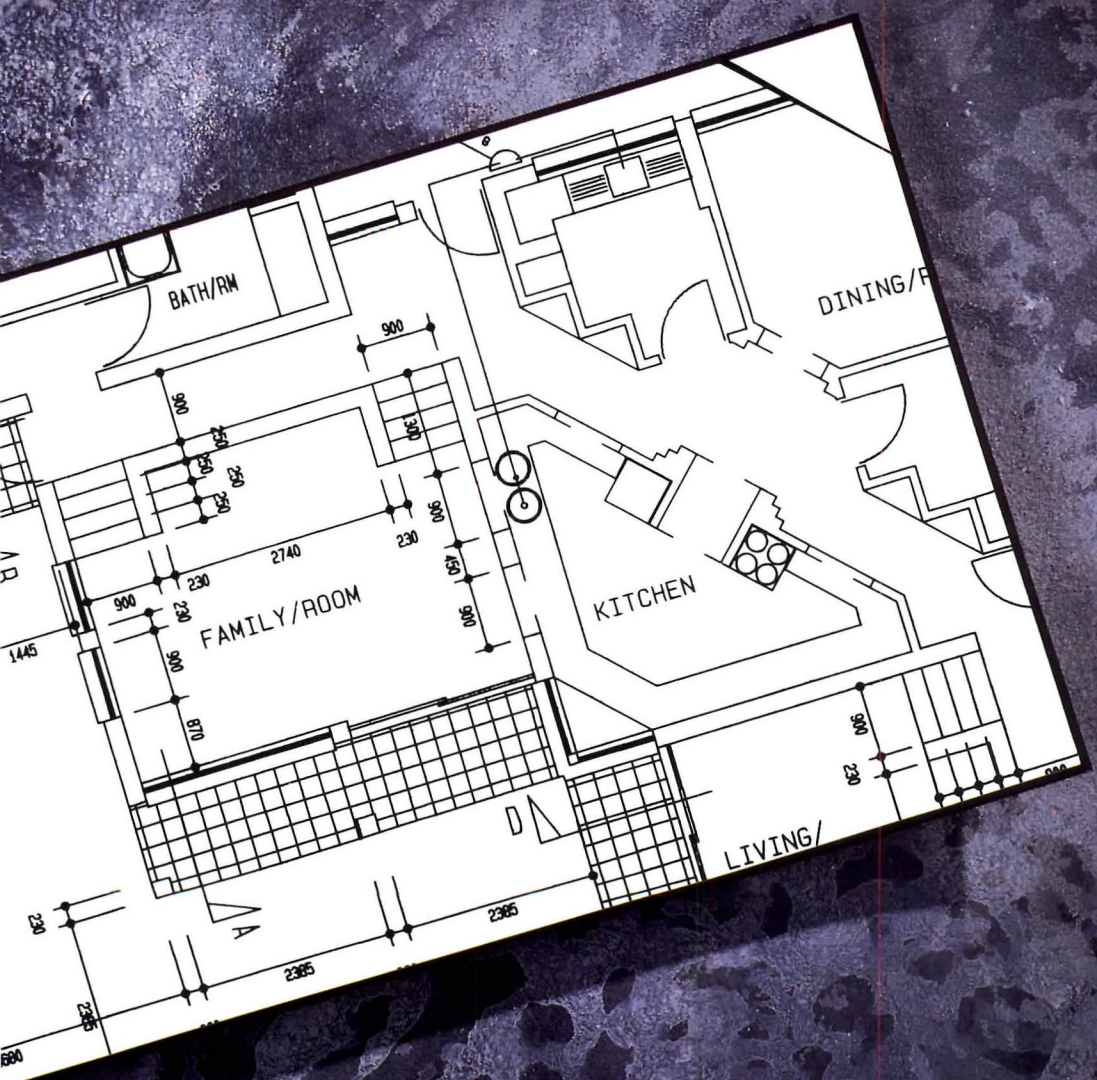

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Building in Developing Nations

Architecture for 'a half-primitive, half-high-tech world.' By Forrest Wilson

We must build a new world, a far better world—one in which the eternal dignity of man is respected," said Harry S. Truman in a radio address to delegates at the opening session of the United Nations conference in San Francisco on April 23, 1945.

The dream of building a better world after World War II rested on the export of industrial technology to "underdeveloped" nations. It was to be a peaceful transfer of power creating "one world" of health and light, white walls, and flat roofs. The "arsenal of democracy" as the United States termed itself during the war, was prepared to beat its swords into condominiums.

Le Corbusier boarded a Liberty ship in La Harve and headed for the United States with his "modulor" in his pocket, ready to esthetically revolutionize American industrial production. The backward forces of primitive building and vernacular architecture were to be overcome by a brave new world of basic forms in concrete block sized by the golden section, if Corbu had his way.

Today, architects are not quite as sure of themselves as they were 40 years ago. The buildings of pre-industrial cultures continue to compete with those of the industrial world. Where the two meet, a seesaw battle takes place. Industrial buildings are juxtaposed with primitive and vernacular. A single street may have facades of sun-dried brick and low-e curtain walls. Metal skins win temporarily. Victory is not final, for indigenous building forms return to center stage in the guise of luxury hotels and cultural "theme parks." There are handcrafted temples in Kathmandu, Nepal, that are neighbors to fast-tracked, CADD-designed hotels. German and French tourists plug television sets into convenient outlets in stuccoed mud walls of exotic Tunisian grain storage bins. Truman's "new world" is a mixed bag.

How do architects design in a half-primitive, half-high-tech world? How does this world go about building? The following interviews provide some answers from a sampling of nations.

Afghanistan

Afghanistan is an arid, mountainous country with a population believed to be a little over 15 million (1986 estimate). Its rivers are unnavigable and used for irrigation. Agriculture is the mainstay of the economy, although less than 10 percent of the land is cultivated. Afghanistan straddles the historic silk route to India through the Khyber Pass. It has been conquered by Darius I, Alexander the Great, Arab invaders, Genghis Kahn, and Tamerlane. England gained control in 1907 after two wars, and Afghanistan regained independence from England with a third British-Afghan war in 1919. The country became a republic after a military coup in 1973. Pro-Soviet leftists took power after a bloody coup in 1978, and in December 1979 the Soviet Union began a massive military airlift into Kabul. Soviet troops fought Afghan rebels until recently when the Soviets began to withdraw.

Stanley Hallet, associate dean and chairman of the Catholic University of America department of architecture and a former Fulbright lecturer at the University of Kabul in Afghanistan, describes his study of Afghan architecture: "When at the University of Kabul, I was asked to help develop an architectural curriculum. We felt strongly that the students first must understand their own architecture. Even before the Russian invasion the university student body was highly political and frequently closed down the school through strikes. During these periods we organized both Afghan faculty and students to study, draw, and examine traditional Afghan architecture. When school was in session, the research was used for studio problems. In many ways, the research and field work provided a rich educational experience.

"The lessons were in rammed earth and sun- and fire-baked brick. Beautiful, carved wood, prefabricated window systems were slipped into primitive masonry structures. The elements of construction were modularly coordinated. Complex and sophisticated heating and ventilating systems were well integrated into floors and walls. Spatial organization to ensure family privacy was brilliant. Wind scoops ventilated rooms during the summer, and elaborate coiled underfloor systems radiated heat during the winter. Fortresslike farmhouses were surrounded by six- and eight-foot rammed earth walls built from the ever present and abundant supply of earth.

"From the ingenious yurt mobile framing systems to the elaborate wood and stone buildings of Nuristan, many lessons could be learned. There appeared to be no new building problems. Afghans knew how to build for Afghans. People need the same things today they have always needed—privacy and community, rest and activity, shelter and a sense of place."

Africa

Claudia Russell, an American architect who has supervised State Department building projects in various North African countries, talks about today's environment for building in Africa: "Quantity surveying is commonly used in bidding in Africa, as it is in Europe. This may be because bidders in Africa are often foreign or because of a European colonial heritage. Government funding agencies want a fixed fee, but bidders want the freedom and security of the quantity survey. They prefer to make additions or subtractions based on the quantity fee. With fixed sums there seem to be more trade-offs and negotiations because a formula for predetermining trade-offs is not there. The onus falls on the contractor to bid the job holistically and carefully rather than rely on assigning prices to predetermined quantities.

"Codes are a big issue—whose codes, when, and how will they be applied against whose materials? Power sources and voltages are always different. In one project I know of, an Ethiopian electrical contractor, using British standards and U.S. materials, bid on an existing building in a fourth country. Codes become a huge issue when there are U.S. codes, local building practices, and foreign materials all mixed together.

"There are differences in infrastructure to look at as well. In

America, fire codes assume there is a fire department. This is an invalid assumption in many parts of the world. Likewise, many U.S. building systems are critically dependent on continuously operating electricity. Electrical stoppages are common in the Third World. Maintenance schedules are critical.

"The work site is a scene unto itself. Scaffolding is often bamboo, and workmen without shoes or hard hats hoist and install precisely machined metal and glass panels brought to the site on donkeys.

"The extremes of heat and cold play havoc with many roofing materials. Most built-up roofing does not appear to stand up well. It was my observation that an impervious material with quick runoff versus a flat roof construction was the most effective.

Cecil Steward

"Timber is often plentiful, but it must be treated to prevent bugs and rot. On one project it was cheaper to fell native trees, send them to Europe for milling and preservative treatment, then ship them back, than it was to import American products. The wood is also excellent. In some areas, African mahogany is so plentiful it is used in packing crates.

"With respect to constructors, I found that the most critical demand is asking for a right angle. The concept does not naturally exist for them. They may have never seen one. It was an issue that forced me to beat my head against the proverbial wall—one with rounded corners.

"Skilled labor in Africa is difficult to find. There is therefore a constant need for supervision. There seems also to be a general lack of respect for construction dangers. There is a fear factor in America instilled in the workplace that works as a safety factor. When Allah is in charge of site safety, the workers apparently can ignore danger.

"The cultural twists are interesting too. My favorite recollection is of the prayer rugs cut from carpet scraps that sprouted up all over town. Of course, when a project is completed, there are always local customs to be honored, such as the slaughtering of a lamb and sprinkling its blood on the building and building equipment.

"A huge issue for the Third World is the energy consumption of U.S.-style buildings. The loads and demands are outrageous. There is the perception of those in underindustrialized countries that American airconditioning is a Cadillac compared to the ox cart of indigenous climate-control techniques. Those who can afford airconditioning want it. Yet American systems require enormous amounts of power. On one project, a mile-long trench a meter deep and a half-meter wide was dug with pick and shovel to run an electric cable. At what point does a U.S.-style building no longer have a right to the huge amounts of power it drains from subsistence-level cities?"

China

The population of China is estimated at more than 1 billion. The country has a centrally planned economy with economic development coordinated in five-year plans. Despite rapid industrialization in recent years, China remains predominantly agricultural with about 75 percent of its work force engaged in agriculture. Cultivation is limited to 15 percent of land surface. China is one of the world's major mineral producers and the 10th-ranking oil producer. The first documented Chinese civilization was the Shang Dynasty, about 1500 B.C. to 1000 B.C.; the last of a succession of dynasties was the Ch'ing Dynasty, 1644-1911. China became a republic Jan. 1, 1912, following the Wuchang Uprising. Western powers had forced an opening for overseas trade in 1834. Foreign wars and internal revolutions culminated in the civil war of 1945, which established the People's Republic of China in 1949 following the ouster of U.S.-backed Chiang Kai-shek. In 1950 the People's Republic entered the Korean War against U.S. and United Nations troops. The United States and the People's Republic established diplomatic relations on January 1, 1979.

Cecil Steward, FAIA, dean of the college of architecture at the University of Nebraska at Lincoln, has been a frequent visitor to China and has worked with Chinese architects: "Architecture in the People's Republic of China is in the midst of epic change. Recently there has been an intense debate between traditionalists and modernists. One argues for a technologically modern architecture that retains its distinctive Chinese characteristics. The other looks for images to express the culture of a new society. They would forge an esthetic from the expression of modern construction methods and materials that would reflect the society's social development and individual creativity.

"Eight years ago all buildings except those of major importance were built from standardized designs using standardized components from manuals of building types patterned after Russian designs of the 1950s.

"China is now embarking on a massive construction program. In 1986 the country reported a capital facilities investment of $79.97 billion in U.S. dollars, representing a 16.7 percent growth over 1985. There are more than 160,000 projects under construction at a value of $241 billion. The single largest construction investment is in urban and rural housing.

"Construction goes on despite an environment of crucial demand and rapid change. Responsibilities have shifted from state selection of construction 'companies' to competitive bidding. Choice is restricted, there are materials shortages, tradesmen are inexperienced, tools are simple, there is a shortage of

Above, rammed earth construction in Shaanxi Provence, China.

architects, construction codes, and inspectors, and management is inefficient.

"Major changes are under way. The government has announced the establishment of a national network of 345 'construction quality-control stations' to regulate the building industry. Concurrently, they have introduced a 'thorough responsibility system.' Managers' and workers' wages and bonuses are tied to work quality. They have also introduced a system of two-year technical training of construction workers.

"The Beijing Association of Aesthetics in Science and Technology was created in 1986, as well as the All-China Association of Aesthetics, acknowledging the importance of esthetics to architecture, communications, and medical science and technology. The objective, according to their report, is to prevent 'economic progress from creating a world of ugliness.'

"The Architectural Society of China and the Capital Architectural Art Committee in Beijing recently recognized 32 projects in the first design awards ceremony ever held in China. Requirements were projects that had been in use for at least one year.

"China's new values have been evolving for about 40 years, the open-door policy for the past 10. This is a very short period in Chinese history. Chinese architects have a unique opportunity to influence the images of a dominant world culture. Will the architecture be distinctive to China, and will it be contemporary with the society and culture of the new 'Middle Kingdom?' "

India

India, a country of about 800 million people, is divided into two separate economic entities: villages supported by primitive agriculture, in which 40 percent of the population live in poverty, and urban India, one of the world's most heavily industrialized areas. Approximately 70 percent of the country's work force engages in agriculture. India has one of the oldest civilizations in the world. The 4th to 6th centuries after Christ marked the golden age of Hindu culture for its science, literature, and arts. The Mogul Empire and European encroachments began in 1526, and in the 17th century the British, operating as the East India Co., gained control of most of India. After the Sepoy troops mutinied in 1857, the British supported the native rulers. Discontent with British rule intensified, and Mahatma Gandhi led the movement for independence from 1919 until his assassination in 1948. British India was partitioned into India and Pakistan in 1947, and several hundred thousand died in the disorders that followed. India became a democratic republic on Jan. 26, 1950. India and Pakistan have fought wars in 1947-48, 1965, and 1971. India faces continuous runaway population growth, labor strife, and intercaste violence.

Uttam C. Jain, an architect whose work is financed primarily by public and governmental agencies, supplemented by private enterprises, observes some of the differences between Indian and American building: "The Indian building industry lacks standardization and industrialization. It rests on local craftsmen, indigenous materials, and traditional building techniques. The present regulatory environment is fragmented and ineffective, even though the building industry is politically stable.

"Indian practice is labor intensive, and construction is more of a craft than a technology here. Handcraft still takes precedence over mechanized operations, and the workers' skills vary at different levels of building activities. Industrial manufacture is restrictively specified for fixtures, fitting, fenestrations, and servicing the edifices. Tradition also influences building practice in large measure. Indian architecture offers to the architect the same kind of freedom and choice as that of a painter who paints his canvas intuitively.

"In my practice, I tend to give buildings a handcrafted look to the extent possible. This gives a building an instant association with its place and its people—edifices belong to the place.

"I have not had the opportunity to assess North American building technology closely enough to offer an opinion of it. Perhaps its large scale of practice makes it seem less virtuous. There certainly is a higher degree of specialization in American designing and construction than there is in India. One general impression is that North American practice is more a response to technological pressures. And, to us, computerized practice is a distant drumbeat.

"At one time, Corbu and Kahn were Indian heroes, and their images and modern style still linger. Postmodernism without taking anthropological roots primarily seems handy for catering to popular taste, but it makes for buildings with appearances unrelated to context. There seems to be a lack of debate on architectural issues."

Libya

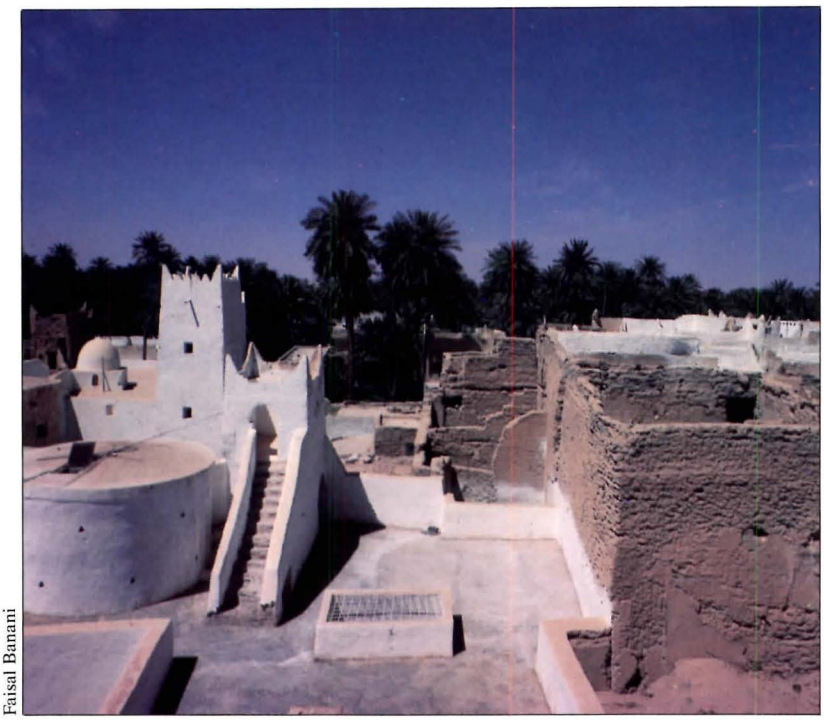
The Socialist People's Libyan Arab Jamahiriya has a population of 3,876,000 (1986 estimate). Discovery of oil in 1958 transformed Libya from a poor agricultural country into one of the world's leading petroleum producers. Petroleum accounts for 95 percent of export earnings and more than half the national income. Agriculture is the work of half the labor force. Occupied at various times by Carthage, Rome, Arabia, Morocco, Egypt, Spain, and the Ottomans, Libya was a base for pirates during the 18th century. It was seized by Italy in 1911, and Libyan resistance against the Italians continued until the 1930s. Crucial desert battles of World War II were fought in Libya. The country became an independent constitutional monarchy on Jan. 2, 1952.

Faisal Banani is a graduate of the school of architecture of the Libyan technical university in Tripoli. He formerly headed one of the largest architecture firms in Libya: "Architectural information is costly in Libya. For instance, the designers of the Tripoli Sports Center had to hire one English firm that did nothing more than supply Olympic standards, and at considerable cost. When part of the Central Bank of Libya burned in 1975, Libyan architects repairing the damage lacked structural and other related drawings. The former Italian architect was hired as a consultant to supply them, again at considerable cost.

"Libya has nationalized its architectural and engineering services. Although priority is given to Libyan firms, the market is open to foreigners. Libyan fees are lower than those of their international competitors. International firms will not accept less that 6 percent on $20 million to $30 million projects, which is almost double Libyan fees. Their justification is the unstable financial market and the fact that Libyan government agencies, like government agencies the world over, never pay on time.

"Most construction in the early 1970s was done by foreign firms. Libyan companies were unfamiliar with specialized buildings such as banks and sports centers, and there was little local labor. So construction work is being done by Egyptian, Tunisian, Italian, Romanian, and South Korean companies. Each foreign company brings in its own workers. Different nationalities are

Residences in Libya integrate outdoor 'rooms.'



Faisal Banani

paid different wages for the same work. Egyptian labor is cheapest, German the most expensive, and Italians in between.

"Egyptians are the best workers in concrete, stone, and brick and are generally excellent builders despite their low wages. Tunisians do excellent ceramic work, and both Moroccans and Tunisians are excellent in the restoration of historic buildings.

"By the mid-1970s, a fifth of Libya's population consisted of illegal immigrants. When political problems arise, the workers are then rounded up and dumped on the borders, which creates a very noticeable labor shortage in the construction industry.

"A few international firms are in complete control of Libyan construction. When the government goes to bid, four or five contractors ostensibly participate. Actually only one or two submit reasonable offers. Sophisticated research of building costs is undertaken by the Libyan secretariat of housing. If bids are unreasonable projects are scrapped.

"Libya's total population is well over 3 million. Economic development is drawing major immigration to central cities. Half the population of Libya lives in two major cities, 1 million in Tripoli, 600,000 in Benghazi.

"There is a single school of architecture, which opened in 1969. The school has 200 students and the professors are Egyptian. There is a new generation of architects graduating who have learned how to design with new building materials that local builders don't yet know.

"In spite of this, the Libyan architect has princely power. The architect stops the job with a letter to the contractor and a copy to the client. If the contractor talks to the client, the client tells him to talk to the architect."

Nepal

Nepal is a mountainous kingdom in the Himalayas between India and China. It is the only Hindu kingdom in the world. Its 17.5 million people are primarily agrarian with fewer than 10 percent living in cities. There is some livestock raising and textile manufacture. Tourism is a major source of foreign income. A British protectorate from 1816, Nepal was granted independence in 1923. It was controlled by the Ranas family and isolated from foreign influence and economic modernization until 1951 when a limited constitutional monarchy was established.

Nepalese architect Ambika P. Adhikari talks about building in his country: "Architecture in Nepal is predominantly handcraft, although, in a small but growing sector, building practices are similar to those of North America and Europe. Nepalese architecture is remarkably beautiful and sophisticated. It is an architecture of limited resources—of temples, public buildings, and exterior spaces skillfully designed and superbly built. The architecture of Kathmandu and its surrounding valley may be among the most beautiful in the world.

"The influence of architects and building professionals is increasing, and has a major effect on government and institutional buildings built under government control. There are about 200 local A/E firms.

"Despite the growing acceptance of the concepts of modern architecture, it is not blindly accepted as superior to indigenous building. North American practice is the model, but extreme differences in economy, building technology, and development of the building industry make modernization of building practice an enormous problem.

"Spatial configuration of contemporary buildings conflicts with cultural needs. Proud owners of modern houses add worship rooms, change the kitchen, and redesign the dining room. Traditional Nepalese buildings, on the other hand, do not achieve a high degree of thermal comfort. Dampproofing is lacking, solar control nonexistent, and sanitation poor. There is little horizontal spatial flexibility in traditional buildings, and vertical expansion is blocked by intricate roof construction.

"Blending modern and traditional design, despite their individual inflexibilities, is the architectural challenge. Modern technology can correct traditional Nepalese building shortcomings. This blending is crucial in the strong traditional setting of Nepal. Building must be low cost, labor intensive, and use minimal material. Passive solar, daylighting, natural ventilation, dampproofing and lightweight roofing are among the first considerations. Site and services, zoning for solar accesses, and preservation through recycling must be addressed in the regulatory area.

"The successes and failures of North American technology are important in Nepal not as a model but as a lesson."

Nigeria

With more than 100 million people, Nigeria has the largest population of any country on the African continent. It is the world's sixth leading petroleum producer, and its oil wealth accounts for the strongest economy in black Africa. Agriculture employs 70 percent of the work force. A former British protectorate, Nigeria gained independence in 1960 and became a republic in 1963. Civil war raged from 1967, when the Eastern Region, proclaiming itself the Republic of Biafra, seceded, until the secessionists lost in 1970. After 13 years of military rule, Nigeria returned peacefully to civilian rule in 1979.

B.O. Koleosho & Partners, Architects, is a firm in the capital

city of Lagos. B.O. Koleosho, a graduate of the Catholic University of America architecture school, worked in the United States before returning to Nigeria: "The major clients for the construction industry in Nigeria are government, private enterprise, financial institutions, quasi-government agencies, public corporations, industrial concerns, multinational firms, and foreign companies.

"Of these, the government is the largest client. It has spent billions of dollars since the early 1970s on thousands of kilometers of expressways, bridges, airports, and school buildings. This construction boom has slacked off somewhat, but contracts for oil refineries and power stations continue to be awarded. Also, there are small-scale investments in building from the private sector including schools, houses, and light manufacturing facilities.

"The most common construction material is sandcrete blocks. Although shop drawings are seldom used, architects' drawings are common. The standard form of contract was derived from the RIBA. Quantity surveyors participate on major building projects.

"In large projects involving heavy industrial layouts and intensive civil engineering works, interface with U.S. practice is possible. Nigeria can benefit from American technology, construction expertise, and cost-saving and time-scheduling techniques. Nigeria also can learn from America's tradition of fine craftsmanship.

"One of the attractions of being an architect in Nigeria is the great opportunity to design and build. Architecture in Nigeria is largely an urban profession, but urbanism itself is a growing phenomenon. There are not many architects, and the few that are there tend to be widely dispersed. Urban renewal and rural development for the building market is untapped. This is in marked contrast to the United States, where the profession appears saturated, and the young American architect spends years as a donkey over a drafting board. This may explain why the same people, usually over 40, are featured continually in U.S. magazines.

"The low level of technical education of most construction workers makes construction challenging in Nigeria. The architect's supervision duties may turn him into a site foreman. The educational-level difference between architect and builder is much greater in Nigeria than in the United States. Also, Nigerian clients may pick their own consultants, which causes problems if the consultants are lazy."

Saudi Arabia

The population of the Kingdom of Saudi Arabia numbers just over 11.5 million people. Arabia was inhabited for thousands of years by nomadic Semitic tribes before it was united by Mohammed in the early 7th century. His successors brought Islam and the Arabic language to the entire Near East and North Africa, but Arabia itself soon returned to its former nomadic status. The Saudi dynasty was founded by Ibn Saud, who overthrew Turkish rule in Nejd in 1913 and by 1926 captured the Turkish province of Hasa, the Hejaz, and most of Asir. Oil was discovered in the 1930s, transforming the new country's economy.

Bari Fez Barrington, an architect and construction manager, speaks from his experience of building in Saudi Arabia: "The major client is the Saudi government, in the form of ministries specializing in different services, with one central finance ministry that holds all allocated funds.

"The primary difficulty of working in Saudi is the international mixture of firms working on any given project. U.S. documents can be used to direct Greek, Saudi, Korean, Italian, and German construction companies. This makes third-party coordination necessary by construction managers and project managers.

"Although Saudi Arabia appears to be in a building slump at this time, various projects in all fields remain under construction. The use of North American practice techniques is creating high-quality, innovative conditions with incentives based on negotiations with a selection of contractors. Saudi Arabia is strictly oriented to bidding and low prices.

"Inspection companies police all approvals for each ministry on each project. Liability lies with the contractor, not the consultant. The attitude is that the contractor should know better, which can lead to problems such as design compromises.

"The Saudis basically use U.S. standards for construction. They also use foreign labor, and there are few local crafts of any kind, although there are some Saudi-manufactured products.

"U.S. and European design is accepted. The government is searching for Islamic cultural ties, and Egyptian architects seem to fit that bill at the moment. However, in Saudi Arabia, what you see mostly is U.S. and European building design.

"Saudi architectural education appears to produce architects competent to solve technical problems, but who are not tested by a registration board or in practice. The few Saudis who have their own practices immediately hire foreigners to do the work. Again, there is very little traditional influence, and the foreigners appear more anxious to perpetuate Islamic tradition than do local architects."

Stephen J. Kirk, an associate of Smith, Hinchman & Grylls, is a value-engineering program manager under contract to the General Directorate of Military Works of the Saudi Arabian Ministry of Defense and Aviation: "The vast reserves of oil and minerals can underwrite the Saudi economy for centuries. Yearly expenditures are based on oil demand and price. Over half of each year's budget is allocated for building construction, roads, and other public works.

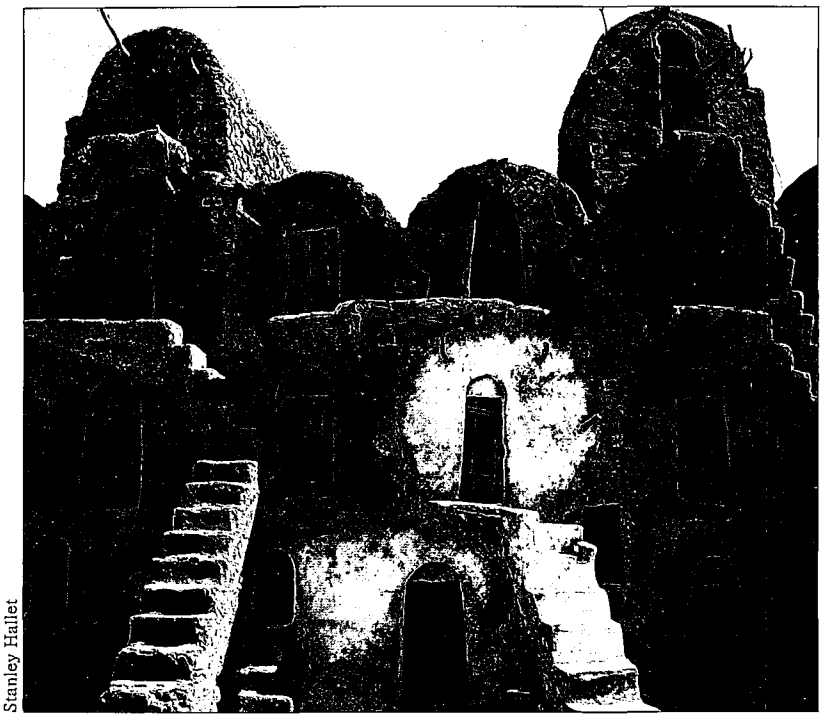
"The general vision of designers has been that of an oil-rich country embarking on a bold new architecture. The result has been buildings that reflect neither the cultural nor the climatic conditions. However, after 25 years of architectural extravagance created by designers from all over the world, the Saudis are returning to the basics of resource economy and functional efficiency.

"There are several reasons for this decision. The facilities designed, with few exceptions, house highly sophisticated mechanical and electrical systems. Little thought has been given to maintenance requirements. The notion of unlimited wealth has spawned facilities that will be underutilized for years. Energy efficiency and water conservation seldom have been considered—both are precious resources subsidized by the Saudi government. Energy is provided by oil-generated electricity, and water in the coastal areas comes from desalinization, also subsidized and distributed by the government.

"Serious problems have surfaced with existing facilities. It is difficult, sometimes impossible, to find spare parts for sophisticated systems supplied by companies from all parts of the world. Maintenance and operation of complex equipment by unskilled labor takes its toll. Facilities designed by many nationalities, based on differing standards, add to the problems of replacement, maintenance, and operation.

"Buildings designed seven or eight years ago have not been built because cost was significantly higher than anticipated. Other buildings are partially constructed, awaiting final funding.

Value engineering, introduced by SH&G, is used to bring projects into construction, effect savings, and make projects economically feasible. Energy is conserved, maintenance simplified, and the need for spare parts reduced by reducing HVAC equipment size. Locally available concrete structural systems can be used to save both cost and time."



Stanley Hallet

Stairways and four-story grain storage vaults in Tunisia.

Tunisia

The population of Tunisia is about 7.4 million (1986 estimate). Agriculture is the economic mainstay, although mining and tourism are important. The land was settled in the 12th century B.C. by the Phoenicians, who established the powerful city-state of Carthage, which was defeated by Rome in 146 B.C. The region was taken by the Vandals in the 5th century, the Byzantines in the 6th, and the Arabs in the 7th. It was a pirate stronghold in the 16th century and became a French protectorate in 1881. The nation gained independence in 1956 after intense nationalist agitation. The Republic of Tunisia was established in 1982.

Stanley Hallet (also interviewed for this article regarding Afghan architecture) was a Peace Corps volunteer in Tunisia: "My search for low-cost housing began at MIT. After graduating in 1964, I went to Tunisia to build housing and ended up building hotels for tourists. The country invited Peace Corps volunteers, then assigned them to the bureau of tourism.

"Low-rise hotels were built of vernacular materials—stone, rubble, and plaster, with brick vaults. Construction was traditional sun-dried brick. The mason tied a string to his hand and to a stake in the ground, inscribed a radius, and built a dome. Rough rubble and brick walls were trued with plaster.

"In the south of Tunisia, where I spent months studying villages, the Tunisians built a vast array of housing types. Some were constructed above ground, others dug underground or directly into the sides of mountains. A French planner converted and connected several underground houses into a hotel. The guests descend and wander through a labyrinth of rooms and tunnels interspersed with skylighted courts.

"There was a plethora of forms sometimes carved out like a lunar landscape, sometimes laid up in brick, sometimes formed in place out of rubble, stone, and mud. Where did such variety come from to be localized in one particular place? I visited and revisited the area for the next 10 years to piece together the history.

"The Berbers situated their villages on mountaintops as refuges from invading Arab tribes. They descended down the mountainsides and burrowed and built in the valleys below in different ways and at different times as local conditions, history, and geographic conditions permitted. Each invading culture brought its own architecture and techniques. With each addition a new synthesis emerged. The Tunisians were constantly enriched by one invading culture after another. The major invaders today are European developers that come to build tourist hotels.

"As designers seeking a unique solution to low-cost construction, we were incredibly naive. The problem was far more complex than developing a cheaper mud. There proved to be no miraculous connection between low cost and housing. Every culture had already and ingeniously found the best, most practical means of providing shelter for itself."

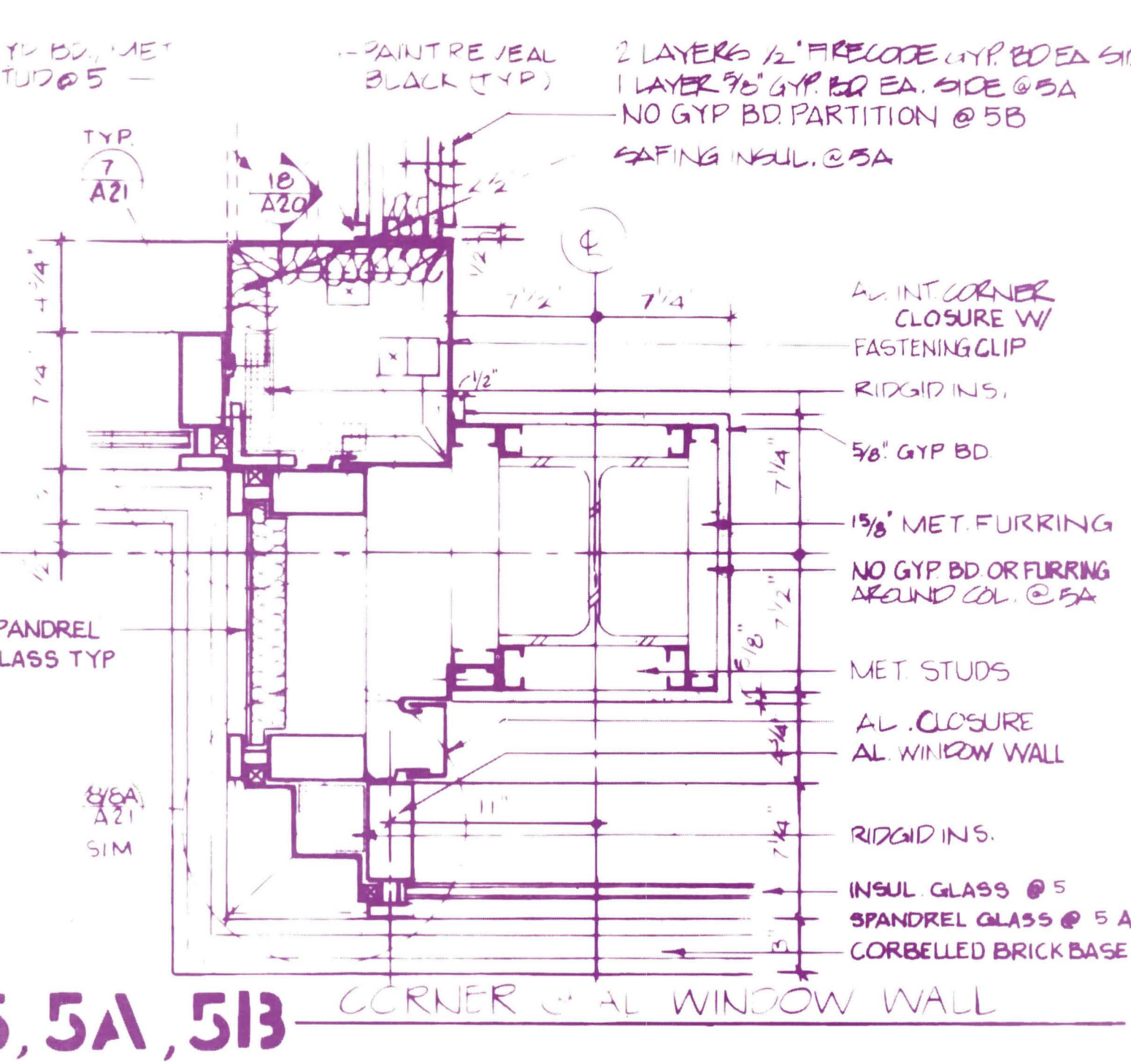
Ali Djerbi, director of the Tunisian Institut Technologique d'Art, d'Architecture et d'Urbanisme, adds his impressions: "The culture of Tunisia today crosses time from the Middle Ages to ours. We search for a new way to create architecture that will extend from our roots to the future. The modern movement brought new ways of thinking about architecture. Although it did violence to indigenous forms, it provided useful analytical tools.

"Corbu's work begins with the analysis of traditional architecture. His concepts of space and light were formed during travels in the south of Algeria. The purity of form, relationship between geometry and spatial organization, function and space, and the clarity and simplicity established the base of modern architecture. These are the lessons Le Corbusier learned from the Mediterranean vernacular architecture of North Africa.

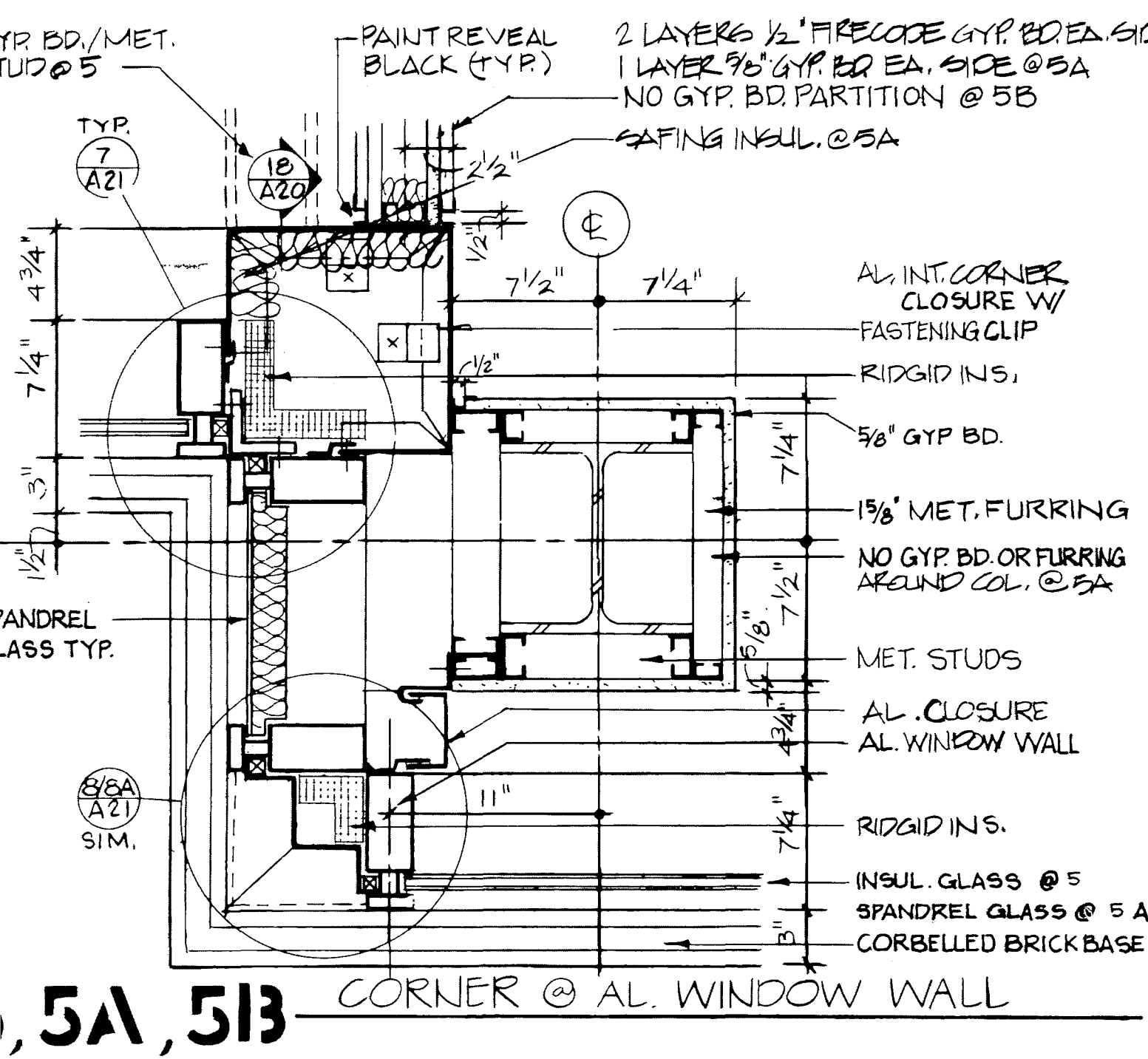
"In the south of Tunisia, people have made impressive vernacular adaptions to the environment. They live with nature and deal with climatic problems directly on the site. An ideal image of the relation of man and site is found here. Solutions for all formal relationships—the dome, vault, and rhythm of repetition—can be found in our vernacular architecture.

"Space is created in direct response to body function and attitude. Furniture is superfluous. All that is needed can be found in the space. For instance, the bed is the architectural form of sleep. It is not only a bed, it is a place of quiet, a space inside a space where there is security to sleep without light or noise. The bed space for wintertime is not high off the ground. The walls hoard the warm air during the day and diffuse it over the sleeper at night. The summer space is upstairs, outside, surrounded by air far from the ground. Windows call in fresh air during the night, and are closed during the day to keep the inside cool.

"We find in Arabic calligraphy a movement from right to left. Going from right to left, and downward, and continuing to the left, when I reach the left I cannot move. If I want to move I have to change my steps. I cannot move. I have to stop and punctuate. We find this in architectural forms. The elevation is calligraphy. All must be related—the form, the structure, the space, and the language." □



Which one would you choos



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Finding New Uses for Computers

By Oliver R. Witte

Like any new technology, the computer was first put to use as a replacement for existing procedures. Early consideration of the computer by architects focused on whether it could do better or faster what they had been doing manually. Some concluded that it could, but others remained skeptical. Even now, many in the profession are unconvinced that even repetitive drafting can be done more efficiently with a computer than by hand in every case.

As a technology matures, users find that it affords opportunities they had not anticipated. Architects in this second stage of development of computer technology are discovering techniques that expand their horizons and make feasible a range of services that previously were out of the question. A handful of architects now are reaching for a third stage, in which both the technology and the techniques adapt to each other to make significant changes in the process of architecture.

Most architects who use computers today believe it is a mistake to try to force total automation. The best principle still is "use the right tool for the job." They point out that television has not replaced radio, the microwave oven has not replaced the range, and the telephone has not eliminated the postal service. Even carbon paper is making a comeback in fan-fold computer paper, of all places. Pencils and tracing paper are likely to be around for a long time, even in the most automated offices.

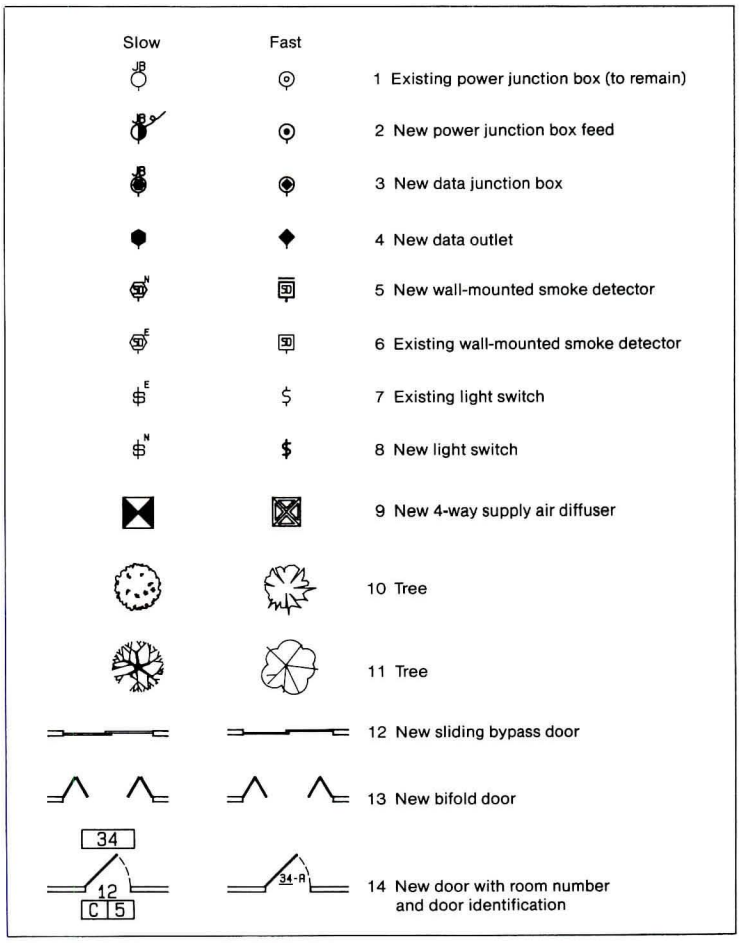
The following vignettes illustrate techniques being employed by practitioners at various stages in the evolution of computer-aided design.

Simpson Gumpertz & Heger, San Francisco, has found unexpected uses for the computer in reconstruction. Water had damaged balconies at St. Mary's Gardens, an apartment project in Oakland, Calif. Because of the variables in demolition and replacement, the probable bids were likely to be quite high. To protect both the owner and the contractor, Raymond W. LaTona, a principal in the firm, prepared working drawings for six types of demolition and six types of replacement framing. Thus the contractor could give a unit price, depending on which combination was necessary.

Simple computer techniques made it possible to draw all eight sheets of combinations in 35 hours of drafting with Cadvance by Isicad. Manual drafting would have required more than 100 hours and would have made unit pricing unfeasible.

Creighton Nolte, AIA, a San Diego architect, finds that his Macintosh computer helps him with construction contract administration by allowing him to quickly create and update construction schedules. Frequent changes to a construction schedule make manual techniques too cumbersome. But the computer handles the changes conveniently and recalculates the effects of each new circumstance, thus avoiding misunderstandings and possible subsequent litigation.

Nolte also takes advantage of the Macintosh's exceptional ability to merge text and graphics. Documents that combine these elements help him present his design concepts more effectively to clients, investors, tenants, and public agencies because he is showing and explaining simultaneously.

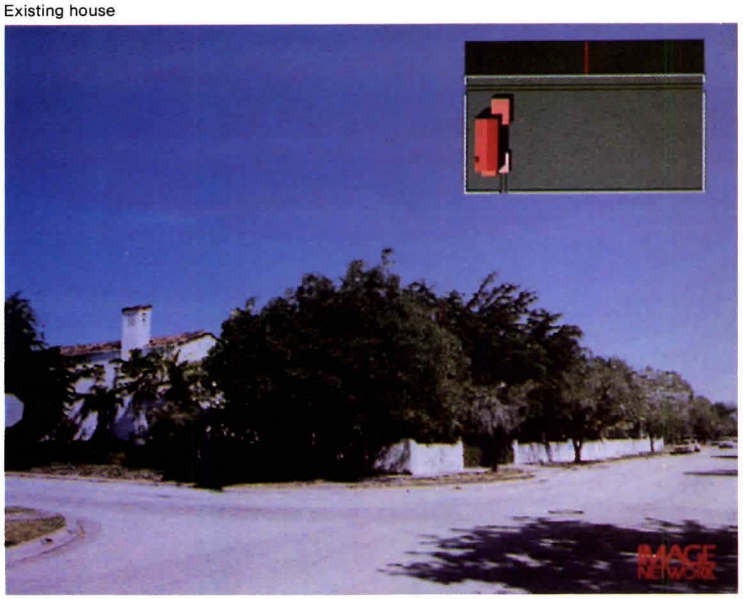


The biggest bottleneck in the automated office is the pen plotter. Stenbro Associates, Chicago, took a look at its symbols and discovered that some very nice trees took up to a minute and a half to plot. John H. Hanson, AIA, the firm's president, ordered a review of office standards. The result speeded plotting and eliminated graphic redundancy, clearing the way for drawings that are simpler and clearer. The "before" and "after" figures above show how Stenbro conveys more information with less drawing on its Point Line CADD system.

Stenbro eliminated all letters except on life safety symbols, such as smoke detectors. New equipment (Lines 2, 5, and 8) is shown in heavy lines, existing equipment in light lines. No figure has more than four sides to avoid confusion with a circle. Line 4, for example, shows a data outlet. The amount of poché has been reduced. Line 9 shows an air supply diffuser. Without the fill, interior triangles can indicate which vanes are active.

Lines 12 and 13 show new doors. On Line 14, the confusing jumble is replaced with a single number and letter, indicating Door A in Room 34, underlined to distinguish door numbers from other numbers. Other information is placed in the door schedule—now easier to reference from a drawing.

Existing house



Scheme permitted by code and style ordinance

Proposed demolition

Alternative proposed by historic preservation board

Architects are skilled at visualizing changes before they occur. Conveying those visions to clients and regulatory agencies can be difficult. Image Network, Coral Gables, Fla., harnesses its computer to persuade.

The client, the historic preservation administrator of Coral Gables, wanted to save a registered house from demolition to make way for a 20-unit apartment building. At a public hearing, Image Network presented simulations showing how the property looked at present, how it would look after demolition, how it would look with the kind of apartment building permitted by local regulations, and how it would look with an alternate plan that would save the house and yield 21 apartments.

The city's historic preservation board was shocked to see what damage could be done legally. By unanimous vote, it denied the demolition permit and began work on getting new rules adopted.

Image Network photographed the site, took it into the computer with a Howtek color scanner for display through a Targa 16 video adapter by Truevision. The replacement apartment buildings are composites of scanned photos of existing buildings in the neighborhood, merged and edited with Image Network's Inscale. The site plan was drawn with Autocad.

The drawings below are from a study for a new sports complex in Chicago, proposed by Skidmore, Owings & Merrill in association with Murphy-Jahn. The complex, which probably will not be built, involved pairing a football and a baseball stadium. A single dome on a track would permit either stadium to be covered or uncovered as needed.

The proposal for a movable dome, built of metal facets, was so unusual that the architects felt a large model should be built to facilitate public understanding. But working out the design of the dome and determining the exact size and shape of the facets, so the model shop could build it, turned out to be a major undertaking. In what might be the first illustration of the practical benefits of deconstructivist architecture, SOM built a computer model of the dome, dismantled it into its component pieces, and measured them, using the new IBM Architecture & Engineering Series software on IBM RT hardware.

Figure 1 shows a round dome on a square stadium. But it developed that the optimum shape of the stadium was more rectangular. Stretching the round dome to fit over the rectangular stadium (Figure 2) was easy. Then, by pulling apart progressively smaller and smaller components, the dome finally was reduced to pieces that could be measured (Figure 3).

At this point, the architects decided that some of the facets were too large and asked for new measurements based on different sizes of facets. The computer made the recalculations simple. Figure 4 shows the completed model as it was displayed for the public.

Figure 1

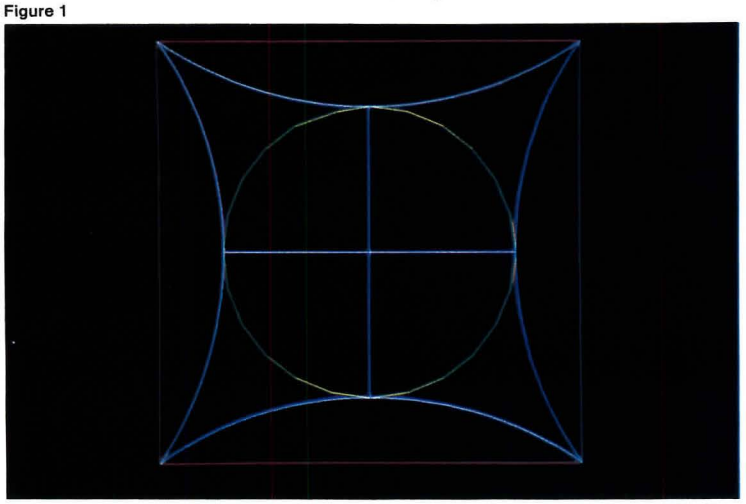


Figure 3

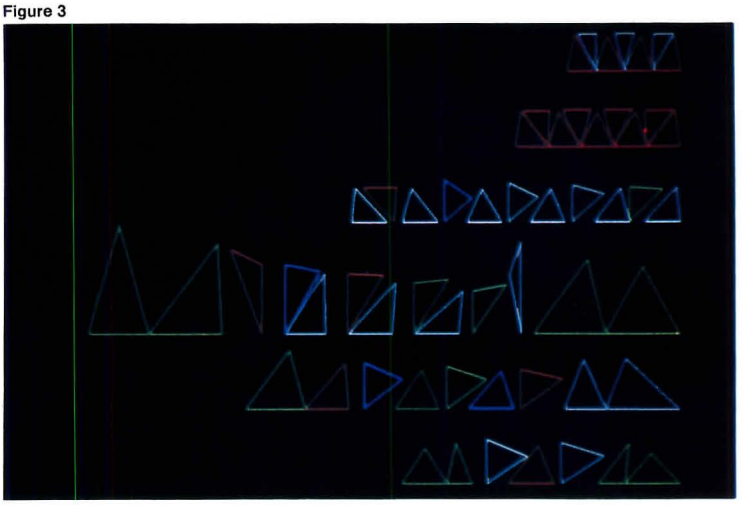


Figure 2

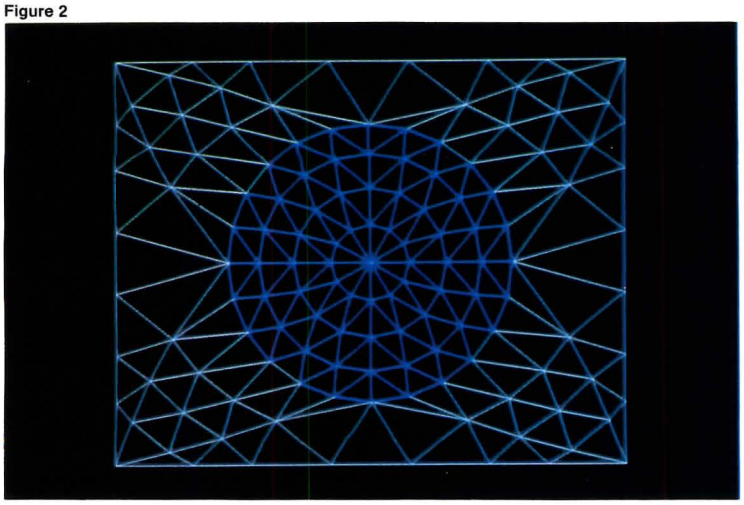
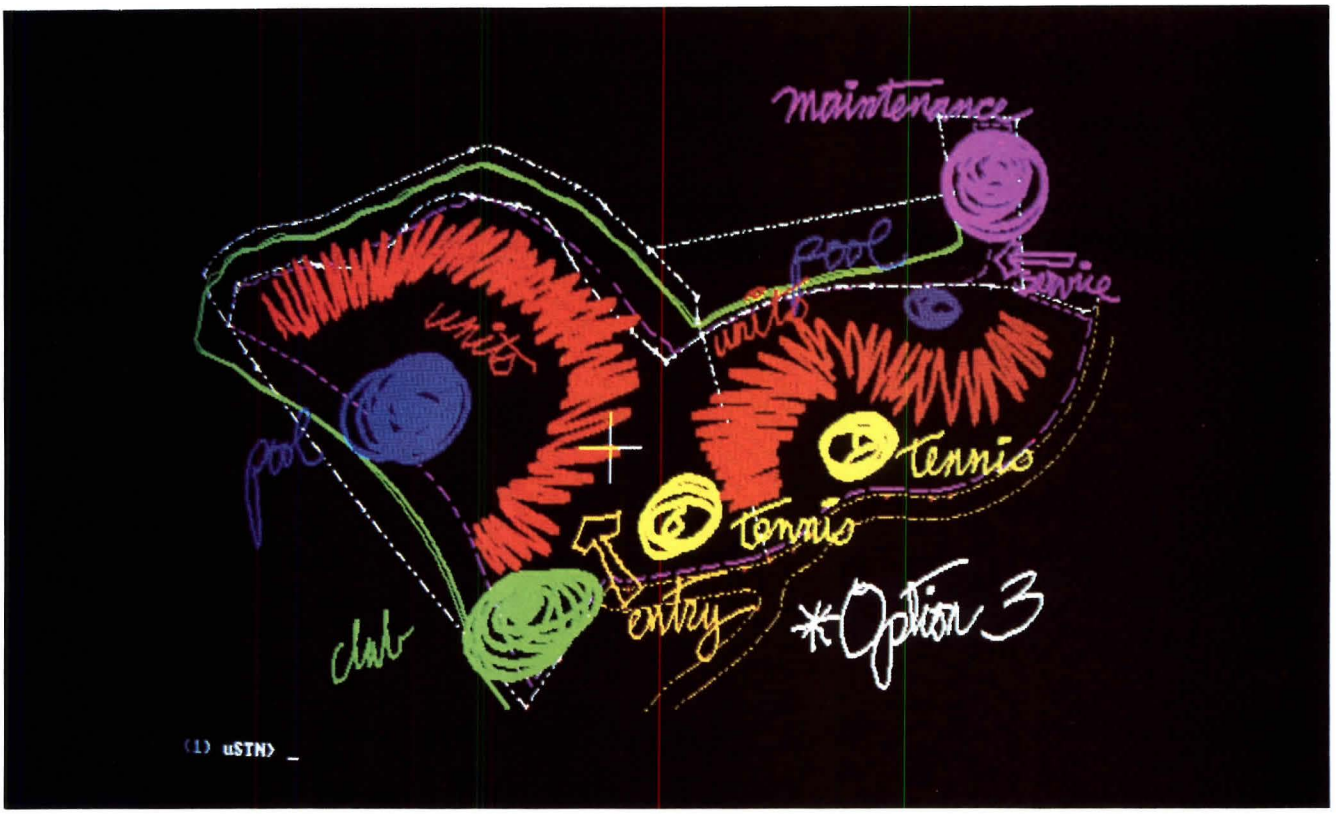


Figure 4



The next big step in the development of computer-aided architecture is likely to come in conceptual and schematic design. Future advances are likely to become progressively smaller in drafting, word processing, accounting, scheduling, and the like. But not until design partners reach for the computer in preference to the pencil will the full benefits of automation begin to be realized in the profession.

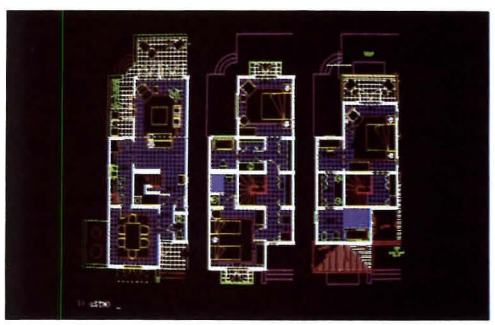
One of the pioneers in this approach is the Whitney Group, Houston. The firm has no drafting tables. Development of a design from its earliest stages—what Gunnar Birkerts calls "brain waves"—is done with Microstation on a Compaq 386/20 computer. The slides shown on this page illustrate the process in the design of the Pond Bay Club, now under construction on St. John in the U.S. Virgin Islands.

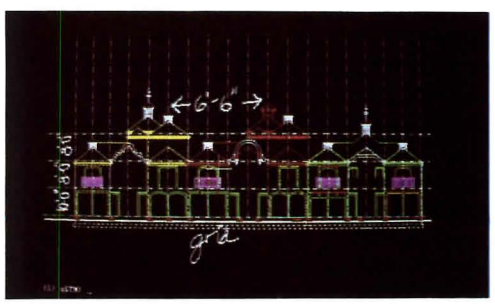
The computer screen in the top photo shows one of the preliminary site-plan alternatives presented to the developer of this resort retreat. To the right, the top screen shows the final space layout of one of the multilevel units. The exterior elements are combined in the gridded elevation, middle, which still looks and feels "schematic" with its hand-lettered dimensioning. The shaded elevation shows the final elevation (all renderings were shaded with color using the Microstation software).

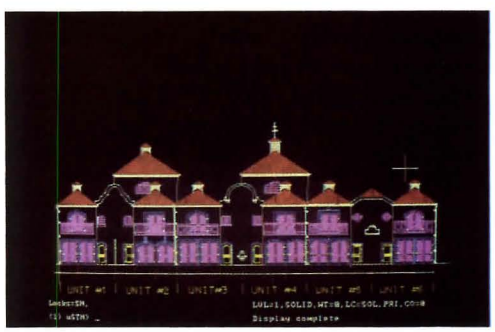
Gary Whitney, a principal of the firm, readily testifies that the computer has changed his practice. Design and drafting have become integrated parts of a continuum. Project architects Al E. Younkin, AIA, and Carrol P. Tabor, AIA, say that this approach increases the percentage of time on a project that can be classed as design from the normal 30 percent to more than 50 percent.

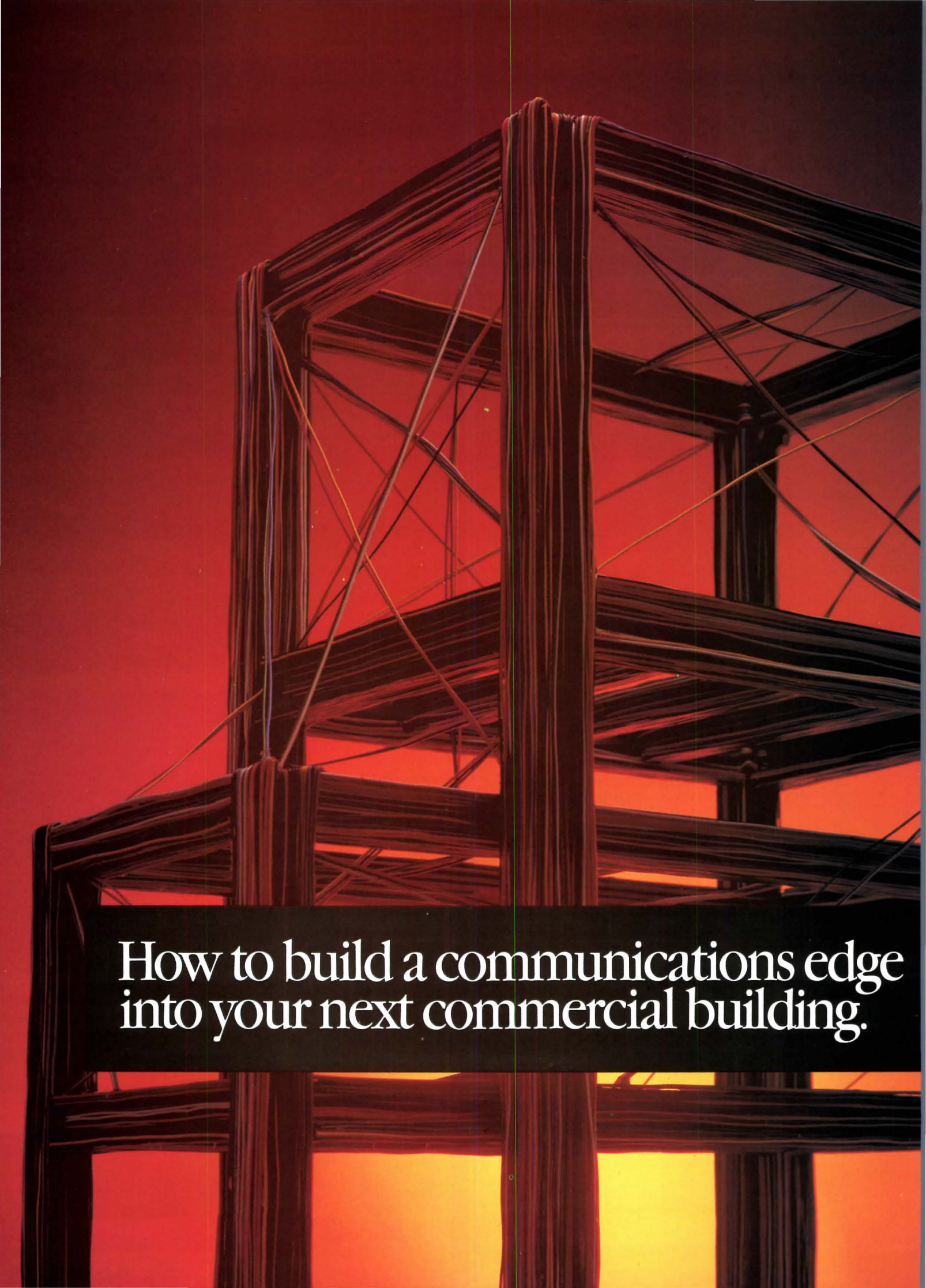
Note the use of color as an organizing tool. It's like having 256 colored pencils in the designer's hands. To switch to another pencil, the designer just points the cursor at the desired color.

Using the computer as a production tool rather than a design tool makes CADD a wall, not a bridge. Whitney believes the computer is great for production, but even better for design. □





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Well, now AT&T can make the installation, expansion, and integration of communications systems simple again. With a complete wiring system that provides connectivity for the various types of equipment your tenants may wish to use: the AT&T Premises Distribution System (PDS).

A lot to take advantage of. AT&T's PDS incorporates every necessary element—from the cabling plan to the system administration products.

All of which results in a number of distinct advantages.

The advantage of accountability—PDS is backed by a firm AT&T commitment to provide connectivity with virtually every major vendor's equipment, including AT&T's.

The advantage of flexibility—PDS makes it easy to use the best product for each communications function. Your tenants are not locked into a single vendor's technology. And PDS supports voice and data transmission, as well as image, digitized video, and other forms of communication.

The advantage of expandability—PDS allows users to connect equipment through universal jacks that fit standard wall outlets.

The "AT&T" advantage. PDS is backed by a comprehensive range of consulting, design, engineering, and service support to ensure the system meets current and future communications needs. Our Application Assurance Program is a commitment that your PDS will support certified applications for a full five years.

For more information, call AT&T at **1 800 247-1212, Ext. 597** or mail the coupon. Or contact your authorized PDS distributor.

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P.O. Box 1278, Morristown, NJ 07960-1278.
Please send me more information about the AT&T Premises Distribution System.

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Title _____
Company _____
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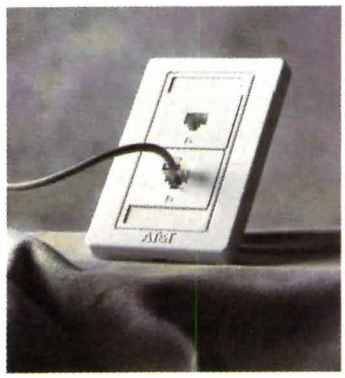
City _____ State _____ Zip _____
Phone ( ) _____



AT&T's PDS is a comprehensive system of basic components, from inside wire to electronic apparatus, including the Universal Information Outlet above, through which users can access PDS with hardware from virtually any vendor.

AT&T
The right choice.

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Design with a Floor and a Ceiling in Mind!

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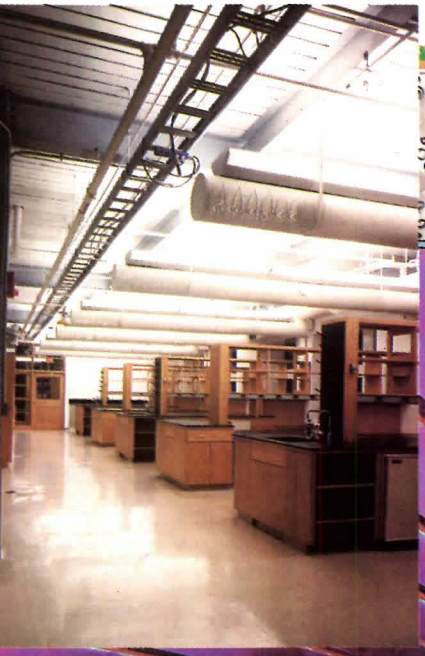

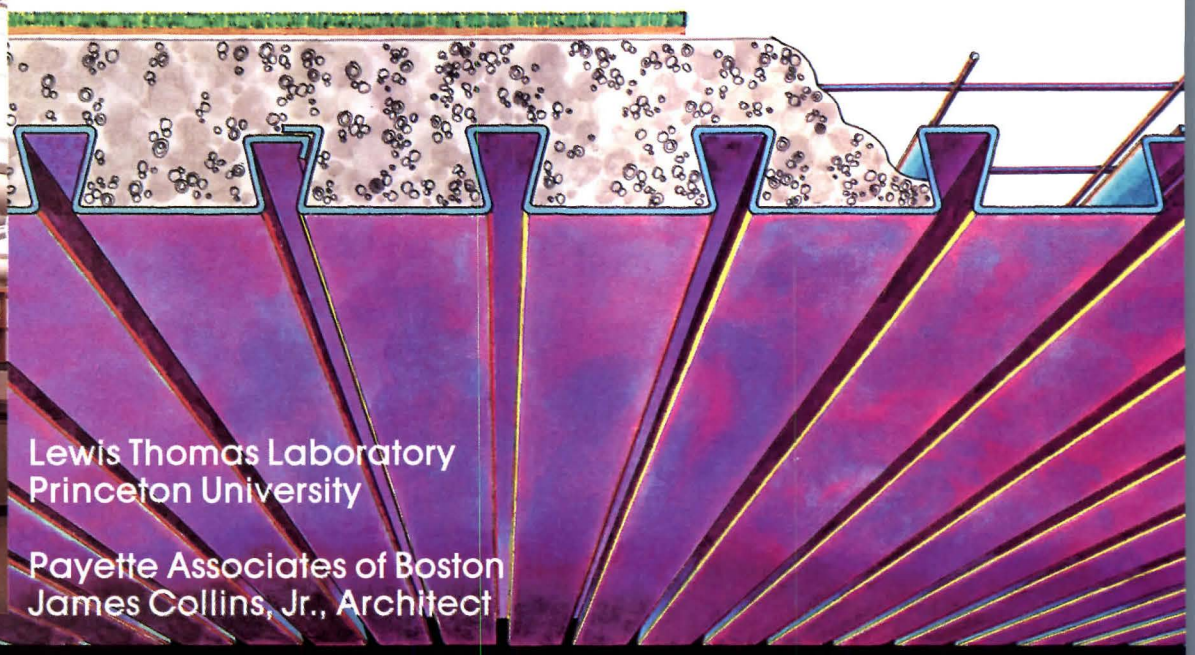

Lewis Thomas Laboratory
Princeton University

Payette Associates of Boston
James Collins, Jr., Architect

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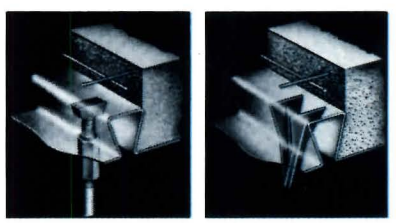

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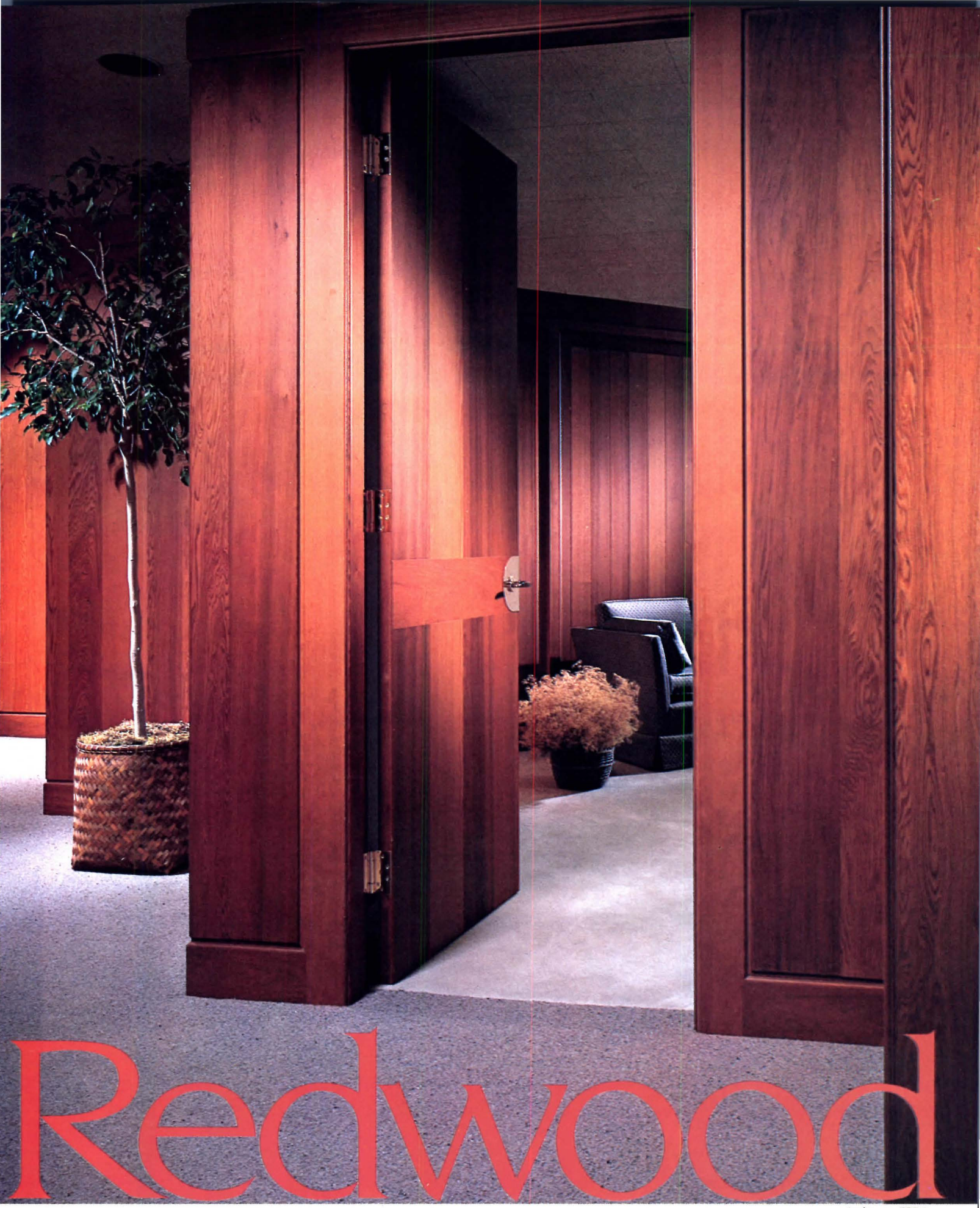

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Our Colorfast Warranty says our customers' carpets can take ten years of sunlight exposure without fading.

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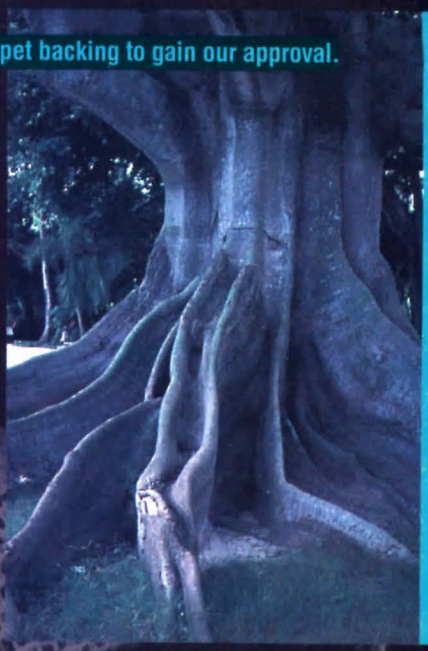

We don't certify any carpet that can't stand up to the daily stampede.

Pull back the edge of any carpet made from BASF Fibers and you'll find a Performance Certification label. Proof that we've tested that carpet against all the elements that work against it. Things like static electricity, exposure to light, the constant stampede of traffic and the strength with which the fibers are rooted in the backing. For 20 years, BASF Fibers has been at the leading edge of product performance testing. Subjecting carpets to a barrage of more than 21 rugged tests. Ensuring that our Zeftron® nylons stand up to the elements. Guaranteeing that our products live up to your expectations. In the future, as in the past, you can look to BASF Fibers to stay on the edge, testing the limits of product performance so that our customers' carpets perform for you.

BASF Fibers. Celebrating 20 years of leadership in Performance Certification.

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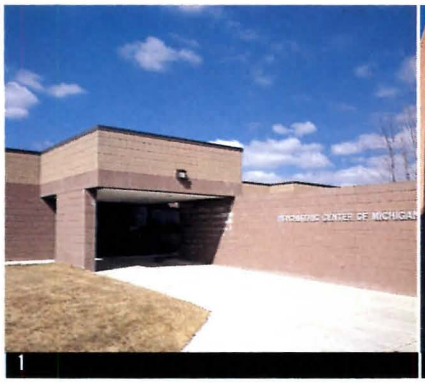
BASF Corporation
Fibers Division

Zeftron® nylon

BASF



1

2


3

Six major reasons to specify Sloan...

the first time.

At first glance, it's difficult to imagine how these six different buildings are related. But if you take a closer look at their histories, you'll find they all share a common theme: the washrooms in all six buildings have been refitted with Sloan flushometers.

True, these buildings don't look old enough to need major plumbing repairs. But the fact is, the original flushometers that were installed just didn't hold up. Even after repeated servicing, they continued to malfunction. They didn't shut off properly. They leaked at the stops. In some cases, they even flooded the washrooms. In short, they weren't Sloan flushometers.

Unlike substitutes, Sloan flushometers offer proven, reliable service. With built-in quality at an affordable price. That's why today more buildings are equipped with Sloan flushometers than with any other brand.

Only Sloan's rugged, tamper-proof design can assure the quiet, dependable operation so critical in buildings like these. Plus, Sloan flushometers are built to last for years with only minimal, routine maintenance—an important consideration for specifiers who value time and money.

The next time you consider specifying a substitute, think about these six buildings. Then specify Sloan. The first time.


4


5


6

1. Psychiatric Center of Michigan Hospital, New Baltimore, MI **2.** YMCA of Raleigh, NC
3. Barnett Bank, Tampa, FL **4.** S.E. Louisiana University School of Nursing, Baton Rouge, LA
5. Southwest Financial Plaza, Phoenix, AZ **6.** North Central High School, Spokane, WA

SLOAN VALVE COMPANY
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A Tradition of Quality and Pride

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Today, a new generation of advanced gas cooling equipment brings to commercial air conditioning the same economy and reliability that gas brings to heating. Before you design your next project, let your gas company show you how right gas cooling can be. Gas. America's best energy value.

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How to go 20 years without a leak... beautifully

Don't sacrifice beauty for function and economy. Our KLIP-RIB™ concealed fastener roof system gives you good looks without leaks along with guaranteed long life. The system is engineered for retrofit as well as new construction and with our Zincalume® finish carries a 20-year performance warranty. We also have a wide variety of durable paint finishes and colors to choose from. Plus, our patented clips reduce installation time, give weathertite construction and a strong, clean design line. For more information on our watertight case, simply phone or circle our reader service number.

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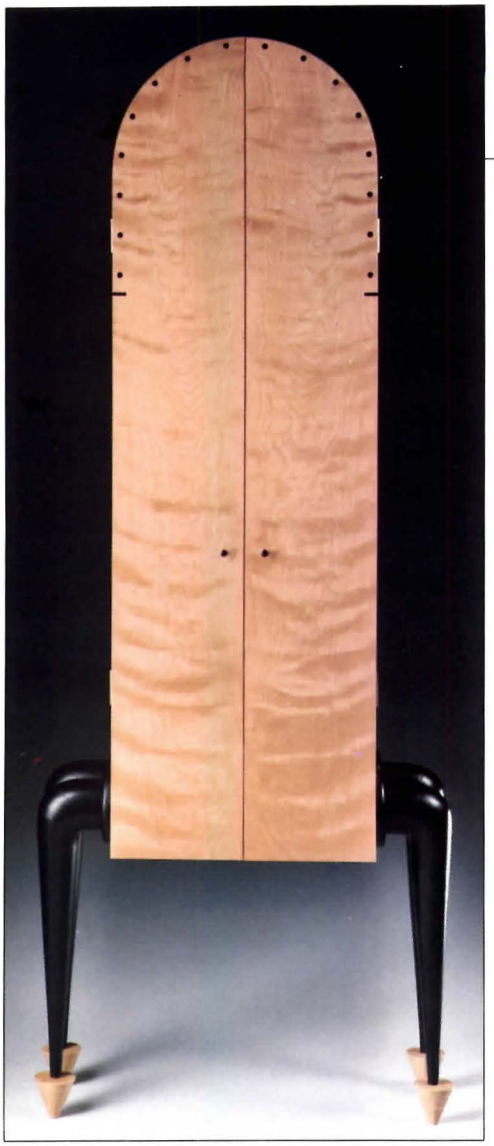
ASC PACIFIC INC.

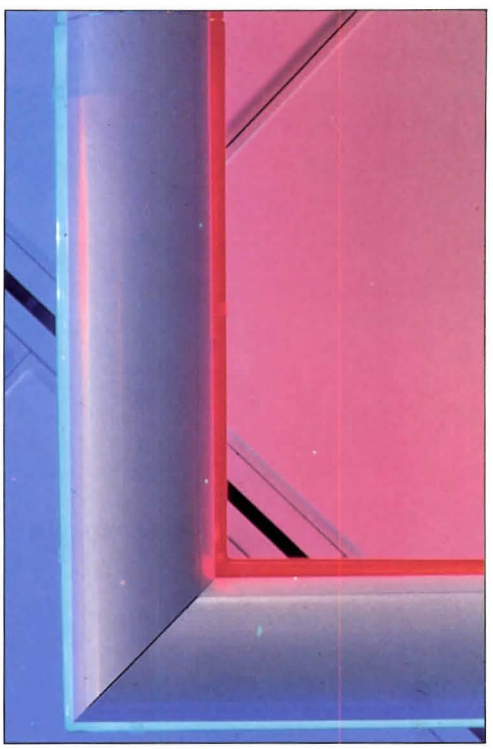
Circle 119 on information

PRODUCTS

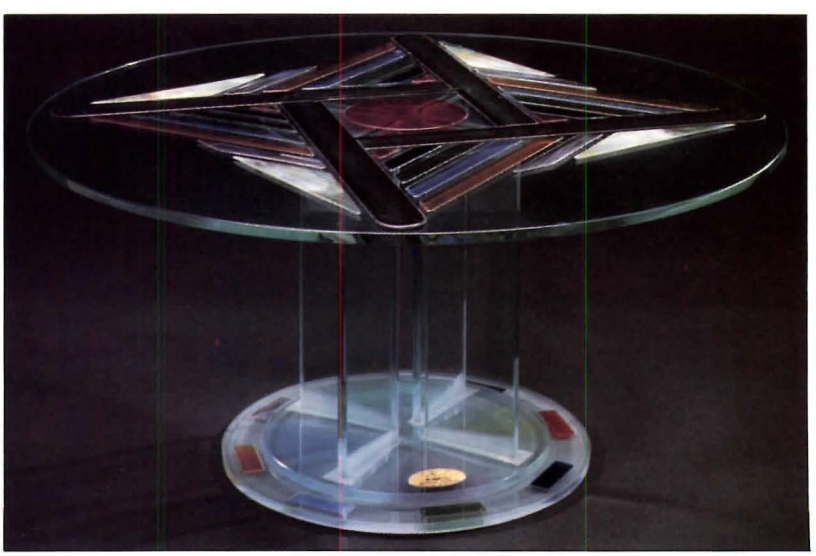


Custom Wood Furniture
The "High Boy" cabinet (shown above) was built for use as either an electronics center or a dry bar. The cabinet is constructed of curly birch and ebony leather wrapped legs and measures 84x28x18 inches. Designer/craftsman Dale Broholm is an experienced wood furniture maker with many pieces to his credit, including some now in private collections and in the Boston Museum of Fine Arts. Among Broholm's other work is a drop leaf table with sharp triangular sides for a dining surface where space is a consideration. The mahogany, satinwood, and wengé inlay table measures 29x30x60 inches, and seats up to six people. A queen-size, knock-down bed in either painted maple or select natural woods features cedar slats, a rubber mat, and postmodernist-appearing conical legs that narrow into balls that rest upon the floor.
Dale Broholm
Circle 401 on information card

Products *is written by Amy Gray Light.*



Versatile Tubular Lighting Fixture
TLS-5 Neon System features red and blue neon that runs along either side of an extruded aluminum tube housing a fluorescent light (shown left and below). Using standard lengths, tube modules can be joined together to form two continuous lines of neon alone, or with fluorescent uplight or downlight accents, or with Staff 1 circuit track that accepts any Staff 1 circuit track fixtures. The corner couplers are designed so that there is no visible interruption in the neon light.
Staff Lighting
Circle 403 on information card



Solid Glass Furniture
"The Pristine" coffee/cocktail table (above), made entirely of glass, measures 36x17 inches. Separate pieces have been combined and integrated into a solid piece, and the colored designs are created by inlaying or sandwiching stained glass into clear glass. All furniture is custom made to the user's design or specifications. Company logos can also be accommodated.
Alam Industries
Circle 402 on information card

Products continued on page 148

BLACK MAGIC

Enkadrain® Matting: What Every Subsurface Wall In America Should Be Wearing.

Our 3-dimensional mesh of nylon magically solves the problems of hydrostatic pressure.

With Enkadrain matting in place, water drains away easily. Stress on subsurface walls is fully relieved, so wet basements become a thing of the past.

Enkadrain installs easily against residential and commercial foundation walls after waterproofing to provide an escape route for water and relief from hydrostatic pressure. **See Sweets 02710/BAS.**

Enkadrain offers huge advantages over graded aggregate, gravel, or sand blankets. Lightweight, flexible, and compression-resistant, it installs easily without heavy equipment and with considerable savings over weighty alternatives. What's more, Enkadrain comes with its own filter, so it won't clog like gravel.

The powerful protection of Enkadrain answers a great need.

Close to 60% of residential basements are leaky—a problem Enkadrain can solve. And Enkadrain has been hailed all over the country for its effectiveness in highway and commercial building construction. It's equally beneficial in new construction or retrofit.

It improves drainage in planters without adding significant weight. And it's just the right stuff for earth-sheltered homes, underground parking, and pond liners.

Send us the coupon below or call 704-258-5050 for a free information kit on our one-of-a-kind engineering magic.

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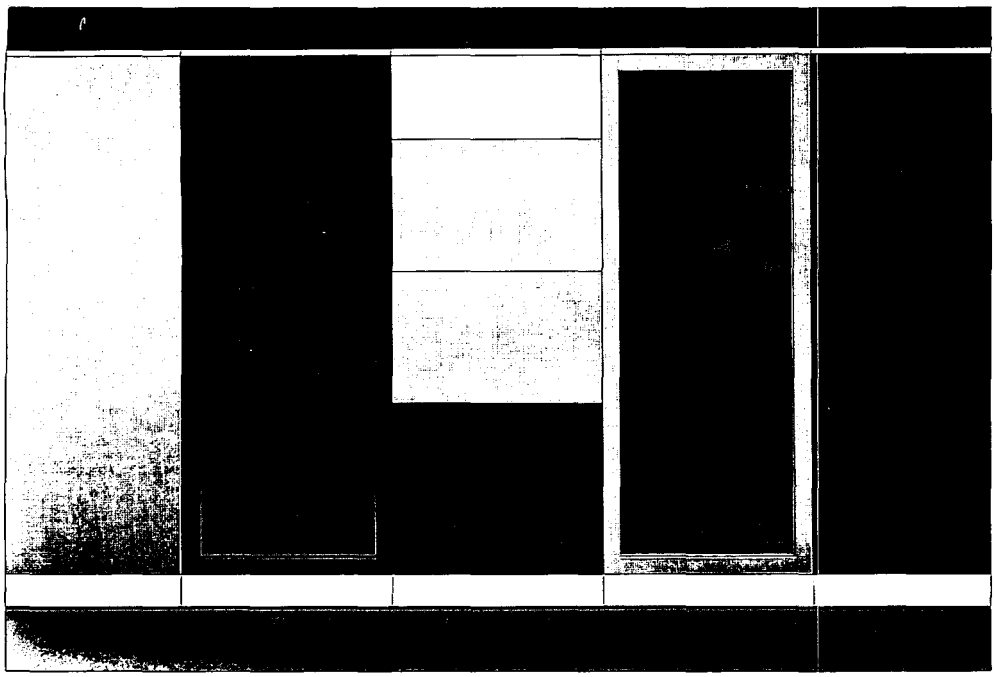


Versatile Office System
The Cetra office system, above, is designed to allow a high degree of design flexibility. Various panel heights ranging from 42 to 80 inches are available, with several panel options offered such as acoustical, sectional, translucent, smoked, and more. Raceways hold and channel electrical wiring, and a patented duo-durometer channel manages wiring. Ambient lighting in three intensity levels is available, and work surfaces and edge treatments may be specified in wood, laminate, or a combination of both. A variety of horizontal or vertical pulls may be ordered.
Kimbell Artec
Circle 404 on information card

Retractable Awning System
A Retractable Aluminum Awning System has aluminum blades that open to any position, interlocking in an extended and closed position to act as a shingled roof or adjusting mechanically to any degree of openness desired, thereby creating an "open roof" atmosphere. The system operates on a standard 120 VAC electrical and may be customized to cover any area. The blades are heavy-gauge aluminum with a baked-on finish that comes in four standard colors or in special colors upon request. The fireproof system is also designed to remain nonabsorbent to the sun's rays.
Retract-A-Roof Corporation
Circle 405 on information card

Puncture-Resistant Wall System
The Toughwall exterior insulation and finish system is designed to protect structures from the abuse of high traffic or vandalism. The system can be mechanically fastened to virtually any substrate, and over existing walls. The Toughwall system is reputedly lightweight, water repellent, and an excellent insulator.
STO Industries Inc.
Circle 406 on information card

Dehumidifying System
The Dry-O-Tron combination dehumidifier and pool water heater for indoor pool enclosures uses recaptured heat from the humidity it extracts to heat the pool's water, cutting operation cost. This enables architects to mix living spaces with wet areas such as swimming pools or spas with less risk of structural damage from internal condensation.

Moisture passes through a dehumidifier coil and is cooled below its dew point. The system's closed-loop energy recycler

Products continued on page 152

NOTHING NEGATES A GOOD PRODUCT FASTER THAN A QUESTIONABLE INSTALLATION.

IF YOU'RE COUNTING ON A ROOF TO DO ITS JOB, PICK A CONTRACTOR WHO KNOWS HIS.

We've been keeping people dry long enough to know a finished roof is only as good as its installation. That's why Manville depends on a select, established network of approved contractors to make sure building owners get the most out of every Manville roof.

The Manville Approved Roofing Contractor program assures you of a knowledgeable, experienced, approved installer who works directly with your Manville sales representative and district engineer to get your job done right the first time. He's the best there is.

And the roofing materials he's trained to use and install are equally reliable. In addition to high quality roofing felts, asphalts, and insulation, Manville also provides a full line of engineered accessories designed to fit your roofing needs. Plus, the most comprehensive systems guarantee program in the industry.

Remember, when you're looking for a contractor for your next roofing project, select a Manville roofing contractor. The best in the business.

For more information on our roofing systems, see your Manville sales representative, or contact Manville, P.O. Box 5108, Denver, Colorado 80217-5108.

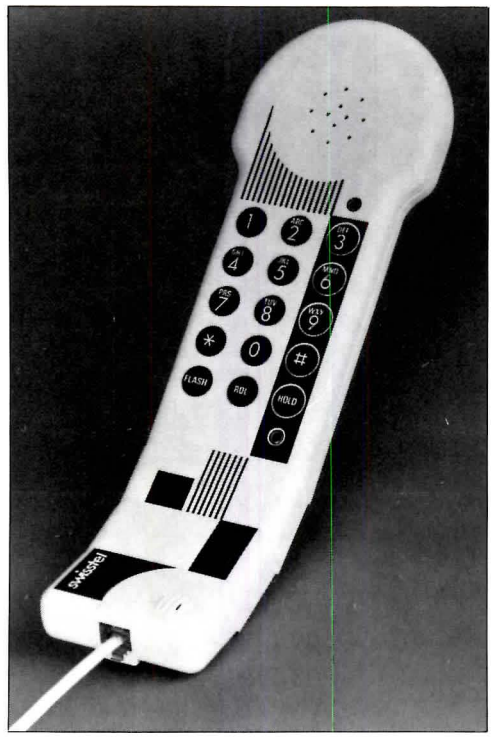
Circle 131 on information card


Manville
Total
Roofing Systems

Products *from page 148*
captures the latent heat that is given off in the process and returns it to the pool along with the condensate. Dry-O-Tron may be specified almost anywhere that wet areas have been included indoors. The product may also be used in retrofit design.
Dry-O-Tron
Circle 407 on information card

Rail Seating
The AE9000 Series Rail Seating, constructed of either wire grid or perforated metal, features one- to four-seat units in straight and radial segments, with or without backs. Three table models are offered, with two litter or ash receptacles to match. The seating is carried on a heavy steel rail, which can be pedestal-mounted or freestanding and is coated in a two-stage powder-coat finish in 10 standard colors.
Forms + Surfaces
Circle 408 on information card

Designer Telephone
The Swisstel telephone from Switzerland, shown above right, comes in 10 colors, features a slender (½-inch thick) silhouette, contains virtually no wiring, and comes with five accessories: a cushion for the ear; skid stoppers to prevent the phone from slipping and sliding on smooth surfaces; a retractable wall hook; a larger detachable hook for hanging the phone; and a shoulder cradle. The Swisstel also

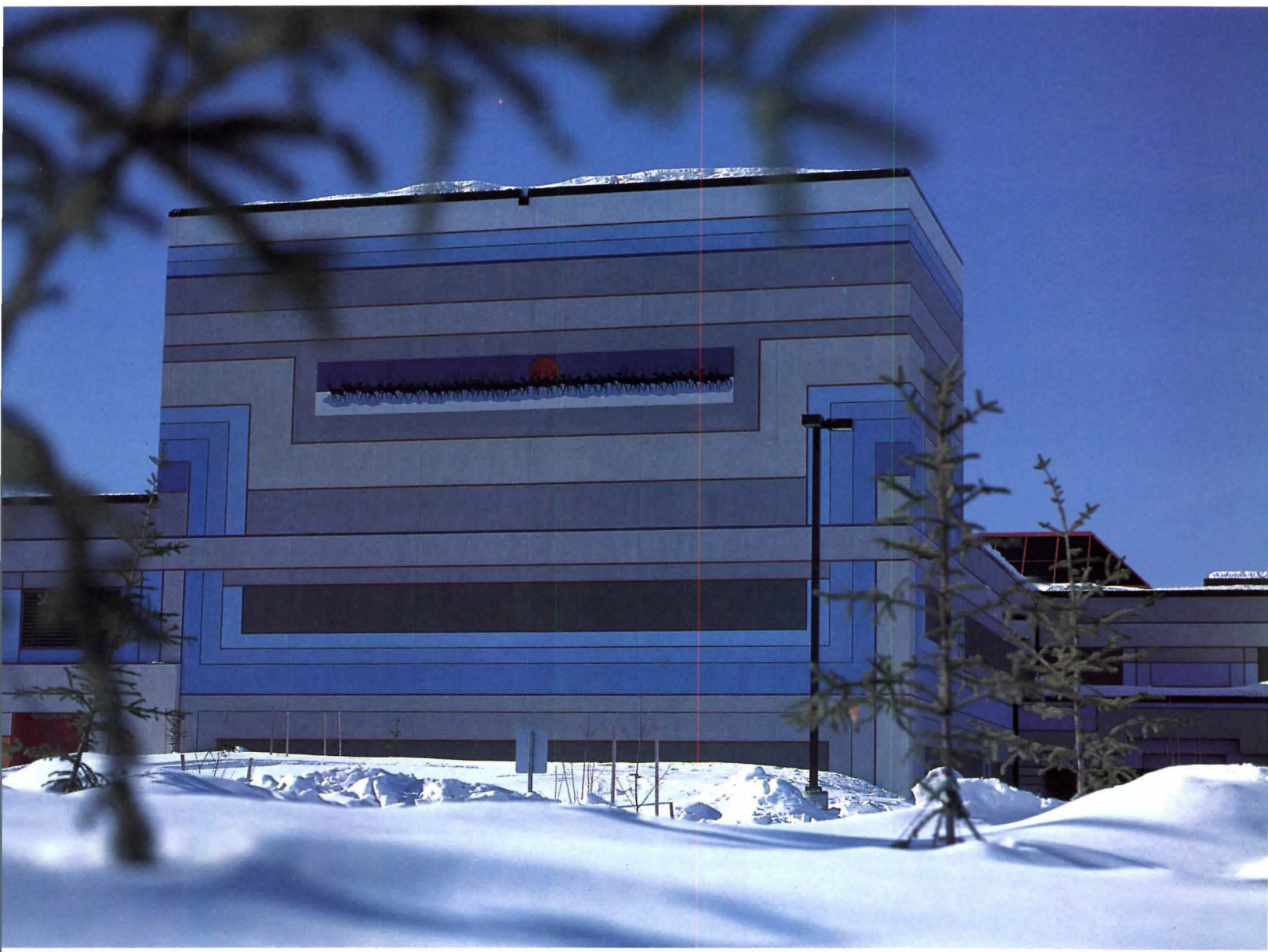


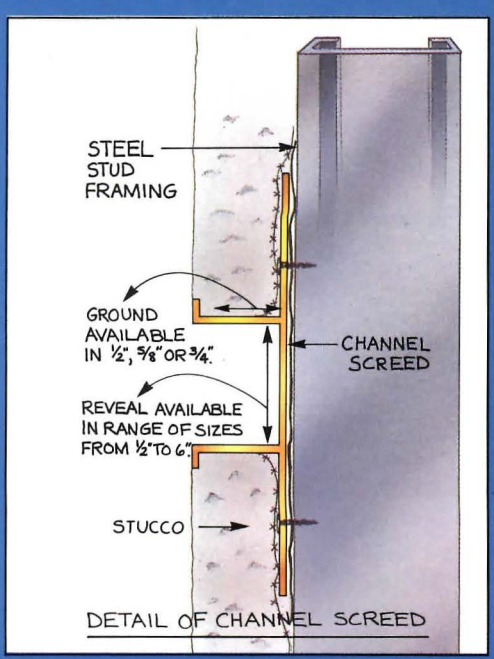
has an on/off light, hold button, on/off switch, flash button that accesses services, redial button, flexible mouthpiece, and a modular jack that connects the telephone to most standard telephone cords. On the back of the telephone are a ringer volume control, a pulse/tone switch, and an indicator light for when the phone is on.
Swisstel Inc.
Circle 409 on information card

Decorative Designs Catalogue
A newly published catalogue details 75 authorized, licensed designs of architect Frank Lloyd Wright. It features the work of four licensees selected by the legal heirs to Wright's estate, as well as photographs of the designs, product dimensions, materials used, and significant historical information. A perspective on Wright and his work, with reproductions of many of his original designs, is also included. The licensees reproducing a collection of the architect's designs are Cassina S.p.A. of Milan, Italy, for furniture (distributed in America by Atelier International Ltd.); Oakbrook-Esser Studios Inc. for art glass windows; F. Schumacher & Co. for fabrics, wall coverings, and rugs; and Tiffany & Co. for china, crystal, and silver.
Frank Lloyd Wright Catalogue
Circle 411 on information card

Sun Control Blinds
The Skyshield sun controller is a nonretractable louver blind available in different slat widths that clip into rigid slat carriers or rack arms, tilting the slats from closed to fully open in one direction. The blind may be installed horizontally, vertically, or at any intermediate angle, and can be fabricated to fit any window shape.
The Skyshield is suggested for skylights, sloping windows, and in situations where conventional blinds would be unsuitable.
continued on page 155

Fry's Aluminum Architectural Moldings Add a Third Dimension to Your Design





North Pole Senior High School — A silent sentinel in the snow-covered frontiers of Alaska. A symphony of visual impact and originality, made possible with Fry aluminum moldings. Custom extrusions, carefully matched colors, and factory fabricated intersecting pieces allow this design to flow in an uninterrupted fashion.

Fry's other capabilities to aid your unique design include radiused moldings and fabrication enhancements to ease installation. No longer a purely functional product, **Fry aluminum moldings** provide you with design options as limitless as your imagination.

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Look for us in Sweets catalog 09200/Fry.

Circle 139 on information card

Performance Without Sacrifice

Engineered for extraordinary performance. Designed for exceptional aesthetic appeal. The Classic series of surface mounted door closers from Rixson-Firemark.

- The clean, uncluttered geometric line...
- cold, rolled steel arm...
- durable *metal* cover for uncompromised plated finishes...
- A precision mechanism characterized by cylinder tolerances held to .0005 of an inch.

Indeed, this is the Classic surface mounted door closer.

RIXSON

RIXSON-FIREMARK
A MARK IV INDUSTRIES COMPANY
9100 West Belmont Avenue, Franklin Park, Illinois 60131 (312) 671-5670

Circle 141 on information card

Products *from page 152*
Blinds are also available to suit curved glazing such as barrel vaults. Controls feature a cord tilter for small, high-level windows; a lever for low-level windows; handwheel; gearbox with detachable rod and handle for large, high-level windows; electric motor with manual switching; an automatic constant light level control; clock or thermostat override; artificial lighting control; and custom control panels. The manufacturer was awarded the British Design Council Award for Excellence in Design in 1985.
Technical Blinds International Inc.
Circle 412 on information card

New Door Hardware
The HEWI door hardware program now includes lever handles, thumb-turns, a tubular passage latch, and a privacy dead bolt. The tubular latch is designed with heavy springing for use with steel core lever handles, providing retraction of the ½-inch bolt with 28-degree rotation of the hub. Both the latch and dead bolt, shown above, have front plate covers of nylon to match the color of the lever handles and thumb-turns and are available in 2⅜-inch or 2¾-inch backsets. The passage latch and lever handles are UL-approved and compatible with the latch and mortise locks of several U.S. manufacturers.
HEWI Inc.
Circle 413 on information card

Modified Bitumen System
Rhoflex Delta modified bitumen membrane is applied where the conventional method of torch application is not preferred.

By combining an adhesive and flameless heat technique, the adhesive is sprayed, rolled, or brushed over the entire undersurface of each roll during application, and flameless heat sources are then used to fuse the edge and end laps to rolls already applied. The manufacturer claims that the Rhoflex Delta system achieves a secure and watertight adhesion of the membrane to the substrate.
Teltex
Circle 414 on information card

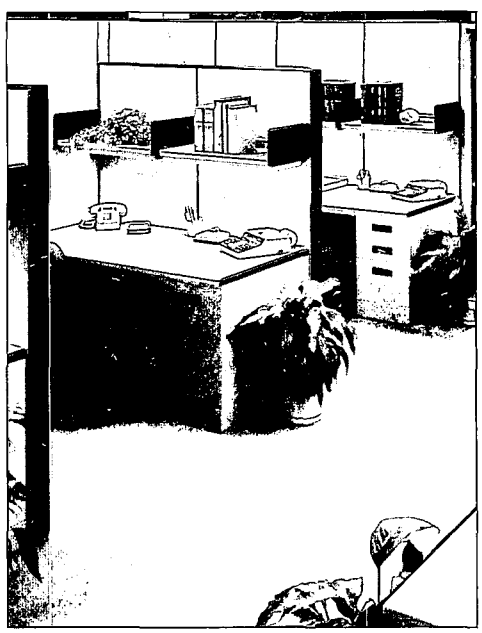
Ceramic Tile Importer
The Santa Fe Collection, a ceramic tile importer, features more than 100 styles of tile in all sizes, and colors, including standard 4x4-inch tiles; floor tiles 6x6 inches or 12x12 inches; and tiny ⅜x⅜-inch or 1x3-inch tiles. The Santa Fe Collection represents manufacturers in Japan, Mexico, Spain, Italy, and Brazil.
Santa Fe Collection
Circle 415 on information card

Mobile Conference Table
The Concorde conference table folds in half so that it can be rolled out of the way or stored. The table comes in either a rectangle or boat shape and accommodates up to 10 people. Rectangular tables are offered in four sizes: 3½x10 feet, 3½x12 feet, 4x10 feet, and 4x12 feet. Boat-shape tables are available either 10 or 12 feet long and 3½ or 4 feet wide in the middle. The tabletops are standard plastic laminate in a choice of 25 colors and four wood veneers, or a material that resembles soft glove leather, which comes in six colors. Tabletop edge treatments are a bullnose edge trim in wood or a shock-absorbing urethane bullnose edge. Legs are of 16-gauge steel tubing in either chrome finish or a choice of three colors.
Howe Furniture Corporation
Circle 416 on information card

Concealed Masonry Flashing
A through-wall concealed masonry flashing combines a metal foil with a glass fiber Mylar reinforcement end sheathing. Called Fiberweb 300, the ⅓-mil metal foil is surrounded by sheets of polyester film bonded to a glass fiber reinforcement. Average total thickness of the product is 7 mils. Because of this construction it can be

continued on page 156

Products *from page 155*
placed tightly in mortar beds with less chemical reaction than standard copper flashing, because the construction prevents the metal foil from touching the mortar, reducing the possibility of deterioration due to acid or alkali reactions. The unique construction also allows it to be formed more easily than copper to the exact shape required for the installation, even at extreme temperatures. Fiberweb 300 comes in 150-foot, 48-inch rolls and is also available in 12-, 16-, 18-, 24-, and 36-inch-wide rolls. A flashing tape for sealing all lapped joints and sealing any punctures made during installation is also available.
Dur-O-Wal Inc.
Circle 417 on information card



Open Office System
The Tempo 3 Radius office system (above) is offered by Shaw-Walker in response to surveys of architects and other users who specify open plan systems.

The Tempo 3 Radius line begins with 48-inch-wide acoustical panels, also available in 40-, 53-, 60-, 65-, and 75-inch heights and in 33 standard fabric colors. A 3½-inch-radius panel trim, in three trim options, completes the sleek, soft appearance. Reveal strips fit over panel-to-panel connections. No tools are required for panel installation.

Work surfaces are radiused on all four sides, and an adjustable articulating keyboard shelf can be stored when not in use to conserve space. Radius binder bins are modular, and the top and door front can be removed to form a bookshelf. A concealed door pull retracts into the bin when open and can be raised from any position. Display shelves and bookshelves for low-end panel versions, as well as hanging and mobile pedestals, are also available.

The Tempo 3 wire-management system has a 13-inch capacity, allowing installation of up to six 20-amp circuits and 14 25-pair telecommunications cables per panel. Each circuit can service up to

continued on page 158

Making more elevators makes Dover No. 1.

Every year since 1979 Dover has made more elevators than anyone else in America.

For the tallest office building in Austin, Texas, we built the fastest elevators in town. Four high-rise elevators in One American Center move passengers at 1,000 fpm. Dover Traflomatic II® microprocessor controls further speed service by minimizing response time.

Fourteen other low and mid-rise Dover elevators serve this enormous new downtown office, shopping and dining complex.

For information on Dover elevators or assistance on any elevator project call your local Dover office. Or write Dover Elevator Systems, Inc., P.O. Box 2177, Memphis, TN 38101.

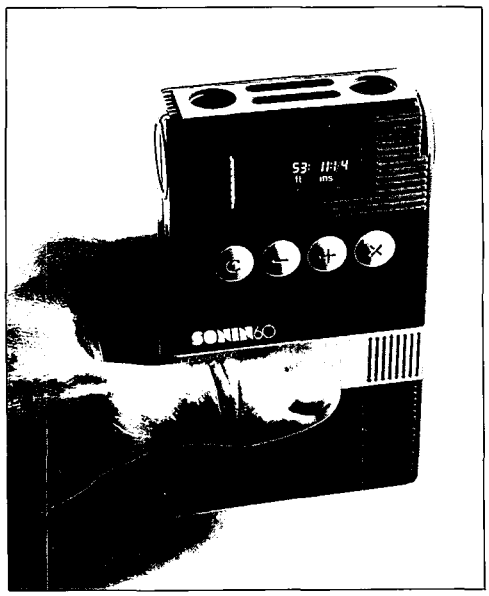
One American Center
Owner: Rust Properties
Architect: Morris Aubrey and Associates
Contractor: Gilbane Building Co.
Elevators sold and installed by Dover Elevator Co., Austin, Texas

DOVER®
ELEVATORS

Products *from page 156*

10 duplex receptacles for six circuits. Vertical channels within each panel allow specification of optional receptacles at work-surface heights.

A low-profile task light fits beneath the system components and features a bilateral prism lens that distributes light evenly over the entire work surface. All Shaw-Walker products come in a wide variety of steel, laminate, and wood finishes that complement the manufacturer's other components and computer-support furniture.
Shaw-Walker Company
Circle 418 on information card



Ultrasonic Measuring Devices
The Sonin measuring instruments use ultrasonic waves and a microprocessor to compute and measure the distance, area, and volume of a space, including windows, walls, floors, furniture, patios, pools, walkways, and driveways, as well as wall covering, carpeting, tiling, paving, painting, or carpentry.

Because the device uses ultrasonic waves processed by custom-designed microchips, measurements are computed in seconds. Electronic readings appear on the liquid crystal display. The Sonin has two memories and a calculator, so it can add and subtract and compute areas and volumes of different spaces. The Sonin 60 measures up to 60 feet. Other models measure up to 150 and 250 feet. The Sonin is pocket sized and weighs six ounces.
Sonin Inc.
Circle 419 on information card

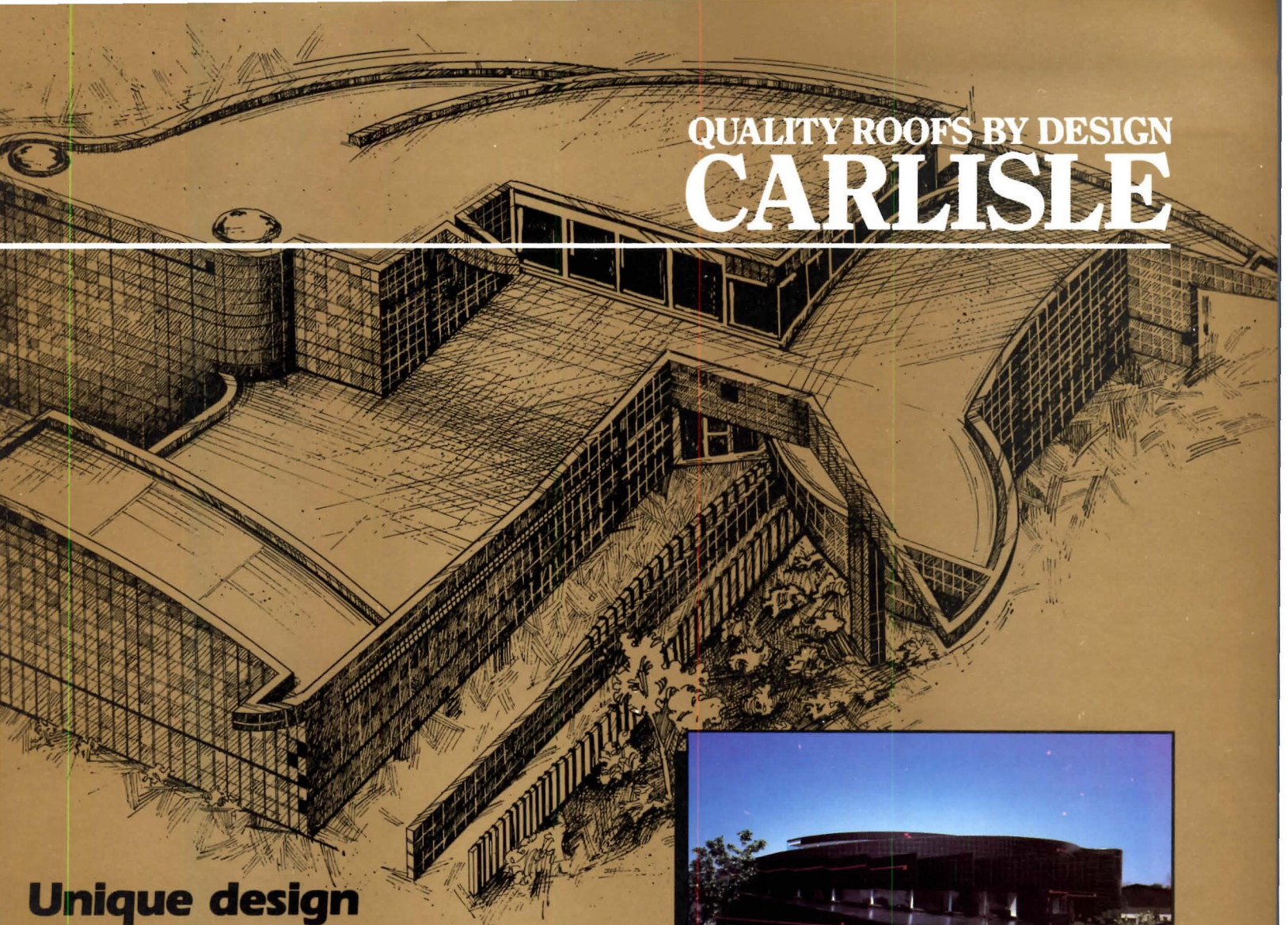
Interior Color Specifying System
A color specifying system designed to make interior color selection easy for designers features 840 colors, 600 of which are new. The ColorAnswers system is based on the specification needs of specifiers and designers and on current and projected color trends.

Colors are arranged in a fan deck which separates color hues. Specifiers can access these colors through a color case that

continued on page 160

QUALITY ROOFS BY DESIGN

CARLISLE



Architect: Harvey Ferrero
Roofing Contractor: Brodak Roofing & Sheet Metal
Carlisle Manufacturer's Representative: Holmes Associates

Unique design considerations make Carlisle's Fully-Adhered Roofing System Max Klein's choice.

"Design A" follows the irregular contours of the roofline—and fits them like a glove.

Call it unique, exciting or striking. When Max Klein, a major plastics housewares products manufacturer decided to build a new corporate headquarters, he resolved it would be unconventional, beautiful and memorable.

Designed by Detroit architect, Harvey Ferrero, the Southfield, Michigan structure is all of these.

The inventive architectural concept is difficult to describe. Its spirals, curves, slopes and angles flow with an irregular but fluid geometry.

And the first-class-plus building required a top-of-the-line roofing system. One flexible enough to follow the intricate geometry of the roofline. A system strong and reliable enough to perform outstandingly under Michigan's rigorous weather conditions. A system that is fully adhered to hold fast for thousands of tomorrow's.

They chose Carlisle's "Design A" Fully-Adhered Roofing System.

Owner, Phil Brodak, Brodak Roofing of Wixom, Michigan observed "The roof has more angles than I've ever seen. It is flat, circular, barrel-shaped and juts in every imaginable direction. And because the roof is visible, it had to have a smooth, perfect, solid black surface."

Concluded Brodak, "The Carlisle 'Design A' system is the only roof I know that could perform well under such design considerations. It was the perfect solution. Its fully-adhered roofing system allowed us to go wherever the roof went." Carlisle's roofing membranes include the standard EPDM and a new polyester reinforced EPDM. Both are available in designer colors–basic black Sure-Seal® or the innovative white-on-black Brite-Ply™.

Next time you need a roofing system try a Quality Roof by Design . . . try Carlisle.

Need more information?

Call a Carlisle representative/distributor. Or call Carlisle SynTec Systems toll free at 1-800-233-0551. In Pennsylvania, 1-800-932-4626. In Canada, 1-416-673-5557. Or write Carlisle SynTec Systems, P. O. Box 7000, Carlisle, PA 17013.

CARLISLE
Carlisle SynTec Systems

Circle 149 on information card

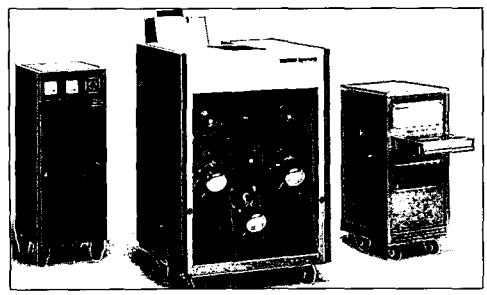
Products *from page 158*

has 3⅝x4¼-inch swatches. Each swatch includes information on the reflective values so it can be determined if the color meets specific lighting requirements.

Selected color families will be represented by individual color cards, so that a large selection of color hues within the same color family is immediately accessible. The two color cards currently available represent the most popular colors used in residential decorating and current trends, based on the manufacturer's research. One contains shades of light, midtone, and accent colors, and the other card, called Whites and Lights, features 24 varying shades of white and lightly tinted colors. The new system will also feature spice and traditional colors, sunwashed desert shades with a Southwestern influence, and soft pastels. Color selections from the new system will be available in all Sherwin-Williams interior paint lines.
Sherwin-Williams
Circle 420 on information card

High Definition TV System

Eidophor large-screen video projection systems, reputedly the world's largest-screen video projection systems, feature screen sizes ranging from 13x10 feet to 53x39 feet. Now a new High-Definition TV (HDTV) system for use with theater-size screens has been introduced.



The Eidophor Model 5177 Multi-Standard HDTV projection system provides a light output of 3,300 lumens and will project up to 40-foot-wide images on regular motion picture screens. Other product features include high luminance on any surface; easy viewing even in severe ambient lighting; multistandard, meaning no interaction between primary colors; an aspect ratio that is easy to change; and modular construction, for ease of maintenance. The Model 5177 is increasingly being used in theater ventures. Benefits cited for using the HDTV are lower production costs, easier editing, uniform quality of images, the ability to film a whole range of special effects, easier programming of live and canned events, and the minimization of piracy through encryption of program material when it is transmitted to the cinema via satellite or cable.
Information Display Systems, a division of Science Applications International Corporation.
Circle 421 on information card

Products continued on page 162

BRITE VUE

Revolving Doors

Brite Vue revolving doors form luxurious appearing entrances and deliver smooth, efficient performance year after year. Three or four wing models are available. Door wings and enclosures are fabricated in aluminum, stainless steel, architectural bronze or brass with satin or mirror polished finish. Speed control can be mounted in overhead canopy or in the floor.

Write or call today for complete information.

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So. Calif. (800) 344-4554, No. Calif. (800) 445-5525,
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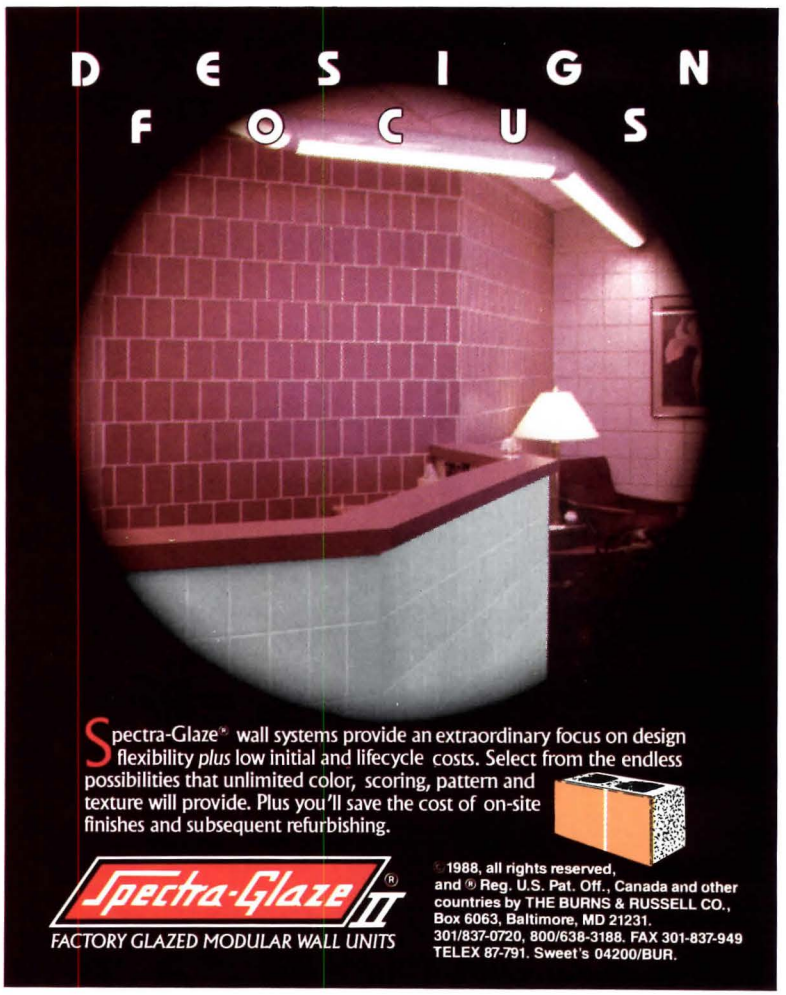
Windwood Center, Virginia Beach, Virginia
Architect: Williams, Tazewell & Cooke • Glazing Contractor: PPG Industries

Circle 153 on information card



Spectra-Glaze® wall systems provide an extraordinary focus on design flexibility *plus* low initial and lifecycle costs. Select from the endless possibilities that unlimited color, scoring, pattern and texture will provide. Plus you'll save the cost of on-site finishes and subsequent refurbishing.

Spectra-Glaze II®
FACTORY GLAZED MODULAR WALL UNITS

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Redwood

Specifier's File

Free folio of literature for architects illustrates the beauty and performance of redwood.

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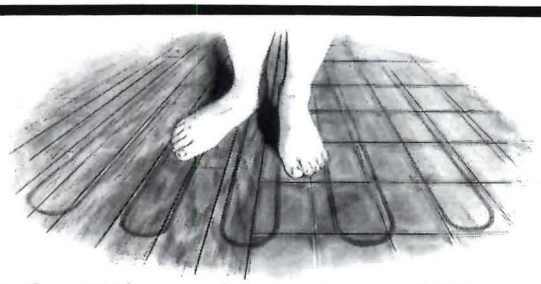

Make Tile and Hardwood Floors Feel as Warm as They Look

Wood and Tile floors are warm and inviting to the eye, but cold to the touch. You can change that by installing radiant floor heating from Wirsbo. The system is simple. Warmed water is circulated through a network of specialized plastic tubing beneath your tile, hardwood, or carpet floor. It's an easy system to install, compatible with any heat source, and more energy efficient than nearly all other heating methods. So make the part of your design your clients touch most as warm as it looks. Specify Wirsbo Radiant Floor Heating.

We'll help you design the most efficient radiant heating system on your current or next heating need. Find out all the benefits of Radiant floor heating. Call or write:

Wirsbo Company
1026 East Riverside Blvd.
Rockford, IL 61111
(815) 282-1141

WIRSBO

Circle 159 on information card

Decorative Metals
A new concept in decorative metals is Sublichromie/Odyssey anodized aluminum that has vibrant colors saturated on its surface. Using a coloring process, anything that can be printed on paper can now be put into aluminum. Sublichromie/Odyssey has won two design Oscars in Europe at the International "Batimat" show and a Certificate of Achievement at the Roscoe Awards in New York City. Free samples and information are available.
Advanced Technology Inc.
Circle 422 on information card

Look of Granite
A smooth, clear, gel-coat finish embedded with granite chips produces a variegated look that resembles granite, without the cost and weight of granite. The interior or exterior finish is available in a variety of colors and can be applied to most seamless glass fiber products, including planters, tables, seating, waste receptacles, and sand urns. Because of its durability, the granite finish also works well on sculpture, signage, and architectural details.
Krueger Inc.
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Computer Software Search Service
A service called Softwhere? helps construction firms find the best software for their particular needs. The independent software search service keeps information on file on more than 23,000 software packages. The service claims the reports it sends to clients that request them are unbiased, since the service does not sell the packages. Prospective clients send Softwhere? an analysis form outlining what they want from a program and how much they intend to spend. For a flat fee, the service reports back to the clients all the packages that meet their particular needs and where the programs can be obtained.
Softwhere?
Circle 424 on information card

Corner Glass Block
The new Weck corner glass block has a 90-degree bullnose corner with uninterrupted reinforcement channels. The Weck channel allows room for continuous reinforcement with fully adequate mortar space at all points in the structure.
Glashaus Inc.
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Office Chair
The Discovery ergonomic office chair has four controls that adjust seat height, back and seat inclinations, and back height. All adjustments are made while the user is sitting in the chair. Foam cushions bonded to molding underneath the upholstery in the back support and the seat, as well as additional integral foam, prevent damage to the chair and enhance comfort.
Fixtures Furniture
Circle 426 on information card

Products continued on page 164

HEAT MIRROR™ made it fly

Create a naturally-lighted glass enclosure for thirty-nine full-size aircraft, and still comply with one of the country's toughest energy codes. That's the challenge Ibsen Nelsen and Associates faced in designing the Museum of Flight at Boeing Field, Seattle, Washington.

The solution? Use over 55,000 square feet of Heat Mirror insulating glass. Heat Mirror provides the same level of solar control as dark tinted glass, yet lets in *over four times more natural light!* There's less need for artificial lighting and a net reduction of 35 percent in the Museum's projected annual energy budget.

Compared to other low-e glazings, only Heat Mirror offers *Total Performance*: controlling winter heat loss, summer heat gain, ultraviolet radiation, sound transmission and condensation better than any other insulating glass available today.

To find out how Heat Mirror can open up your design options, contact Southwall Technologies, 1029 Corporation Way, Palo Alto, CA 94303. (415) 962-9111. Or see us in Sweet's: 08810/SOU.

For immediate help on a current project, call our Architectural Services Department, toll-free:

(800) 365-8794

Southwall Technologies

HEAT MIRROR™

For Total Performance Windows.

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Placement System for Structural Decks
An anchor bolt placement system to position anchor bolts when pouring post-tensioned and conventionally reinforced concrete decks is available with either ½-inch or ⅝-inch bolts that snap into a specially designed galvanized steel clip that is then nailed to the plywood deck. Bolt height is easily adjusted to meet specified deck thickness. The system requires no template stripping.
Cal-Con Products
Circle 427 on information card

Insulation and Finish System
Energex seamless exterior wall insulation and finish system (EIFS) provides insulation, shape, and texture to almost any new or existing exterior wall.

The Energex system consists of four components: a rigid board insulation, reinforcing mesh, Energex matrix, and a finish. The rigid board insulation is a panel of expanded polystyrene available in varying thicknesses. The layer of reinforcing mesh helps prevent surface cracking and can be used in conjunction with an optional glass fiber mesh for high-impact areas. The cement-based matrix embeds the mesh and provides adherence for the acrylic polymer finish, which is designed to resist moisture, fire, and fading. It is available in more than 90 colors and a variety of textures. The Energex system will adhere to virtually any sound substrate on new or retrofitted construction, and it can be prefabricated or applied at the project site.
Vitricon, division of Polymer Plastics Corp.
Circle 428 on information card

Insulated Glass
Low-e insulated, tempered glass is now standard on Sunrise venting and fixed windows from Roto Frank of America. Tinted low-e glazing is optional. The transparent coating is said to exceed the energy efficiency of triple glazing and to eliminate up to 71 percent of the ultraviolet rays that can damage and fade fabrics. The coating has a 10-year warranty against peeling and deterioration.
Roto Frank of America Inc.
Circle 429 on information card

Interlocking Weatherstrip
Andersen Windows' Frenchwood Gliding Door features a full-length meeting-stile interlock/weatherstrip system that provides a continuous flexible seal along the meeting stiles. The continuous silicone bulb weatherstrip makes contact with the stationary panel interlock to provide the seal. The operating meeting-stile interlock tapers from the top and bottom to the center. The top and bottom engage first with the stationary interlock, and the stiles are drawn tightly together in a scissor-type action as the panels close, "zipping" the door shut.
Andersen Windows
Circle 430 on information card

Fire-resistant Duct
A fire-resistant plastic weave duct from ATS Products features a flame spread of 5 and smoke density of 5 on both inside and outside surfaces. The duct may be used in semiconductor clean rooms without the need for internal sprinklers when used for nonflammable corrosive vapor exhaust. The duct has been approved by Factory Mutual Research and listed by the California State Fire Marshal.
ATS Products Inc.
Circle 431 on information card

Accordion Doors
Won-Door two-track accordion-type folding doors are made of corrugated steel for extra strength and feature surface colors and finishes permanently bonded so that they are scratch-, dent-, and ding-resistant. Pins and rollers suspend every panel. The folding door's patented design enables it to span curved openings. Many different height and weight capabilities are available at a weight of just 4.2 pounds per square foot. Different types of STC sound-rated partitions have a patented two-track system with no internal parts and air space between the two walls that creates a cushion against severe blows. A special repair section of track is provided so that damaged partitions can be removed and replaced without disturbing the rest of the partition.
Won-Door Corporation
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They're Talking About Us.

"Of the six plotters in this review, paper loading with the Artisan is the easiest."

"Calcomp didn't cut corners on quality with their entry into the low-cost plotter field. The Artisan 1023 does excellent plots at high speed. Highly recommended."

"...21.8 minutes multi-pen, matching... the fastest D-size plotters tested."

"The control panel sports 16 rubber "chicklet" buttons and a two line LCD (liquid crystal display) that prompts the user in any one of six languages. Settings can be saved for four different users."

"The thorough User's Guide is AutoCAD-oriented and covers nearly everything you need to know to operate this plotter."

CADalyst magazine recently reviewed our Artisan™ plotter in an article called "Plotting with AUTOCAD, part 3." We thought we'd let them tell you how we feel about this new high-performance addition to our plotter family.

If you want to hear more, call 1-800-CALCOMP and learn how Artisan works, in detail and drawings. Or write CalComp, P.O. Box 3250, Anaheim, CA 92803. In Canada, call (416) 635-9010.

We draw on your imagination.™

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All this is backed by Sub-Zero's new 12-year protection plan. Ask for details.

SUB-ZERO

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Model 532 combination refrigerator/freezer with new optional panelized grille

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Model 501R refrigerator and Model 501F freezer

Model 561 combination refrigerator/freezer

For more information contact your Sub-Zero distributor or contact Sub-Zero.

All 500 Series models shown feature new Eurostyled interiors

Circle 169 on information card

DENS-SHIELD™ TILE BACKER FROM G-P. IT'S NOT JUST LIGHT... IT'S WATER-TIGHT.

The lightweight, water-resistant properties of the common duck feather make it one of nature's most perfect designs. At Georgia-Pacific, these same features served as our inspiration in the development of Dens-Shield™ tile backer.

Easier To Handle And Less Expensive Than Cement Board.

Dens-Shield is a full 33% lighter than Durock® or Wonder-Board® –and far less expensive than cement board, as well. Because it's lightweight and easier to cut, Dens-Shield is easier to handle and easier to install. Dens-Shield gives the same 1 and 2-hour fire rating as cement board, yet saves you installation time, effort and cost–and no special cutting or drilling tools are required. Dens-Shield is also less brittle than cement board, so it's less likely to chip or break–especially at the corners.

Tougher On Moisture Than Conventional Gypsum Board.

Dens-Shield's revolutionary core consists of a unique gypsum material that provides greater water-resistance and dimensional stability. Fiberglass mats on the front and back add even more protection, and an exclusive water and moisture-resistant coating makes the face practically waterproof. Properly installed, Dens-Shield requires no additional water or vapor barriers to prevent moisture from entering the wall cavity.

Dens-Shield is ideal for use as a backer board for walls or ceilings in tile baths, showers, locker rooms, or other high-moisture areas. It can be tiled, painted or papered and is available either 4′ × 8′ × 1/2″ or 4′ × 5′ × 1/2″.

Check out the light-weight, tough-performing alternative to conventional tile backer. Specify Dens-Shield–the revolutionary material inspired by one of nature's most perfect designs.

For more information and the location of the Georgia-Pacific Distribution Center or Sales Office nearest you, call 1-800-447-2882, ask for operator #1.

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