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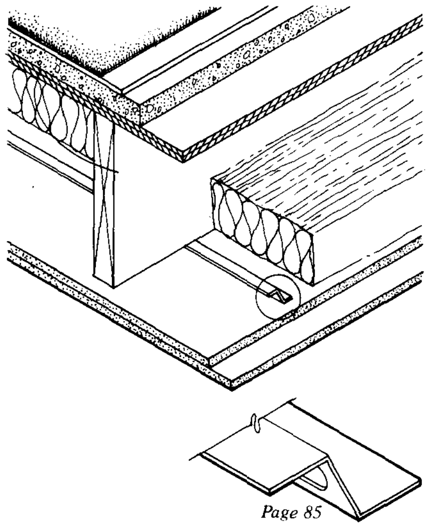

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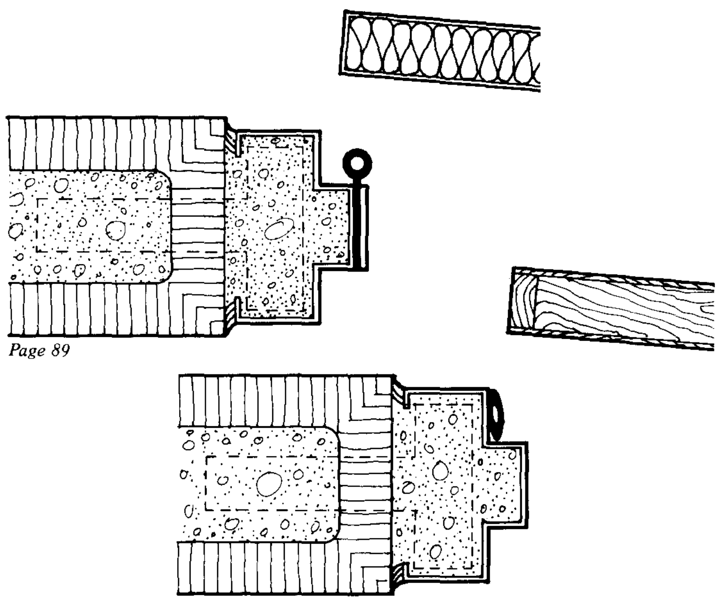

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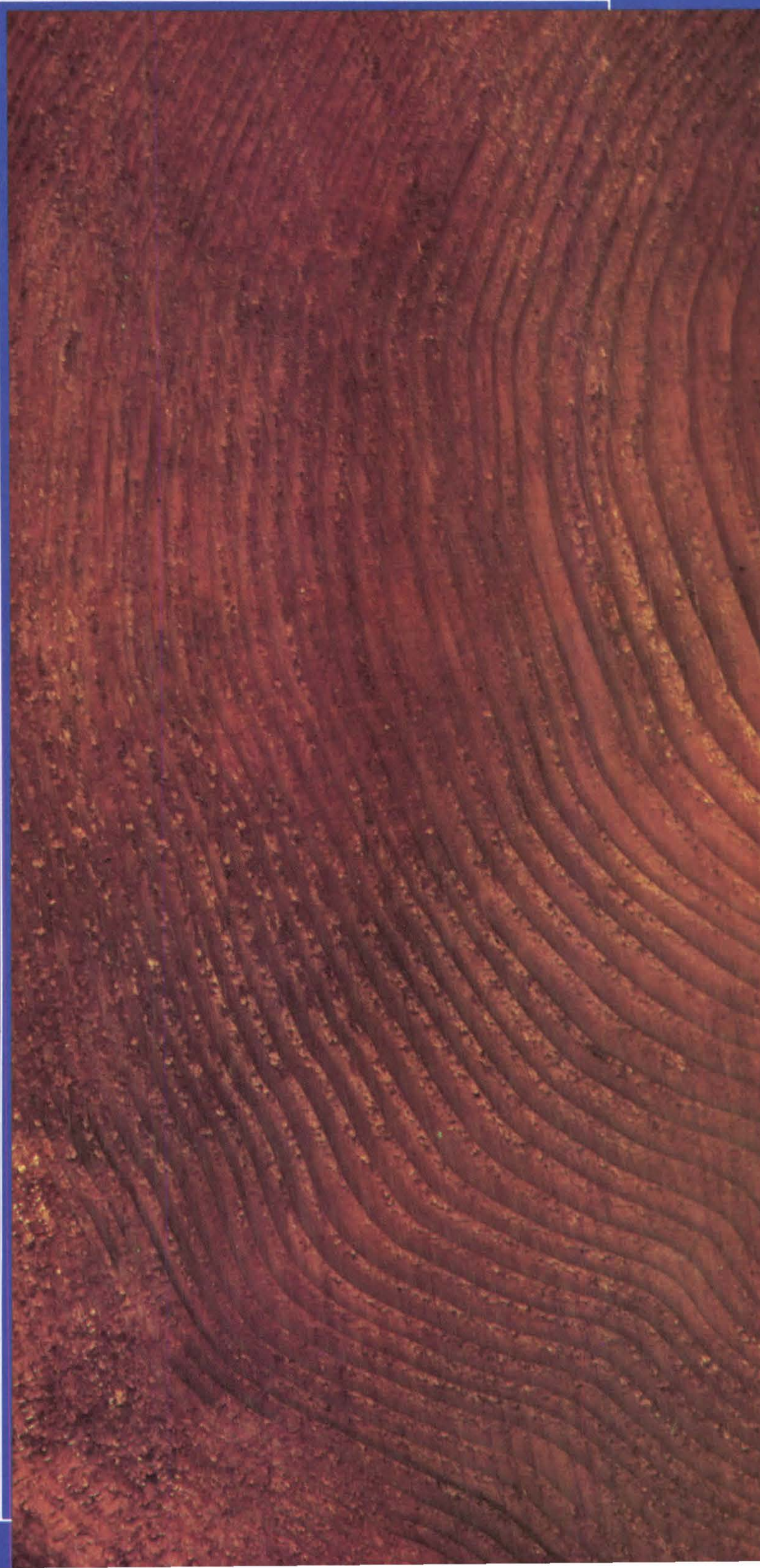

Disasters

Earthquake Rocks Southern California: But It's Not 'the Big One'

Los Angeles Times Photo

For the second week of October the state of California had planned a large-scale exercise to simulate the emergency response to a major earthquake in the Los Angeles area. On Oct. 1, at 7:42 A.M., nature rendered the exercise redundant by providing an earthquake of Richter magnitude 6.1, centered nine miles from downtown, near the town of Whittier.

The earthquake was felt sharply over a wide area, but the major damage occurred in the towns west of Whittier along the San Gabriel Valley. The slippage took place on an unmapped fault some five miles from the well known Whittier fault. Preliminary records show a maximum acceleration of 45 percent of gravity some 10 kilometers from the epicenter. This is high; by comparison, the devastating Mexico earthquake of 1985 recorded only 16 percent of gravity. But this continued for about a minute, compared with three to five seconds for the Los Angeles event. Moreover, the period of the latter quake was short—never approaching one second, while in Mexico City the two-second period of the shaking coincided with that of tall buildings and greatly amplified the acceleration.

Because of the geography of Los Angeles, this earthquake took the form of a number of local events. This was not the big earthquake that the area awaits; indeed, the October event was only small to moderate, in earthquake terms, and the big one could have an energy a thousand times greater. For a modern city, the magnitude of the October earthquake represents that at which structural damage only begins to occur—severe damage to really poor buildings, but considerable damage to contents and equipment.

Damage in this quake is estimated at $137 million; 10,910 buildings were damaged, including extensive damage to 51 county buildings. Most serious was damage, mostly nonstructural, at the county-USC medical center, where the administration building and a nurses' dormitory had to be evacuated. In addition, several buildings were damaged at the California State University campus, including $1.1 million of equipment and residual damage from a chemically caused fire at the physical sciences building.

One person was killed by a direct building failure. A student at the university died after a concrete panel fell from a parking structure, apparently levered off by impact due to an inadequate seismic separation. Though this tragedy repre-

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sents a degree of probability comparable to winning the state lottery, it brings home the lesson of keeping away from the perimeter of buildings. And nagging concerns about the safety of hundreds of thousands of exterior panels in the expected "big earthquake" relate to the life-threatening potential of nonstructural damage and to architects' responsibilities in design and coordination.

The immediate and longer effects of this modest quake were widespread. Some 470,000 electric power customers lost power. The freeway system—at commuting time—was severely disrupted, partly due to structural damage. A relatively short closure of the area airports—three minutes for Los Angeles and 90 minutes for Burbank—caused delays that rippled through the national airline system. There were more than 100 gas leaks, which caused 46 fires; an additional 26 fires were started from other causes. More than 20 people were trapped in elevators (requiring fire department rescue) and 79 traffic accidents have been attributed to the event.

Some 12,000 people were displaced from more than 9,000 houses and 1,400 businesses. A week after the quake, more than 1,600 victims were housed in Red Cross shelters. And in the streets, 10,000 refugees stayed outside their houses, camping out in the hot weather. Many of these were from Mexico, Guatemala, and El Salvador, with vivid memories of earthquake terror. Reinforcing the general nervousness was the usual pattern of aftershocks, with an alarming hit of 5.5 magnitude on the fourth day after the quake and some 26 shocks with a magnitude over 3.0 during the week after.

Although several buildings collapsed in Pasadena, the most concentrated damage occurred in the town of Whittier, whose downtown shopping area has many refurbished masonry buildings dating from the turn of the century. The refurbishing was for the most part cosmetic rather than structural, and three buildings collapsed and as many as 20 more may be beyond repair. An eight-block area was still closed after a week, a major loss to the small businesses involved. In the interest of safety, many undamaged or slightly damaged buildings remained closed, because an influx of customers might be hurt in aftershocks that could bring down adjoining weakened structures. Almost every store in the area had broken glass.

About 2,000 houses in Whittier were damaged, for the most part older dwellings that had shifted off foundations or suffered collapse of unbraced cripple walls. Collapse of brick chimneys was widespread. Many porches were tilted or pushed down, and brick veneer peeled off. Newer residential structures performed well, though contents were tossed around wildly.

One disturbing collapse of a newer structure was that of a parking garage at a shopping center on the outskirts of town.

Los Angeles Times Photo

Its structure consisted of poured columns and girders supporting long-span precast tees. It was L-shape in plan, and a major collapse occurred at the area of high stress in the notch of the L. The implications of the impact of a larger quake, occurring at a time of major shopping activity, are serious. This performance is an instance of the earthquake finding a place of weakness in a major engineered structure, and it shows the danger of heavy, nonductile concrete frame structures.

The damage to unreinforced masonry buildings in Whittier and elsewhere increased knowledge of the vulnerability of these buildings and the need to strengthen or demolish them. Since 1981 Los Angeles has enforced an ordinance that requires owners of about 8,000 such buildings within the city limits either to reinforce or to demolish them, within a time schedule that varies according to the occupancy of the building. To date, about 30 percent of these buildings have been attended to. This quake should give some useful information as to the efficacy of these measures. Preliminary reports indicate that the retrofitting was successful in preventing or limiting damage. The experience of Whittier indicates the economic (and possibly life-threatening) consequences when appearances are preserved but structural defects are neglected.—Christopher Arnold, AIA

Mr. Arnold is a seismic design specialist and president of Building Systems Development Inc., of San Mateo, Calif.

Awards

AIA Awards Program Honors Achievements in Urban Design

AIA has presented eight citations for excellence in urban design in an annual awards program that recognizes "distinguished achievements that involve the expanding role of the architect in urban design, city planning, and community development."

The eight winning projects include a Florida resort community, a downtown plan, and low-income housing programs.

A program dubbed "patching and stitching in urban neighborhoods" was commended by the AIA review panel for "its consistent recognition of existing housing patterns in existing neighborhoods and the use of 'pattern books' to develop current housing."

The Pittsburgh firm Urban Design Associates, the Manchester Citizens Corp., and Montgomery & Rust Inc. were cited for working together to create infill housing that is "sympathetic and sensitive to its surroundings." UDA principal David Lewis, FAIA, said, "We tried to revive the 'pattern book' approach by incorporating a variety of surfaces and styles but a consistent scale." The program has constructed housing in single-family and multifamily neighborhoods in Pittsburgh, Richmond, Va., and Norfolk, Va. Funded by various forms of local public/private initiatives, the housing program has developed units priced at both low-to-moderate and moderate-to-high levels in older, urban neighborhoods.

Skidmore, Owings & Merrill/Chicago, Caldwell American Investments, and the Milwaukee Redevelopment Corp. were honored for the Park East corridor development plan in Milwaukee. The plan proposes a variety of housing types, retail and commercial uses, and parks for Park East, a linear, 20-acre site that resulted from an abandoned highway right-of-way. The review panel praised the plan's "imaginative and varied treatment" of the

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White Cement
Imagination in Architecture

CONTEST

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1987-1988 NATIONAL STUDENT DESIGN COMPETITION

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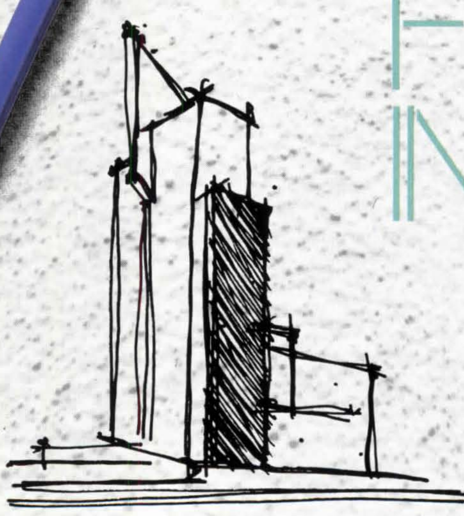

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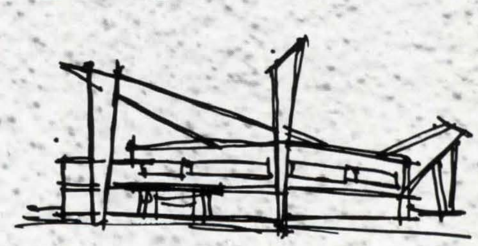

A I A S

The American Institute of Architecture Students
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Lehigh Portland Cement Company and the American Institute of Architecture Students (AIAS) invite students of architecture, engineering, and urban planning to participate in the Winter 1987-1988 national student design competition "White Cement—Imagination in Architecture."

The Challenge. The program will challenge you to design an airport terminal facility for a growing metropolitan area utilizing remarkably versatile architectural white cement as a principal design material. The unique plasticity, uniformity, and strength of architectural white cement will enable you to mold your design concepts into unusual, interesting, beautiful, and useful shapes that can be cast-in-place or precast with precision.

This competition will serve as an excellent educational exercise, affording a comprehensive and in-depth understanding of the various design attributes—shape, size, texture, pattern, color, form—of architectural white cement as a construction material. Competitors should exhibit imagination in designs which emphasize precast, cast-in-place, concrete masonry units, stucco, and terrazzo applications for interior and exterior surfaces.

The Awards. 1st Prize, $5,000. 2nd Prize, $3,000. 3rd Prize, $1,000. Four Honorable Mentions, $400 each. Awards to AIAS Chapters at Winning Schools, $250 to $750.

The Requirements. All participants must be registered students, full or part time. Individuals or teams of up to three students may participate. At least one student of each team must be a student of architecture. Registration opens October 26, 1987 and closes February 22, 1988. Competitors will have an eight-week period from their registration to complete their work.

To Enter. Registration forms may be obtained by contacting the AIAS Headquarters, 1735 New York Ave., N.W., Washington, DC 20006, or the AIAS Chapter at your school. A $15.00 entry fee will be required with registration.

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nine-block area and its "effective community-based planning and review process."

"Watkins Glen Tomorrow" (see Dec. '86, page 76) was established to revitalize a small town in southern New York through a community participation process in which the region's attributes were identified, a plan developed, and a design implemented. Centerbrook Architects of Essex, Conn., the American City Corp., the City of Watkins Glen, and Cahn Engineers were responsible for the process, communication, and design.

In commending the San Francisco Chapter/AIA for its urban design plan for the Embarcado corridor, the panel said that, as a result of the chapter's effort, "the public and various agencies have become involved in a unified and far more visionary plan for this important waterfront."

The town of Seaside, Fla., (see April, page 62) was cited as a "fine example of regionalism in urban design" and "very successful in terms of architectural styles," said the panel. Robert Davis (owner), Barret, Daffin & Carlin (civil engineer), Douglas Duany (landscape architect), and Andres Duany, AIA, and Elizabeth Plater-Zyberk, AIA, collaborated to "re-create, on an 80-acre Florida beachfront site, a small southern town."

The Denver downtown area plan of the Denver Partnership Inc. and the Denver city and county planning office was cited by the panel for successfully "developing a long-term urban design framework which involved corporate leaders, civic and neighborhood leaders, government officials, and others" in creating "a vision and [establishing] guidelines for reaching it."

The Boston Housing Authority, Goody, Clancy & Associates, Tise Architects, and Mintz Associates were honored for establishing a model program to revitalize "debilitated or abandoned public housing projects to become viable residential complexes" within their neighborhoods. The panel said the program "demonstrates how an enlightened public housing authority has been able to extend the useful life of its public housing stock."

The East Cambridge riverfront plan of the City of Cambridge, its urban design and planning staff, and Dennis Carlone & Associates was commended for its catalytic role in the redevelopment of an area along the Charles River. The panel said the East Cambridge plan "has leveraged many large-scale private investments based upon the public design" and has "achieved a high standard of design from the private sector."

The review panel included Peter H. Brown, AIA; John Clarke, AIA; Murray C. McNeil, FAIA; Charles Redmon, FAIA; and Leslie Gallery, AIA.

Submissions for next year's awards are due May 2. For more information, contact your local AIA chapter or Bruce Kriviskey, AIA, at Institute headquarters.

Chicago Architects Design Medals for Museum Benefactors

The Art Institute of Chicago has commissioned Chicago architects to design one-of-a-kind bronze medals to honor major benefactors of the department of architecture. Chicago has a diverse architectural heritage, and the first three architects selected to create the medals personify the city's architectural pluralism.

The first medal in the series (top) was designed by Helmut Jahn, FAIA, and presented to construction management executive Harold Schiff, who contributed $50,000 to the museum and created a fellowship to provide grants to young local architects. Jahn's medal features a gridded cube that recalls the patterned facades of a suburban office building he designed, on which Schiff's company provided construction management.

Stanley Tigerman, FAIA, designed the medal (middle) for developer John Buck. Tigerman placed a jagged line through a city skyline separating a group of modernist towers from several more articulated and historically rooted buildings.

Ironically, it was SOM's Bruce Graham, FAIA, who chose a more classical design for a medal (bottom) to be presented to developers Lee Miglin and J. Paul Beitler.

Regarding the medals for benefactors of the Art Institute, John Zukowsky, curator of architecture at the museum, said, "There has been a long tradition of architects designing medals from the Renaissance through the 19th century. We see these presentations as a creative way to honor our benefactors of architecture as well as participate in this age-old tradition."

Red Cedar Awards Program Honors Sixteen Buildings

Sixteen buildings were recognized in the 1987 awards cosponsored by the Red Cedar Shingle & Handsplit Shake Bureau and the American Institute of Architects. Initiated in 1973, the biennial program honors architects and buildings that demonstrate design "excellence and significant functional or esthetic uses of red cedar shingles or shakes."

The winning architects and their entries are:

- Mark P. Finlay of Fairfield, Conn., for the Reichhelm residence in Westport, Conn.
- Kliment & Halsband Architects of New York City for a gate house in Woodstock, N.Y. (see July, page 64).
- James Cutler Architects of Winslow, Wash., for the Strickland residence in Bainbridge Island, Wash.
- Backen Arrigoni & Ross of San Francisco for the Rafanelli residence in Piedmont, Calif.
- Fisher-Friedman Associates of San Francisco for the Palo Alto Redwoods condominiums in Palo Alto, Calif. (see July '85, page 65).
- Jan Timmer/Brian Bydwell Architects of West Vancouver, British Columbia, for Cascade Village in Burnaby, British Columbia.
- MWM Architects of Oakland, Calif., for Brickyard Landing in Point Richmond, Calif.
- Lagerquist & Morris, AIA, of Seattle for the Todd studio addition in Friday Harbor, Wash.
- CBT/Childs Bertman Tseckares & Casendino Inc. of Boston for Island House in Mattapoisett, Mass.
- Stopfel Associates Inc. of Boston for CHBA Carriage House in Brookline, Mass.
- David S. Gast & Associates of San Francisco for the Keegin residential remodeling in Sausalito, Calif.

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Awards *from page 24*

- Donald K. Olsen of Sausalito, Calif., for the Laneside condominium renovation in Sausalito.
- Bentz/Thompson/Rietow of Minneapolis for the Lake Harriet Band Shell in Minneapolis.
- Chad Floyd, AIA, of Essex, Conn., for the Seneca Lake Pavilion in Watkins Glen, N.Y. (see Dec. '86, page 76).
- Fay Jones & Maurice Jennings Architects of Fayetteville, Ark., for the Pinecote Pavilion in Picayune, Miss.
- Backen Arrigoni & Ross of San Francisco for Hawthorne's in Richmond, Calif.

The awards jury consisted of John D. Bloodgood, FAIA, of Des Moines (chairman); Donald Sandy, FAIA, of San Francisco; and Hobart Betts, FAIA, of New York City.

Eighteen Projects Cited for 'Excellence on the Waterfront'

The Waterfront Center in Washington, D.C., has awarded two top prizes and sixteen honor awards in its "Excellence on the Waterfront" design competition. The winners were selected from 109 entries submitted from 28 states and two Canadian provinces. The criteria included sensitivity of the design to the waterfront site, originality, the project's physical compatibility with its community, and its civic contribution and educational role.

The Monterey Bay Aquarium in Monterey, Calif., by Eshrick Homsey Dodge & Davis, San Francisco, won the top award for the best current work. The jury unanimously praised the aquarium for its sensitive architecture, "capturing the character of the city's industrial past," its "intimate connection with the bay it adjoins," and its "powerful educational impact and economic stimulus."

The other top award, for best "classic" entry, went to the Harbour Town, Sea Pines Plantation on Hilton Head Island, S.C., by Stuart O. Dawson of Sasaki Associates Inc., Watertown, Mass., and Charles E. Fraser of Hilton Head. The jury said the project set "a standard which combines environmental sensitivity in development, public openness in a residential resort, and graceful appearance seldom exceeded in subsequent developments anywhere."

Honor award winners: National Aquarium, Baltimore, Md., Cambridge Seven Associates, Cambridge, Mass.; Waterfront Programming Facilities, Harbourfront, Toronto, Ontario, Harbourfront Corp., Lett-Smith Architects, Zeidler Roberts Partnership, and Schefter-McCallum, Toronto; Sellwood Riverfront Park, Portland, Ore., Bureau of Parks and Recreation and Mayer Reed Schwartz, Portland, Ore.; Forest Park Beach Shoreline Protection, Restoration, and Recreational Development, Lake Forest, Ill., City of Lake Forest and Warzyn Engineering, Madison, Wis.; Jackson Brewery, New Orleans, Jackson Brewery Development Corp. and Concordia Architects, New Orleans; S/S William A. Irvin Ore Boat Museum, Duluth, Minn., City of Duluth and Duluth State Convention Center Administrative Board; Metropolitan Toronto Police Marine Headquarters, Toronto, Crang and Boake Inc. and Don Mills, Ontario; Battery Park City, New York City, Battery Park City Authority, Alex Cooper & Partners, and The Ehrenkrantz Group & Eckstut, New York City; Bayside Marketplace, Miami, Benjamin Thompson & Associates, Cambridge, Mass., and The Rouse Co., Columbia, Md.; Portside Festival Market/Festival Park/Trinity Plaza, Toledo, Ohio, The Collaborative Inc., Toledo, Enterprise Development Co., Columbia, Md., City of Toledo, and Trinity Episcopal Church, Toledo; RiverPlace, Portland, Ore., Cornerstone Columbia Development Co., Portland, and Gaylord Grainger Libby O'Brien Smith Architects, Seattle; Santa Monica Pier Carousel Park, Santa Monica, Calif., Campbell & Campbell and City of Santa Monica; Gene L. Coulon Memorial Beach Park, Renton, Wash., Jones & Jones, Seattle, and City of Renton; Hans A. Suter Wildlife Area, Corpus Christi, Tex., City of Corpus Christi and Park and Recreation Department, Corpus Christi; Waterfront Park, Boston, Sasaki Associates Inc., Watertown, Mass., and Boston Redevelopment Authority; Platte River Greenway, Denver, Platte River Greenway Foundation and Wright Water Engineers, Denver.

Jurors were David Wallace, FAIA (chair), Gerald Blessey, Ann Buttenwieser, Norm Hotson, Michael Krieger, Laurie D. Olin, and Wolf Von Eckardt.—Karen Collins

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Government

Replacement Housing Proposed For Development Displacees

While a controversial antidisplacement law for federally funded community development projects will most likely not be approved by Congress, it represents the widening concern over the nation's dwindling supply of low-income housing, in both the public and the private sectors.

Introduced into the Housing and Community Development Act of 1987 by Rep. Barney Frank (D-Mass.), the antidisplacement provision calls for any government or private developer to "provide for a period of 20 years one for one replacement of all low- and moderate-income dwelling units demolished within the same community." The antidisplacement provision was adopted by the House, but not the Senate. At the time this was written, House-Senate conferees had not yet reported.

Both the Community Development Block Grant and the Urban Development Action Grant programs would be affected, although the UDAGs with their heralded public-private partnership are considered more of a displacement force than the CDBG projects. Currently, all federal projects are subject to the uniform relocation of real property procedures, through which the federal government pays moving expenses and rent relocation supplements for three and one-half years.

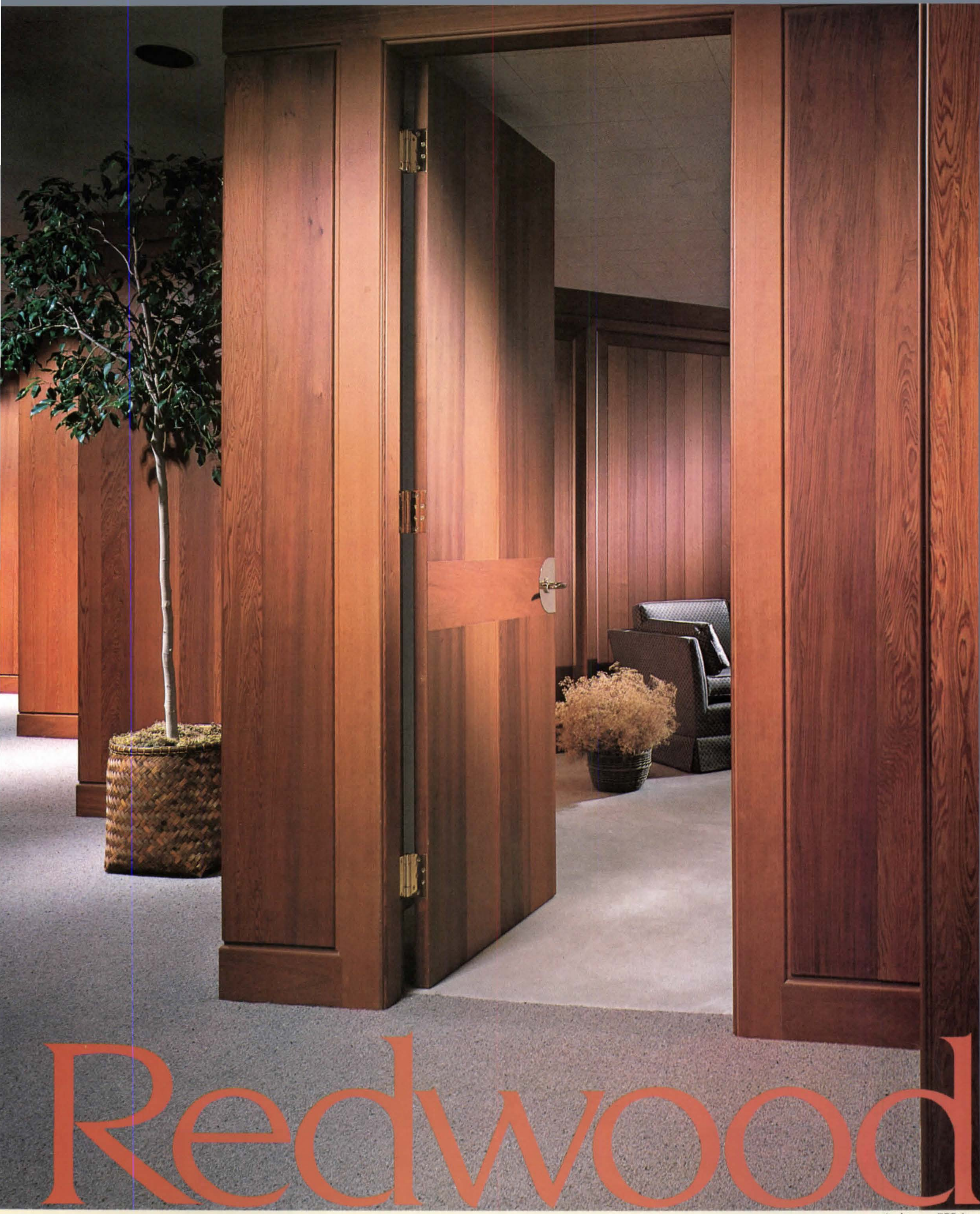
In introducing the antidisplacement language, Frank suggested that often UDAG and CDBG projects exacerbate problems of homelessness and quicken gentrification. He pointed to one project in his district, where a UDAG was used to finance an upscale shopping center, complete with a Neiman-Marcus department store. "The South End of Boston used to be a neighborhood for poor people. Now it's a neighborhood for rich people," he said. Frank goes so far as to suggest that "if you develop a new shopping center and the rents go up across the street, poor people are being displaced."

Frank's amendment drew quick criticism from local government leaders around the country. Los Angeles County officials said that the antidisplacement requirements are "potentially so expensive they will make virtually any project infeasible." A National League of Cities spokesman said that Frank's proposal would "limit municipal authority and sharply impact economic development." Many others argued that any resulting displacement is often balanced by the project's economic development and the subsequent increase in employment opportunities.

Displacement figures surrounding the CDBG and UDAG programs are hard to come by. However, a general decrease in both private and public low-income housing has been widely documented. What concerns housing experts most is the impending confluence of trends in federal housing: the virtual halt of low-income housing construction; the aging and decay of subsidized housing projects, accelerated by dwindling rehabilitation funds; and the expiration of 20-year contracts with private sponsors of low-income housing.

More and more often, there is no low-income housing for those who are displaced. Local housing officials report that there is no public housing available for hundreds of thousands of low-income families. There are 44,000 persons on the waiting list in Chicago, 60,000 in Miami, 200,000 in New York City, 23,000 in Philadelphia, and 13,000 in Washington, D.C. In a recent survey by the National League of Cities, more than half the 444 cities contacted reported problems of "severe proportions" in finding housing for the homeless and low-income renters.

The decline of low-income housing is



directly related to the recent dramatic rise in homelessness. And, unless some drastic steps are taken, as many as 18.7 million people could be homeless, burdened with excessive rents, or forced to live in slums, the Neighborhood Reinvestment Corporation predicts.

Given the magnitude of the low-income housing crisis, it is certain that Frank's (and others') displacement concerns will continue to surface as affordable replacement housing is harder and harder to find. In the larger arena, a re-evaluation of the federal role in providing affordable housing is being spearheaded by Senators Alan Cranston (D-Calif.) and Alfonse D'Amato (D-N.Y.). And the impending housing crisis could become a vocal issue during the 1988 presidential campaign.

In fact, what some think may be the future direction of housing policy—that of cooperative ventures between nonprofit organizations and local and federal governments—has been proposed in the 1987 housing bill as an experimental grant program. Called the Nehemiah Housing Opportunity Grants, the program would be based upon the Nehemiah Plan, established in New York City in 1980. There a coalition of 52 religious congregations raised seed money, secured $15 million in interest-free loans from the state for mortgages, received land donations and short-term suspensions of property taxes, and built 1,600 single-family houses.

—Nora Richter Greer

Coalition Calls for Major Overhaul of Infrastructure

In response to the critical state of America's physical infrastructure, AIA and allied organizations have established the Rebuild America coalition to increase public and private awareness of the problem. The 13-member committee was formed to stress the importance of rebuilding and maintaining all elements of the built environment—highways, airports, railways, waterways, and deep water ports, as well as public buildings ranging from city halls to warehouses to hospitals and emergency services facilities.

The Rebuild America coalition includes Associated General Contractors of America, National Association of Home Builders, National Association of Counties, National League of Cities, and other engineering and construction organizations. According to the group, half of the nation's bridges are deficient and nearly 29 million Americans are not served by sewage treatment plants. The coalition also reported that the Federal Highway Administration calculated that from 1981 to '83 deteriorating highway conditions increased the cost of using the national highway system by $68.98 billion, in terms of greater travel time and additional expenses of transporting goods and services.

The group has set legislative goals to tackle the nation's public works crisis:

- A halt to any further funding reductions in federal infrastructure improvement efforts;
- The release of funds sitting in the highway and airport trust funds;
- An end to federal restrictions on use of tax-exempt financing for infrastructure purposes;
- Creation of a federal capital investment program aimed at states' and localities' infrastructure needs;

In joining the steering committee, AIA President Donald J. Hackl, FAIA, stated that the rehabilitation of the nation's infrastructure must "take into account need and function, benefit and cost." However, Hackl said, "the creation of a quality human environment depends on the skillful and well planned integration of all those elements [of the infrastructure], none of which can be permitted to break down without impairing and imperiling the entire community."

Hackl also observed that the responsibility for "revitalizing communities and rebuilding America is shared among all levels of government—federal, state, and local—as well as private enterprise, community groups, and those professionals whose skills and resources are essential in finding workable solutions."

The Rebuild America coalition called for a federal infrastructure policy that would encourage state and local land use

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planning and both short- and long-term capital improvement plans. A survey conducted jointly several years ago by the U.S Conference of Mayors and the National League of Cities found that of 809 cities questioned, over 90 percent "reported that they have either a capital budgeting process or a substitute which accomplishes the same purpose." The group also recommended federal legislation to amend the budget law and to establish a federal capital budget.

The call to make infrastructure repair a top national priority was repeated by AIA First Vice President Ted Pappas, FAIA, in testimony in October before the U.S. Senate Environment and Public Works Subcommittee on Water Resources, Transportation, and Infrastructure. Pappas recommended legislation that recognizes the importance of various public buildings in the infrastructure network and urged Congress to continue to use the Brooks Act for procurement of A/E services to ensure selection of the best designers from "a functional, esthetic, and safety standpoint." He also suggested that federal infrastructure policy should encourage both state and local land use planning and capital improvement plans.

In concluding his testimony, Pappas said, "The national interest in better public works is clear, and so is the federal responsibility to provide its fair share of the resources necessary to do the job. It won't be cheap, but it will be more costly for the quality of American life if any one of the partners, whether the federal government, the private sector, or other levels of government, fail to hold up their end of the bargain." —LYNN NESMITH

BRIEFS

Building Ventilation Booklet
The Building Thermal Envelope Coordinating Council has published the proceedings of a building air infiltration and ventilation workshop that examined research and technology transfer issues relating to air infiltration and ventilation in residential and commercial buildings. Copies are available for $23 from the BTECC, 1015 15th St. N.W., Suite 700, Washington, D.C. 20005.

Call for Papers
Arizona State University's department of planning has announced a call for papers on "The City of the 21st Century" for a conference to be held in April. The deadline for papers is Dec. 15. For more information contact Madis Pihlak, Dept. of Planning, Arizona State University, Tempe, Ariz. 85287.

Furniture Design Competition
A design competition for anyone with a furniture design not previously marketed is being sponsored by Directional Inc. The winner will receive $5,000. Second and third prize winners also will be chosen from submissions of residential seating and dining or occasional tables. The entry deadline is Dec. 1. For more information contact George Mesberg, Directional Inc., 200 Lexington Ave., Suite 710, New York, N.Y. 10016.

U.C. Davis Campus Competition
The University of California and the National Endowment for the Arts are sponsoring an international design arts competition for land surrounding the entrance to the campus of the University of California at Davis. This single-phase design competition is open to all architects, landscape architects, environmental designers, artists, plant scientists, and students who are professionally supervised. A total of $15,000 in cash prizes and design commissions will be awarded. The deadline for registration is Feb. 15; and entry submissions are due March 15. For more information contact Kerry J. Dawson, Design Arts Competition, The University Arboretum, Department of Environmental Design, U.C. at Davis, Davis, Calif. 95616.

Call for Papers
The Center for Urban Well-Being is seeking papers or case studies for its fourth international "Making Cities Livable" conference to be held March 8-12 in Charleston, S.C. The conference is intended to bring together European and American professionals in urban design, architecture, city planning, and historic preservation. The deadline for 100-word abstracts is Dec. 1. Submissions should be sent to Suzanne Crowhurst Lennard, Conference Organizer, Center for Urban Well-Being, Box QQQ, Southampton, N.Y 11968.

News continued on page 36

PPG's Spires As a Stage Set for Life

Dennis Marsico of Pittsburgh calls himself an architectural photographer, and he is that, but he is also an art photographer who uses architecture as medium as well as subject. PPG Industries knew his work and, when it completed its Philip Johnson/John Burgee headquarters, correctly surmised that it would be ideally suited to Marsico's approach.

So the company commissioned Marsico to do an essay on the complex, making clear that it didn't want "the traditional realistic documentation," in his words. His approach, as he describes it, is to "use the buildings as a stage and drop objects and people into this setting. The people are made to look directly at the camera so that it is clear that they know they are being photographed." When they hold objects, as does the man on the cover (Marsico's uncle), it is made clear that the objects are props.

Marsico describes these photographs as "metaphors" but maintains that they are as realistic as the traditional approach to architectural photography, in which the scene is made pristine and people and objects are likely to be eliminated rather than added. He is currently applying his approach in a monograph on the early Italian modernist Giuseppe Terragni, with the aid of the Graham Foundation.

—Donald Canty, Hon. AIA

ARCHITECTURE

November may seem a bit early to talk of the new year, but editors are used to living in the future. And December will kick off our observance of the magazine's 75th anniversary, so this is our last chance in the old year to talk about the new.

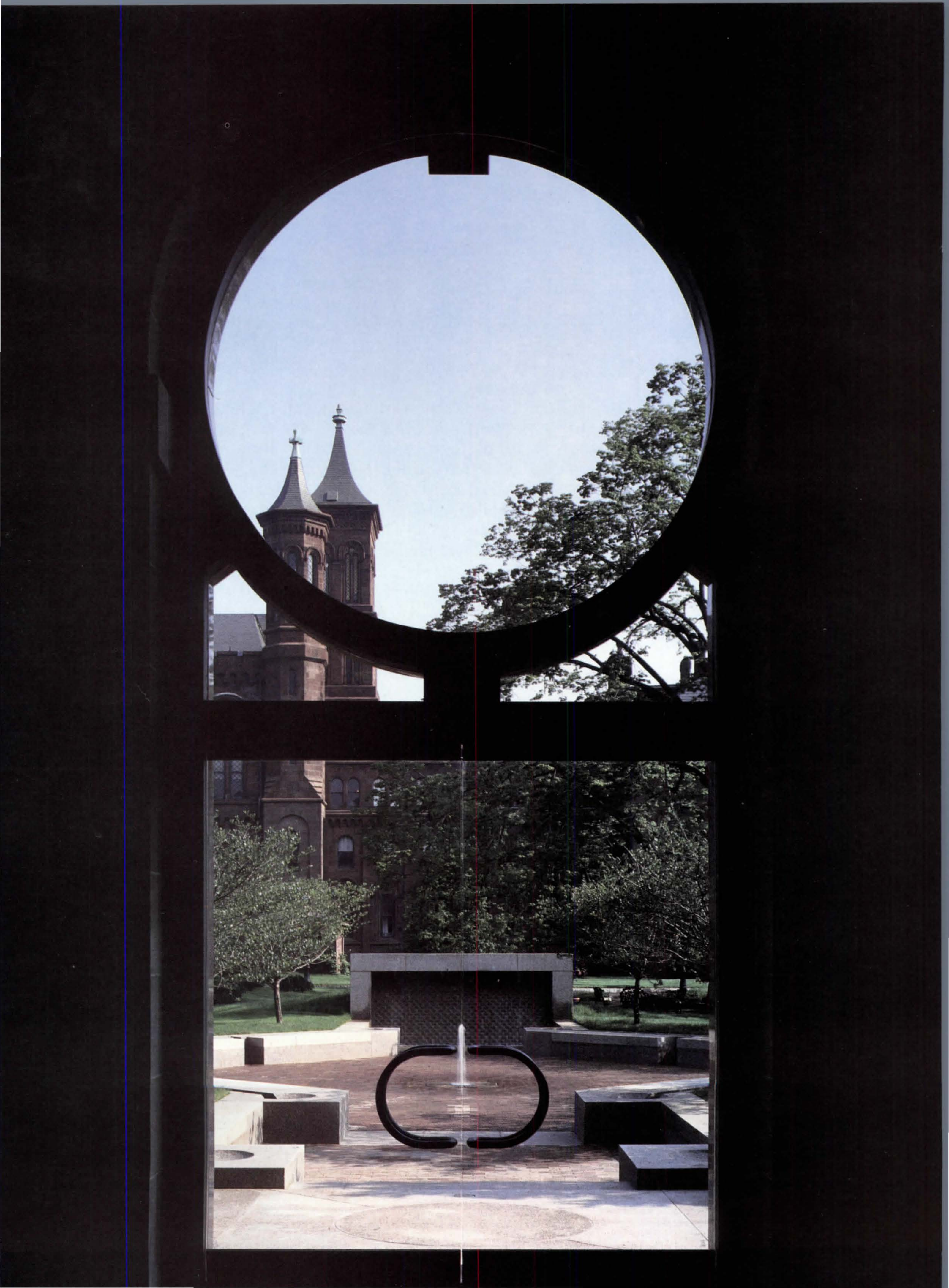
It will begin with an issue dominated by office buildings—not that we are reverting to types, but a lot of good examples came along all at once. February will deal in large part with campus planning and design. March will be our annual special issue on building technology, this one dealing with structure.

April will be the preconvention issue, divided between the convention city, New York, and the convention theme, art. May will be the annual review of new American architecture, and June will present the winners of our second interior design awards program (details to come).

July will be a residential issue and August again will contain a set of profiles of architectural schools. September will be the world issue, and October will concentrate on architecture in this country's smaller communities (exactly what's meant by "smaller" will be spelled out later). The intent, like that of our "discovery" issues of unpublished firms and last month's collection of small work, is to broaden our coverage and uncover previously overlooked talent.

November will deal with the ever more significant issues involving the care of old buildings and the relating of new ones to them. December will introduce another new feature, profiles of firms that consistently do quality work with emphasis on how they organize to do so.

The observance of our 75th anniversary will continue through the year, one form being a series on basic building materials in the Technology and Practice segment of the magazine. We will also be observing another anniversary, the 100th of the election of the Institute's first woman member, Louise Bethune of Buffalo, N.Y., with coverage of the current contributions of women to architecture.—*D.C.*



Photographs © Robert C. Lautman

Masterful Placemaking Beside the Mall

Artfully blending old and new, buildings and landscape. By Donald Canty, Hon. AIA

The garden, says the architect, was the raison d'être for the building. The architect, as he likes to refer to himself in telling of his tribulations on the project, is Jean-Paul Carlhian, FAIA, of Shepley Bulfinch Richardson & Abbott. The garden is the romantic new south forecourt of the Smithsonian castle, named for donor Enid A. Haupt but dubbed "the quadrangle" by the institution. The building is a huge, 96 percent underground structure housing the Asian and African arts museums of the Smithsonian plus a large amount of administrative space.

The site was an alternately neglected and abused plot of ground between the castle and Independence Avenue, definitely the former's backyard. Around it was a remarkably disparate group of buildings: the castle itself, to the west the Italianate Freer Gallery, to the east the sprightly, Victorian Arts & Industries Building of the Smithsonian. (Farther east are the Hirshhorn pillbox and the popular but ponderous Air & Space Museum. Sometimes it has seemed that over the years the Smithsonian has devoted itself to seeing how different each of its buildings on the Mall could be from one another.)

Former Smithsonian Secretary S. Dillon Ripley, Hon. AIA, had a strong drive to give the castle the kind of setting to the south that it deserved (a tentative step in this direction had been the creation of a small Victorian garden beside employee parking). At the same time he was being pressed to put the African art museum on the Mall, and had an opportunity to acquire a remarkable collection of Eastern art (from the late Arthur M. Sackler, for whom this museum is named). However, Ripley also was under some criticism for building too much along the Mall.

Left, aqueous plaza through exotic window of Museum of African Art. In panorama at top, new construction above ground consists of copper-roofed 'folly' to left of castle, entry pavilion of Sackler in left foreground, that of African museum at right.

Hence the idea of going underground, which was Ripley's. He first turned to a Japanese architect, Junzo Yoshimura, Hon. FAIA, who proposed that the museums' above ground presence be small pavilions with a somewhat theatrically ethnic flavor. Yoshimura suffered a stroke, and Carlhian was brought in to design both the garden and the museums. Carlhian discarded the ethnic pavilions and turned instead for design cues to the adjoining buildings.

He proposed three above ground structures: entry pavilions for the two museums on the Independence Avenue corners of the site, and a smaller pavilion plugging a gap between the castle and the Freer, serving as entry to the third underground level, containing offices, auditorium, classrooms, and other nongallery spaces (allowing access to this more public realm without threat to the security of the works of art in the galleries).

The third pavilion was made a kind of band shell with a whimsical copper roof—"a folly, of the park," says Carlhian. He approached the design of the other two in full consciousness that there were many on Washington's battery of regulatory and review bodies who thought either nothing or as little as possible should be built across the face of the castle.

He began by establishing the footprints, then moved with trepidation to the crucial issue of height. What he proposed was going higher than Yoshimura's pavilions would have but maintaining cornice lines lower than those of the neighbors.

Turning to design, Carlhian sought not only to relate to the neighbors but to reconcile them with each other and create of old and new a coherent ensemble. As he saw it, he could have made the African (east) pavilion an echo of the angular, adjoining Arts & Industries and let the Asian (west) pavilion echo the arches of the Freer next door (to which it will one day soon be umbilically linked).

© Nick Wheeler/Wheeler Photographics

© Robert C. Lautman

Instead he decided on cross-referencing. The African museum got the curved forms, expressed in domes, windows, and everywhere else Carlhian could think of, and the Asian pavilion got pyramids and diamonds. The castle, which has a little bit of everything, mediates between them.

It worked. The ensemble is full of counterpoint—and respect. The pavilions are pleasing in form, handsomely detailed, and finely crafted of large chunks of granite, pink for the African, gray for the Asian.

As to the issue of size, to the casual automobile passerby on Independence Avenue seeing the pavilions obliquely, they can seem to intrude on views of the castle. But stand at the handsome new central gates, built to original drawings of castle architect James Renwick Jr., and the full width of the castle is in view.

From inside the quadrangle the scale of the pavilions seems just right. They blessedly block part of the view of the bland 1960s federal office building across Independence. And their heft helps them hold down the corners of what has become a clearly defined space with an engaging sense of place.

Part of the latter achievement has to do with the interplay between buildings and landscaping. The Victorian garden was erased except for one tall linden that the underground building was notched to spare. Otherwise Carlhian had a tabula rasa.

He made good use of it. The landscaping is varied and eventful, reinforcing major axes and views of the buildings. Highlights are two paved fountain-bearing squares behind the African and Asian pavilions, reflecting their respective geometries.

There may be a bit much Victoriana in planting patterns and

Above, the plaza and fountain outside the African museum invite visitors to walk through and sit around them. Rectilinear fountain at rear masks ventilator. Left, entrance to African museum. Sackler's is mirror image with diamond instead of circle. Facing page, Sackler plaza with its Asian geometries and 'moon gates.'

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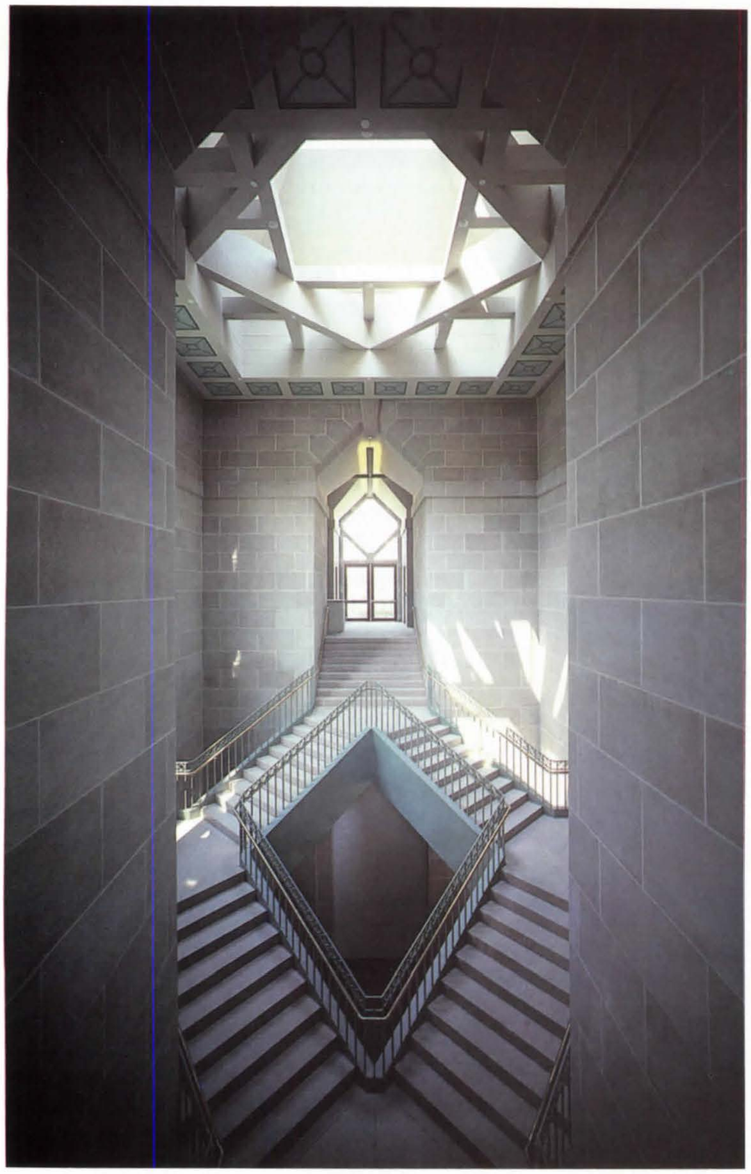


appurtenances—one can easily imagine ladies in long dresses with parasols strolling here. But it is one of Washington's nicest, and most architectural, small parks, and people already are flocking to it.

Inside and below ground things are not quite so wonderful. There is a certain inconsistency and confusion, much of it traceable to turbulence in architect-client relations. Ripley was the initial client, and a strong one, by all accounts, who kept most major decisions to himself. He retired and his successor, Robert McC. Adams, was more of a believer in delegation. The effective clients became the Asian and African museums' directors, Thomas Lawton and Sylvia Williams, respectively.

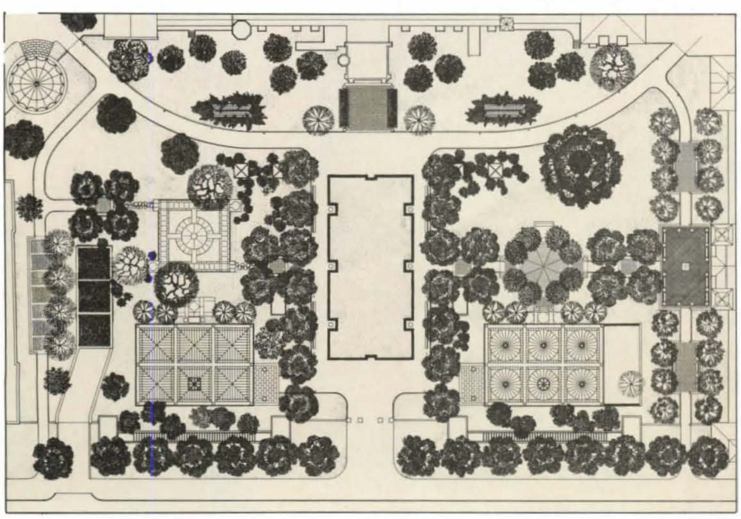
At ground level each of the museum pavilions is essentially a big empty open space (emptier in the African, since Lawton has added furniture in the Asian). Carlhian terms these spaces "grand vestibules," where dowagers can shed fur coats and Girl Scouts form ranks before descending into the galleries. Maybe so, but they are very large for such a nebulous function.

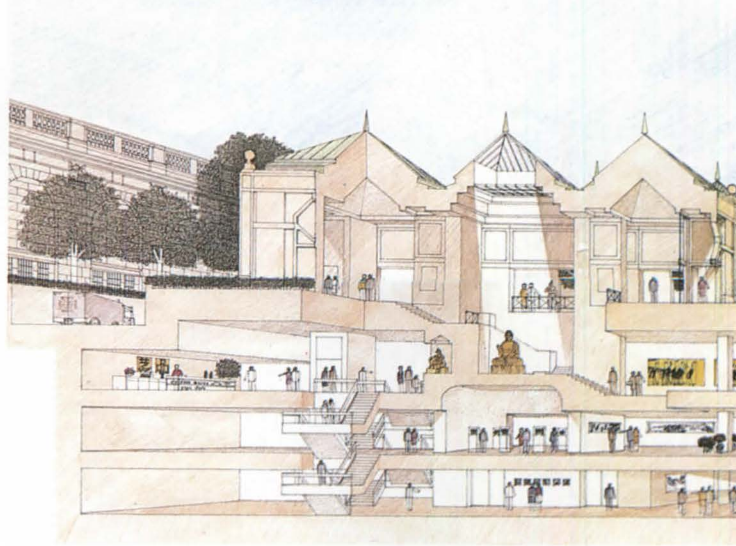
There are fine views through large expanses of clear glass to the garden and surrounding buildings, framed intriguingly by the shapely windows. The African museum turns a stained glass window to Independence Avenue and its federal facades. Another was made for the Asian "vestibule," but Lawton chose not to use it.

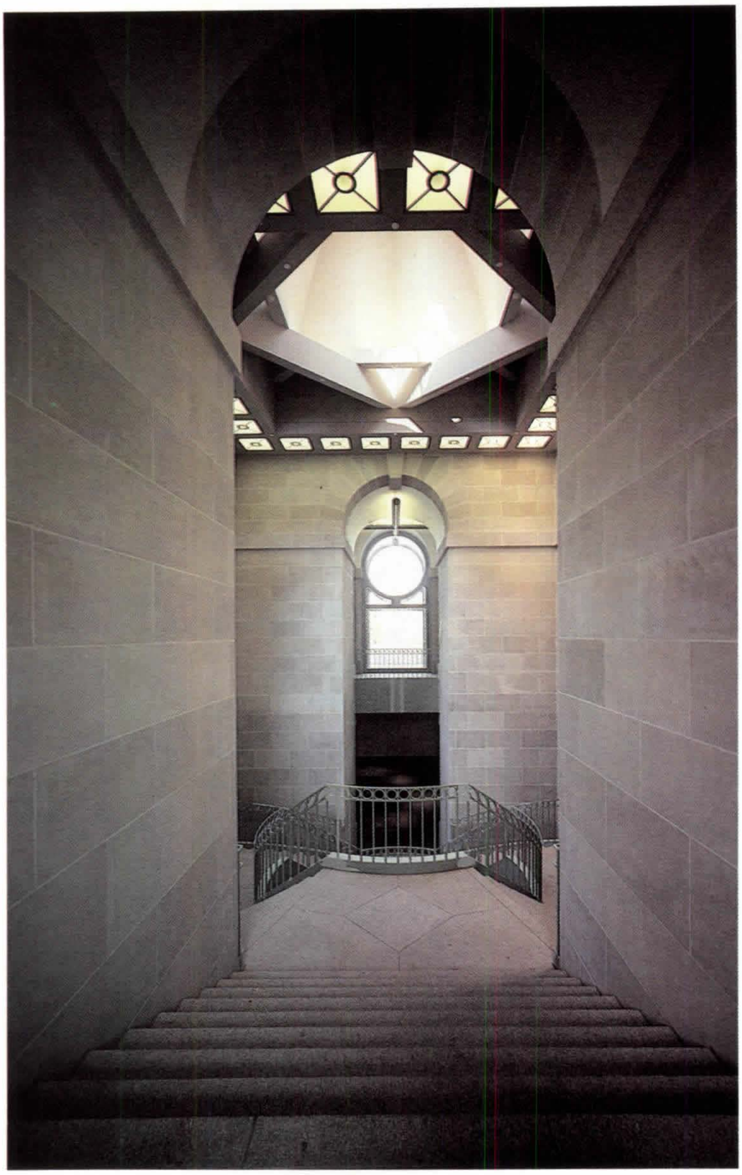
From the big spaces one enters grand stairways that are the highlights of the interiors, beginning with 10-foot-square skylights and extending to the second level below grade. The route down is both ceremonial and geometrical in each museum.

The destination is not what Ripley and Carlhian had planned, at least for the moment. They placed a great hall at the very center of the building, its ceiling that of the first level below grade and its floor that of the second, with balconylike overlooks from the second into the huge (78x116-foot) volume. The two

Grand stairwells of the Sackler (left) and African (right) museums. They bring light into all three underground levels, terminating in reflecting pools. Carlhian was particularly concerned that descending into the galleries would be a downer, so he paid special attention to making the experience ceremonial. Original section shows significance of double-height central hall.







Photographs © Robert C. Lautman

museums were to share it for "blockbuster" traveling shows, social events, etc., and there was a folding partition that could bisect it for separate use. However, exhibits cannot be mounted on folding partitions so the directors asked that the divider be drywall, as are the partitions in most of the galleries. All of the overlooks except one were covered for the inaugural exhibitions because, according to the Sackler's Lawton, the shows were made up of mainly small objects that could not be seen well from above. Within the African museum's side of the great hall, in fact, a separate freestanding pavilion was built for the inaugural.

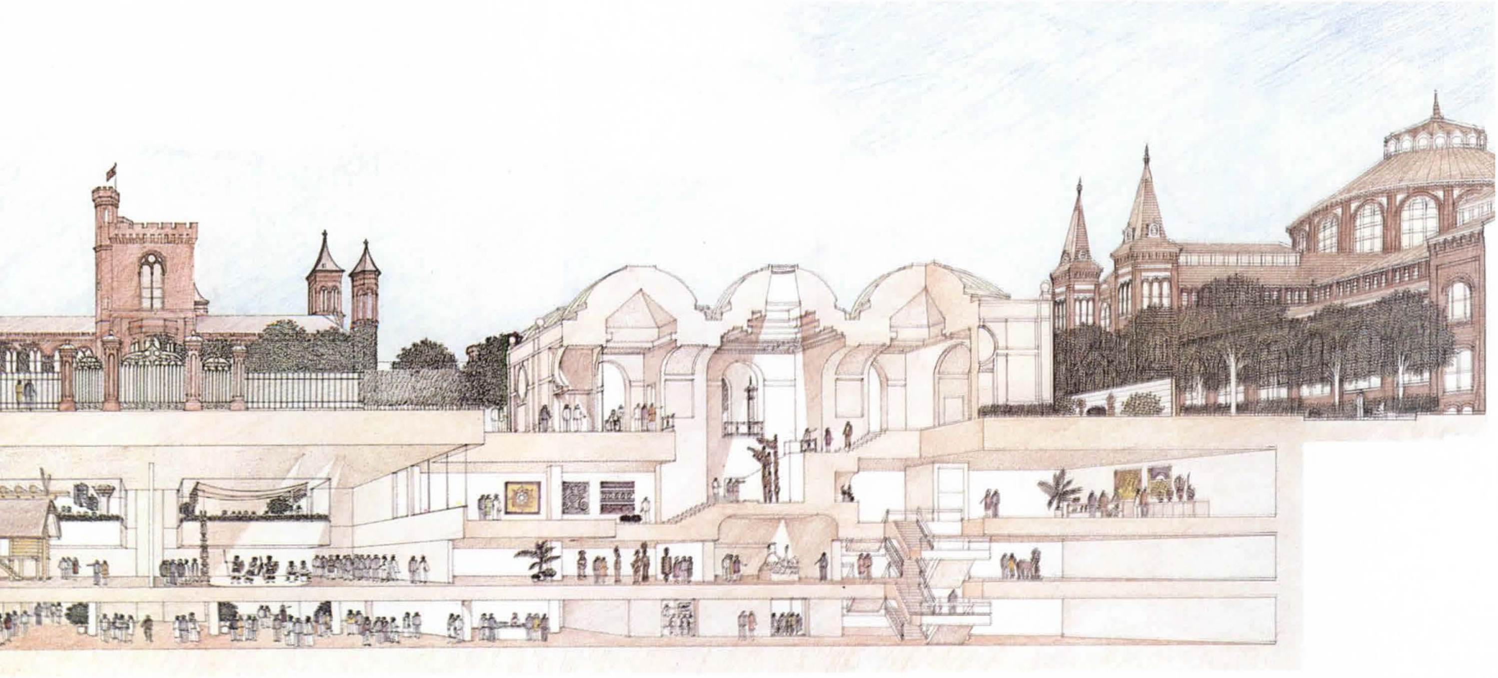
Carlhian feels that all this is desecration, and it certainly robs the gallery levels of a focal point beyond the stairwells. But Lawton is firm in his assurance that it is all temporary, and the great hall will be used as a single space with overlooks as the need arises.

Galleries are arranged around this space, and their character is largely dependent on exhibit designers, the architects having provided only raw space. As set up for the September opening, the Asian galleries were more spacious and serene than the African, with some truly dramatic moments.

Neither, however, enjoys much in the way of natural light. Two linear skylights were built along the Independence Avenue side of the pavilions, but the one over the African galleries has been completely blocked off and the one over the Asian galleries coated to a dull translucence. How one feels about this may depend largely on whether one is a museum director or an architect.

Two smaller skylights serve the central concourse of the third level below grade, reached by escalator from the third and smallest pavilion. The three-story-tall concourse, running the full east-west length of the building, is a grand but somehow unresolved space, where neoclassical details and ornament contrast with expanses of pure modernism. The end wall is a splendid mural by Richard Haas, partially obscured by one of the hefty pedestrian bridges that span the concourse.

All of this is written before the opening of the museums to the public, and the ebb and flow of people might well change one's perceptions of the interiors. There is no doubt, however, that above ground Carlhian and the Smithsonian have concocted a very pleasant Washington experience.



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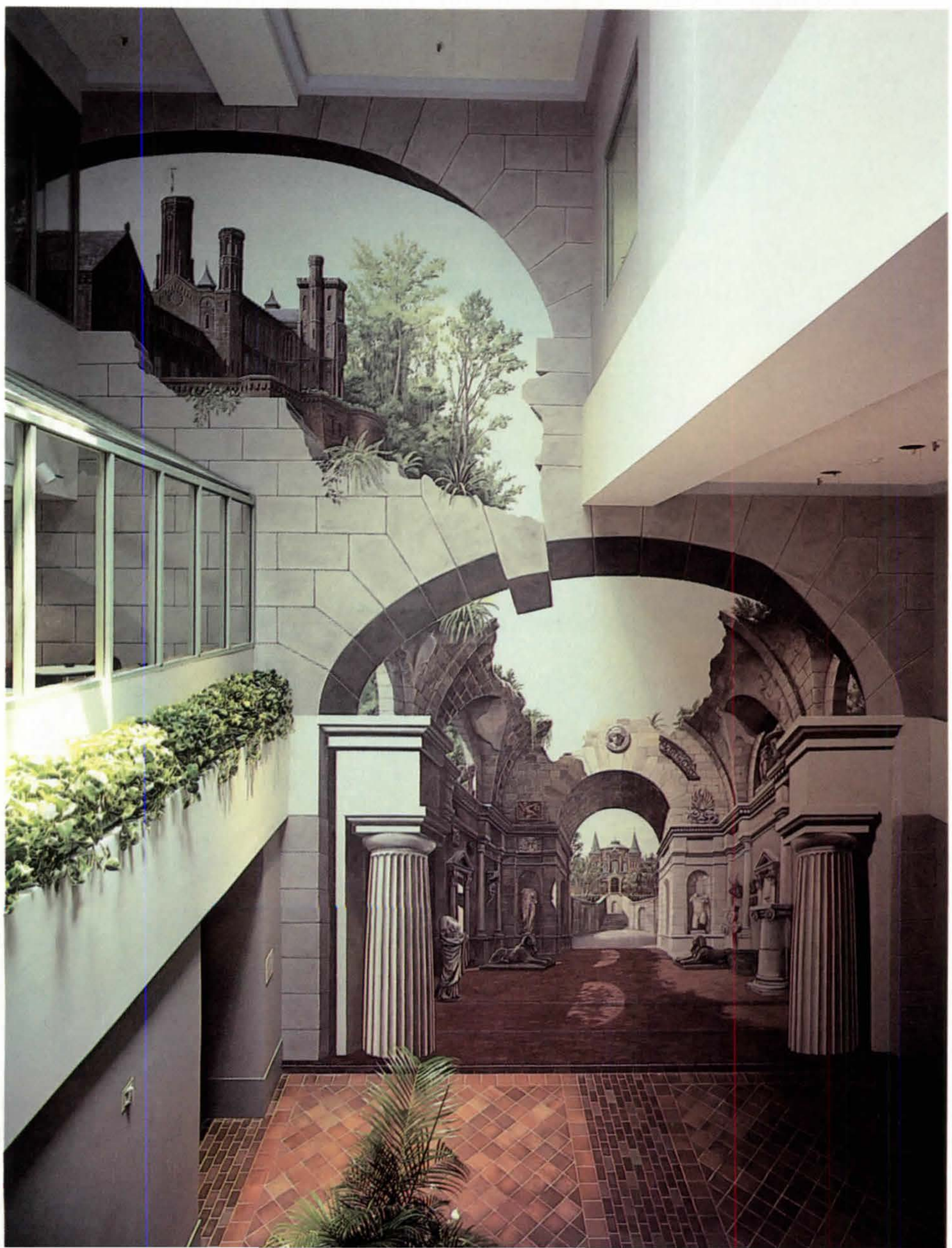

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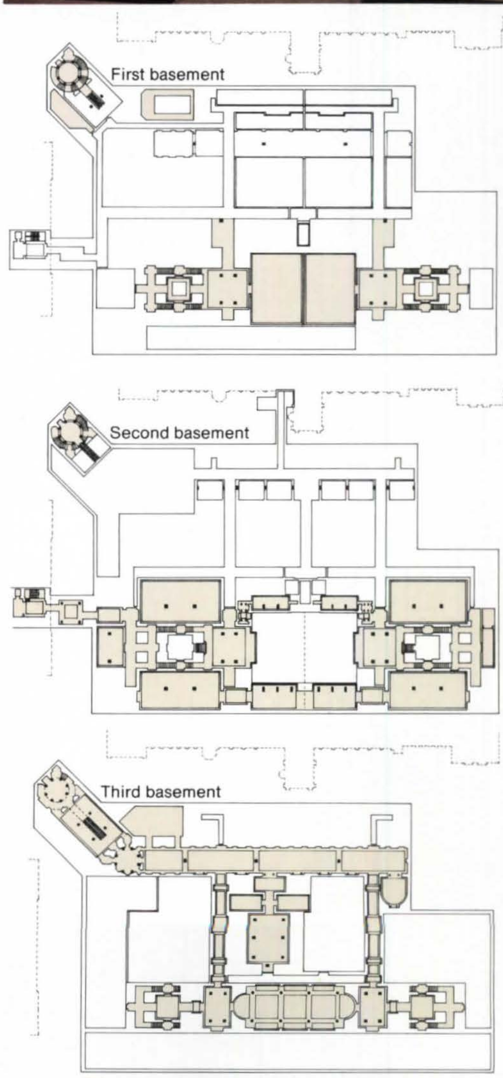

Above, left, 'street' at third level below ground has spatial drama but some of the character of a shopping mall. It ends in Haas mural, left. Above, two of the opening exhibits. In galleries, much was left to exhibit designers. □

Strode Eckert Photographic

Portland as an 'Urban Theme Park'

A new rail line links its attractions.
By Gideon Bosker and Lena Lencek

Portland, Ore., is a city whose net architectural whole is far greater than the sum—or height—of its individual parts. In Donald Canty's analysis of Portland's downtown (see July '86, page 32), he pointed out that "a city needs a plan taken to the third dimension . . . that maximum use should be made of the shaping powers of transportation . . . [and that] this thinking has found perhaps it purest application in Portland—and it has worked."

Summarizing the state of affairs 16 months ago, Canty painted a picture of a "humane" city on the cusp of reaping the benefits of a 30-year-long, joint public-private planning legacy that has included an AIA award-winning transit mall; an urban renewal implementation mechanism spearheaded by the Portland Development Commission (PDC); the emergence of viable historic districts resuscitated by the Portland Historical Landmarks Commission; a new public square; and a certain "architectural audacity." Our purpose is to begin where Canty left off and, more specifically, to analyze the "coming attractions" to which he alluded, among them the light rail system, the newly completed Performing Arts Center, the Vollum Institute for Advanced Biomedical Research, and the linking of Lloyd Center to the downtown core.

Now completed, these recent projects argue that Portland architects are consciously designing buildings that are user-friendly and promote interaction, circulation, and such old-fashioned virtues as comfort, intimacy, and festiveness. In short, Portland is less a city of architectural big shoulders than it is one of finely tuned biceps and triceps. As Gregory Baldwin, AIA, Zimmer Gunsul Frasca (ZGF) design principal for the new light rail system, explains, "Portland is a gregarious city that reaches out to its citizens." Adds Robert J. Frasca, FAIA, a ZGF colleague, "This is a city whose architecture is digestible, readable, and comprehensible." And perhaps even more important, accessible.

In fact, with the implementation of the light rail system, Portland has taken on the character of an urban theme park par excellence. It is this feeling of freewheeling exploration within a controlled, rational environment dotted with contiguous urban synapses that gives Portland its architectural charm and makes it, one could argue, the quintessential humanistic 20th-century American city. Like a well-run theme park, Portland is a clean and rational city. Its downtown is stitched together by a transportation system that efficiently circulates people through a wide range of archetypal urban episodes. There is a functioning specimen, usually no more than one, for every facet of metropolitan life: a public plaza, a performing arts center, a grand 10-theater movie house, a scientific research institute, a university, a historic district-cum-public market, and many other attractions. For the most part, each specimen in this architectural microcosm is well crafted and engages in a dialogue with its surrounding neighbors.

The miniaturizing ethos that characterizes a theme park shows up in Portland as an urban street grid parceled into 200-foot-long blocks, with expansive north-south avenues that strategically orient facades of large downtown buildings to the movement of the sun. Allowing for an unusually high ratio of

Dr. Bosker, a physician, and Ms. Lencek, a professor of Russian at Reed College, are the co-authors of Frozen Music: A History of Portland Architecture *(The Press of the Oregon Historical Society, 1986).*

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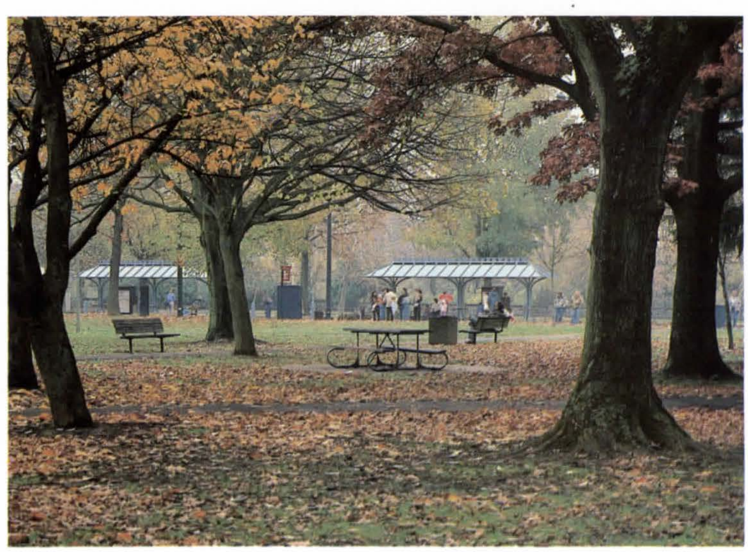

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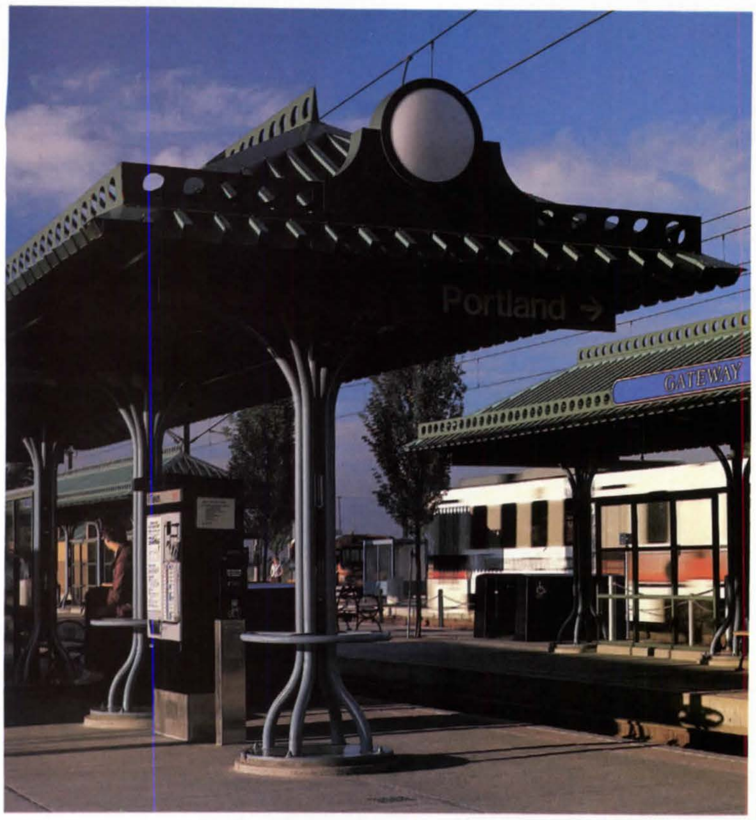
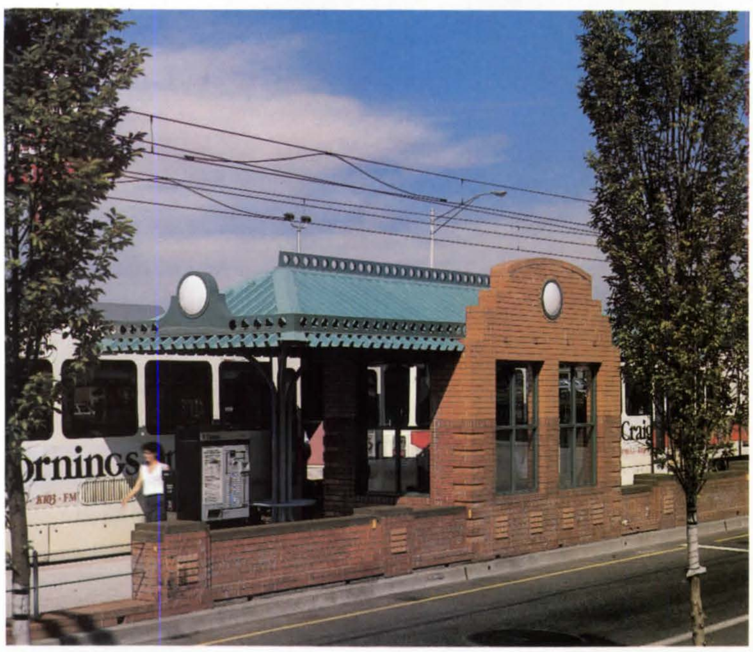




open to built space, this solar-sensitive urban plan has been accruing dividends since 1870. "Portland's 200-foot block structure and frequent streets provide ready access to open space, light, and air that has helped give Portland its special quality," says Michael Harrison of the Portland Bureau of Planning.

Put another way, Portland is a city where the show begins on the sidewalk, which, as it happens, is where the $214-million, 15-mile light rail system known as MAX has made its strongest impact. "We purposely designed the light rail to run at street grade, rather than above or below, so it would become a visible and easily accessible participant in the commercial and cultural fabric of the city," explains ZGF's Baldwin. Free for passengers who travel within a downtown core area called "Fareless Square," the trolley line is already a clear success. The 20,000 daily ridership has exceeded projections of 10,000 to 12,000 patrons. And on weekends, when ridership was anticipted to fall, MAX has attracted as many as 30,000 passengers, suggesting that downtown Portland has become somewhat of a tourist attraction—in the theme park vein—for its own citizens. MAX has also had a salutary effect on adjacent properites. According to Baldwin, "Retail sales have increased by 20 to 40 percent in adjacent properties, and the value of private construction of nearby parcels exceeded the system's entire capital costs by five to seven times."

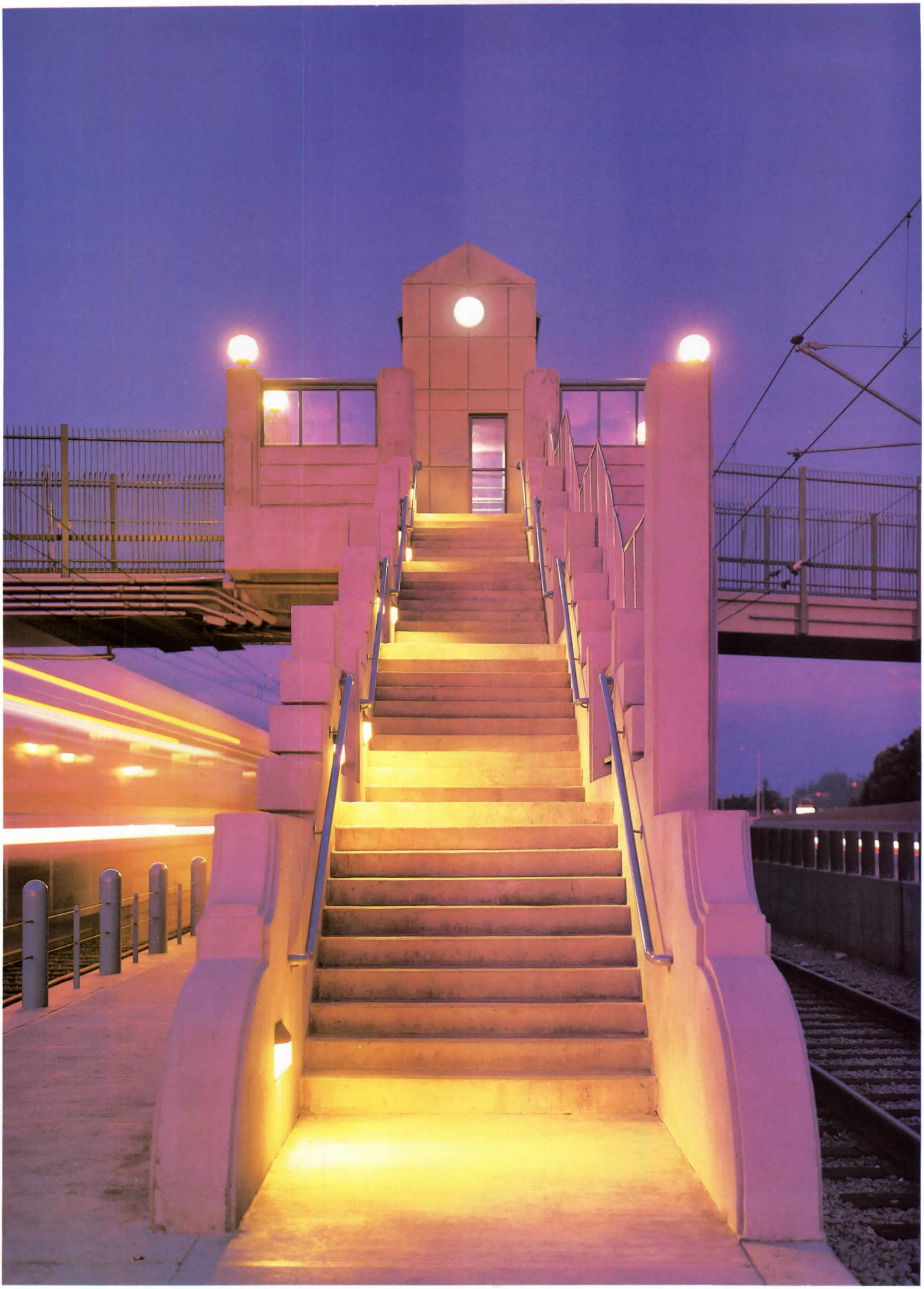
In Portland, compatibility, harmony, continuity, and "the stage and its action" have been architectural buzz phrases for the Portland Design Commission since the early 1970s. As Canty emphasized, ordinances, design competitions, and the Skidmore, Owings & Merrill master plan that originated in conjunction with Portland's inner planning sanctum have played a critical role in shaping the city's architectural direction.

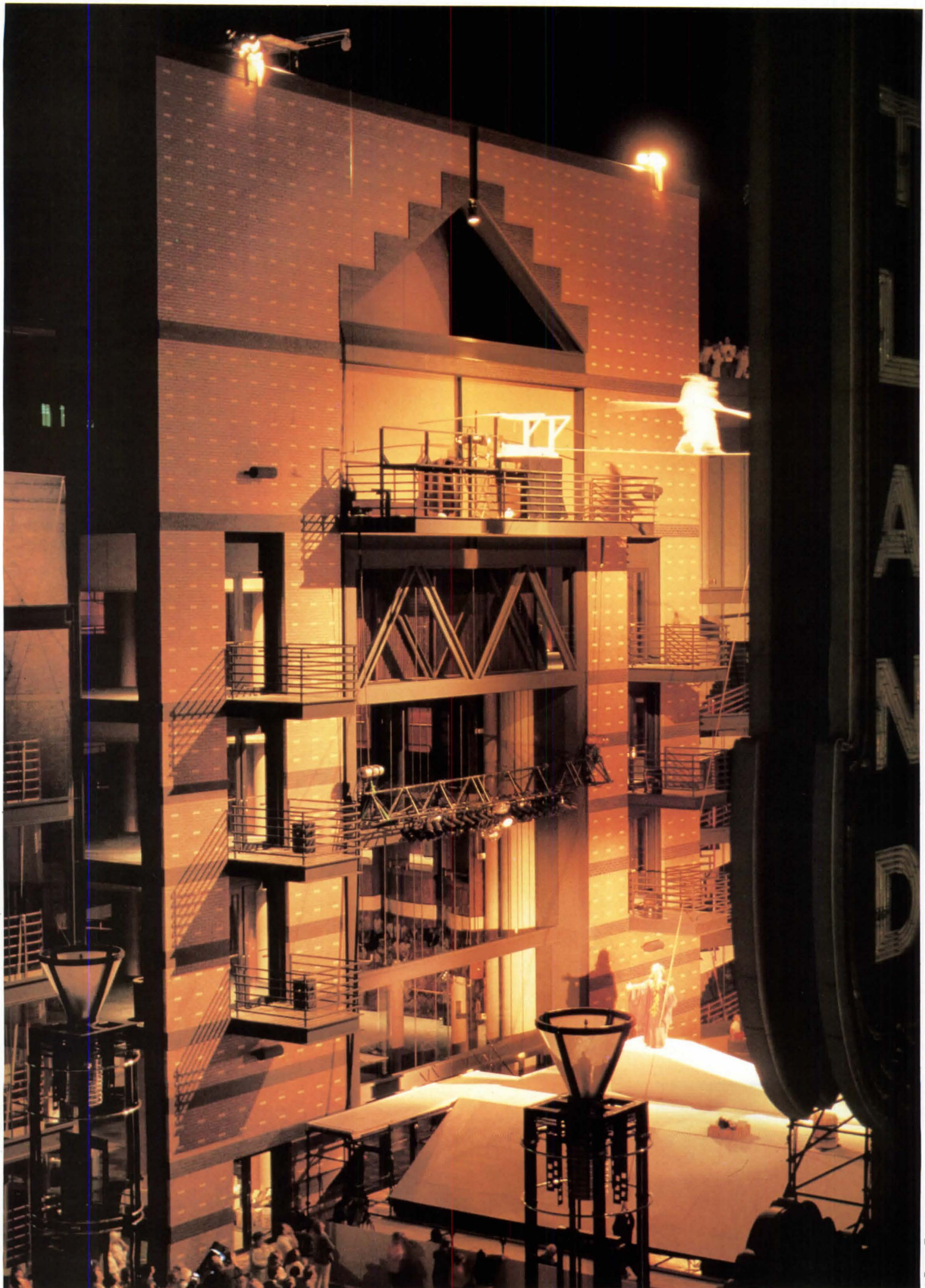
From purely a design standpoint, light rail is a tribute to the flexibility and adaptability of this approach. The downtown stations have been detailed with brick and shelter furniture to complement the Yamhill and Skidmore/Old Town historic districts and the existing elements of the transportation mall. From a planning perspective, the system, like a network of nerve synapses, has seamlessly stitched together the city's key urban attractions. MAX strategically bends around Pioneer Courthouse Square (the city's newly rediscovered urban nucleus), in and out of the two historic districts, then nudges against the Morrison Bridge gateway and crosses the river to Lloyd Center, home of a new cinema multiplex and the site of a convention center being designed by ZGF.

These additions have come at a time when the Portland Bureau of Planning has been working on a new central city plan. For the most part, recent recommendations are not radical but rather expand on the original master plan of the early 1970s. Above all, the plan renews a commitment to "assuring a human scale" for downtown Portland and promoting "an inviting environment, and attractions for residents, as well as visitors."

MAX, which is already pivotal in achieving these goals, has injected new life into Pioneer Courthouse Square, an exuberant public plaza designed by Willard K. Martin, the iconoclastic Portland architect who died shortly after the square's completion in the tragic crash of an antique single-engine plane he had restored. Martin's vision that the square would become "a living room for the people of Portland" has been realized "to the MAX." On a recent summer evening, more than 2,000 Portlanders assembled in Pioneer Courthouse Square for a *sit-down* dinner, complete with linen and wine, while the Four Tops turned Portland's downtown into a Motown hot spot. Discharging passengers into a gregarious plaza rimmed by some of the city's finest terra-cotta buildings, MAX has helped convert a space that once was bursting with the bustle of a grand hotel (the Portland Hotel by McKim, Mead & White, 1889, demolished in 1950) into an open, triumphantly public space that has served as a site for everything from flower festivals and movies by moonlight to breakdancing for glossy-lipped adolescents and square dances for city seniors.

Top left, typical metal shelters. Center, side shelters at suburban stations are smaller, brick structures individualized in form and color. Left, downtown turnaround designed as 'good neighbor.' Right, sheltering stairway links train and bus lines.





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The Portland Center for the Performing Arts, located two short blocks from the Broadway and Yamhill light rail stop, was formally dedicated last Aug. 29 with a breathtaking performance by Philippe Petit, the French-born high-wire artist noted for his daredevil walks, sans net, between urban architectural landmarks. For the Portland christening, Petit arabesqued over a steel cable strung over the new Main Street Mall connecting the renovated Arlene Schnitzer Concert Hall to the Performing Arts Center. The nocturnal performance was a unifying gesture for these two principal components of a complex that is the culmination of a public-private effort to provide a world-class performing arts facility for local theater companies and a concert hall for the Portland Symphony.

The largest single donation to the arts center's construction came from the citizens of Portland in the form of a $19 million bond measure passed in 1981. Designed by a team of three archi tecture firms—Portland's Broome, Oringdulph, O'Toole, Rudolph, Boles & Associates (BOOR/A), the Toronto-based Barton Myers Associates, and the ELS Design Group of Berkeley, Calif. —and Theater Projects of London for technical design, the new 127,000-square-foot building includes two theaters, a large rehearsal hall, a small restaurant, box office, costume and set assembly workshops, and offices for resident companies.

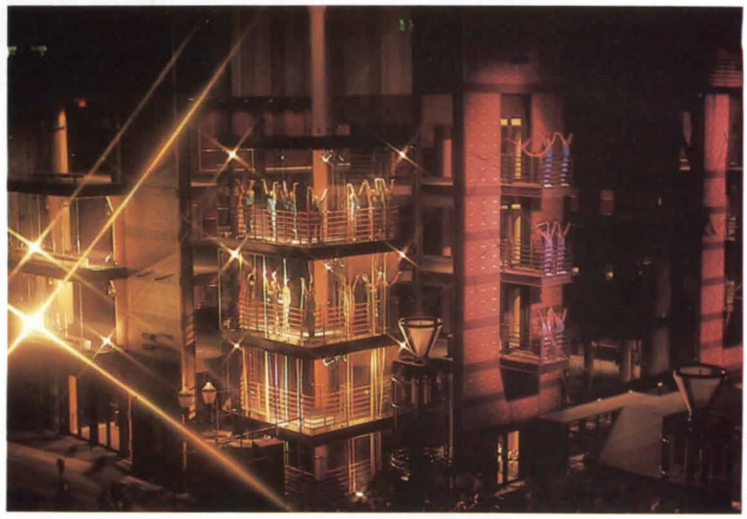
Perhaps the most intriguing aspects of the arts center's design and execution were the challenges faced by the architects in siting the L-shaped project and in drawing heavily and explicitly on the historical, ornamental, and formal elements of the adjacent buildings. Donn Logan, FAIA, of the ELS Design Group stressed the importance of "designing the new complex to fit within the context of existing buildings. The First Congregational Church, built in 1895, is one of Portland's most important historic landmarks, and . . . we will attempt to emulate the church's basic geometry and organization."

At first glance, it appears that Logan's prescription has been carried out. The building's entrance portals, scale, and roof geometries clearly draw on analogous church elements as reference points. And the salmon-colored brick veneer pays homage to the buffed brickwork on the adjacent Arlene Schnitzer Concert Hall and Heathman Hotel. But while the brick facade on the arts center is similar in color, the flat, ungiving quality of the material—chosen largely because of budgetary constraints—contrasts disappointingly with the textured brick of a 1928 movie theater by Rapp & Rapp. Not surprisingly, a sweeping gesture that would integrate the adjacent architectural styles into a single complex appealed to the jury, which described the building program as one "that would create a center for the performing arts, unifying a 1920s motion picture theater on one block and a new building next to a historic church on the other, with a somewhat grungy part of town on one side and a great allée/park on the other."

In short, the program demanded a series of innovative solutions to a very difficult problem, which ultimately coaxed out a design strategy that faithfully addresses Portland's urban, historical, and architectural fabric. As it happened, the problematic site and its adjacent buildings provided a unique combination of formal and contextual constraints—and incentives—that permitted the final solution to crystallize. Despite a somewhat hostile and monotonous block-long face on its eastern Broadway facade, the arts center successfully blends the rigorous technical and human requirements of formal theater in its interior with the symbolic objective of advertising an entertainment palace to its citizenry outside.

With its diaphanous, five-story-high, glass-lined stairwells ablaze with spiraling seven-watt theater marquee lights, its 27-foot-high, neon-illuminated stainless steel Main Street gateway towers that recall Fritz Lang's "Metropolis," and its polka-dotted facade (some

Left, a tightrope walker plies his art between elements of the Center for the Performing Arts at its recent opening. Top right, dancers using the glazed stairwells as a stage, also at the opening. Center, an entrance. Right, the view down Broadway. Remodeled movie palace is part of complex.



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Left, the dazzling Lloyd Center Cinema. Right, the terra-cotta facade and intricate, inviting courtyard of the Institute for Advanced Biomedical Research, perhaps Portland's most striking recent building.

have called it the wall with measles), the Performing Arts Center projects an unambiguously gregarious face that is comfortably contiguous with the movie theaters lining Broadway's designated Unique Sign District. In toto, these elements create an atmosphere where the mind is free to frolic and becomes receptive to entertainment.

The 368-seat Dolores Winningstad Showcase Theater boasts an exposed latticework grid of red-stained cedar that a local writer described as "so brutally red, you'd swear that you were gazing with seared eyeballs at the inside of your head." Much of the criticism of the arts center thus far has centered on color schemes, brick patterns, and the unexpurgated eclecticism of the overall design scheme, which has been described as "psychotic," "busy," and "showing four entirely different faces, one for each architecture firm."

To some extent, the building's detractors fail to account for the fact that a contemporary entertainment complex—especially one that must host a variety of performing disciplines—will, out of necessity, reflect the interaction between conflicting issues that characterizes the modern world. Moreover, some of these objections pale into insignificance when the house lights dim and the sun descends; the arts center, above all, is a nocturnal animal and shows its best faces when pressed into service for a night of theater-going. On behalf of the twisted stylistic skein that characterizes the arts center, BOOR/A design principal Stanley Boles, AIA, points out, "There is a vitality in Portland . . . a freedom that exists now—a fluidity between styles—and if you have a strong organizing idea and esthetic goal, you can achieve it by applying the most appropriate pieces from a whole range of idioms, whether it is high-tech or Romanesque."

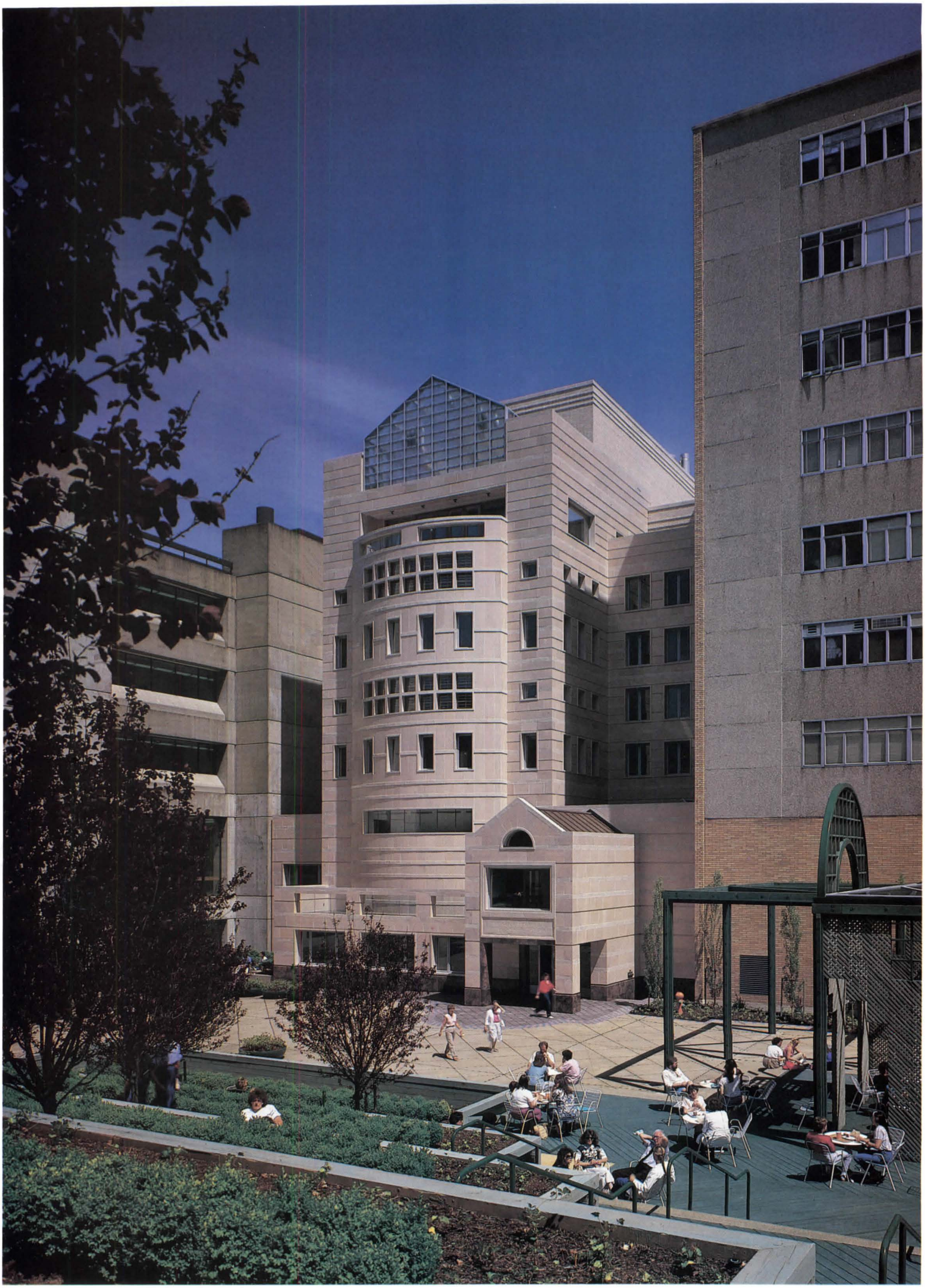
Perhaps the liveliest addition to the MAX line is the recently completed Lloyd Center Cinema, a state-of-the-art theater complex that recalls the opulent heyday of Hollywood movie theaters of the mid-1920s. This project's visionary leap is the interiorization of architectural elements that usually appear on a building's exterior. "Our client, Tom Moyer, was interested in theatricalizing the movie-going experience," explains project designer Richard K. Spies, AIA, of BOOR/A. The result combines an extremely sensitive and ingenious juxtaposition of inexpensive materials with a highly efficient circulation scheme. With its gallant glass and steel frame, its latticework of split- and ground-face block accented with red, white, and black ceramic tile, and its refulgent neon marquees in the interior, the 10-plex perhaps is best described as erector set vernacular.

A rotunda leads from a concession area into the "street of theaters," which resembles New York's illuminated Broadway. In this case, however, the movie theaters are sheltered from the often rain-drenched sidewalks; in Portland, such shelter is an important asset. The 10 distinct art deco-influenced neon marquees create the illusion of "walking down Main Street," says Spies, "so each house appears as if it is fronting out on an imaginary boulevard." Appointed with luxurious cushioned seats and low-voltage Tivoli lights, the 3,094-seat theater is a throwback to the day when people could walk into big movie palaces for 25 cents and feel like royalty—a day when, says S. Charles Lee, Hollywood's architect of Babylon, "people could sit on velvet seats under crystal chandeliers, in an atmosphere that was much grander in scale than anything else they knew."

As A.E. Doyle, Portland's master architect, said more than half a century ago, "In architecture, there is not much new that is good that is not based on something old that is good." Over the past year, citizens have witnessed in Portland's recent architecture a freshly kindled interest in exploiting materials—most notably, terra-cotta—that served the city's architectural needs so well in the past. Contemporary planners and architects have come to view the shimmering white Beaux-Arts buildings sheathed in terra-cotta that line the transportation mall and Pioneer Courthouse Square as testimonials to the capacity of this glistening material for cutting through the grayness of Portland's doleful, rain-sodden months. In a draft of the central city plan released last July, the Portland Bureau of Planning recommended the adoption of a terra-cotta district in downtown, which would be the first of its kind in the country.

Terra-cotta has made a sparkling comeback not only in downtown public projects such as Pioneer Courthouse Square but also in institutions far from the central hub that serve the scientific community. For the Vollum Institute for Advanced Biomedical Research (IABR), ZGF's Frasca took his cue from architectural predecessors of the early 20th century and looked to Gladding, McBean & Co. of Lincoln, Calif., Portland's principal supplier of terra-cotta during the 'teens and '20s and one of the last manufacturers of this product on the West Coast. Frasca's designers rediscovered the virtues of a sheathing material that had served commercial projects in the central core well, and they selected terra-cotta at about $25 a square foot.

Although far removed from the urban grid served by MAX, the IABR reflects the firm's intensifying interest in matching



Photographs © Strode Eckert Photographic

Left, rich wood finishes of the center's public and study areas are intended to give it a scholarly 'Oxbridge' quality, contrasting with utilitarian laboratories. Right, rear elevation in the wooded hills overlooking downtown employs modernist geometries.

historically rooted spatial and ornamental sensibilities with their corresponding human functions—in this case, scientific research. Completed last May, the terra-cotta-clad center exemplifies a commitment to classical ideals endorsed by architectural theorists since Vitruvius. This view held that architectural forms and spaces should classify a mood or ambience appropriate to the function and symbolic importance of the building. As Frasca explains, "the best research building is one that takes two very different kinds of spaces and brings them crashing together so people working there can easily navigate from one into the other. In the case of IABR, we have attempted to meld 19th-century values of intellectual exchange with 20th-century values dictated by the technical requirements of biomedical research."

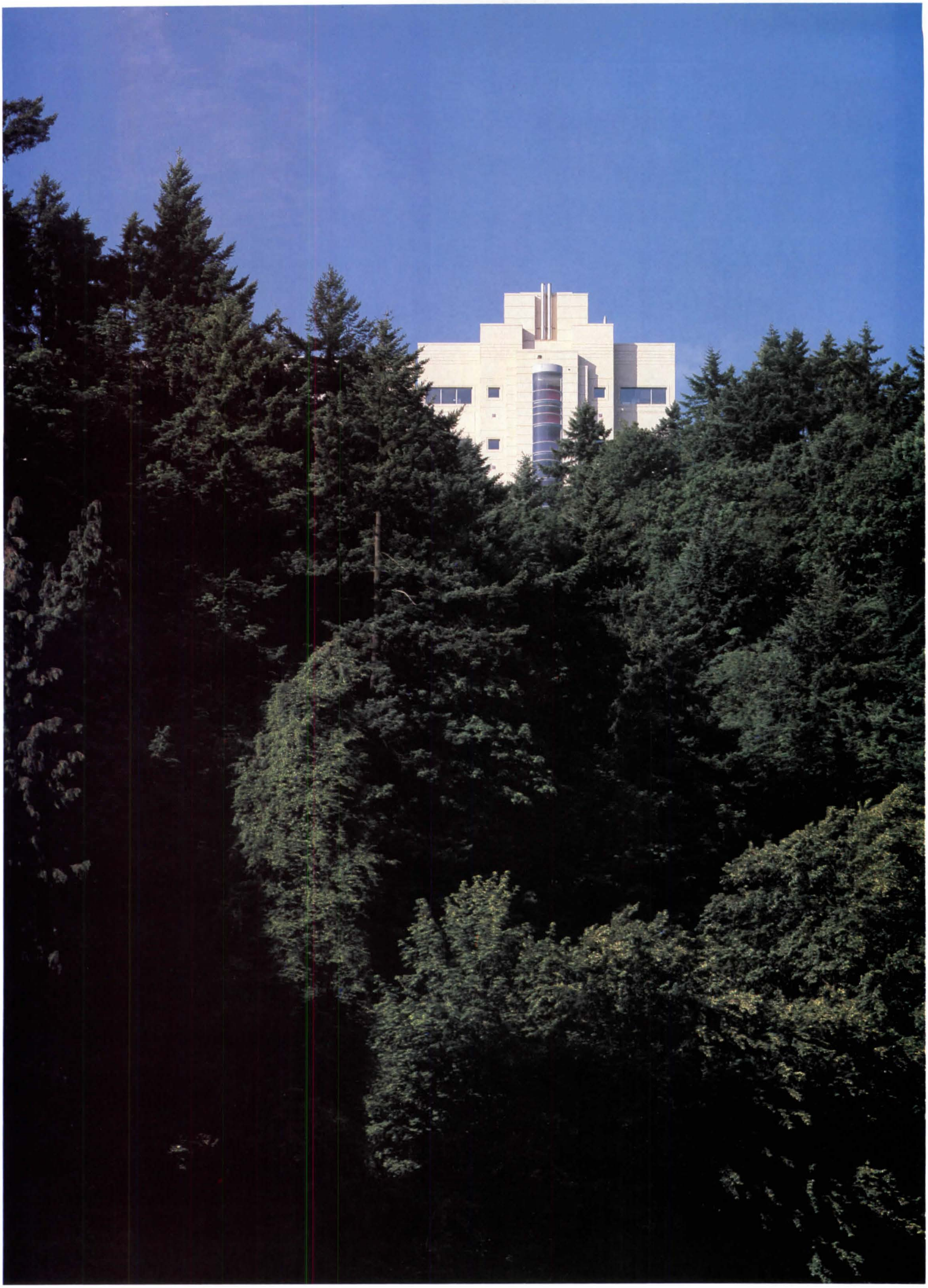
The result is a building that glistens with a radiant pink-peach glow on the outside and nurtures scientific inquiry in its interior. Sensitively tucked into a space bordered on one side by Oregon Health Sciences University's worn and brutalistic Basic Science Building and its undistinguished Medical Research Building on the other, the six-level, 67,000-square-foot IABR is at once contemporary and arcane. With its panoply of simple geometric shapes—triangles, rectangles, and squares—and a southern bowed section that gestures toward a courtyard, the slender, peach-colored edifice resonates with historical and cultural messages. By introducing a dramatic stylistic tension between the building's southern and northern facades, the architect externalized two distinct functions—high-tech laboratory research and scholarly interchange—and anchored each to a recognizable historical form.

In this regard, the gently curving terra-cotta and glass front facade, unmistakably Palladian in its inspiration, encloses small reading lounges that recall the Cambridge and Oxford vision of scholarly interchange. Frasca says, "We have dubbed the design concept 'Oxbridge,' a term that refers to those spaces where people can meet, think, and exchange ideas . . . areas that suggested an Oxford and Cambridge university Gothic." The Oxbridge sections house the institution's meeting rooms, library, cafeteria, a 70-seat auditorium, and a formal director's suite for special gatherings. In finish, detail, and ambience, these sections deliberately oppose the institute's laboratory areas. Designed as spaces where scientists can rendezvous or sit and quietly ponder the subtleties of a newly sequenced chain of DNA, the meeting rooms are generously appointed with paneling, beech floors and molding, and dark hardwoods including cherry and walnut. The two-story library is anchored by a mezzanine whose wood casement fenestration and abundance of natural light conspire to create an ethereal and atmospheric quality conducive to abstract and intellectual pursuits.

United "cheek by jowl," as Frasca puts it, with these Oxbridge spaces is a central core of research laboratories housed in a section of the building that, with its sharply angled facade and brick exterior, is unmistakably high-tech. The laboratory spaces called for an 18-foot floor-to-floor height to accommodate the necessary overhead HVAC, lab plumbing, and electrical distribution systems. The design provides a cost-effective alternative to interstitial floors by allowing seven feet of space between ceilings and the structure above. The core of each laboratory is reserved for service and support functions used jointly by several researchers in adjacent modules 10 feet square.

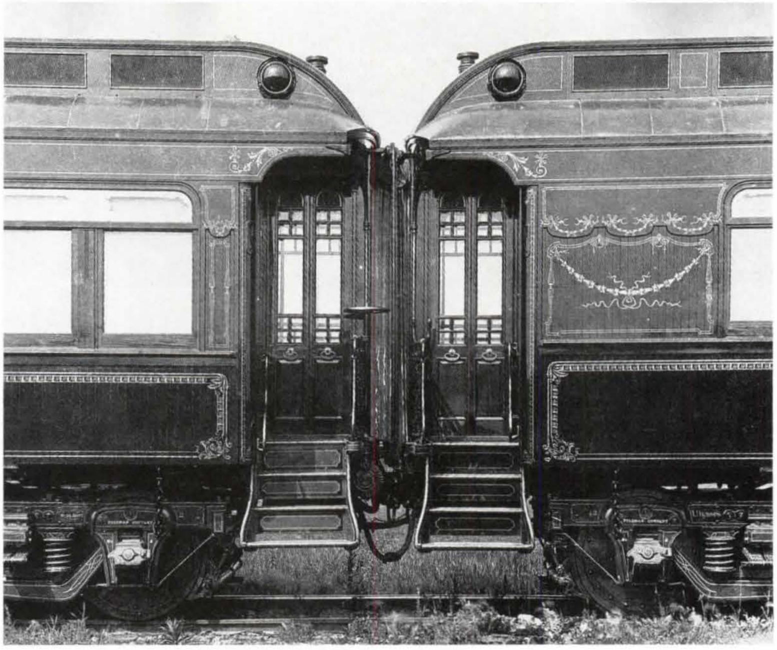
To effect a fluid transition to buildings between which the IABR is wedged, the ZGF design team transformed what was once a nondescript parking lot into a courtyard that Frasca says was inspired by a French river bank. The lunchroom in the basement of an adjacent building, Mackenzie Hall, was extended into a courtyard laced with an elaborate green scaffolding that recalls a German beer garden. According to OHSU President Leonard Laster, this outdoor dining niche has "already become a focus for campus life and ensures the integration of the Vollum Institute into the stream of university life."

In the Vollum Institute for Advanced Biomedical Research, ZGF reveals an eclectic impulse for matching historically generated spaces with their appropriate human activity. This spatio-functional correspondence is clearly the guiding principle for the IABR, which in many respects is two buildings in one. By providing a practical way to segregate different human activities into separate spaces, each conducive to its function and invoking its own spirit, the IABR pushes the so-called postmodernist designation beyond mere surface or figurative manipulation and squarely into the realm of human activity. In this enlightened project, historicism can be pressed into service to fulfill functional requirements, thereby evolving beyond a mere visual exercise, something for which the Portland Building by Michael Graves has been adversely criticized. "Though melding the best of two centuries, the institute is not a look backward. It is as modern as a spaceship," says Frasca. And a spaceship, he would agree, is one of the few things even downtown Portland cannot boast of having in its urban theme park. □



Renewing a Remarkable Planned Community

Pullman remains a highly livable 'architectural oasis' in south Chicago. By Christian Laine



Courtesy Pullman Research Group, Chicago

Pullman, American's first industrial utopia, remains an amazing island in the middle of Chicago's grimy south side: an architectural oasis where real people live and work amid beautiful gardens and extraordinary, if modest, houses.

Pullman was built in the 1880s as a company town by transportation industrialist George Pullman and designed by architect Solon S. Beman and landscape architect Nathan F. Barrett. For his utopia Pullman purchased in the late 1870s a 4,000-acre plot just west of Lake Calumet. There factories would produce Pullman Palace Cars, the sleeping cars that brought luxury to overnight rail travel. To lure experienced workers from large cities to what was then only prairie land, Pullman promised a significantly improved environment where his workers would not have to live, as he said, "in crowded and unhealthy tenements, in miserable streets, and subject to all the temptation and snares of a great city." Pullman believed his model town would elevate and refine his workers and make them less susceptible to the growing nationwide labor movement and disruptive strikes.

Pullman was not a benign philanthropist—he was a shrewd businessman. The Pullman Co. owned all property and leased it back to the community: the shops, parks, markets, theater, bank, school, hotel, and even the church. Rents were fixed to give the company a 6 percent return on its investment.

What made the city of Pullman remarkable for its time was its meticulous urban plan that incorporated radically new technology. The housing was placed north and south of a central industrial park. Single-family residences were reserved for the managerial classes and located near factories. Laborers lived in smaller row houses or boarding houses. The public and the company's administrative buildings were placed centrally near the Illinois Central Railroad depot.

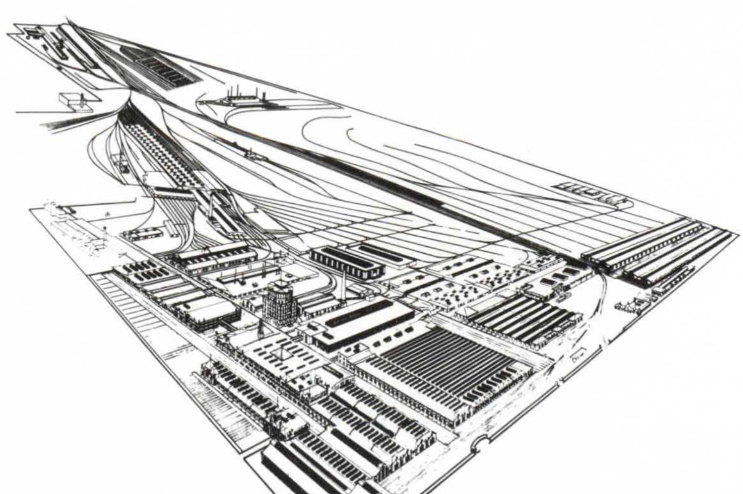
Beman, in his mid-20s at the time, designed all the buildings prior to 1900, giving the city an unusual cohesiveness. Its main

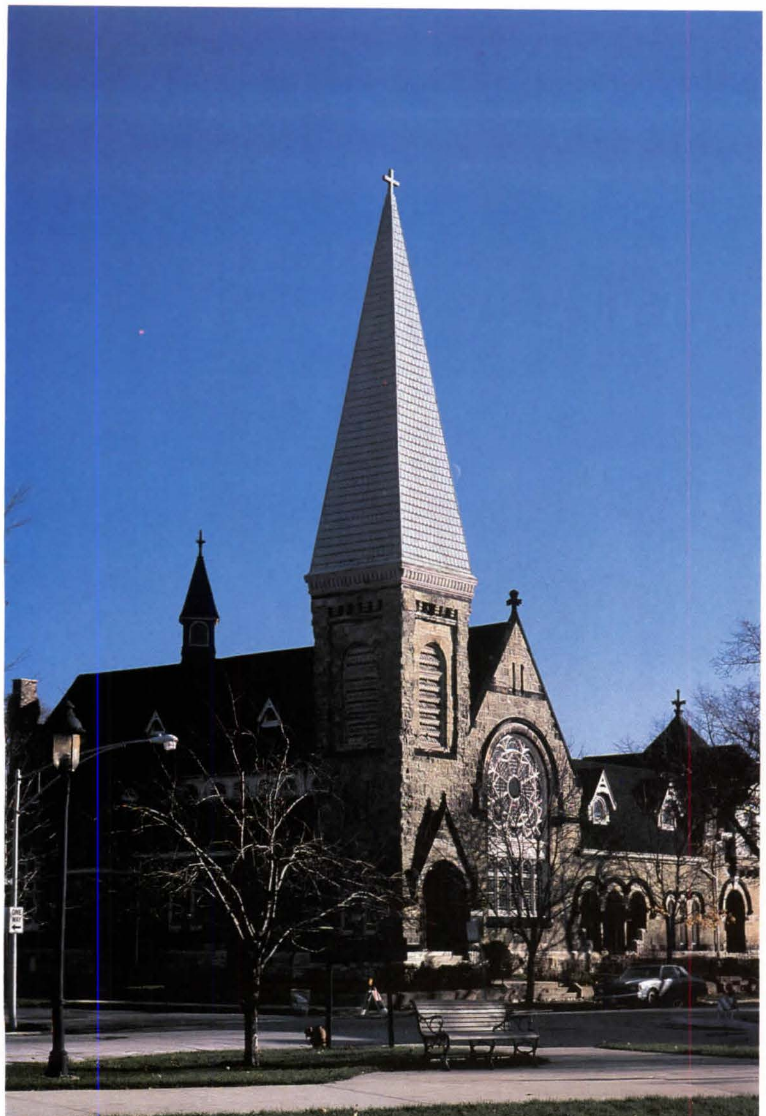
Mr. Laine, who lives in the South Pullman Landmark District, is an architectural journalist and critic.

Facing page, above, clock-towered administration building during Pullman era; below left, today; below right, early rendering of factories and rail yards. Above, luxurious Pullman rail cars.

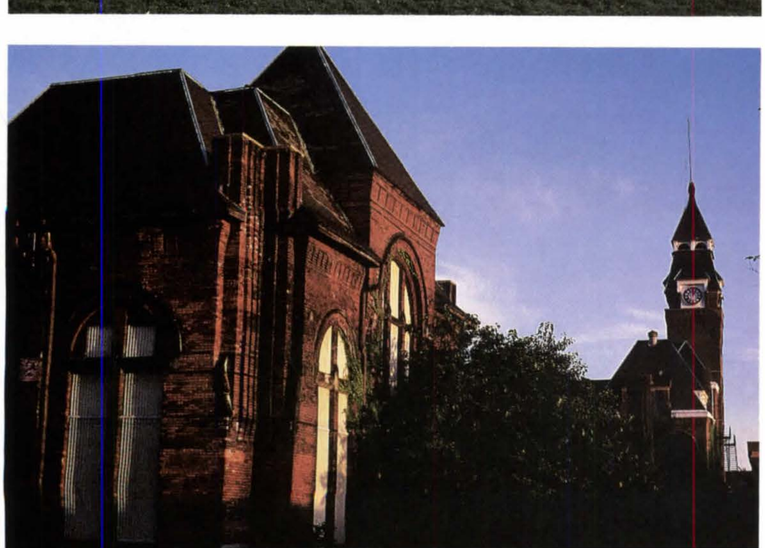
Courtesy Pullman Research Group, Chicago

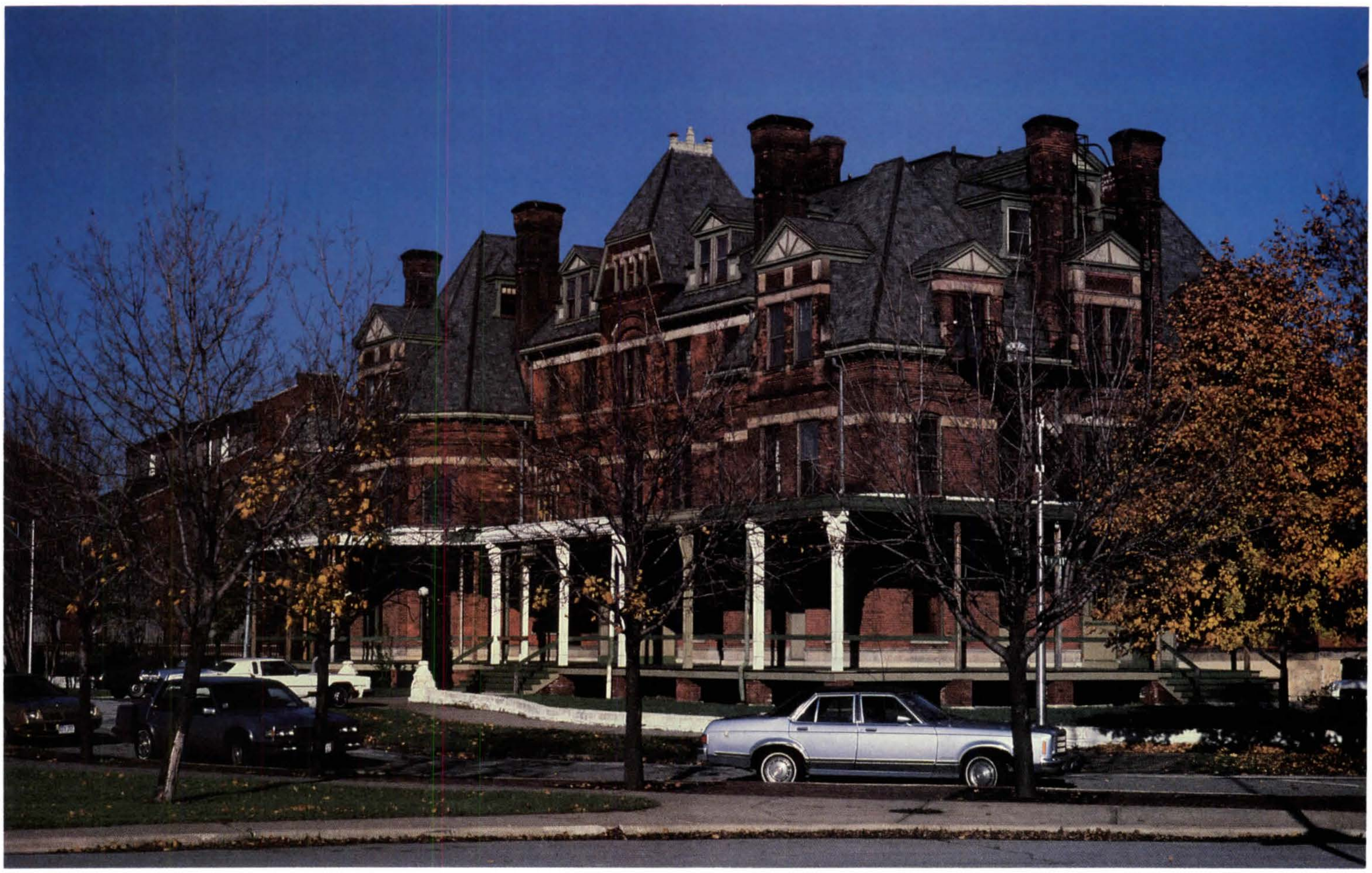
Christian Laine





Facing page, the Queen Anne-style Hotel Florence has become the centerpiece of the town's restoration. Left, Greenstone Church, a serpentine limestone design combining Gothic revival and Romanesque. Below, view of the clock tower from one of the building's wings. Above, arcade outlines the central plaza.





Photographs by Christian Laine

style is an eclectic Victorian that borrows from the neoclassical and American Romanesque. Buildings are brick except for the church, which is covered with stone. (In keeping with Pullman's autocratic philosophy, the brick was made of clay quarried at Lake Calumet and fired into bricks at a Pullman plant.) Later other architects would destroy the singlemindedness with an unwieldy addition to the administration building and an annex to the hotel, among other things.

The administration building with clock tower, which during the Pullman era faced the man-made Lake Vista with its lakeside promenade, is one of the focal points of the city. The 1881 building exhibits a range of design sources, including Roman-inspired arched doors and windows. Closer to the Illinois Central depot is the Hotel Florence, a four-story, Queen Anne-style building with gables, turrets, and a wraparound porch. Market Hall was a thriving two-story atrium lined by shops. It is now only a fragment of its original self; in the 1930s the top floor was removed, and in 1972 the building was gutted by fire.

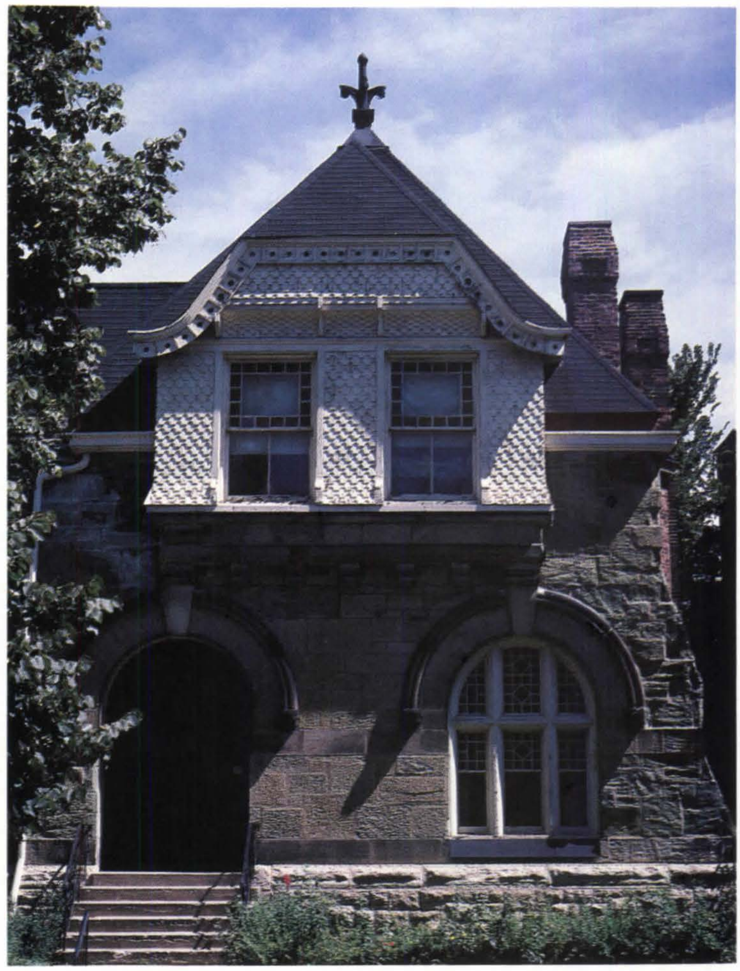
Perhaps Pullman's most charming building is Greenstone Church, built of Pennsylvania serpentine limestone over brick. Its large spire and heavy mass suggest the Gothic revival common in the work of Richard Upjohn, with whom Beman apprenticed, and the Romanesque style of H.H. Richardson. The church recently was renovated by architect Charles E. Gregersen.

Nearby is Pullman Stables, now a gas station and auto repair shop. The factories—the few that remain in the district—exhibit the classic utilitarian style of the Midwest, with stripped-down facades that echo the simplicity of Italianate churches. One factory has been renovated into subsidized housing.

For the 1,750 housing units Beman developed a dozen basic types, although rooflines, general configuration, and detail were varied to create different vistas. The formal parti was classical, and many units had a simple portico as the main organizing element. All the units were entered by a raised stair. The units were arranged in rows of two to 28, and each unit had direct access to a private fenced-in yard that opened onto an alley for, among other activities, the daily trash collection provided by the Pullman Co. In each unit a premium was placed on natural ventilation and light, particularly through large skylights and glass-transomed doorways. In the workers' housing, the kitchens were the main and largest family spaces. For additional cohesiveness in the district, all trim on windows, doors, and frames was (and in the south historic district still is) painted red and green, the official Pullman Co. colors. As a finishing touch, all city grounds were landscaped and maintained by the company.

One block presents a sociological idiosyncrasy—the 11300 block of South Langley, known as "incubator row." In the Pullman era, newlyweds occupied the two-story, two-flat row houses on the west side of the street as starter housing. Once children arrived, families moved across the street to three-story housing.

Right, a Pullman factory. This page, residential design reflected the status of the inhabitant: below, manager's detached house; below left, two-story row houses of the newly married; left, three-story houses for couples with children.



Another of Beman and Barrett's innovations was a system of drains and sewers installed prior to building construction. Sanitary sewage was pumped to the Pullman farm and converted into fertilizer. (And the food grown at this farm found its way into the community markets.) The subsurface drainage returned unpolluted water to the natural water table. An electric generator provided currency throughout the city. Streets were paved.

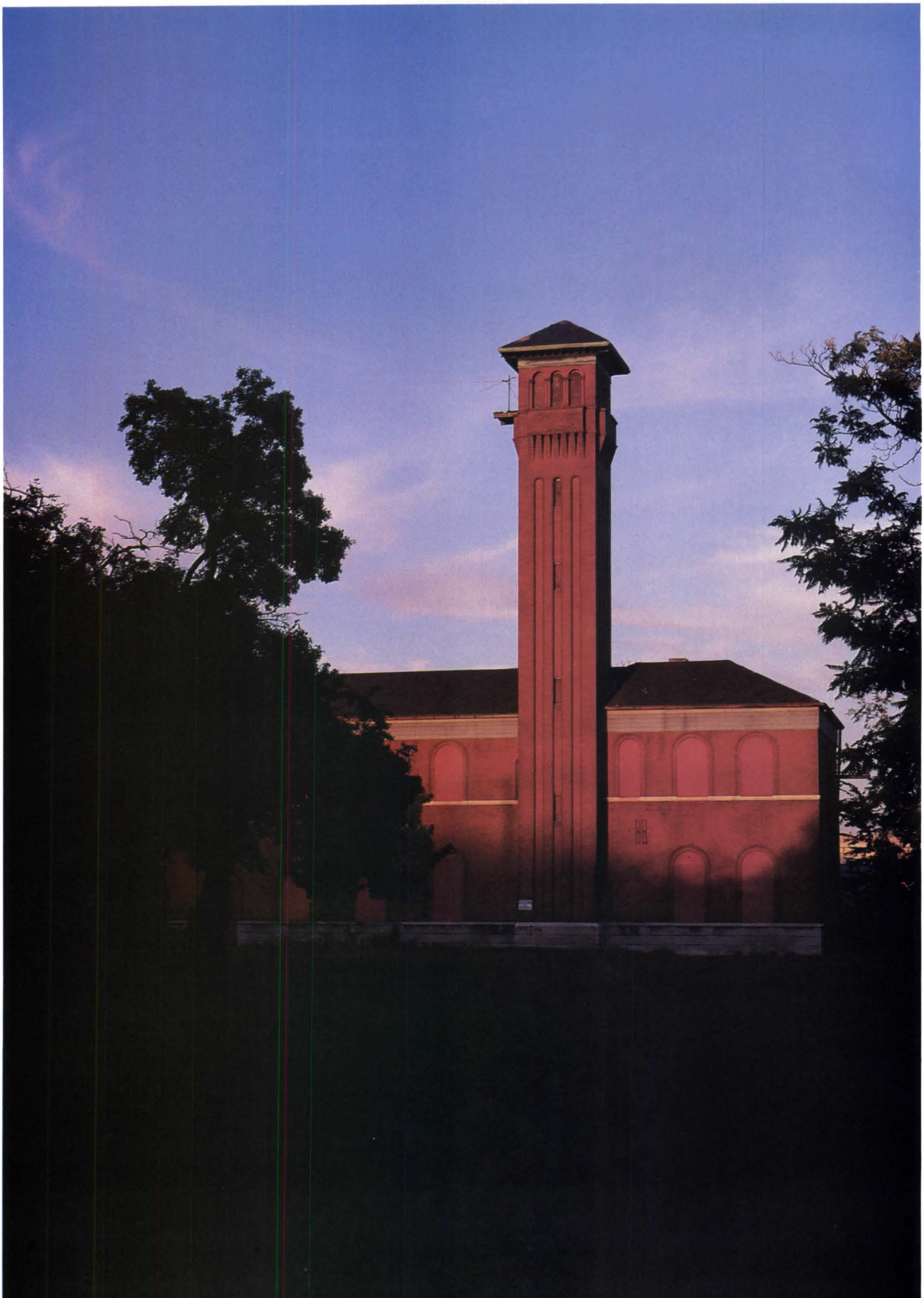
Pullman was quickly a success. During the Columbia Exposition of 1893, architects who had come to Chicago from other parts of the United States and Europe took the Illinois Central to Pullman, and presumably left with visions for similar planned communities. Indeed, the early 1900s garden cities in Europe clearly were influenced by the city of Pullman.

Pullman's heyday, however, was short-lived. The first major blow was economic hardship brought by the depression of the early 1890s. While wages for Pullman workers were reduced by 25 percent, rents stayed the same. Disharmony between the company and the workers culminated in 1894 in a companywide strike that severely disrupted railroad operations across the country. At the height of the tension, there were sympathy strikes in 27 states and territories, a federal court issued an injunction against the Pullman strikers, and President Grover Cleveland sent 2,500 National Guard troops to Chicago to break the strike.

In the strike's aftermath, the relationship between company and community continued to deteriorate. George Pullman died in 1897. A year later, the Illinois Supreme Court ruled that the Pullman Co. charter did not give it the right to own both factory and town. Houses were sold to the workers at 100 times the rental rate, and the district was annexed by Chicago. In the '20s, the 90-foot-wide, 250-foot-tall Arcade Building was torn down. In 1957, the water tower was demolished when the Pullman Co. made its final break and left the city. Many factories and support buildings were demolished. But somehow only 1 percent of the housing stock in the southern district was demolished; the rest would become the backbone of the historic district.

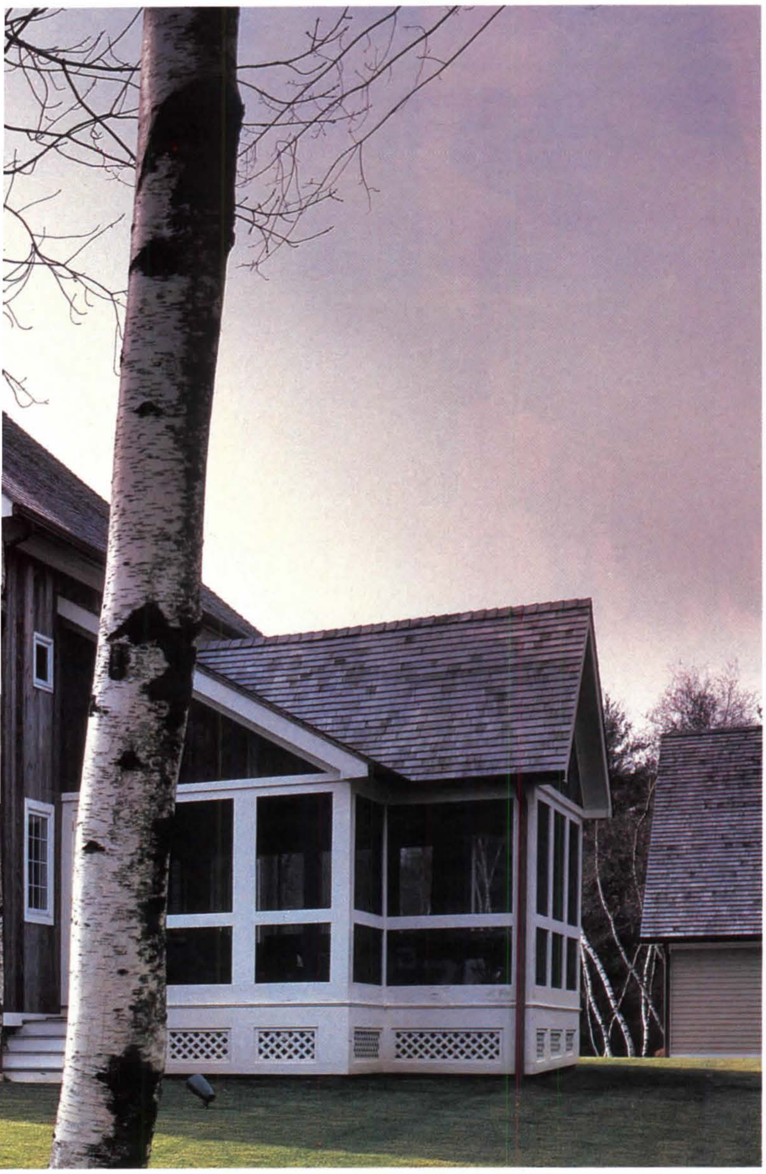
The destruction of Pullman was threatened in the early 1960s as part of citywide urban renewal, but the community was able to ward off severe damage and in 1969 Pullman was designated a national historic landmark. Similar status was forthcoming from the state and city, but only the southern portion is protected. The Historic Pullman Foundation, formed in 1973 by community activists to buy and renovate public buildings, acquired the Hotel Florence just days before its certain demolition. It is now the centerpiece of the foundation's work.

Pullman's population is primarily blue-collar, racially mixed, and proud of its landmark status. Unlike Williamsburg, Va., Pullman had no wealthy patrons to protect its heritage. Instead, the community has organized on its own, holding dinners, bake sales, and house tours to raise funds for restoration and repair. It is a place of civility



Photographs by Christian Laine

Heritage



'Architectural Accretion' of an Old Barn and New Construction

Something old and something new are married in this house located on an eight-acre, lakefront site in Pound Ridge, N.Y., designed by the New York City firm Haverson/Rockwell. The former is the structural frame of a 100-year-old barn, moved from a site in Goshen, N.Y., about 50 miles northwest of Pound Ridge. The latter are the barn's new cedar plank exterior, fenestration, and spacious interior (where the family does most of its informal living), wed to a clapboard "main house" devoted to formal entertainment and bedroom spaces.

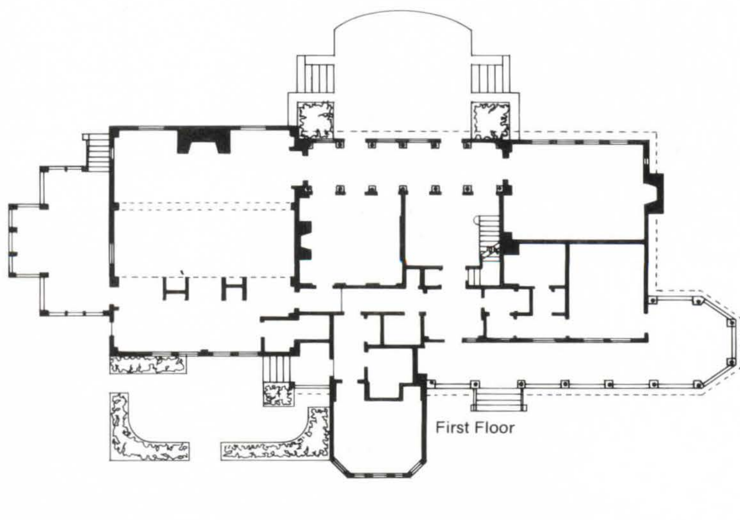
The client collects antiques (the house is almost completely furnished with them) and his largest acquisition is the barn (whose oak structure shows the work of the sawyer's adz), found after a long hunt throughout the Northeast. Jay M. Haverson, AIA, and David S. Rockwell, AIA, explain that the structure's configuration was adjusted to meet its new use as a large family living/cooking/dining space, which is trimmed in antique blue and dominated by a craggy fieldstone fireplace that rises to the barn's peak. About three-quarters of the way up, the fireplace opens in a circle, allowing more light and a view of the tie-beam and king-post.

The main house pokes into the barn in the form of a loggia, which knits the family room, dining room, and living room together; all these spaces have views to the northeast of the lake. The loggia itself has a cove-lighted vaulted ceiling and refined woodwork (in marked contrast to the rustic family room) and leads to a dramatic staircase. The staircase has a room all its own—a vertical shaft filled with sunlight gained from a lantern at its top. This lantern rises above the house's roof line and is crowned by a sheltered widow's walk.

The entire conglomeration—barn, wings, lantern, numerous porches—appears as an architectural accretion, its parts carefully modulated in sum.—Michael J. Crosbie

Left, above, house as it faces lake, with cedar-clad barn at right in photo. Balcony links master and children's bedrooms. Below, obverse elevation with lantern and airy front porch, near left.

Photographs © Mark Ross



© Mark Ross

Above, soaring family room with exposed antique barn framing. Kitchen at right in photo is sheltered by loft off the master bedroom. At photo's left is loggia. Right, loggia as it extends from family room to living room, with dramatically lit woodwork. Below, child's bedroom furnished with Shaker antiques. □

© Mark Ross

Mark Ross

Picturesque Stable Complex Becomes a Set of Condominiums

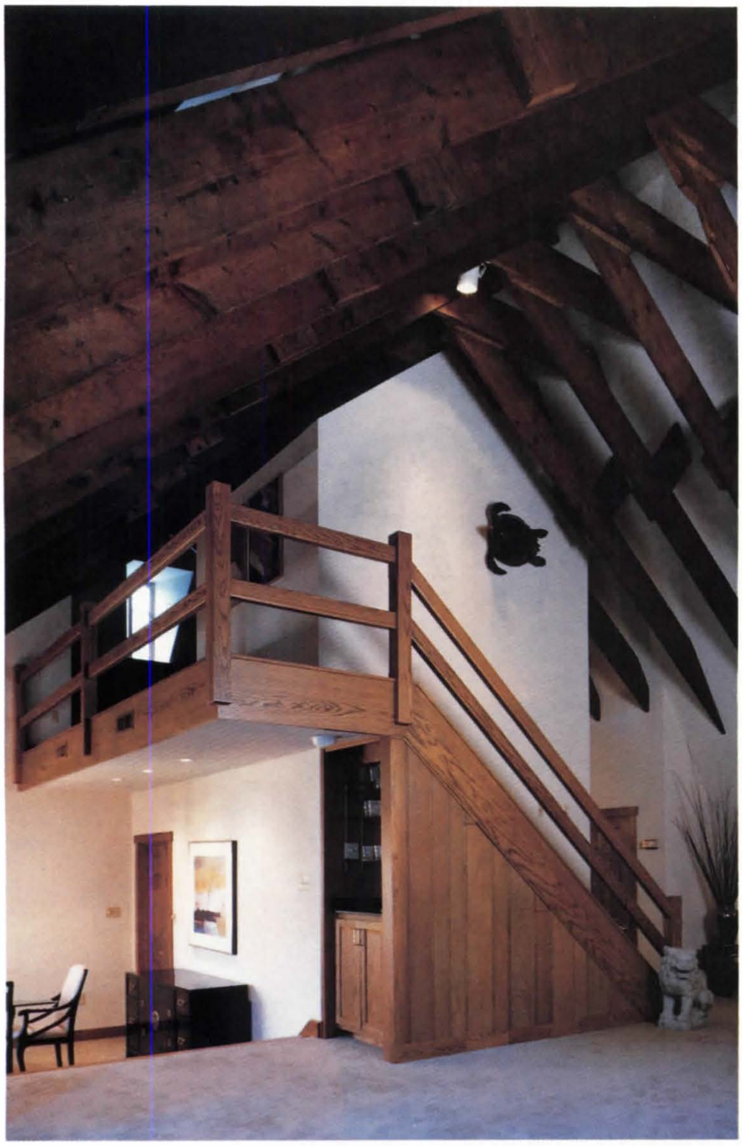
© Dennis Marsico

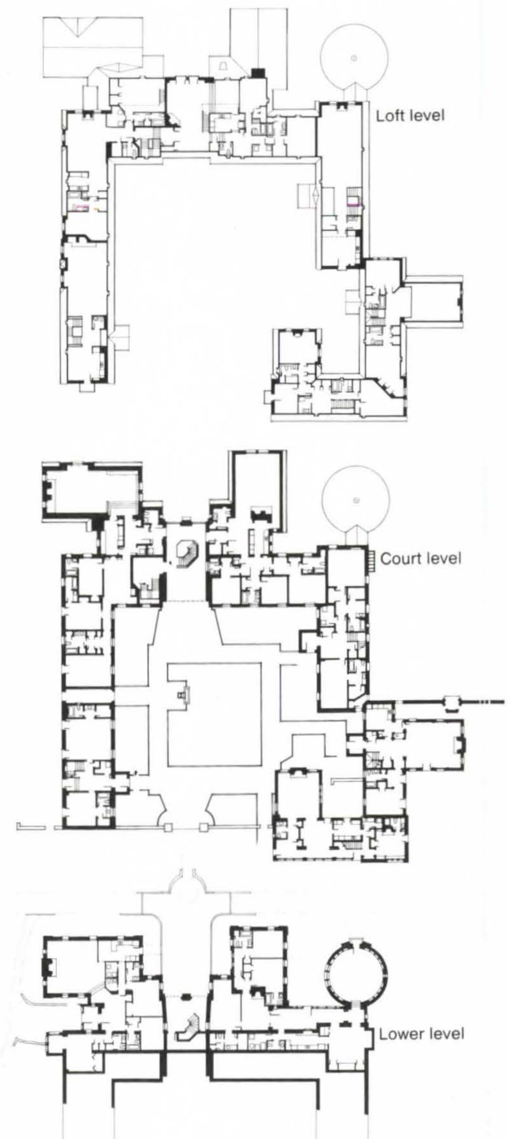
The renovated Hunt Stable is a romantic ensemble of buildings in a storybook setting. Nestled among rhododendron, mountain laurel, and evergreen trees in the rolling hills of southwestern Pennsylvania, the 1921 Norman-style stable housed the Mellon family's hunt horses until the early 1970s.

The Pittsburgh firm MacLachlan Cornelius & Filoni Architects meticulously renovated the original building and made alterations and additions so subtle it is difficult to differentiate the old from the new. Originally containing 28 stalls, grooms' quarters, hayloft, veterinarian's area, and a great round trophy room, the complex now houses 10 condominium apartments, each approximately 2,000 to 2,800 square feet and all different in floor plan and finishes.

The building clusters around an open courtyard, originally a place for the horses to cool down after exercising. This space (right) is now a landscaped common area with Belgian block walkways and a simple yet elegant fountain. The service paddock with double rounded archways is a covered central entrance,

© Dennis Marsico





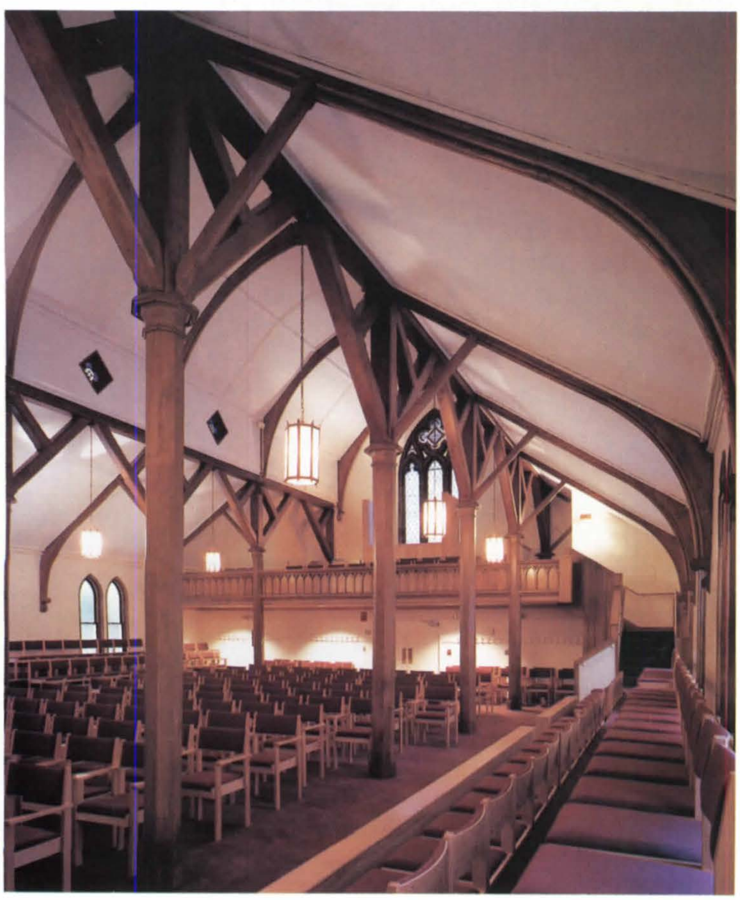
and a new stairway connects the three levels of the stable complex. The paddock tower, once a source of natural ventilation, serves as a skylight crowning the living room of one unit.

New vestibules and glazed foyer additions provide each unit with its own entrance. The cut-out triangular details above the doorways of the gable vestibules recall the original dovecotes in several of the gable walls, which now are filled with glass blocks. Custom doors and windows were designed to fit existing openings, and many new dormers and dormer windows were added to provide more light and to increase overhead clearances in the loft spaces. In one unit, an arcade running along the west elevation was enclosed with floor-to-ceiling windows to create a hallway that opens onto the main living spaces. All the additions respect the original configuration and details, and the new exterior finishes, including stucco, stone, and heavy slate roof tiles, blend almost perfectly with the original materials.

To maintain the character of the stable, the architect reused and relocated many of the existing features such as doors, wainscotting, brick pavers, iron hardware and stall partitions. On the loft level, the steeply sloping ceiling and the original wooded trusses were maintained.

The conversion of the stable to condominiums provides a new and appropriate use for an unusual building and successfully evokes the romanticism of a bygone era without becoming kitsch.—Lynn Nesmith

Library Becomes Auditorium, Gymnasium Becomes Library



Westbrook College is a small institution in Portland, Me., that emphasizes nursing and business courses. It possesses two handsome old buildings: one, a brick gymnasium built about 1900; the other, a wooden Gothic church that the college used as a library. Amsler, Hagenah, MacLean of Boston was asked to make two conversions: to remove the library from the church and put it in the gymnasium, and then to turn the church into an auditorium. The result is two of the most unpretentiously successful new college buildings in New England.

Both buildings are part of the Westbrook College district, which is on the National Register of Historic Places. The architects previously had shown their ability to work within the confines of a historic area in their arts center at Phillips Exeter Academy in New Hampshire. At Westbrook, they moved with equal tact.

There's little to be said about the auditorium. The architects recycled the old church with maximum care and caution, installing almost invisible new air-handling systems and quietly appropriate seating, lighting, railings, and stage. No attempt was made to alter the liturgical atmosphere. The new auditorium thus feels dignified and a little bit sacrosanct—a place for serious talk.

The library, known as Abplanalp Library, was a more challenging design problem and the result is even more successful. Abplanalp is part new, part old. The old part is the former gymnasium; the new part is two wings of offices and study rooms that make an L shape, connecting the old gym to another older building, Alumni Hall, while in the process forming a courtyard. New and old have been worked into an ensemble that enhances all of its parts and gives Westbrook a fine new outdoor space.

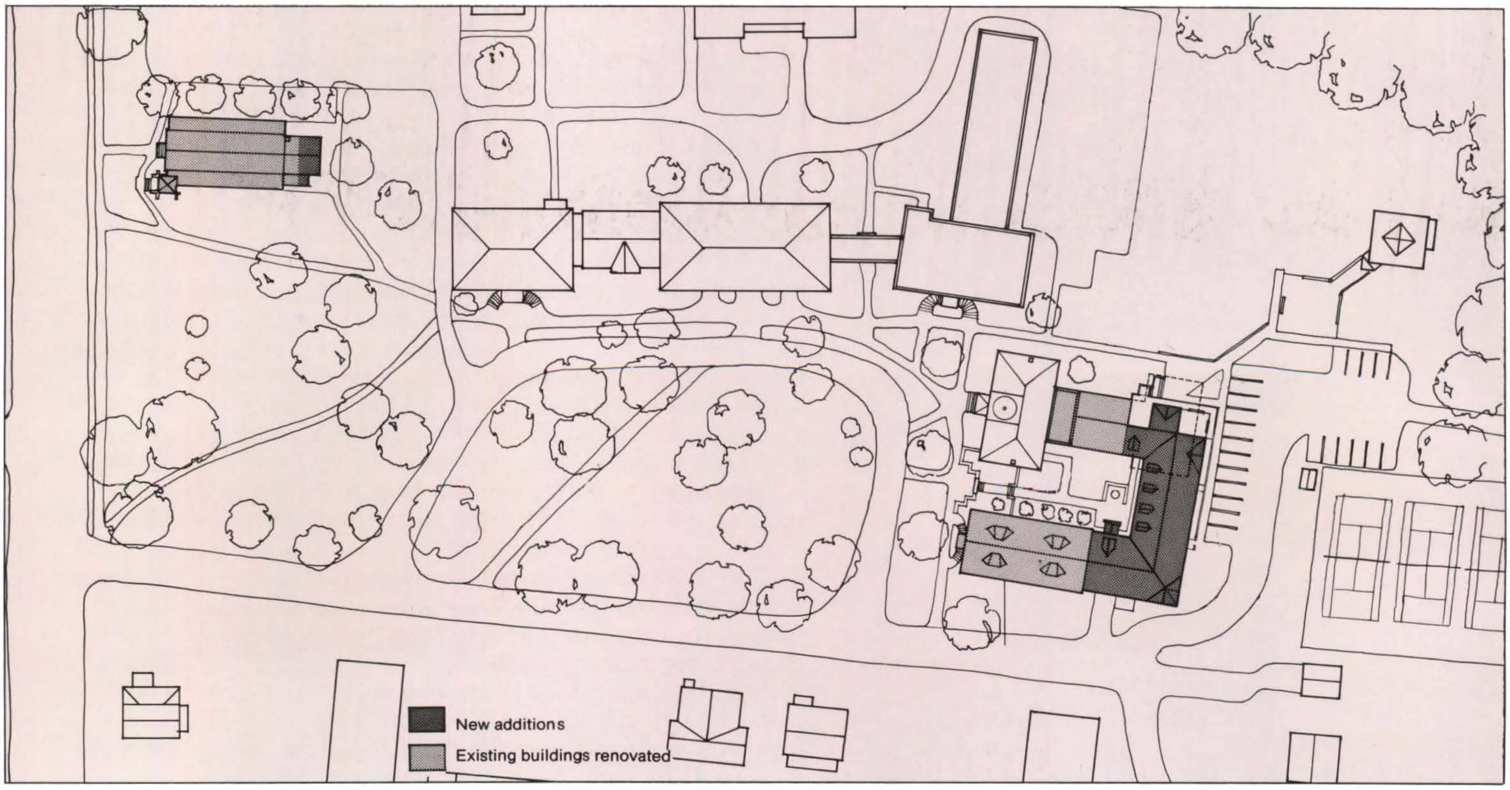
The old gym is the gem at Westbrook. It has been converted into a two-story reading room of real power. Huge dark-stained wood trusses span it at the top, sunlight floods in from three sides, and tiny dormers project high patches of light onto the walls. In its original form as a gym, the room possessed a balcony-level running track; the track had disappeared by the time the architects arrived on the scene, but they found turnbuckles in the trusses from which the track had once been hung by rods. The architects used the same turnbuckles to hang a reading balcony of their own, restoring the scale and interest of the room and, at least for old-timers, memorializing the former track.

Whatever is new in this room is frankly new. There are no historicizing details. The bright, gridded, white metal railing at the balcony is fully contemporary, yet its understanding of both scale and craftsmanship make it the perfect foil for the dark, intricately trussed roof above.

In its new parts, Abplanalp is equally fresh. The two new wings are fronted with big white-framed ground-floor windows, each looking onto the new courtyard, and each dedicated to a different Maine writer. The writers' names are inscribed above their windows, as in the classical roll calls you see on the facades of older libraries—Socrates, Virgil, Dante, and so on—with the ironic, localizing twist that these authors are Kenneth Roberts or Sara Orne Jewett or Edna St. Vincent Millay instead. The architects have developed a unique facade in which each of the memorial windows is set into its own two-story brick niche, crowned by a white dormer, giving each author's window a surprising monumentality. At the same time, the facades pick up and boldly exaggerate the characteristic New England neo-Georgian college vocabulary of red brick and white trim. That vocabulary is also the source of a freestanding portico, which

Above, the wooden Gothic church-turned-auditorium. Left, the 'dignified' auditorium interior with its liturgical atmosphere intact. Right, the library's courtyard is entered through a portico with the former gym on the left.

Photographs © Nick Wheeler/Wheeler Photographics



Above, the library's two new wings meet at a highly articulated corner; below, left, natural light floods into one corner's interiors; left, the newly formed courtyard. Facing page, two-story reading room in the former gymnasium with reading balcony.

forms a ceremonial gateway into the courtyard—and which, like a billboard, signals the presence of the library complex down the long, ragged college oval at one end of which it stands.

Inside, the new rooms are quiet, sun-filled spaces with cool gray walls and white trim. They are pleasant but unremarkable. At the entrance, someone's unfortunate obsession with security has led to a maze of bars and detectors reminiscent of airline terminals. One more happy surprise, however, awaits the visitor. This is the Maine Women Writers Collection, an archive of books, letters, diaries, and manuscripts, some contained in antique bookshelves and cabinets. The architects have given this collection a double-height room that turns the corner between the two new wings—a room so sunny it is virtually a solarium, with wide doors that open out onto a raised private reading terrace that is entirely enclosed, both sides and top, with white trelliswork. No attempt is made to adapt the style of the room to the furniture, with the pleasant result that the furnishings themselves seem like art objects in a gallery setting.

Church becomes library becomes auditorium; gym becomes library. Who ever said anything about form following function? Part of the delight of the Westbrook buildings is their temporal collage—the enlivening perception of new uses in old containers. Amsler, Hagenah, MacLean have treated this college campus with the delicacy and conservatism of surgeons. They have inserted new tissue and restored the old while in no way repressing their own ability to invent delightful form.—Robert Campbell

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Flamboyant and Illusionary Remodeling of an Office Tower

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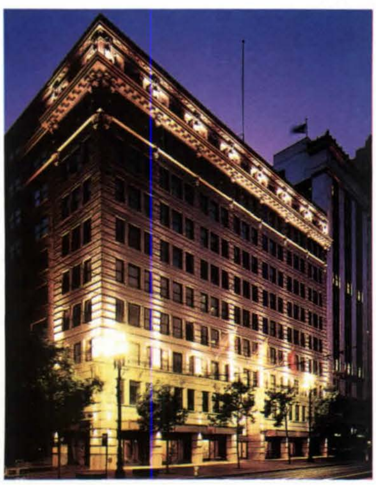
Left, the Monadnock's new entry enlivens Beaux-Arts theme. Right, barrel-vaulted lobby with historically derived wall paintings.


© Donna Kempner

Office buildings in San Francisco dating from before the 1906 earthquake and fire, which leveled most of downtown, are of course rare and probably worth preserving. The Monadnock Building (Meyer & O'Brien, architect) was almost completed when the fire reduced it to its steel frame. Finished in 1907, it stood for many years in a prize Market Street location, between the opulent Palace Hotel and the city's newspaper towers. But both street and building fell out of favor and into decay.

In 1983, developer Don Baker of Eastdil Corp. began a $20 million restoration, with Whisler-Patri as architect in charge. Deep cast-concrete rustication on the two lower floors and a new, high-arched entry give the remodeled Monadnock an even riper Beaux-Arts flavor than it had in 1907—although nothing to compare with some voluptuous specimens nearby. A trellis-surrounded sculpture garden open to the sky replaced the glass-covered light well. Baker's most flamboyant gesture was to commission painters Charley Brown and Mark Evans to design illusionistic window surrounds, "marble" panels, and "sculpted" decorations (plus a few birds) for the courtyard walls, turning them into those of a mock 10-story palazzo. On the side walls of the barrel-vaulted entry, they painted figures from San Francisco history in Renaissance dress. On the vault itself, the end lunette, and one high inner wall, imaginary nude statues pose symbolically, and female deities disport. The flat, bright painting may be closer to billboard art than to Tiepolo or Veronese, and is unlikely to *trompe* any visitor's *oeil.* But it's an inexpensive way to decorate an old building, to fake back an imaginary past, and to attract upscale tenants to the wrong side of the street.—David Littlejohn

Mr. Littlejohn teaches journalism at the University of California at Berkeley.

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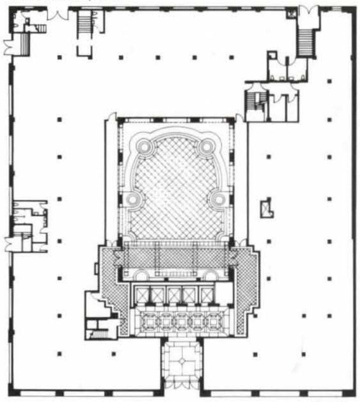
First floor plan



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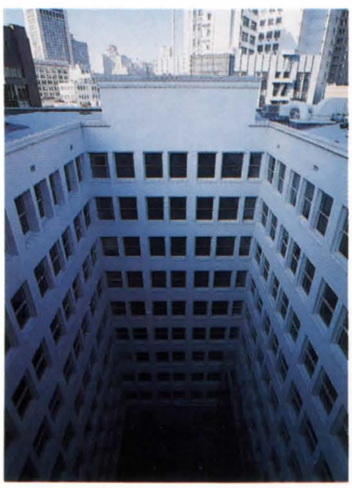

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Monadnock's trellis-surrounded, outdoor sculpture garden was once glass-covered light well. And the plain walls of the 10-story court have been radically transformed by the painters' brushes. □

Colorful Atrium Penetrates Warehouse Made into Offices

© Dennis Marsico

Top, 'before' view of the building's rear on First Street; above, renovated facade with new entrance is now the front.

Pittsburgh is no longer a gritty industrial city. Today the city's skyline is defined not by the smokestacks of steel mills but rather by a crop of gleaming corporate towers—Burgee/Johnson's PPG, of course, but also near-completed buildings by Kohn Pedersen Fox and Hugh Stubbins, FAIA. In addition, the city's once bustling and later neglected waterfront warehouse area is emerging as a revived commercial and residential neighborhood, called the Firstside Historic District.

A very successful example of the historic district's transformation is the Waterfront Building, an 1870s warehouse converted to professional office space by the local firm MacLachlan Cornelius & Filoni Architects. The building originally had faced the Monongahela River, but the construction of an elevated freeway in the 1950s severed the link to the waterfront. The traffic and noise of the highway were not conducive to a pedestrian entrance, so the architect reversed the building's orientation and created a new front and a ceremonial entrance on First Avenue. Along this elevation the sidewalk was paved in brick, and trees and plantings were added.

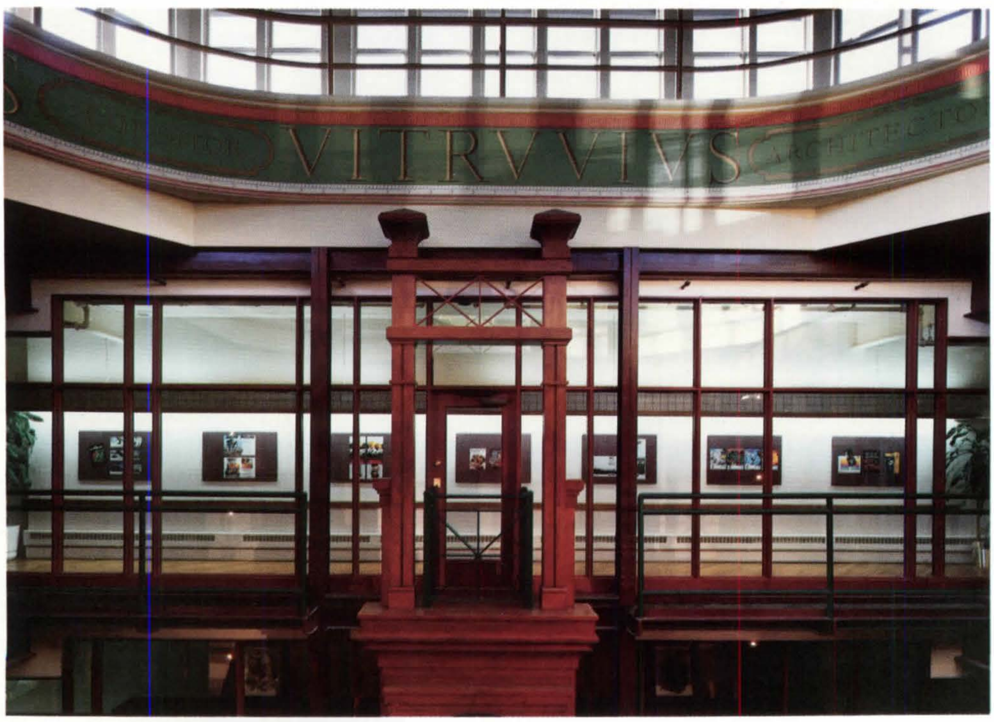
The exterior masonry shell and details were restored, and the insulating glass block windows were replaced with re-creations of the original window fixtures. Arched openings were incorporated into the expanded glass and wood-framed storefront.

The main entrance doors are recessed into the building, creating an exterior vestibule leading to a glass-enclosed bridge that spans to a central atrium. This hallway gradually slopes up and then down to further develop the illusion of crossing a bridge, while the cutaway design brings light to the basement level.

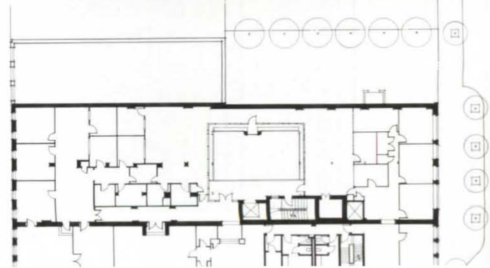
Incorporating an existing ventilation feature, the architect was able to carve out a grand yet perfectly scaled atrium for this relatively modest speculative office building. The atrium is the central organizing element and provides circulation for each level. A lantern with a center oculus crowns the atrium, and the drum of the dome is inscribed (appropriately) with Vitruvius's three principles of architecture—firmness, commodity, and delight.

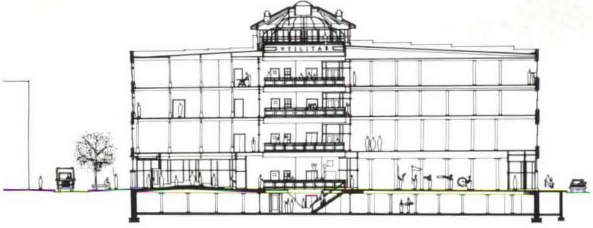
On the basement level of this central space, a remnant of a massive stone wall foundation is juxtaposed with a new ornamental terrazzo floor. An original stairway was moved and now connects the first floor and lower level. Original fireplaces were retained for new private offices.

The exterior restoration of the Waterfront Building is skillful and literal, while the interior modifications create an exciting new space that respects the building's heritage without imitating its style.—Lynn Nesmith



Rich colors and varied materials were used in the atrium restoration: top, looking down to the patterned terrazzo floor and original stone foundation; above, inscription along the dome; right, center oculus providing natural light. Facing page, stacked 'architectural assemblage' rises four stories □





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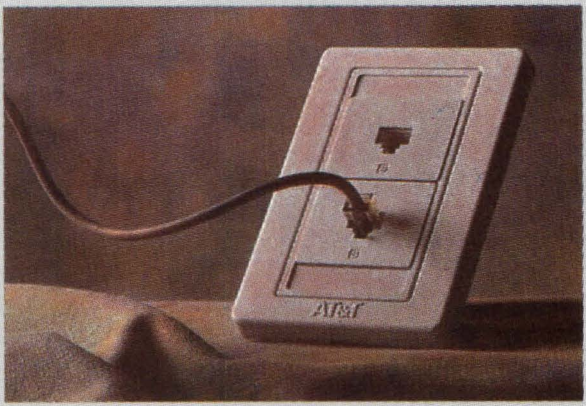
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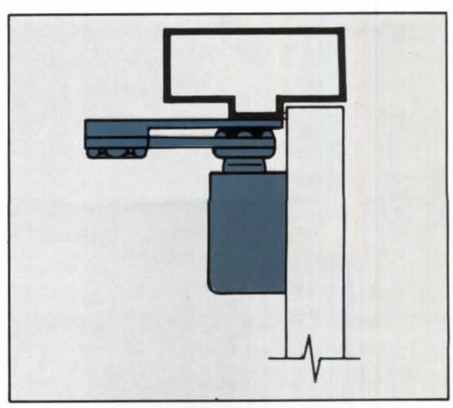

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Quieting Multifamily Dwellings

Sound isolation between units suddenly becomes a critical concern. By Carl J. Rosenberg, AIA

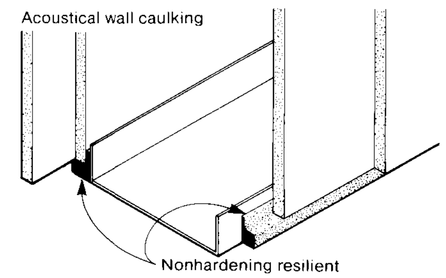
Over the past few years, there has been a surprising increase in complaints and concern about sound isolation and privacy in multifamily dwellings. As acoustical consultants, we have seen a great number of lawsuits brought by condominium associations against developers and architects for inadequate sound isolation performance, and lawsuits against realtors or sellers for misrepresentation of so-called soundproofed units.

This trend is probably exacerbated by the growing number of condominium conversions of older buildings. Apartment dwellers can accept a certain amount of intrusion and lack of privacy; after all, the building is not theirs. But the owners of what used to be apartments—now called condominiums—expect and demand greater privacy; they can't blame the landlord anymore. We also see higher expectations from older persons who are moving from suburban single-family homes to multifamily buildings in the city, or to life-care facilities. This demand for acoustical privacy puts pressure on developers, who are pushed to reduce costs and minimize expenses, even for so-called luxury housing. Additionally, it is becoming common practice for building codes to require that the architect demonstrate a specified level of acoustical performance for building components in certain occupancy types, including multifamily dwellings.

The most prevalent acoustical problems in multifamily dwellings are: airborne sound isolation between adjacent units, both horizontally and vertically; impact noise from the occupants upstairs; and plumbing noise.

Avoiding these problems begins with an understanding of how to evaluate sound transmission from one building space to another. The most commonly used term for evaluating a building construction for its performance at blocking sound is the Sound Transmission Class or STC rating. This rating is based on the decibel scale, and values can range from near STC 0 (no blocking of any sound) to as high as STC 80 (virtually no sound transfer). In typical construction we commonly see values between STC 30 and STC 60. At the lower end of this range, you can hear normal conversation through a wall without much trouble. At the higher end, even a high-powered shouting match would be a mere rumble coming from the other side of the wall. However, such blocking performance is rare.

Any wall type or building material can be tested in a laboratory to determine its STC value. However, when that same construction system or material is installed in the field, you can expect a rating that may be five to 10 decibels lower. One reason is that the laboratory test sample was built by laboratory technicians, not a general carpenter. In the field, details like caulking may be omitted, there may be back-to-back outlets, and there are invariably other "flanking" paths (such as a common floor) that transmit sound from one side of the wall to the other by way of the surrounding structure, without the sound going through the wall itself.



The STC is a rating for a single construction element, tested in a laboratory. Actual field performance is more accurately described by the Noise Isolation Class, or NIC, which is a measure of the *overall* reduction of noise from a source room to a receiver room, irrespective of how the noise traveled.

The STC and NIC rating systems, which are based on the same procedure and are thus in a way equivalent, were designed to measure how effectively a sound-isolating construction blocks human speech. They are not accurate evaluation or measurement tools for sound from a mechanical room next to a bedroom, or for isolation of aircraft noise, or for other special cases where the source of potential annoyance is not speech. However, for the usual airborne noise sources in multifamily housing, the STC and NIC systems are a good guide for comparing different constructions, keeping in mind that there may be adjustments between laboratory and field test data.

Wall construction and vibration

Sound waves striking one side of a wall will cause the structure to vibrate, and the vibrating wall will radiate the sound wave to the other side. The STC value will increase (that is, less sound will get through the wall) if the vibration is decreased, either by a heavier wall (which better resists the sound wave) or by decoupling of the surfaces (which breaks the structural continuity).

In practical terms, what then makes a good party wall between adjacent dwelling units? The most important ingredients are:
• adequate mass;
• separation of the skins of the wall;
• absorption in the cavity.

Assume, to start, standard stud construction for the party wall, with a single layer of gypsum board on each side. This might yield a field performance of NIC 35. The following questions and answers pertain to increasing the NIC value.

Does it matter whether the stud is wood or metal? Probably not much, although light-gauge metal studs seem to be less rigid and stiff than wood studs, and this helps decouple the wall.

Does it matter how many layers of gypsum board are on the

Mr. Rosenberg is a supervisory consultant in architectural acoustics at BBN Laboratories Inc., a division of Bolt Beranek and Newman Inc. He also teaches acoustics at MIT and Princeton.

stud? Yes, more are better because of the extra mass. Doubling the layers of gypsum board will come close to doubling the weight of the wall, which will improve sound blocking by five or six decibels (STC points), which is quite significant. Furthermore, the extra layers offer an opportunity to stagger the joints, thus reducing the chance for cracks and gaps that leak sound.

Should there be insulation in the cavity? Yes, but with a qualification. If the studs are wood, the insulation merely damps the gypsum board, which then vibrates less. Isolation improves by three to five decibels. If the studs are metal—that is, if the two sides of the wall are already somewhat decoupled—the improvement can be greater, generally five to eight decibels.

Is plaster better than gypsum board? Only the weight really matters. Gypsum board weighs approximately four pounds per square foot per inch of thickness; plaster weighs five to nine pounds per square foot, depending on the aggregate used.

Is it worth using ⅝-inch gypsum board instead of ½-inch or ⅜-inch? Again, only the weight really matters, and only if you can increase the weight by about a factor of two. In other words, changing from ½-inch to ⅝-inch does not do much good, but changing from one layer to two makes a significant difference.

Is caulking necessary? Absolutely, because hidden behind every baseboard or molding is a potential unseen opening with a relative STC value of 0, waiting to let sound pass through the wall.

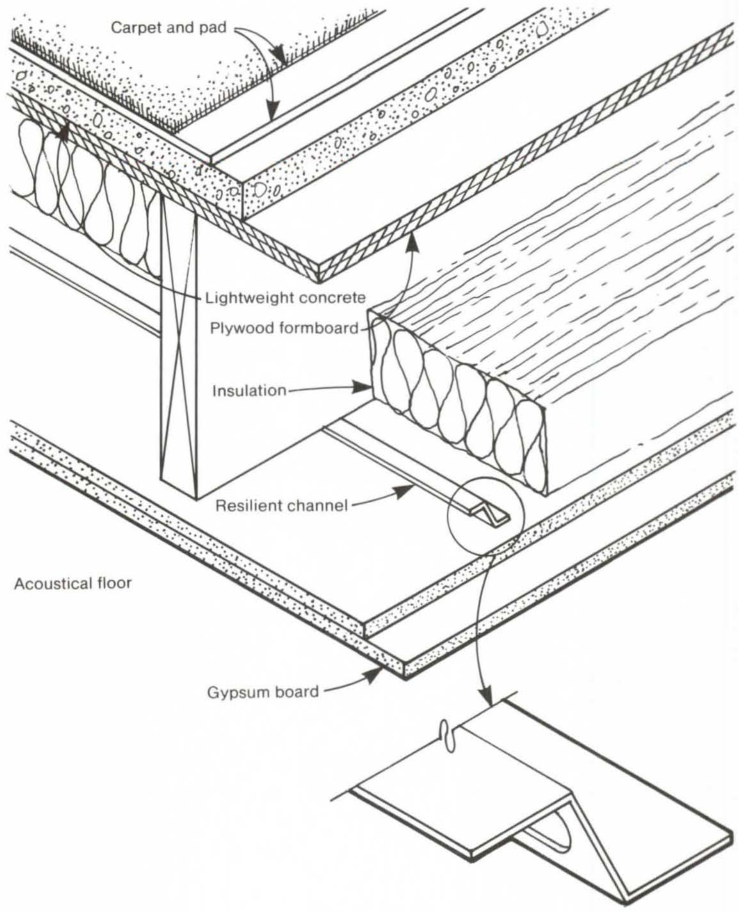
What about back-to-back outlets? These are another potential leak through an otherwise decent wall. And phone jacks and antenna outlets can be even worse, because they may not have even the benefit of back-boxes, so they are literally a hole in the wall. Therefore, it is helpful to offset the openings so that they occur in different stud cavities.

Does it matter what type of insulation is in the wall? Not much. Glass or mineral fiber (with or without paper lining, with a density of about three pounds per cubic foot), rock wool, or vermiculite all contribute about the same benefit of soaking up sound in the cavity and damping the gypsum board facing. Thicker batts are generally better than thinner ones, provided they fit loosely and are not crammed into the cavity.

Keep in mind that the best single-stud wall will be only marginal for sound isolation as a party wall, because it has that one integral stud that will transmit sound energy from one rigidly attached skin of the wall to the other. We have found the field performance of a single-stud wall—even with two layers of gypsum board on each side and insulation in the cavity—to be in the range of STC 40 to STC 45, which is far below the performance that most guides and laboratory data would have you expect.

For better performance, there should be more mass or more separation. More mass could mean concrete or concrete block. In this regard, dense, heavy concrete offers better sound isolation than lightweight concrete of equal thickness. More separation entails finding some way of decoupling one side of the wall from the other.

Resilient channels: Resilient channels are Z-shaped metal furring strips with holes punched in the middle web to make the channel less rigid, thus helping to decouple the faces of the wall. In a laboratory test, especially with wood studs, they may improve sound blocking by seven to 10 decibels. But to achieve this full acoustical benefit in the field, the resilient channels must be installed carefully, and this is often awkward and difficult. Proper installation requires no "short-circuits," or places where the gypsum board might be in contact with the studs. Cabinets hung on the wall and baseboards nailed through to the studs will reduce the isolation integrity of the channels. Seldom do we see satisfactory wall installations of resilient channels.



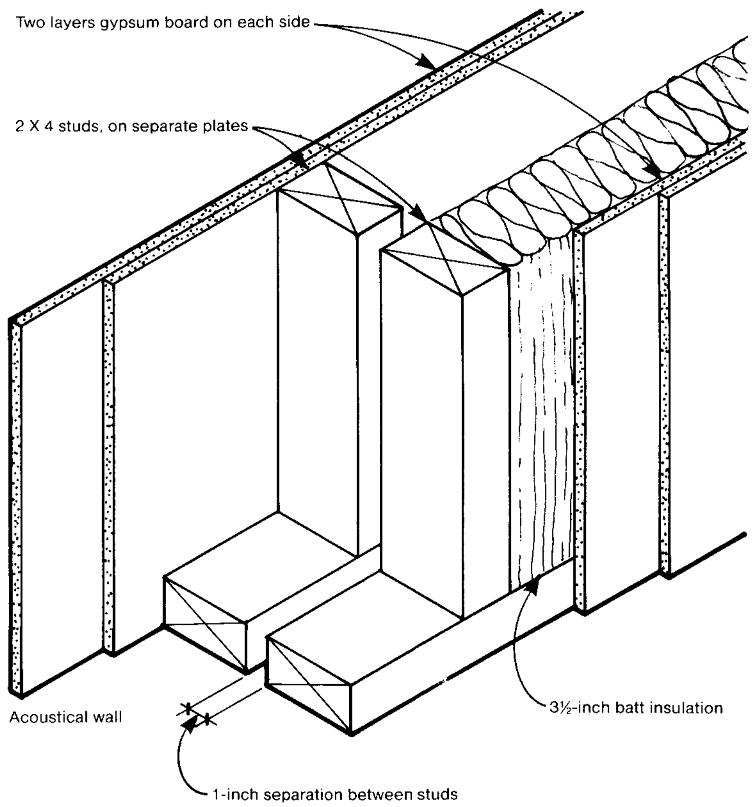
Staggered studs: In wood construction, it is possible to align 2x4 wood studs on a 2x6 plate so that alternate studs support opposite sides of the wall. (This is not possible with steel studs because the inner flange of the stud has no part of the plate to be fastened against.) Staggering the studs improves the sound isolation performance, but there is still a common path from one skin of the wall to the other through the common plate and header.

Double studs: A separate row of floor-to-ceiling studs for each side of the wall can provide 10 to 15 decibels improvement over the performance of a single-stud wall. Contractors find this an easy wall type to install, and it has the potential for excellent sound isolation performance.

This lesson was well learned by a developer who had sold a new town house unit to a lawyer, assuring him that the unit was soundproof with respect to the neighbors. The party wall was single-stud construction with insulation in the cavity. When the lawyer was not happy with the noise he heard from his neighbor, the developer first tried to remedy the problem by adding gypsum board to one side of the wall. Then he added furring strips and resilient channels and more gypsum board to the other side, with insulation in the new cavity. The lawyer persisted in his complaints, but there was no more room for additional construction to be added to the wall, and its performance was still below NIC 42. Finally, the developer had to buy back the unit at a loss, much to his dismay.

This developer sought advice on his next project before building it. He carefully erected party walls of double-stud construction. He even had each side of the wall carried on separate footings and kept all framing separate from unit to unit. The resulting performance was above NIC 58, which is exceptionally good. The developer then could proudly demonstrate to prospective buyers the acoustical excellence of the model units.

Fire-stops and gusset plates: Obviously, any rigid contact between one stud and the other will reduce the acoustical benefit of the double wall system, and therefore must be detailed to maintain separation between separate walls.



Floors and ceilings: vertical transfer

The same concerns of mass and separation apply equally to floor/ceiling constructions. If the flooring above and the gypsum board below are rigidly attached to a single set of joists, chances are good that sound will transfer easily from one floor to the other.

Won't insulation in the cavity solve all problems? With the rigid ties through the joists, the vibrations will bypass the insulation, and the improvement will be only three to five decibels.

Does it help to use a deeper joist, such as a stud joist? Since all joists are quite deep anyway, this does not significantly improve performance.

How can I add more mass? A concrete topping or slab construction or a poured gypsum underlayment will improve the sound isolation performance if the mass is sufficient. A thin, lightweight topping (such as one used as a leveler) probably will not do much good by itself.

Resilient channels: We find that resilient channels work much better for ceilings than for walls because the channel can be correctly and consistently loaded by the ceiling all the time, and it is harder to "short-circuit" the installation. Resilient channels are by far the most useful and practical way to achieve separation of the layers in a floor/ceiling system. Remember, the perimeter of the ceiling should be caulked with a nonhardening acoustic caulk so the ceiling can still move independently of the walls. Also, you must avoid recessed lights—they reduce the integrity of the ceiling and create acoustic holes in the otherwise solid barrier.

Sound-deadening board: So-called sound-deadening board usually refers to a ½-inch mat of fiberboard sandwiched between the subfloor and the finished floor, which is supposed to help decouple the floor from the joists. This will not improve performance much because the sound-deadening board does not offer any resilience (it is not like a spring) and because the floor on top of the sound-deadening board is usually nailed though to the joists.

Impact noise: This is the sound of people walking around upstairs, or slamming doors, or creating any other impulsive source where the energy is induced directly into the structure. It is difficult to measure impact noise quantitatively because standard test procedures (such as the ASTM tapping machine test to measure Impact Isolation Class, or IIC) do not really duplicate the kind of energy generated by a typical source, such as a person walking. Also, impact noise may have varying components, such as the hard, high-frequency click-click of heels on quarry tile and the low-frequency thud or thump of footfalls on wood-frame construction.

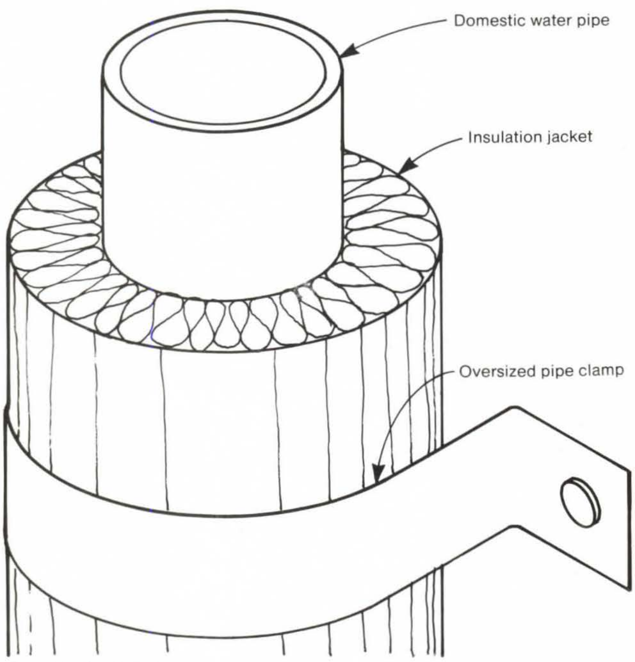
For the high-frequency noise problem the most effective solution, short of requiring the people upstairs to walk barefoot, is carpet, because it reduces noise at the source. Even with carpet, however, low-frequency thumping noises can be transmitted, especially in wood-frame dwellings. The only way to solve this problem even partially is to build a resilient ceiling, as described above, or use a heavier mass such as a concrete topping in the upper unit.

This heavier mass for the upper part of the floor will improve sound isolation and lessen impact noise transfer, and the mass can be even more effective if it is isolated or resiliently supported from the structure. In extreme cases this is done with resilient mounts for a so-called floating floor, but other products, relatively new to the U.S. market, may be appropriate for residential conditions. A sound-reducing matting, which is a compression-resistant three-dimensional nylon pad, may be helpful when used with ceramic tile or a concrete topping, and with resilient channels for the ceiling below.

We have seen many old warehouses and wharves renovated in the Northeast. Architects look at the old plank floors and say, "Let's refinish them and leave them exposed." Then they look at the large beams and the underside of the plank below and say, "Let's clean these up and leave them intact." But invariably, to reduce impact noise, one or the other must be covered. In some cases the floor gets a topping of concrete with carpet and pad, with the edges carefully caulked (especially to fill in the gaps when the concrete shrinks). In other cases the ceiling is covered with resilient furring and gypsum board, with insulation in the cavity. For best results, do both.

Other people's plumbing noise

Plumbing noise (invariably from someone else's plumbing) is the bane of existence for most occupants of multifamily housing. It is not airborne noise that creates the problem—if you made a tape recording of the noise from a water fixture or shower and played it through a stereo in the neighbor's bathroom, at the same volume as the original, the noise probably would not intrude into the next unit. The problem is the vibrational energy of water in pipes that are in contact with the structure. This energy causes the studs and wallboard to radiate that energy as noise. The problem is exacerbated by PVC drains, which offer less resistance to the transfer of energy than do older cast-iron pipes.



Pipe vibration isolation

In any case, the vibrational energy must be decoupled from the structure. Back-to-back bathrooms should have completely separate framing, such as a double wall, so that one unit's piping does not contact its neighbor's. Similar double walls should be used wherever a chase wall adjoins a bedroom. Piping can be separated from the framing by wrapping with insulation and using oversized clamps. Chases should be heavily treated with insulation, perhaps six inches thick if stud spacing allows.

In one luxury condominium project, the designer took great care to separate units with poured concrete slabs, double-stud party walls, etc. But in one place, where a duplex unit nestled under another unit, a bathroom abutted a stairwell and the wall was single-stud construction with a shower head firmly attached to that stud. The shower noise made the stairwell sound like a waterfall. Remounting the shower head solved the problem.

Background sound, rural and urban

Studies conducted by the U.S. Department of Housing and Urban Development in the 1960s highlighted the relationship of background sound levels to the degree of privacy that people could expect from neighboring units. It was found that a given wall construction in a rural environment, with very low background sound levels, would be less acceptable than the same wall construction in an urban setting, where background sound levels are higher. HUD therefore proposed that criteria for constructions between dwelling units be adjusted to account for the background sound level, with more stringent standards applied to rural locations.

Although this is still a good idea, it is better established in theory than in practice. Most codes do not yet recognize the contribution of background sound in covering up or masking sounds from a neighbor. Most builders discover this factor the hard way. Some perfectly good constructions, with high STC ratings, can be judged unacceptable if the background sound is so low that it provides no masking. A builder should be extra cautious with constructions in quiet areas—not only do they lack masking sound, but they are precisely the areas that attract buyers and occupants who equate quiet with quality. All is well until the neighbor moves in.

At a fine resort development, we encountered a modest floor/ceiling construction: open wood joists, wood floor above, gypsum board below. Complaints began as soon as one unit above another was occupied. The developer added insulation to the cavity; that helped a little but not enough. Then the developer totally rebuilt the ceilings with resilient channels, which raised the rating to near NIC 50. But occupants still are plagued with airborne and impact noise transmission. The units have electric heat, no sound of any air-handling equipment, and no nearby vehicular traffic. The background sound level is quieter than in some of the world's best concert halls, and as a result every footfall and pin drop can be heard. Such a quiet background requires higher than normal sound isolation or some masking sound producer, such as fans or airconditioning.

Planning and layout

The worst acoustical problems, which are also perhaps the easiest to avoid, arise from poor layout and insensitive planning. Wherever possible, units should be stacked with like uses above each other, not just because it is neater but because it reduces acoustical problems and makes a better environment. After construction, there is no easy remedy for these conditions:

- a bathroom of one unit over the neighbor's living room, with the drains framed out below the living room ceiling;
- a kitchen with an elegant quarry tile floor (a marketable amenity) over a bedroom;
- HVAC equipment for one unit dropped into a soffit over the neighboring unit's family room.

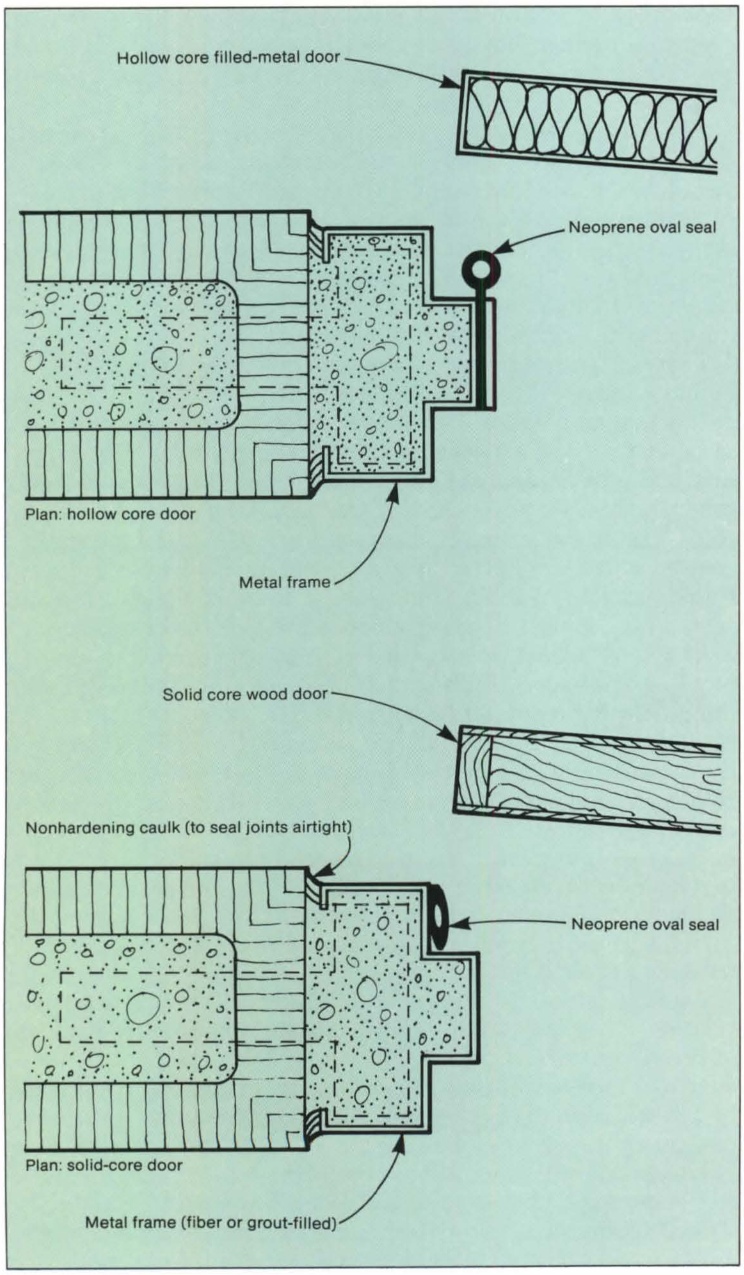
Common sense would have avoided these problems. Good sound isolation starts with good planning and layout. Next comes sensible design of wall and floor systems, using an understanding of the guidelines of mass, separation, and absorption. Also, keep in mind the background sound factor. Details, especially those involving resilient separation, must be executed carefully, and diligent supervision in the field is essential.

These principles are just a cursory introduction to sound isolation in multifamily dwellings. Acoustical consultants can provide further assistance at two stages of a project—early in the design development, when the initial approach and budget are established, and near the completion of contract documents, when final details and specifications are set. A sound-insulated building is achievable, and the end result can be a rewarding project for all. □

Sound Isolation For Wall Openings

By M. David Egan

When a weaker element, such as a window or door, is used in a sound-isolating construction, the composite Sound TransmissionClass (STC) for the combination is usually closer to the STC of the weaker element than to that of the stronger. Consequently, where high sound isolation is needed, doors and windows must be carefully designed and detailed. The following general rules may be used to plan sound-isolating composite construction. To maintain an STC rating, if the weaker element is less than 25 percent of the construction, the STC of the weaker element should not be more than five points lower than the STC of the stronger element; if 25 to 50 percent, the STC should not be more than two points lower; and if greater than 50 percent, the STC of the weaker element will *be* the composite STC.



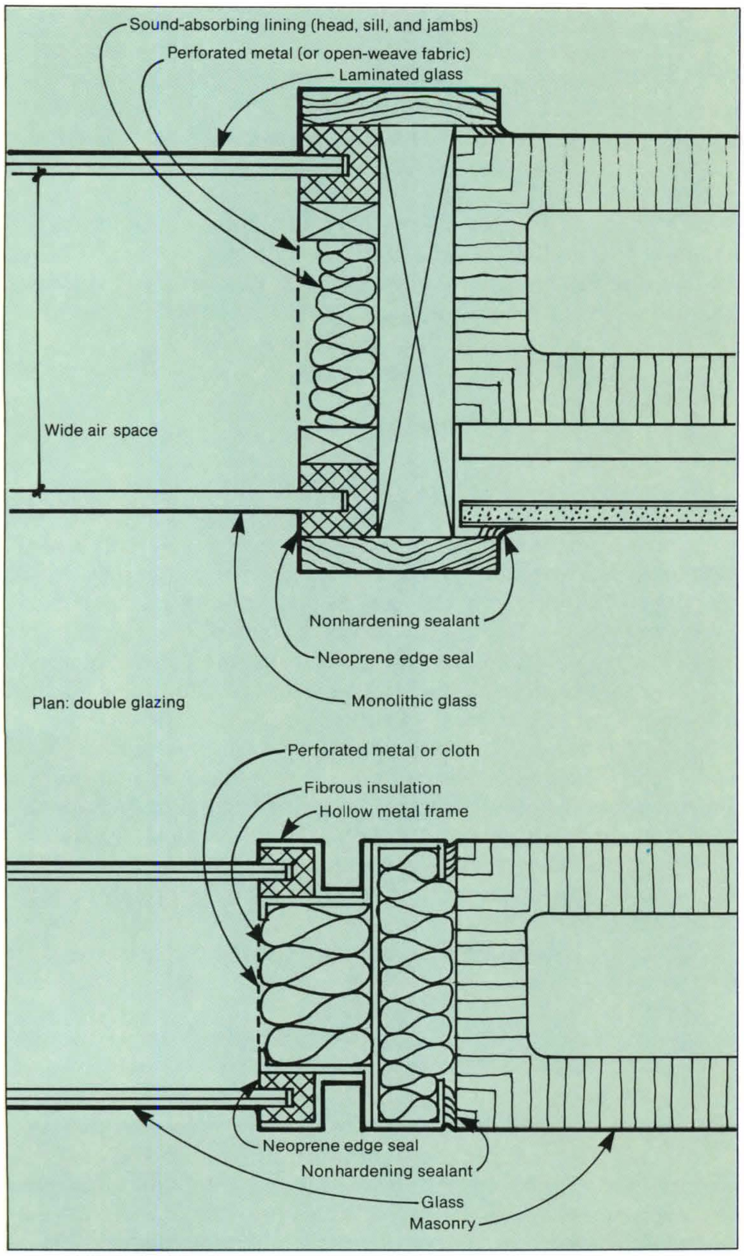
Doors as sound barriers

The bar graph shown on the next page presents STC data for conventional wood doors and frames and for proprietary metal doors and frames especially designed to achieve high STCs.

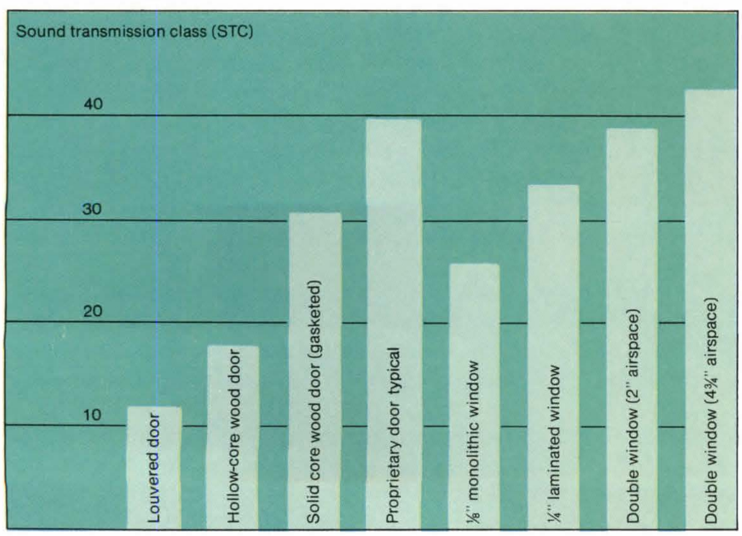
To be effective as a sound barrier, a door must be heavy and gasketed around its entire perimeter to be airtight when closed. Slightly greater than normal pressure will be required to close the door against soft, airtight seals. Doors that are louvered or undercut to allow air movement will be nearly useless as sound barriers. Ungasketed solid-core doors will perform only slightly better, depending on how well the door fits the opening. Gasketed hollow metal doors filled with fibrous materials and dense limp materials, such as sheet lead or lead-load vinyl, have higher STC performance than gasketed solid wood doors of identical weight. In restoration projects, door weight can be increased by laminating thin lead sheet to the inside of the door panels.

Checklist to improve STCs of doors:

1. Do not use louvered or undercut doors where sound isolation is needed.
2. Use solid-core wood doors or fiber-filled, hollow-core metal doors, gasketed to be airtight when closed. Frames should be filled with grout (or packed with fibrous material) and caulked airtight at the wall. For high STC requirements, use proprietary hollow metal doors that come with special frames and adjustable gasketing such as refrigerator-type magnetic seals.
3. Doors with raised sills usually provide better surface contact than those with flush sills and consequently can increase STC ratings by three to six points. However, proprietary adjustable automatic door bottoms and cam-lift hinges are effective for use with flush thresholds.
4. Seals should be adjustable to compensate for wear, thermal movement, settlement of building structure, and other factors that cause misalignment of doors. Locate all seals in one plane to prevent sound leaks at corners due to adjacent seals that do not meet.
5. Carefully adjust gasketing to attain an airtight seal and uniform closing pressure along all edges of the door. A stethoscope can be used during installation to locate leaks by detecting transmission of sound from stereo loudspeakers playing pink



Plan: double glazing



noise on the opposite side of the door. After installation, gasketing may require periodic adjustment, repair, or replacement, depending on use.

6. Stagger locations of doors on opposite sides of double-loaded corridors so that noise will not pass directly from room to room across corridors.

7. Use stub corridors or vestibules as sound locks. Two doors in tandem, with wide spacing between, can act independently to be compatible with high STC wall and floor/ceiling constructions. To be effective, surfaces of sound locks should have sound-absorbing finish treatments.

Windows and glazing

The bar graph presents STC data for window construction. The highest STC is provided by double-glass construction with wide spacing between panes of different thickness. The lowest STC is provided by ⅛-inch-thick monolithic float glass (or by double-glass construction with narrow spacing between panes of identical thickness). Narrow air spaces act as conductors, readily transmitting sound energy from pane to pane.

STC data for identical window constructions can vary widely from one laboratory to another. Discrepancies can be due to variations in size and shape of the panel being tested (glass dimensions affect resonant frequencies), edge support conditions (rigid support stiffens the panel, thereby lowering sound isolation), and other factors. The STC of a single layer of plastic is similar to that of a single layer of glass of identical mass.

Checklist to improve STCs of glazing:

1. Increase the thickness of single panes up to ½ inch (to increase mass).

2. Use laminated glass—usually 30 mil polyvinyl butyral interlayer sandwiched between two layers of glass (to achieve limpness and provide damping). Laminated glass can achieve an STC rating of three or more, higher than monolithic glass of identical thickness. In cold regions, damping provided by the interlayer may be adversely affected by low temperatures, thereby reducing sound isolation of the exterior glazing. In double-glass constructions, place laminated glass on the warm side of the window.

3. Use double-glass construction with at least ½-inch spacing between the panes of different thickness so that the panes will have different resonant frequencies. The ratio of thickness should be about 2:1. Tilting one pane does not affect sound transmission but may be beneficial to control reflection of light. Replacing one pane of glass with an equal thickness of laminated glass increases the STC by four.

4. Increase the spacing between panes up to six inches. STC increases by about three per doubling of the mean separation distance. Avoid using lightweight frames; and, where especially high STCs are required, use separate frames to reduce the flanking of sound energy.

5. Line the interior perimeter of the frame with sound-absorbing treatment to improve the sound isolation by two to five decibels at high frequencies.

6. Mount frames with soft, neoprene edge gaskets, which provide higher isolation than putty or caulking for the same thickness of glazing.

7. Use sealed windows, which usually have STC ratings three to five points higher than operable windows with gasketing. Operable double windows with separate sashes can be more effective than a single sash with close-set double glazing. □

proper for one situation can constitute professional negligence for another. Detailing of a wall system using brick veneer with a steel stud backup for a one-story building versus the same options for a twelve-story building might be an example. Ultimately, the task of defining exactly what was required after the fact and for each claim is left to the courts. However, no court, professional society, university, or government agency can establish in advance a set of detailed rules or standards that define comprehensively what the standard of care will be for all architectural services or projects.

In a sense, society strikes a bargain with the professional. Society sees architects as having unique knowledge and capabilities, and trusts that they will use their special skills to benefit society in general and their clients in particular. Society recognizes that an architect cannot guarantee an outcome any more than a doctor can guarantee health or a lawyer acquittal. In situations where unknown or uncontrollable factors are common and where judgment and special skills are the principal ingredients of service, infallibility is impossible.

For that reason, the engineer or architect is not required to produce a perfect plan and there is no implied warranty or assurance that the drawings or specifications will be free from defects. There is even a legal precedent stating that under generally accepted contract provisions there is no implied warranty that what has been designed will even be suitable for the owner's intended purpose or use.

For the architect's side of the bargain, by accepting a license to practice, the architect binds herself or himself to perform professional services within a reasonable standard of care. While there can be no precise definition of the extent of a design professional's responsibilities for a project in advance, the principle is that the architect agrees to perform as well as other reasonably prudent design professionals would, given the same situation in the same location at the same time.

This may sound vague and imprecise, yet in actual operation the principle works fairly easily. Each side in a lawsuit brings other design professionals into court as expert witnesses. They review the facts at issue in the case and give opinions as to whether the design professional's actions were reasonable under the circumstances. The judge, arbitration panel, or jury then is left to decide how much credibility to give the experts' opinions, since the experts are just other professionals.

Given the number and variety of "reasonably prudent" design professionals who exist, there is a complex and dynamic universe of allowable options that evolves over time as professional knowledge increases about each particular building material or system. Therefore, the second condition of the bargain that design professionals strike with society is to agree to keep reasonably abreast of changing technologies and code demands. In 1947, a 30-inch height was adequate for a handrail. In 1967, the use of asbestos materials did not constitute negligence. In 1977, barrier-free access was often considered an unnecessary, even imprudent, additional expense. While we can't anticipate just which areas of design next will be subject to increasingly codified requirements, indoor air quality, radon, toxic wastes, and building security are only a few of the subjects that AIA and NSPE routinely monitor to provide design professionals with current information.

This leads to the third condition of design professionals' bargain with society. Because the universe of prudent options is complex and dynamic, professionals agree to recognize the limits of their own competency and to undertake functions and responsibilities for only those professional services for which they are properly qualified by education and experience, or for which they can assemble a qualified team of competent consultants.

That's the bargain: society agrees not to expect perfection from you; you agree to perform reasonably and with prudence. Of course, you strike a second, more detailed, and very special bargain with your client every time you sign a contract to provide professional services. The truly prudent professional thinks long and hard about the quid pro quo before promising to provide a client more than is required in the broader contract with society.

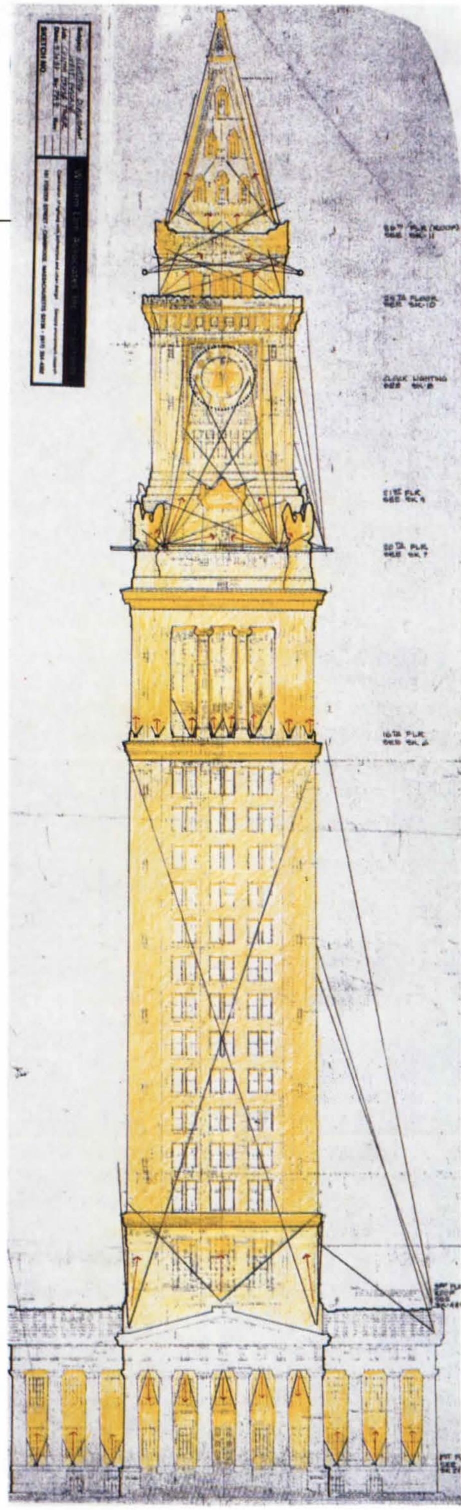
An example might be the case of a client's proposed requirement that you certify that a project is built in accordance with the contract documents. Since an all-encompassing certification can be made only on the basis of first-hand, personal knowledge, you shouldn't agree to that requirement unless you are personally informed and qualified to prudently assume the risk. Of course there are other factors to consider as well. Exceptional risk should be accompanied by exceptional compensation.

While many practitioners choose not to offer exceptionally risky services, the absolute avoidance of risk is not possible. The only way you could achieve that would be to avoid the practice of your profession. Every professional action carries with it a risk, but design professionals have been educated and trained to handle that risk. Insurance statistics suggest that they are probably very good at it. The 1987 AIA firm survey report indicates that 89 percent of firms surveyed had no professional liability claims against them in 1986.

Consciously setting up a risk management program in an architectural practice is one way to develop a plan for achieving the standard of care. Risk management may be compared to defensive driving, or perhaps to "prudent driving." Many of us probably would say we drive prudently, rather than by the strict rules defined as defensive driving. We know the rules, but, through many miles of driving experience, we have also learned that it is both effective and reasonably safe to apply them only as conditions warrant. In dense fog we slow our speed and add car lengths between us and other vehicles. Through experience we've learned, in normal conditions, to trust the capabilities of both our cars and ourselves, so we drive for a balance between maximum effectiveness and utmost safety. There is a continuum from defensive through prudent to reckless. The prudent driver tries always to avoid being reckless, but is not so defensive as to routinely avoid making the trip.

From the standpoint of legal liability, choosing whether to be prudent or not is easy—of course you should opt for prudence. From a business standpoint, the difficult evaluation is just how much time and resources you are willing to commit—and to negotiate into your contracts—in order to make prudence work.

With the metaphor of driving in mind, consider three of the most important elements of proper risk management for the design professional: risk assessment, equitable allocation of risk, and documentation. Claims data strongly suggests you should consider at least those elements and the cost of a risk management program for your business versus the possible cost of claims against you. It is anticipated that there will be 44 claims this year for every 100 insured design professional firms. The cost will be enormous. But, cost aside, design professionals and, for that matter, society can ill afford the terrible drain of productive time and psychic energy spent in defense. □



Boston's first 'skyscraper,' the 29-story Customs House tower, is undergoing extensive renovations that include lighting the entire exterior, and its clock, to enhance the building at night.

Lighting And Preservation

There are challenges not present in new work.
By Elena Marcheso Moreno

There exists an unharmonious relationship between modern expectations for light and the historic character and fabric of an old building, creating a tension that can pull a designer in opposite directions. On one side is the perception that highly illuminated building spaces are necessary for daily activities in the 20th century; on the other is the desire to preserve the mood and character of the past. In fact, there is no reason for these requirements to be at odds. Sufficient lighting can be provided for occupants to perform their tasks in an old building just as well as in a new one. In an old building, however, the approach must be thoughtful of the overall philosophy of the restoration and of the materials and components being preserved.

Rehabilitation, as opposed to preservation, usually has as its objective a new use for an old building—a building that might be of little historic distinction or even be not all that old. Rehabilitation ranges from sprucing up or supplementing what is already there to completely gutting a building and providing entirely modern interiors. In the latter case, restoration is not important and the lighting design would be tackled in basically the same way as in new buildings.

In the context of lighting, preservation seems to imply not that the original lighting concept—fuel type and light levels—must be strictly adhered to, but rather that the objective be to help the user perceive the building in the manner that was intended when it was first designed and constructed and lighted. In general, then, the approach is to re-create the original sense of style and space.

At the time many historic buildings were designed, light levels were low and the light source crude. The candle was high-tech. In a preservation project, the designer's objective is to make lighting function at modern levels without obviously changing the appearance of the interior spaces. The project is a challenge to use the old in a new way.

The problem is really one of light management, says Roger W. Moss, a historian and executive director of The Athenaeum in Philadelphia. In his book *Lighting for Historic Buildings,* to be published in March by Preservation Press of the National Trust for Historic Preservation, Moss says that natural light is the most authentic illumination for buildings erected before the mid-19th century and that a dramatic change in architecture and design occurred when artificial light was introduced. With the advent of electric light came a dependency on more light.

People now expect higher levels of illumination than they had available in bygone eras. Adequate lighting in the modern sense is essential to modern building occupants.

Unfortunately, says Moss, "the requirement for adequate lighting is too often an argument for installing excessive levels of ambient illumination, usually in the form of recessed ceiling fixtures. Many historic buildings renovated in the past two decades—particularly institutional buildings—are now outfitted with enough down-lights, wall washers, and intrusive track lighting to supply a dealer's showroom." It is not uncommon, he continues, for the ornamental ceilings of these buildings to be covered over, or worse yet, defaced with holes. Moss believes that the supplemental lighting needed for both safety and modern tasks should be introduced in a manner that will not destroy the architecture or alter the way the original designer expected the space to be seen.

Respect the original design

The modern approach to lighting for historic buildings is often fraught with insensitivity and can be disastrous to an otherwise thoughtful preservation. Painstaking care to select the original paints and surface finishes, for example, will be in vain if the illumination of those surfaces is so intense that they make garish the brilliant colors designers once used to compensate for subdued light levels. Faithful reproductions of fabrics and wall colors originally viewed by natural light or nighttime illumination from mantel lamps, candlesticks, wall sconces, or hanging fixtures will be grossly distorted if they are flooded with high levels of artificial light, says Moss, who has written a number of books on the use of color in the 19th century. Reflective surfaces—gilded picture frames, mirrors, highly polished wood—can be unintelligible in unblinking incandescent or fluorescent light, he adds. The solution is to reduce levels of ambient illumination from modern fixtures in favor of more energy-efficient and appropriate task lighting from original or reproduction lamps and fixtures that have been wired for electricity.

To further complicate the matter, lighting designer Paul Marantz of Jules Fischer & Paul Marantz, New York City, points out that older buildings may be finished in darker palettes and that reflectance cannot always be factored into the light equation in the same manner as in a new building because brick and wood finishes, for example, will absorb over 50 percent of the natural and artificial light reflected from a ceiling. Marantz, like Moss, argues for more task lighting in historic buildings.

Ambient lighting, however, is still a fact of life in most buildings, old or new, so the design problem is finessing background lighting to reinforce the historic feel of an old building. In the historic commercial and public buildings that lighting designer William Lam of Cambridge, Mass., works on, he frequently uses historic ceiling fixtures—possibly chandeliers—for ambient light. Where the use of the space will not change, existing fixtures often will provide enough ambient light. If the use changes—say an old hotel is converted to offices—higher levels of illumination are required. Lam conceals inconspicuous sources within the historic light fixtures themselves or in other architectural elements such as moldings or the tops of bookcases. The supplemental lighting brightens the ceiling and wall surfaces without obviously changing the appearance of the old light fixture, creating the impression that the light comes from the chandelier just as it did in the past. The improved brightness that results is especially important for dark ceilings and even more so for highly decorated ceilings. Lam is also a proponent of task lighting and believes in designing to the lowest ambient light levels acceptable.

Keeping wiring unobtrusive is usually difficult in an old building where it is important to retain the beauty of an original ceiling and, in many cases, of walls and floors. Often a projection can be created somewhere along a wall or ceiling to hide wiring. Then the projection can be finished like the surface it abuts. Running a projection along a molding strip might also be an acceptable solution.

Gersil Kay, of the firm Newmark Electrical and Philadelphia's nonprofit group Preservation Techniques, says that research is the key to success in any aspect of a renovation project, and lighting is no exception. The trick for both the designer and the contractor is to identify the problem, she says. It is important to understand the buildings of the period and how materials and components are to be replaced if the originals were destroyed. The original fabric of the building must be respected, and an appreciation of the way buildings were put together in the period is also important. Only after all that research should an attempt to wire a building begin, after everyone involved has a feel for the space between walls, ceilings, and floors.

As an example, Kay cites the ornamental plaster ceiling in the chamber of the U.S. Capitol. Although her firm did not work on this building, the solution to hiding electrical wiring is one Kay uses frequently. A very shallow chase is cut into the plaster, preferably in areas without a great deal of ornament. Then thin wiring or flat cable is run to fixtures in the ceiling or mounted on walls. Once the wiring is in place, the chase is filled again with plaster that closely matches the original. It is optimum, says Kay, to run chases around obstacles such as doors, windows, or even radiators, where variations in color and texture of the new plaster are least likely to show.

The key to determining light levels, fixtures, and sources begins with an appreciation of lighting technology, Moss says. Kerosene-fueled lighting, for example, was not common until the Pennsylvania oil fields were opened on the eve of the Civil War. Colonial household inventories provide startling insight into how little artificial lighting was available before the widespread adoption of gas, kerosene, and electricity. Chandeliers almost never appeared in houses of the 17th and 18th centuries, regardless of economic standing; instead they were reserved for public meeting houses. Tabletop lighting and wall sconces were far more typical. (Indeed, it has been said that the electrification of America did not happen until the Second World War.)

Lighting levels were not uniform. Gas produced more light than candles or oil lamps. Apparently, one of Benjamin Franklin's many inventions was a fixture that multiplied the light of three candles by holding them in a certain pattern in front of a mirror so that the quantity of light provided was greater than that of the three candles alone. Still, even the highest light levels were far lower than what 20th-century Americans are used to, says Moss. Tying adapted or reproduction lighting fixtures into dimmers will allow both historic and, when necessary, modern light intensities.

Deciding on the height of light fixtures is often a problem. They should not be too high off the floor or they will encourage overly high light levels; and, for a sense of authenticity, fixtures should be within the reach of a person who would have been lighting and extinguishing candles or gas lamps.

Identifying the type and style of lighting fixtures for a historic building can require a lot of research. It is necessary to know the dates of the original construction and of additions or renovations as well as how the building was decorated. Since a building erected 200 years ago probably will have had its lighting upgraded several times, the restoration designer will need to select a target date, which may depend on what has survived.

There are very few authentic oil or kerosene lighting fixtures, converted or not, to be found. As lighting technology advanced in the 19th century it was easier to replace fixtures than to convert them. Later, any fixtures that might have survived were targets for scrap metal drives during the two world wars, says Moss, and few reproductions are manufactured. Because of requirements of the Underwriters Laboratory, those reproductions are not exact copies of the originals. But they do not need to be. The aim is an overall sense of authenticity in historic buildings. Exact replication is often neither necessary nor desirable except in a museum house. The objective is a look that doesn't distort historic intent and meets modern use requirements.

Turning to the exterior

Enhancement is a lighting design concept applied to historic building exteriors more often than interiors. Actually, enhancement neither restores nor changes a building. Instead it highlights a building facade that was originally left dark because the technology, and possibly the inclination, to light it were not present. Although enhancement is not strictly a preservation technique, it puts historic buildings on show for public appreciation for longer periods than just daylight hours.

But enhancement of a historic building is not simply a matter of applying light. Some approaches will make the building look better than others. How do the time of day, the angle, and the quality of light affect the way it appears? How is the building perceived during the day? Is that the way it should look when it is lighted? Can the daytime appearance be altered with night lighting, not to defeat the historical nature of the building but to enhance some aspect that might otherwise go unnoticed?

The answers cannot be found by simply looking in a book to see how much light should be applied to the building. The light itself is only one factor in perception. The color and configuration of the objects the light strikes and their visual quality can change an observer's impression of light.

Howard Brandston, lighting designer for the renovation of the Statue of Liberty, says that when most architects and designers think about exterior lighting they tend to think about the darkness. Instead, it is more appropriate to consider the appearance of the building in daylight. The nighttime lighting solution should not haunt the daytime appearance of the building. Night should not dominate the day, according to Brandston, and he lists as examples floodlights on poles, hardware, and other lighting paraphernalia that clutter the view. Lights should be placed so that they do not intrude.

Lam agrees that lighting hardware should be integrated into the structure or surroundings of a historic building. Fixtures should be concealed or placed as inconspicuously as possible. He recommends using simple pieces of metal as baffles when specifying lamps attached to an old building to enhance its exterior. The baffles will provide a number of benefits. If the metal is bent to angle toward the building, any potential hot spots of light will be washed out. A baffle also hides the light source and improves the light distribution.

"Architecture is designed to appear with light coming from the upper left to the right, as architects learn to draw it in shades and shadows," says Hugh Miller, AIA, chief historical architect of the National Park Service. "But the point is that the building is actually lighted from above." A lot of buildings are lighted as they are drawn, from the side or below, instead of as they are seen, with the result that architectural expression is not maximized and the light frequently produces unusual and strange shadows. Shadows used for highlighting are acceptable, as long as the lighting is balanced overall; it need not be uniform.

"Overall uniformity is a characteristic of modern lighting," says Marantz, "but a uniform lighting level applied to historic buildings looks wrong and does not evoke a feeling of specialness. The object is not to wash out the shadows but to use patterns of light to emphasize certain features of the building."

Old masonry buildings often have a certain rustication of stonework that even in daylight makes for shadows and patterns, but night lighting, unless carefully thought through, could flatten out the whole appearance, Marantz says. In general, historic stone and masonry buildings were designed to be seen during the day, when the light comes from above. If nighttime lights shine straight in, perpendicular to the facade, all the shadows will disappear. It is commonly recommended that light strike a facade at an angle of 25 degrees or less for the best appearance.

This is one reason Marantz uses windows and doors when he designs exterior lighting systems for old buildings. He considers the building in its original context and period to find clues for enhancement. Old buildings received light through their openings during the day, and at night they sometimes emitted light through those same openings, from task illumination inside. So Marantz will frequently conceal lighting in windows and other openings to enhance special characteristics of the architecture.

Lights can be hidden in other ways as well. Lam has occasionally used globe streetlights found in historic districts to hide lamps that highlight a building nearby. This technique usually requires the approval of the city government, but often it is willing to cooperate. For the Old Court House in Boston, Lam installed lamps on the finial between the two glass globes of a streetlight. The lamps illuminated an inscription across the top of the building that had been virtually unnoticed, even during the day.

Energy conservation is often a criterion for exterior lighting systems, and it can be approached in a number of ways. Except in California and New York, Marantz finds that codes usually do not regulate outside lighting. Even without a conservation requirement, he feels it is the responsibility of designers to try to use the most efficient lights for the job. If the lights that highlight an old building exterior can be concealed, Marantz will often recommend fluorescents, perhaps compact fluorescents, which have a more agreeable color and resemble incandescent sources. Only when the sources must be exposed will he use the actual warmer-colored incandescents for exterior lighting.

Brandston thinks the wrong exterior lighting will ruin the perception of the building's architecture. He questions, for example, the use of high-pressure sodium sources, which produce an orange light. "There are orange buildings everywhere," he says. "If the designer wanted the building to be orange, he would have used orange materials." Brandston recognizes the efficiency of these sources—they provide the same amount of light for less energy—but he questions their benefit for exterior lighting, particularly for enhancing a historic building. "If a building is worth $50 million, why save $2,000 a year and make it look orange and ugly?" There are less obtrusive ways to conserve energy. In lighting the facades of historic buildings the aim is conservation of heritage. □

Parametric CADD: Redoing Drawings

A review of some available software systems.
By Mark Lauden Crosley, AIA

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Redrawing a revised stair elevation is time consuming and frustrating for a person, but a snap for parametric CADD.

Although the productivity gains promised by CADD software vendors are often illusory, most CADD users do produce more work than they did by hand. Much of the gain is a result of reusing drawings and parts of drawings; thus CADD has become identified with repetition.

Repetition is an important part of design, but so is its opposite, variation. One measure of the quality of an architectural software package is the ease with which it permits modifications of standard drawings and details. After all, architects rarely want to use drawings exactly as they have been drawn previously; there are always a few changes to be made. If a CADD user has to change details manually every time a drawing is reused, one advantage of computerization—repetition—is lost.

The fact is, many CADD programs do more than simply remember information (such as drawings). These programs can automatically reprocess drawings, modifying them to suit new situations and saving the effort of redrawing them. For instance, an architect can take a floor plan and elevation stored in the computer, redefine a few parameters, such as column spacing and beam depth, and the machine redrafts automatically.

The technique of customizing a drawing by redefining the number or size of its components is called parametric drawing, and covers a range of related techniques. Some parametric capabilities are built into a program; others are written by users or third parties. For example, a door symbol that is placed into a drawing and automatically drawn to a specified size is a type of parametric routine. On a larger scale, a parametric CADD program might take a standard housing unit type and redraw it with new room sizes, window locations, or structural system. In both cases, someone has created a prototype drawing and written a program to modify the prototype automatically as the user specifies certain criteria. Writing a complex parametric program can require trained personnel and time, so it is important to determine that variations of the prototype drawing are required frequently enough to merit the effort.

Once in place, however, a parametric program is simple to use. Many CADD users employ parametric programs without even knowing it when they use parametric symbol libraries purchased from either their CADD-system vendor or a third party. The user fills in information requested by the computer program regarding, say, the size of a door or plumbing fixture, and the symbol is drawn with little fanfare. A more complex routine might

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draw a specified number of toilet stalls, or lay out a stair based on specified width, floor-to-floor height, configuration, and steepness. A sophisticated stair layout program can perform dozens of calculations, check for code compliance, and produce stair drawings that can be viewed in either plan or elevation.

Building material suppliers are beginning to recognize the potential of parametric drawing and are applying it to their new electronic catalogs because a parametric catalog can be stored on a relatively small amount of disk space, unlike a library of many individual drawings. For example, Andersen Corp. offers a parametric library that can produce 200,000 variations of its window and door symbols on two floppy disks. Some suppliers are encouraging their customers to return their orders in computer format, either to generate shipping lists or to create shop drawings for computer-aided manufacturing setups.

Another kind of built-in parametric drawing links graphics, such as walls, windows, and doors, to a data table. When "wall type A" or "window type 4C" must be changed, new dimensions can be typed into the table and the drawing is automatically updated. This capability can be used to study the impact of different construction systems on a design and can give an architect the option of changing systems without having to redraw and redimension a set of working drawings.

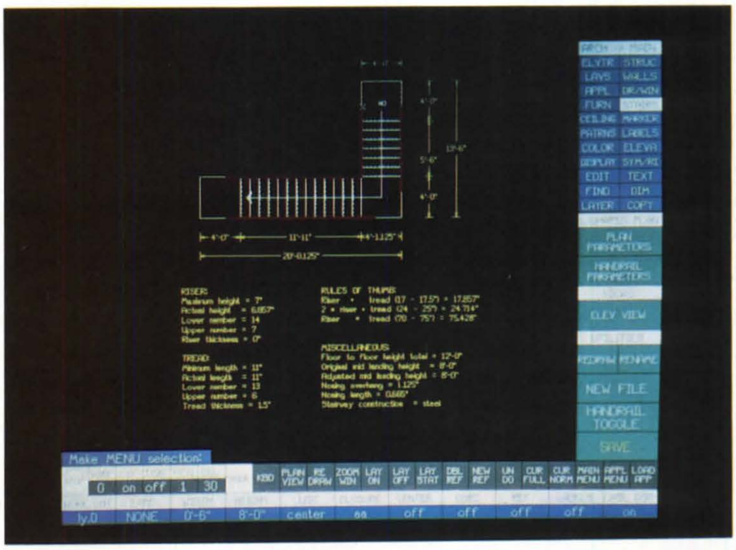
Symbols and objects can also be created with a context-sensitive "intelligence." A partition symbol, for example, might automatically take on the height and surface characteristics of another partition to which it is being attached. The parametric program might construct the symbol accordingly or it might analyze the context and select the appropriate symbol from a library. Eclat Intelligent Systems' VersaSpec uses intelligent symbols that are modified automatically when their context changes.

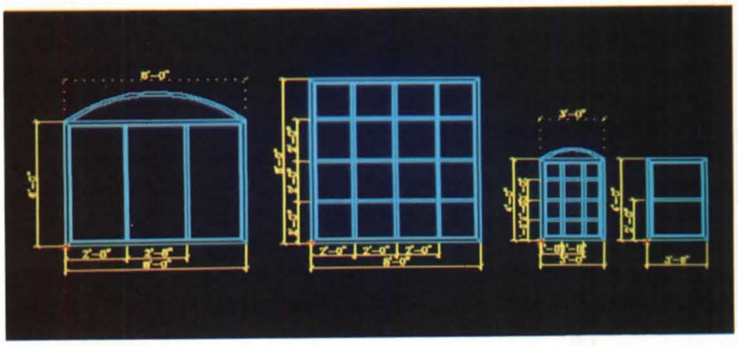
Most CADD programs include a user programming language, such as AutoCAD's AutoLISP or VersaCAD's CPL, that can be used to customize the basic CADD software, giving architects the ability to create parametric drawing routines in-house. The notion of programming strikes fear into the hearts of many architects, but one can usually attain a working knowledge of a graphically oriented programming language without becoming a career programmer. It certainly isn't necessary for every CADD user to learn to write programs, but it can be tremendously useful to have one or two people available to write (or modify) a parametric routine for simple, extremely repetitive tasks.

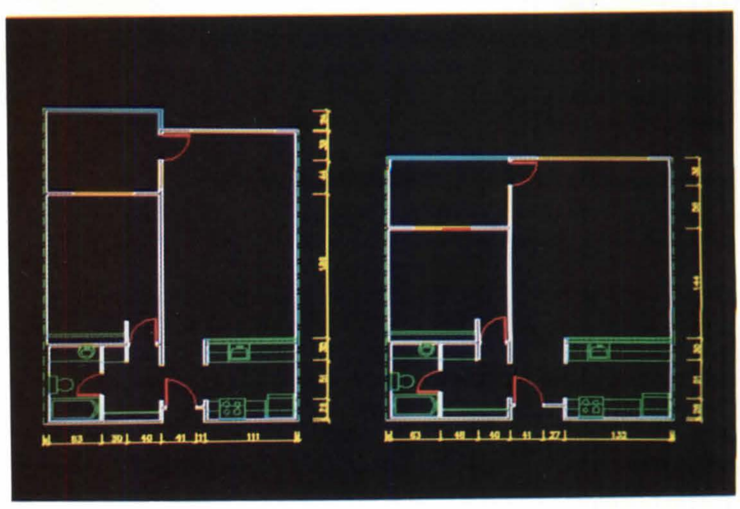
As an example, a basic column design might require varying dimensions in a number of different situations. A parametric program can easily be written in a few minutes that draws the basic column shapes after prompting the user for the dimensions, including the height if the drawing is three-dimensional. The program then automatically draws thousands of different columns.

For architects without programming expertise, an intermediate program, sometimes called a parametric engine, enables a CADD user to draw master drawings that can be redrawn automatically with modified dimensions. The engine takes care of the parametric programming, leaving the user free to concentrate on drawing.

One example of a parametric engine is Synthesis, which works with AutoCAD. Developed by TransformerCAD Inc., Synthesis can be used two ways. First, it enables a user to modify any drawing by simply reassigning dimensions. The computer will reconfigure the drawing to match the new dimensions. Second, it enables a user to create a data table, called a specsheet, that contains interrelated variables representing the drawing's dimensions. The variables can be linked by formulas so that many dimensions can be calculated based on one or two variables. The specsheet can be set up to prompt the end user for specific dimensions; then it calculates the others and alters the master drawing accordingly. Thus, an architect with no programming skills can create sophisticated parametric programs.







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© Courtesy of TransformerCAD

The designer specifies width, configuration, and floor-to-floor height and Sigma Design's Arris software draws a stair in plan (top) and elevation (previous page). TransformerCAD's parametric engine Synthesis, run with AutoCAD, derives window elevations (middle) from one parametric routine and automatically modifies standard apartment dimensions (bottom).

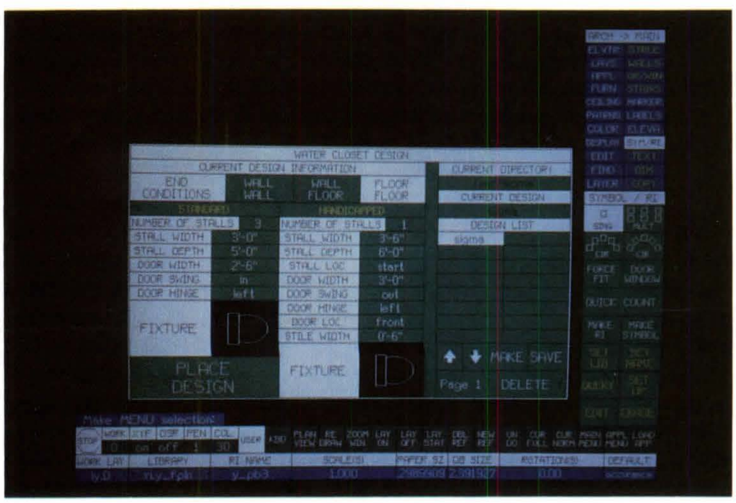
Since a parametric engine makes building custom parametric routines relatively easy, it can be used for a variety of purposes. Simple graphics like the parametric symbols discussed above can be custom made, or a complex drawing made of many interdependent elements can be assembled. For example, a standard wall section can be modified parametrically to reflect varying wall, floor, and roof thicknesses. Likewise, drawings of bathrooms, kitchens, housing units, offices, laboratories, and other repetitious but variable designs can be modified from prototype designs. It is also possible to combine small parametric modules into linked programs. For example, a building design could be assembled from a parametric kit of parts. After the user specifies the building system, column spacing, and floor-to-floor height, the program could draw them with each part constructionally integrated with the others.

The line between parametric drawing and parametric design is a fine one. In traditional practice, designs and details often are sketched by a designer, then drawn and dimensioned by a drafter. Parametrics minimizes the drafting role by assisting a designer in producing finished drawings. This is a significant contribution to the design process: it enables the designer to experiment with dimensional alternatives or with wholly different designs, obtaining accurate, realistic results without laborious drafting. Of course, choosing a predrawn graphic is an important design decision, and a designer who depends upon parametric drawings is limited to those that already have been created unless the expense of creating new ones can be justified.

A parametric drawing is not a blank slate. Someone has imparted to it a number of design decisions. These decisions may not be significant in a door symbol, but a parametric window elevation, wall section, or kitchen design must be chosen carefully. Standard details often are used inappropriately in manual practice, and the hazard is even greater when drawings are so easy to produce.

The information included in a specialized parametric drawing can enable an architect to do work that might require expertise beyond what is available in-house. In computer terms, a program that uses the specialized knowledge of an individual is called an expert system (although there are also other, more specific criteria). Since parametric drawings often are based on designs

This on-screen Arris menu prompts the architect to provide information regarding a toilet stall layout. The program responds with fixture, partition, and door details.



© Courtesy of Sigma Design

created by individuals other than the end users, they contain some elements of a graphic expert system. This is particularly true if they use "if-then" rules. For example, a parametric wall detail might prompt the user for the climate and type of space ("if . . .") and, after consulting a data table, assign ("then . . .") the proper insulation thickness to the wall. Similar routines can be used to adapt drawings for specific building codes, structural spans, or site orientation. Again, care is required that these routines are used properly. In many situations they should supplement, not replace, human experts such as consulting engineers.

Architectural expert systems raise a host of issues that we will face in the next few years. Already we are seeing CADD software developed for specific building types (such as the MediCadd hospital design software from Graphic Horizons Inc.) that enables architects to undertake projects they might otherwise have been reluctant to attempt. A market for buying and selling specialized design software may soon develop. We may even see computer programs that allow users other than architects to undertake design projects. While this trend has obvious hazards for the profession, it might become a means for architects to offer services to clients who previously could not afford custom design services.

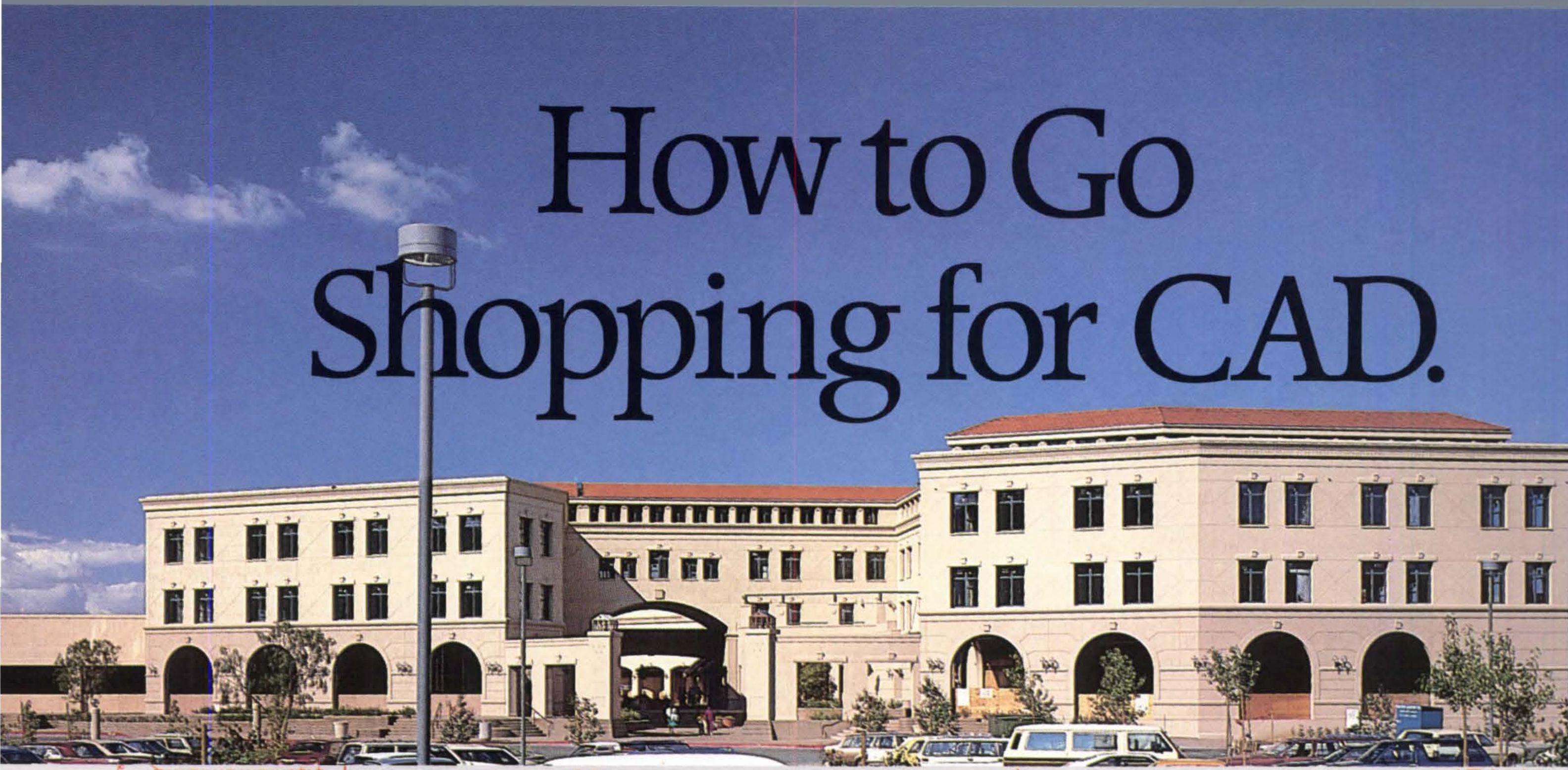
Meanwhile, parametric drawing is quietly becoming a commonplace computer-aided design tool, improving not only speed but accuracy and consistency. It is one of the ways CADD is restructuring the design process, breaking down some of the distinctions between project phases. It can, for example, help architects to transform design drawings directly into working drawings and enable them to continue making design decisions throughout the construction document phase. A consequence is that the preparatory front-end work that is done early in a project becomes increasingly important, since it must be planned carefully if it is to be useful in other projects.

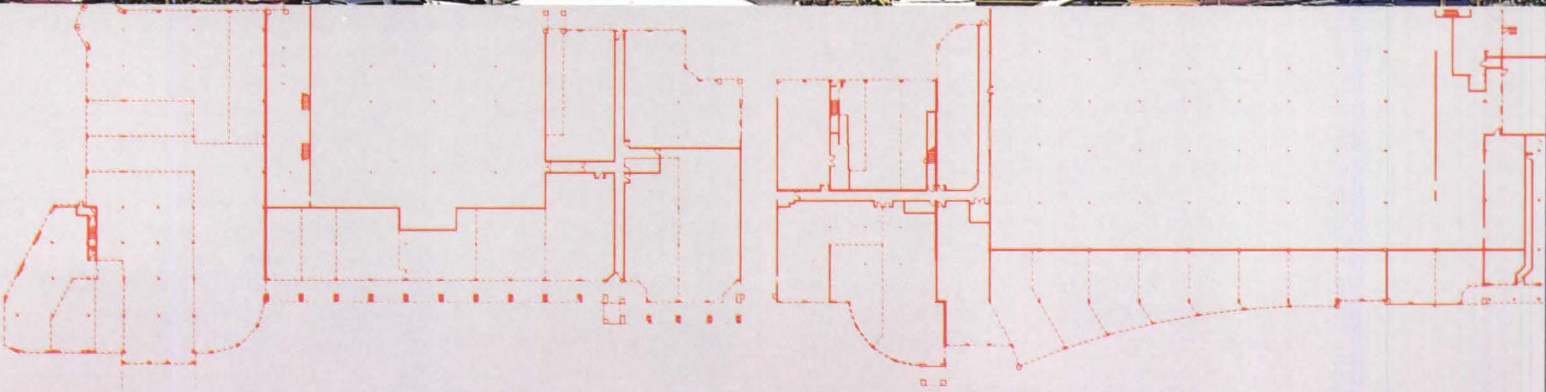
Parametrics is also playing an important role in increasing the usefulness of three-dimensional modeling software. Modeling a building with a computer can be a labor-intensive task, but parametric techniques can be used to build two-dimensional representations into three-dimensional forms. Windows and doors can be automatically placed in 3D walls at the correct height, for example, or complex forms like hip roofs and 3D stairs can be produced with a single command.

In the changing architectural profession, the role of the nondesigning drafter may be disappearing. This places a new degree of responsibility on those in entry-level positions. The value of parametrics and other means of customizing CADD systems may also be increasing the need for architects who can write programs or take advantage of parametric engine software. Since an imaginative parametric routine that offers numerous alternative configurations might be used in many different projects, it is itself an important design project. It is thus crucial that these applications be developed by architects with knowledge of design and detailing rather than by nonarchitect computer specialists.

Tools like parametric drawing eliminate some of the more tedious and error-prone work we do, increasing productivity in both design and drafting. However, they also can be misused in the name of productivity and reduce the creative work that results in appropriate design solutions. Not every task that can be automated should be. We need to carefully define and assert our priorities regarding what kind of work should be automated. Automation does not mean giving up our roles as designers or overseers of the creative process. It may change these roles, but in the end it makes them even more important. □

How to Go Shopping for CAD.





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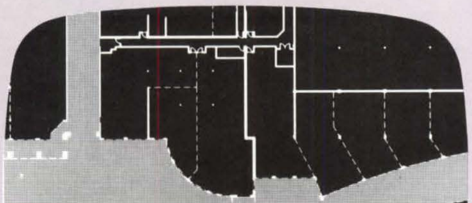

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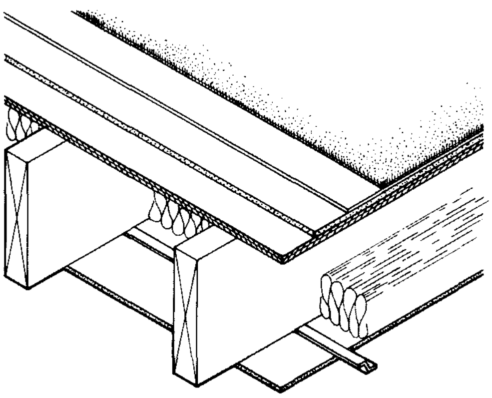
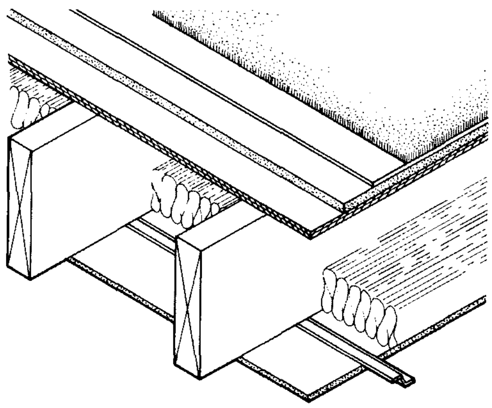
*TechPointers Sept. 1986

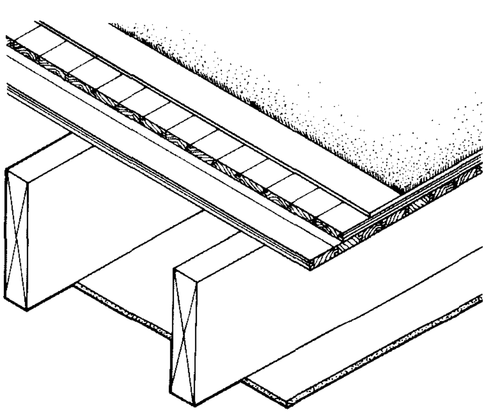
Controlling Sound Transmission Through Floor Assemblies



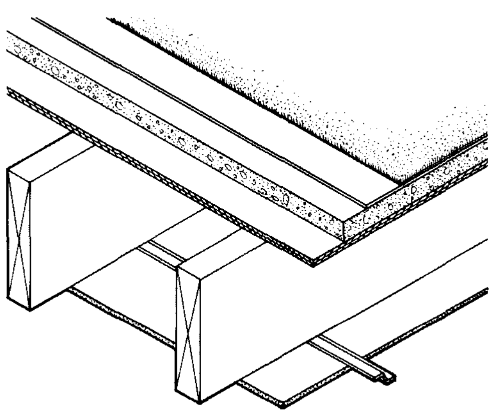
This floor has an STC rating of 50 to 54 and an IIC rating of 73 (with carpet and pad). It consists of ⅜-inch particle board over ⅝-inch interior plywood with an exterior glued subflooring nailed to wood joists spaced 16 inches O.C. A continuous resilient channel is screw-fastened to the joist at 24 inches O.C. The ceiling is ⅝-inch Type X gypsum board screwed to the channel. Glass fiber batts, 3½ inches thick, are laid in the joist cavities.



This assembly rates an STC of 56 to 59, and an IIC (with carpet and pad) of 73. The floor is a proprietary 1-inch-thick sand gypsum underlayment over ⅝-inch plywood. The plywood is nailed to 16-inch-O.C. wood joists supporting resilient channels, over which 3½-inch glass fiber batts are laid. These resilient channels are nailed to the joists at 24 inches O.C. and topped with screw-attached ½-inch gypsum board.



This assembly has an STC rating of 35 to 39 and an IIC rating of 32 (66 with carpet and pad).The assembly is 1-inch nominal tongue-and-groove sub- and finish flooring nailed to wood joists at 16 inches O.C. The ceiling is ½-inch Type X gypsum board nailed to the joists.



The STC rating for this assembly is 55 to 59 and the IIC rating (with carpet and pad) is 70. The 1½-inch, lightweight concrete floor covers ½-inch plywood subflooring that is nailed to 16-inch-O.C. wood joists. A screw-attached ½-inch Type X gypsum board ceiling is below continuous resilient channels that are placed at 24 inches O.C. and nailed to the joists.

From the apartment above came an occasional trumpeting sound and the thunder of hoofs as something ran across the room, followed by the scratching scurry of something much smaller. I assumed an elephant had rented the apartment and was being pursued by a mouse. It turned out that my upstairs neighbor is a rather large woman with a very small dog, and I still don't know why the dog chases her.

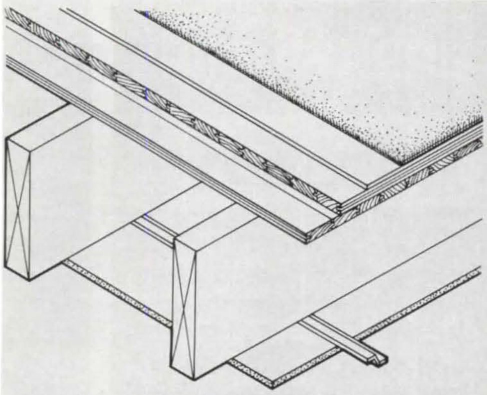
However, the reason I can hear all this and more is that my apartment building is old, built before codes required architects to prove the sound transmission resistance of floor assemblies. Apparently the architect who designed the building gave no thought to sound transmission. The tongue-and-groove oak flooring is nailed through the wood subflooring and to the wood joists. The ceiling below is plaster on lath that is nailed directly to the bottom of the floor joists. This type of wood floor assembly has excellent sound transmission characteristics, and without modification it wouldn't pass today's model code requirements.

The measured difference between originating sound and air-transmitted sound is translated into an easy-to-use numerical rating, called Sound Transmission Class (STC). The better the sound barrier, the higher the STC number. Impact noise, on the other hand, is a special kind of isolated, structure-borne sound. The measured impact noise of a particular assembly receives a single numerical rating called an Impact Insulation Class (IIC). The IIC rating, similar to the STC rating, is calculated by comparing measured data with standard criteria.

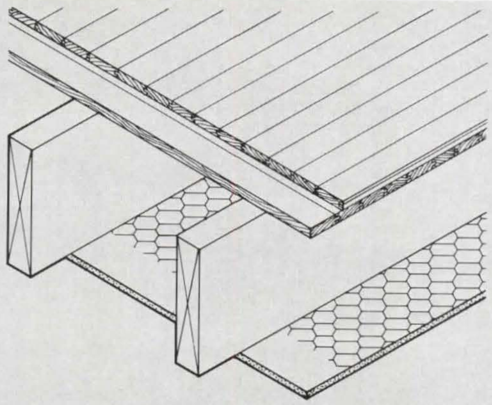
Airborne sound is transmitted as pressure waves that induce vibration in floors and ceilings. As an experiment in airborne sound transmission, put a record on the stereo (Jimi Hendrix's "Purple Haze" will do nicely), make sure the speakers are isolated from the floor, and then turn up the volume. If you place your hand on the floor, you'll feel sound vibrations. Then go downstairs, climb onto a chair, and place your hand to the ceiling. The vibration should be weaker. The difference in vibration from one side of the floor assembly to another indicates its effectiveness as an insulator against airborne sound transmission.

For further information, contact:
Western Wood Products Association, 1500 Yeon Building, Portland, Ore. 97204.
Gypsum Association, 1603 Orrington Ave., Evanston, Ill. 60201.

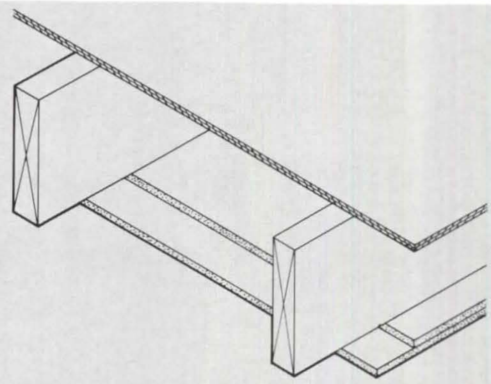
—Timothy B. McDonald



An STC rating of 45 to 49 and and IIC rating of 39 (67 with carpet and pad) can be expected from this assembly, which has 1-inch nominal sub- and finish flooring nailed to 16-inch-O.C. wood joists. Continuous resilient channels at 24 inches O.C. are nailed to the joists, and ½-inch Type X gypsum board is fastened to the channels with screws.



The STC rating on the above assembly is 35 to 39; no IIC rating is available. The 1-inch nominal tongue-and-groove sub- and finish flooring is nailed to wood joists placed at 16 inches O.C. Metal lath is nailed to the bottom of the joists at 6 inches O.C. and is finished with ⅝-inch gypsum/sand plaster.



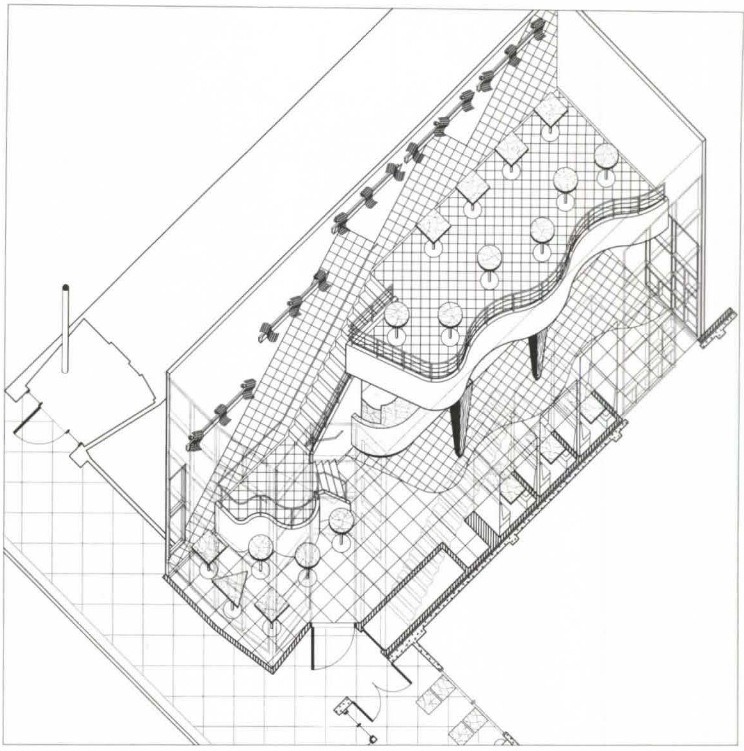
This assembly rates an STC of 35 to 39; no IIC rating is available. The flooring is ½-inch plywood with exterior glue, nailed to wood joists at 24 inches O.C. A base layer of ⅝-inch-thick Type X gypsum board is screwed to the bottom of the joists, then a face layer of gypsum board (applied at right angles) is screwed into place.

Interiors

Although the building bears the name Allied Bank Tower at Fountain Plaza, the Texas financial institution occupies only 41,000 square feet of the I.M. Pei-designed tower (see Dec. '86, page 44). As Allied's principal office in Dallas, it houses banking, safety deposit, lending, and executive functions on the ground floor, mezzanine, and third floor.

Skidmore, Owings & Merrill/Houston designed an interior space that responds to very specific program requirements and to the constraints of the parallelogram footprint of the building. The unusual configuration of the floors and the oblique relationship between the structural grid, service core, and perimeter walls was reinforced by the arrangement and strong horizontal articulation of custom-designed workstations. These workstations are open and low on the mezzanine and floor-to-ceiling on the third floor, while the green lacquer finish, marble desktops, and etched glass panels are consistent.

Project designer Debra Lehman-Smith says that Pei's building materials were used extensively, but not exclusively, to reinforce the link between the banking spaces and the building. The barré gray granite and jade marble of the building's lobby extend into the bank's core walls, elevator lobbies, and flooring.—Lynn Nesmith



Cody's Cafe occupies only 1,800 square feet on the street level of the new, three-story Fred Cody Building in Berkeley, Calif. But when asked about the relationship between the exterior and the interior, architect David Baker, AIA, said, "The building was designed with the cafe in mind."

The cafe with its 22-foot ceiling is set behind a large, curving glass bay. Windows open to the outdoors and to the adjacent namesake bookstore. This double-height space is interrupted by a curving white mezzanine with additional seating, which was "conceived as a discrete element, almost like a piece of furniture," said Baker. "Then somewhere along the way the form came to resemble a piano, and then we added the ebonized wood legs that function as torchère light fixtures."

The vinyl floor tiles continue up one wall, creating an angled pattern that leads to the upper level and serves as a durable wainscott. Built-in booths punctuate a painted wall detailed with a two-foot-square grid pattern, recalling the square panels of the exterior.

All the lighting fixtures were custom designed by the architect. Wall-mounted units have sheets of perforated steel layered to diffuse the light, and hanging fixtures feature a shattered glass disk.

—Lynn Nesmith

Photographs by Christopher Irion

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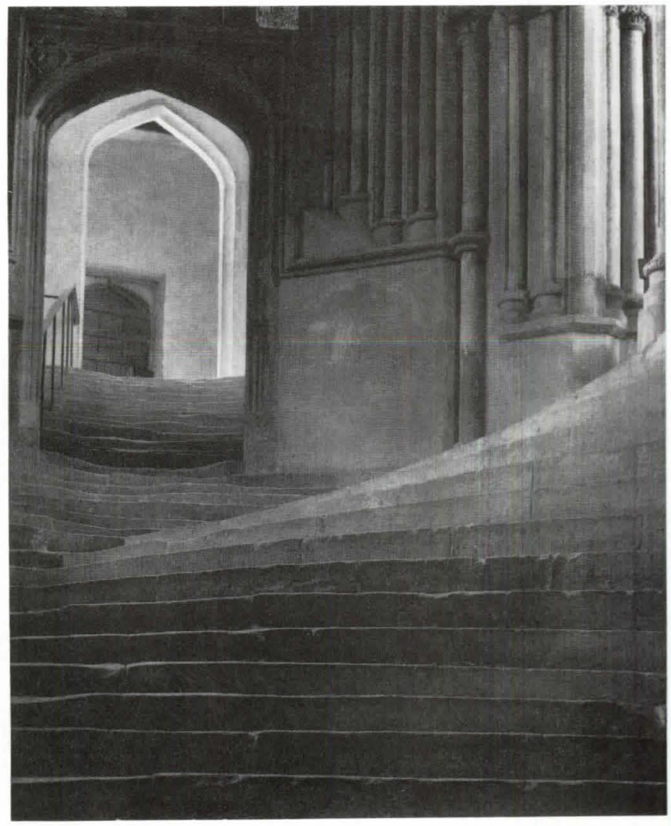
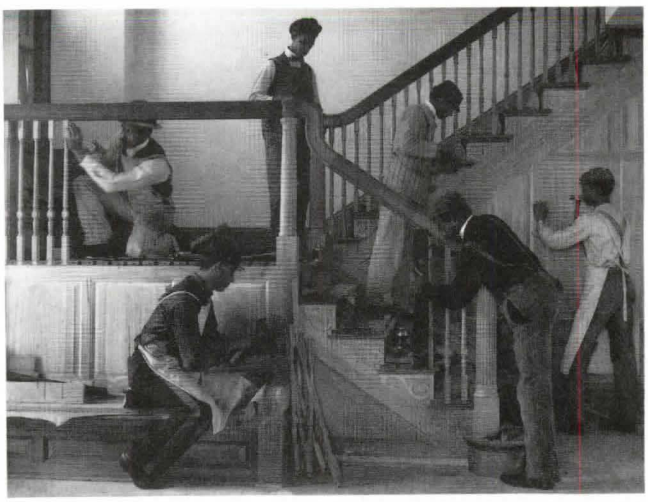
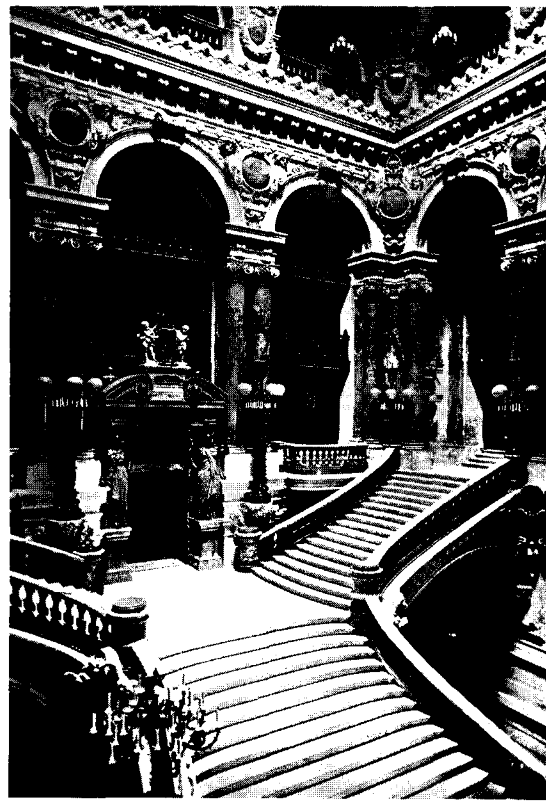


An Ambitious History Of Architectural Photography



BOOKS



Clockwise from facing page, below: ruins in Columbia, S.C., by George Barnard, from photographic survey of Sherman's campaign (1866); stairway of treasurer's residence, students at work, from an album of the Hampton Institute (1899-1900) by Frances Benjamin Johnson; Wells Cathedral, 'A Sea of Steps,' (1903) by Frederick H. Evans; Florence from Palazzo Vecchio (circa 1890s) by Fratelli Alinari; and Paris Opera, grand staircase (1895) by Adolphe Braun.

Architecture Transformed, a History of the Photography of Buildings from 1839 to the Present. Cervin Robinson and Joel Herschman. (MIT Press, $50.)

Photographs taken in 1940, 1955, and 1975 of Frank Lloyd Wright's Johnson Wax building, to choose an example, will look very different, not just because of changes in attire, landscaping, or lighting, but because photographic styles and techniques vary according to the times, their available technologies, and the photographer's eye. As Cervin Robinson writes in the introduction to this ambitiously and masterfully illustrated and printed book, the message of *Architecture Transformed* is that "for almost a century and a half photographers have made expressive statements through their pictures." The text by Robinson, one of America's foremost architectural photographers, and Herschman, an art historian, is lucid and fascinating.

The book "establishes a foundation," as the publisher tells us, "for reading photographs not just as documents of a particular place and time, but also as individual expressions of the constructed world that shapes our perceptions and behavior." It is unique among histories of photography for focusing on architecture rather than landscape or portraiture; for stressing photographers' stylistic and interpretive aims rather than their subject matter; and for viewing commercial and artistic photography as part of the same process.—ANDREA OPPENHEIMER DEAN

Books continued on page 120

The White House in the Context of the Capital

The President's House: A History. William Seale. (White House Historical Association with the cooperation of the National Geographic Society, $49.95.)

George Washington never slept there, but William Seale leaves no doubt of his importance to the selection of the site, its place in L'Enfant's plan for the Federal City, and such details as its overall size, not to mention its designation as the President's House. (The term White House found official sanction only in 1902, when Theodore Roosevelt's family began using it on their note paper.)

Matters such as these, rather than the more conventional elements of architectural history, characterize Seale's two-volume history. It has some surprising strengths. There is no better account of the evolution of the Federal City, although one hopes for more basic data from the L'Enfant papers project, which should clarify further Washington's part as well as architect James Hoban's. Seale gives us a blow-by-blow account of the initial building and its problems with a shortage of brick makers, stonemasons, and other skilled crafts reaching back to the source of the building materials, and he shows how many of the problems that surfaced later can be traced to these conditions as well as to the striving for economy.

John and Abigail Adams were the first occupants of the President's House, and their tenure, though short, was made memorable by their experiences and the record of them left in letters and diaries and by precedents they set, many of which were founded in an earlier diplomatic career. The resulting international flavor was continued by Jefferson, Madison, and other early presidents and was stamped on the very building and its furnishings.

Hoban and Benjamin Henry Latrobe were the architects most responsible for the appearance of the mansion. The burning of the President's House in 1814 by British forces was the major event that required its restoration and one of the first events to illustrate Seale's dictum: "Every activity at the White House is at its roots political."

Hardly a hundred pages into this jumbo-sized work, it is clear that the administration-by-administration lineal format that Seale has adopted will not fit the framework of architectural history. With Jefferson, architecture already is taking second place to what could be called a history of the President's household. From the beginning function dictated architectural forms. The Blue Room's oval shape deliberately reflected the size and protocol of the official assemblies that gathered there. How such rooms changed—or did not change—as populism succeeded the formal styles of earlier Presidents is the theme of this study.

It comes at a time when the White House, imperiled by security arrangements, seems to be becoming little more than a helicopter launching pad for Presidents inclined to fly off to Maryland mountain retreats, leaving the White House to the combined pressures of millions of tourists annually and a growing Executive Office bureaucracy of members whose status is determined largely by their apparent proximity ("access") to the Chief Executive. The institution of the Presidency is changing more rapidly than ever before, and the White House is changing to mirror it. More subtle and momentous is the changing relationship of the President to the place where he lives and works. From the daily press you would think this was a new problem. But Seale shows it goes back to the beginning with James Hoban.

One President after another, with his wife and family, down to 1950, is described in detail—their backgrounds and resources, their political fortunes and aims, their styles of entertainment, and their taste in domestic furnishings and design. Inevitably there is some redundancy in this method, and not much in the way of strict comparison emerges, but it is hard to see any other way to deal with this apparently unchanged 85x165-foot mansion, once composed of a basement service level, a ground floor of public or state rooms, and domestic quarters above that, but now expanded to include subbasements and

continued on page 122

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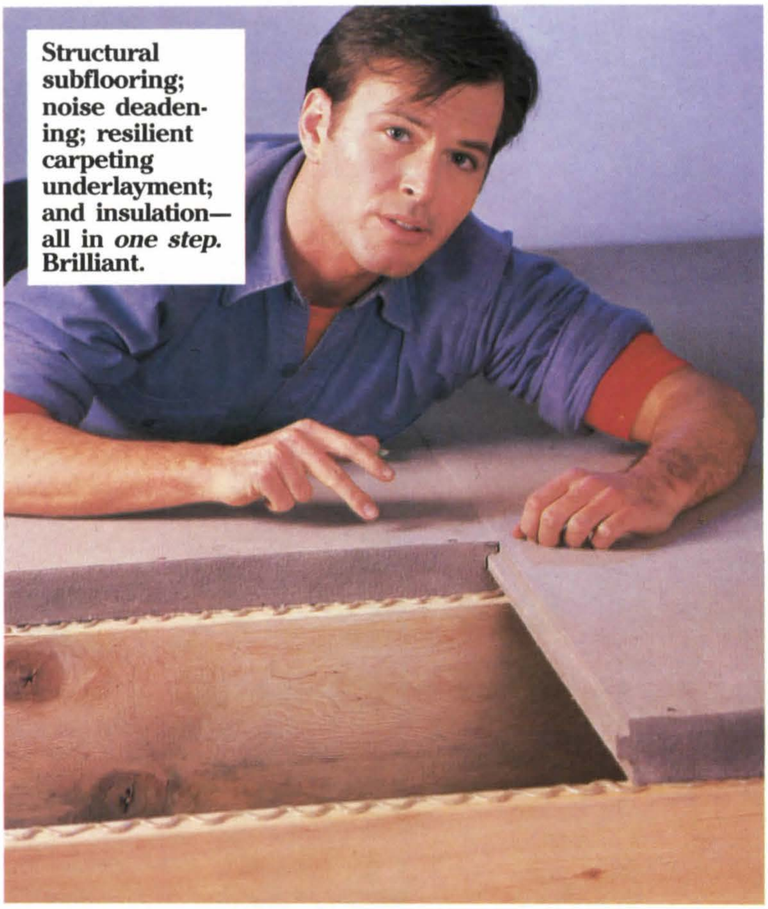

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Books *from page 120*

bomb shelters, wings for Presidential offices to the east and west, an intensively subdivided complex of upper floors for family, guests, servants, and services—not to mention the vast expansion of what is called the Executive Office of the President, in several adjacent buildings. This physical expansion reflects the growth of the office of the Presidency itself.

Although Seale's story of continuity and change over nearly two centuries is based on a fascination with the Presidency, architecture is seldom far distant as successive Presidents and their wives sought professional guidance in imposing their demands on the surprisingly plastic fabric of the nation's most famous house. Some of those called were eminent, like Charles F. McKim, who successfully opposed mothballing the President's House and removing the Chief Executive's residence elsewhere; others moved with the times to make the Palladian building a work of Victorian fashion. At times the building was subdivided into many small rooms; at other times partitions were removed to achieve greater spaciousness. Always there was the pressure to respond to new building technology, new forms of illumination, more abundant bath and toilet facilities. Hardly a President failed to leave some imprint on the building.

From the start the President's House was both a residence and an office—like the house of a plantation owner or a modern professional. Reconciling these often conflicting demands was attempted in various ways, with the domestic side usually losing. With the basement given over to cooking, services, and circulation, the ground floor claimed by official functions and entertainment, and the attic occupied by servants and storage, the second floor was all that remained for the private domestic life of the President and his family—and hardly much of that.

This lengthy account arrives at its most interesting point with the 1950-53 rebuilding under President Truman. One does not have to agree that Lorenzo Winslow, then the White House architect, was a figure of significance comparable to Hoban, who cast the mansion in the mold of the Palladian Irish country house Leinster House, or comparable to McKim, who sorted out the office functions and reestablished a residential character for Theodore Roosevelt. But the design questions and technical problems Winslow faced, the large cast of specialized professionals, and some other considerations of a generation ago will all seem familiar today.

Already it is time for Volume 3 of this story of "The President's House," and one hopes it will include more architectural illustrations. The time is also ripe to designate a White House curator and to make more of the White House grounds and gardens with their rich historical associations. Lafayette Park and the Ellipse are essential examples. But, as Seale reminds us, it is time first to make a more vigorous effort to deal with the continuing problems this great house faces if it is to be a suitable home for our Presidents rather than merely a tourists' landmark or a public office building.—FREDERICK GUTHEIM, HON. AIA

Mr. Gutheim is a Washington, D.C., author, critic, and historian.

The Gate. John van der Zee. (Simon and Schuster, $19.95.)

The subtitle is "The True Story of the Design and Construction of the Golden Gate Bridge." This implies that there have been less accurate accounts around. Indeed, clearly one motivation behind the book was to set the record straight. It makes clear that Joseph Strauss, "the great engineer" generally given credit for the bridge design, was more entrepreneur and promoter than designer. It gives credit where due but seldom given, particularly to engineer Charles Ellis of Strauss's staff and architect Irving F. Murrow.

But mainly it is a saga, written with the pace and drama of a novel, of one of history's great engineering and construction achievements. In a very real sense it is also a great work of architecture.

The author points out that "in its natural state, before it was ever bridged, the Golden Gate was one of the most inspiring sights of all the world." But now what we feel when seeing photographs or paintings of the unbridged Gate "is not regret, but incompleteness. The setting was prelude, the bridge the body of the work. . . .

"Of what other manmade structure can such a thing be said?"

—DONALD CANTY, HON, AIA

Achieving Sound Control Through Absorption, Blocking, and Damping

With the increasing use of open-office design, noise control has become more important. Three basic ways of reducing noise—absorption, blocking, and damping—are used in the acoustical-control products reviewed in this section. A handy reference is a noise control materials brochure available from United McGill on how to achieve proper noise control. It also contains a listing of United McGill noise control products.
United McGill Corporation
Circle 241 on information card

Noise and Vibration Control
The microcomputer-based Noise Cancellation Technology (NCT) 2000 system uses electronically generated sound to cancel unwanted noise by applying the principles of constructive and destructive interference. The NCT 2000 computer closely analyzes the unwanted noise waveform, then generates an antinoise waveform exactly 180 degrees out of phase. Having the antinoise sound generated and injected at the same physical point cancels out the unwanted noise. Unobjectionable sound remains because it does not contain regular pulses in the frequency range of the unwanted noise. The system works for all repetitive airborne, wave, and structurally borne noise. Repetitive low-frequency noises in the range of 600 hertz and under are easiest to conceal.

The NCT 2000 system has four components in addition to the microcomputer: a microphone, or vibration sensor, that measures the noise; a synchronizing sensor on the noise or vibration source; a power amplifier; and a speaker or other transducer to project the antinoise signal. In cases of more than one noise source, a multichannel processor allows control of noise from up to eight sources.
Noise Cancellation Technologies Inc.
Circle 242 on information card

Insulation and Sound Damping
ThermoForm, a cavity-fill acoustic insulation from ThermoCon International, is designed to control excessive noise levels, as well as heat loss or gain and air infiltration. The specially treated, fire-retardant, long-fibered cellulose insulation combines with a self-contained adhesive and is spray-applied directly into wall cavities. The seamless insulation blanket creates a sound-deadening wall by forming a monolithic seal over cracks and openings, which reduces sound levels by an estimated 75 percent.

The newest addition to the manufacturer's line of spray-applied acoustic insulation products is ThermoCon I/C. Specifically designed to be applied directly to interior walls and ceiling areas made of metal or glass, it can also be used with concrete, wood, brick, and urethane foam. ThermoCon I/C is made up of a blend of sulfate wood pulps that have been treated for fire retardancy. When applied at a 1-inch thickness, I/C creates a thermal barrier said to restrict heat transfer by 80 percent and reverberated sound by 75 percent. The insulation is nontoxic and available in many nonfading colors. Both ThermoCon products are UL-listed and FM-approved as Class I, Class A building products.

International Cellulose Corp. features three acoustical/thermal spray products. The K-13 Spray System, a spray-on cellulose insulation for exposed interior applications, is said to provide acoustical control, thermal resistance, light reflectivity, and condensation and corrosion control. K-13 "FC" Ceiling System is a ceiling finish spray that has become a popular replacement for asbestos. The "FC" system provides a textured ceiling with sound absorbency and light reflectivity. The Celbar Wall Spray is a wall cavity spray for sound transmission control between rooms and thermal control in exterior walls. All three products are UL-listed and chemically treated to resist fire, mold, and mildew. The products adhere to most common materials.

A high-tensile-strength polyurethane film (shown below) from Lord Film Products provides resistance to abrasion and puncturing when bonded to acoustical foam. The plasticizer-free film is designed not to stiffen or crack, and it resists both moisture and particulate accumulation. The film comes in gauges of 1 to 90 millimeters, in roll widths up to 80 inches, and in natural or specified colors. Bonding methods include heat press, direct flame, and adhesive.

Pre Finish Metals Inc. has a high-speed, continuous, coil-to-coil process for the manufacture of metal-plastic-metal sandwich structures. All composites are custom designed to meet specific weight reduction and sound damping requirements. With total composite thicknesses available up to .125 inch, metal skins can range from .0065 inch to .100 inch, while the polypropylene core material can range from .001 to .090 inch. Widths are available up to 52 inches. These composites can be made using all kinds and combinations of outer metal skins, such as cold rolled steel, hot-dipped galvanized steel, stainless steel, aluminum, copper, and brass. All

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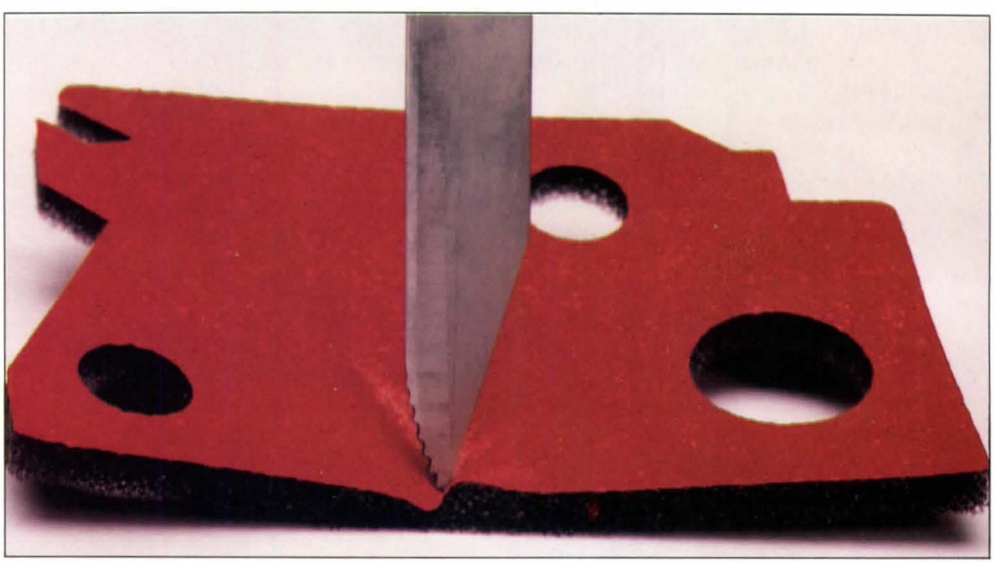

Products *is written by Amy Gray Light.*

Products *from page 125*

forms of processing can be accomplished using tools designed for normal metal fabricating operations.

Acousta-Wall sound-absorbing structural concrete blocks from Trenwyth Acoustical Products have closed tops and vertical slots in front of the cavities that help the blocks absorb sound at a range of frequencies. The slotted faces of the blocks can take any type of paint without significant loss of sound absorption but, if left unpainted, show a higher frequency sound absorption, depending on the aggregate used and the density of the units. The load-bearing blocks have a compressive strength equal to that of ordinary hollow units composed of the same aggregate. Type I blocks have narrow slots and empty cavities and may be used for outdoor or indoor noise control. Type II blocks have wide slots and factory-inserted, chemically inert, incombustible, and moisture-proof glass fiber fillers in the cavities. Both blocks are manufactured to meet ASTM C90 or C129 as applicable.

The Gyp-Crete Corp.'s Gyp-Crete and Gyp-Crete 2000 floor underlayments are made of flame-resistant gypsum that seals cracks for sound control. Gyp-Crete 2000, the newer product, is said to have twice the compressive strength and five times the surface hardness of the original product. Both products reputedly do not delaminate, shrink, or crack. Besides sealing perimeter cracks, stiffening the floor, and deadening the effects of impact noises, the underlayments are suggested for use over hot water tubes or electric cables, to help radiate heat at a constant temperature into each room.

Endura "Low Vibration Square" (LVS) rubber flooring from Endura, a division of the Biltrite Corp., reduces noise in heavily trafficked equipment areas through a combination of a unique rubber stud profile design and a highly resilient rubber compound. The floor "absorbs" vibration and is said to be comfortable to walk on, easy to maintain, and highly slip-resistant. Designed to significantly reduce the vibration sounds of wheeled vehicles over a flooring surface, the rubber flooring is available in 11 standard colors and five "Beachstone" ceramic-look color tones. It can also be custom color-matched.

Laminated glass by Green Laminating Corp. reduces sound even with large expanses of glazing. According to the manufacturer, ¾-inch laminated glass has the same soundproofing qualities as surface-sealed 4-inch brick or 6-inch air-spaced glass. Complete fabrication capabilities include holes, edgework, pattern cuts, and sandblasting.

Saflex laminated architectural glass from the Monsanto Co. consists of a tough, resilient plastic interlayer bonded to glass and set between two pieces of glass. The Saflex plastic interlayer provides good sound isolation performance as well as solar and thermal performance. The laminated glass also protects against impact because it remains intact after breakage—the broken glass continues to adhere to the Saflex interlayer—and because of its two-ply construction. An Acoustical Glazing Design Guide by the manufacturer details performance characteristics and application methodologies for laminated architectural glass manufactured with the Saflex plastic interlayer.

Enkasonic, from Geomatrix Systems, obstructs the passage of sound in floor construction. The floor matting is a two-layer composite of a polyester nonwoven filter fabric heat-bonded to Enkamat compression-resistant three-dimensional nylon matting. Enkasonic contributes to the sound resistance of ceramic tile, marble, hardwood, native stone, wood parquet, vinyl tile, and carpeted floor constructions.

ThermoCon International Inc.
Circle 245 on information card
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Circle 246 on information card
Grefco Inc.
Circle 247 on information card
Lord Corporation, Film Products division
Circle 248 on information card
Pre Finish Metals Inc.
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Trenwyth Acoustical Products
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Gyp-Crete Corporation
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Endura, division of Biltrite Corporation
Circle 268 on information card
California Glass Bending Corporation
Circle 252 on information card
Monsanto Company
Circle 266 on information card
Geomatrix Systems
Circle 253 on information card

Ceiling Tile and Panels

Armstrong World Industries' Architectural Building Products division lists the manufacturer's line of acoustical panel and ceiling tile in a color brochure that includes a comprehensive selection of ceiling products, performance characteristics, price ranges, guide specifications, a fire-resistance ratings guide, and an index of product specifications.

Custom-embossed, fabric-covered acoustical ceiling panels (shown right) from USG Interiors Inc. come in four standard design patterns or can be custom designed. Silent Expressions ceiling panels are available in 2x2-foot panels that are ⅞ inch thick, and in plain, nonwoven fabrics. Silent Squares fabric-covered ceiling panels, also from USG, come in 2x2-foot panels of fabric-wrapped mineral fiber, to reduce reflected sound. Both types of ceiling panels are available with either recessed-grid or radius-reveal edges.

A brochure from the Donn Corp. previews its line of acoustical suspension systems and accessories, and lists technical and performance data and guide specifications. The brochure recommends ceilings for various applications and details each product's particular features. More than 100 colors for most standard ceiling grid and linear metal ceiling products are offered, with custom color matching available.

Armstrong World Industries Inc.
Circle 254 on information card
USG Interiors Inc.
Circle 255 on information card
Donn Corporation
Circle 256 on information card

Prefabricated Acoustic Resistance

Multipurpose acoustical and airtight doors from Industrial Acoustics Co. are now offered as separate construction components. Fabricated from 18-gauge galvanized steel and filled with an incombustible sound-absorptive/thermal damping element, Noise-Lock plenum doors have a laboratory-tested Sound Transmission Class (STC) rating of 42.

The factory-assembled doors come in seven models ranging in leaf size from 24x24 feet to 72x72 feet and in weight from 60 to 260 pounds. Each model is shipped ready for installation. All are outfitted with hinges designed to provide uniform compression of a continuous gasket to achieve an acoustic, airtight seal.

Thermal and acoustical insulation, up to 5½ inches thick, can be attached to walls and ceilings of rooms and cold storage enclosures, piping and ducts, and the exterior of storage tanks by using the Series 7000 Stic-Klip system of mechanical fasteners and a high-performance adhesive, both available from Eckel Industries. The Series 7000 system fasteners are fabricated from corrosion-resistant materials. The system features electrolytic zinc-coated perforated steel bases and cadmium-plated nails or split prongs and washers, along with a neoprene-based Type S adhesive. These fasteners can be anchored to flat surfaces without the need for welding,

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Products *from page 126*

drilling, or penetrating of surfaces. Because the fasteners are attached with an adhesive that can be applied with a putty knife, space is not required for positioning bulky equipment or ventilation and hazard-protection systems.

The specially formulated adhesive bonds the fasteners to a variety of building surfaces, including masonry, concrete, metal, wood, cement, cinder block, and tile. When the adhesive is fully cured, each Stic-Klip fastener reputedly can support up to 76 pounds, with the stress uniformly distributed over the 2x2-inch base of the fasteners.

Norseal Acoustical Foam Tape from Norton-Performance Plastics controls transmission of sound and vibration through adjacent construction materials. It raises the STC rating for wall systems when it is compressed a minimum of 15 percent. A pressure-sensitive adhesive on one side and a removable paper liner on the nonadhesive side assure dimensional stability during application. The Foam Tape is available in standard rolls with thicknesses ranging from ⅛ to ¾ inch, and roll lengths, based on thickness, from 15 to 100 feet.

Industrial Acoustics Company Inc.
Circle 243 on information card
Eckel Industries Inc.
Circle 244 on information card
Norton Performance Plastics
Circle 269 on information card

Interior Wall Panels

Monolithic Acoustical walls from Forms + Surfaces Inc. now can be installed as modular panels. Serenity Monolithic panels achieve a Noise Reduction Coefficient (NRC) of 80 and a Class 1 fire rating. The 9- or 10-foot panels are available in 12 colors of deeply ribbed polypropylene fabric that can be applied to brick, block, plasterboard, or metal partitions and to many other surfaces.

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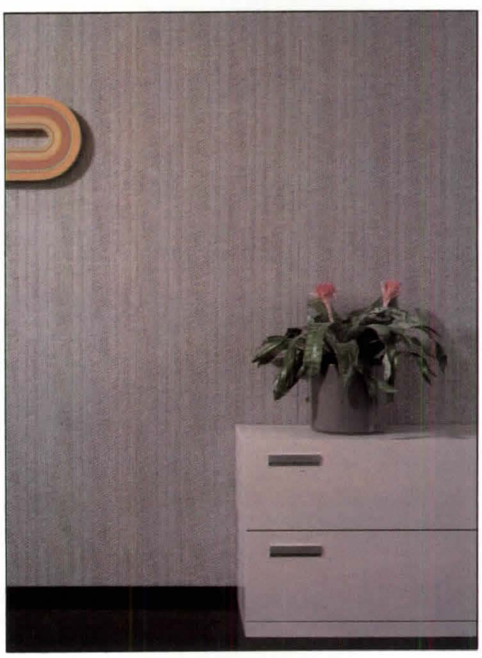

Northwestern Atrium Center
developed by
Tishman Midwest Management Corp.
Chicago, Illinois
Architect: Helmut Jahn

Products *from page 129*

USG Interiors offers acoustical interior wall panels in a variety of woven, tweed, ribbed, and plain fabrics. Called Silent Collection, the panels come in three different fabric groups and 12 colors available for both the Silent 65 and Silent 95 wall panels. The Silent 65 panels with mineral fiber substrate have an NRC range of 0.65 to 0.75. Silent 95 panels with glass fiber substrate have an NRC range of 0.90 to 1.00. The panels are designed to be used alone or with ceilings, walls, accent panels, and baffles. Both types of wall panels can be used with existing wall systems.

Linnear Look acoustical panels from Craxton Acoustical Products are horizontal, fabric-wrapped wall panels that can incorporate a different material in the form of a feature strip between each panel. Linnear Look panels are made of high-density glass fiber covered with a woven, tackable, polyester fabric. In addition to seven standard colors for panels and another seven for feature strips, there are 50 fabrics that can be specified for special order. Feature strips are also available in plastic laminate and wood. The lightweight panels are designed to be field-cut to meet job conditions, and can be either glued with a construction adhesive or applied with Velcro tape.

The standard panel is 96 inches long, 11½ inches high, and ½ inch thick. Special sizes and thicknesses are available. The standard strip is 12 inches wide but can be cut to varying sizes to serve as a take-up panel accommodating varying ceiling heights.

Eckoustic Functional Panels (EFPs) from Eckel Industries reduce background noise and reverberation and can be added to barriers to increase noise reduction or fitted with backs to act as barriers themselves. Acoustic performance data for panels four, five, six, eight, and 10 feet tall (30 inches wide) are in the frequency range of 125-4,000 hertz. Because of the panels' design, wall and ceiling surfaces do not have to be completely covered with EFPs to achieve a desirable acoustic environment. The panels can be positioned so they will not interfere with existing utilities.

An acoustical wall panel system from Peabody Noise Control called Design 90 features a patented honeycomb composite construction. The DS-90 panel systems are made by fusing glass fiber to both sides of a honeycomb core with panel edges protected by an integrally bonded PVC channel frame. As a result, the thin, rigid, tackable panels trap sounds in thousands of acoustically engineered air cells. Panels are available in standard thicknesses of ⅝, one, and two inches, in widths of 24 and 48 inches, and lengths of eight, nine, and 10 feet. The system can also be custom made to virtually any specification.

Panels can be installed with mechanical clips, Velcro strips, or magnetic fasteners, allowing the panels to be demounted and reused. The ⅝-inch-thick DS-90 panel achieves an NRC rating of 0.70 and is available in 10 colors of upholstery-grade wool-like heathers or in the designer's choice of fabrics from the "Shannon" collection.

FastSpace fabric acoustical panels from Panel Concepts are rated NRC 0.75, are 1½ inches thick, and have a high-density glass fiber core for sound absorption. This semirigid core also provides full surface tackability and a Class A fire rating, and is said to be unsusceptible to sags, wrinkles, and pillowing with long-term use. FastSpace panels come in standard heights of 48, 60, 66, and 72 inches and widths, in six-inch increments, from 12 to 72 inches. The panel finishes include five frame colors and six fabric colors, which may be mixed and matched.

Acoustical wall products from Armstrong World Industries have factory-engineered edge details and come in a wide range of surface finishes from soft plush fabrics to durable vinyls. Both the Soundsoak Encore Collection and the Soundsoak Ovation panels have an NRC range of 0.60 to 0.70; Soundsoak Serenade, 0.65 to 0.75; Soundsoak 60, 0.55 to 0.65; Soundsoak 85, 0.80 to 0.90; and Classic Vinyl Soundsoak, 0.45 to 0.55. Appliqués are attached by metal hangers and mag-

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Products *from page 131*

netic or foam tape, depending on the wall surface. Armstrong Sonotrol custom acoustical interior finishes come in many standard upholstery-weight fabrics and perforated vinyls. The panels' micro-perforated finish allows them to absorb sound without the visible holes of perforated vinyl. Edge and corner details can be shaped to any specification, including mitered, beveled, radius, square, or off-square.

Form + Surfaces Inc.
Circle 257 on information card
USG Interiors Company
Circle 258 on information card
Craxton Acoustical Products Inc.
Circle 259 on information card
Eckel Industries Inc.
Circle 260 on information card
Peabody Noise Control Inc.
Circle 261 on information card
Panel Concepts
Circle 262 on information card
Armstrong World Industries Inc.
Circle 263 on information card

Sound-Masking Generator

Architectural masking is the psycho-acoustic method of controlling the background ambient sound within work environments. Without significantly raising the overall sound level, sound masking merely fills in the silence to mask speech and reduce workers' awareness of other occupational and equipment noise.

The model MT-1500 sound-masking generator acoustic control unit by Soundolier, with an integral signal module, drives a set of selected filters that space the response of sound-masking systems, improving privacy for speech in open-plan offices and commercial areas.

The unit has 14 adjustable broad-band active shaping filters, on ⅓-octave centers from 200 to 4,000 hertz, allowing for compensation in both room and loud-speaker acoustics. The unit mounts on a standard 19-inch-wide relay rack panel and operates on 110-volt AC. All controls are accessible from the front and protected by a security cover.

Soundolier, division of American Trading and Production Corporation
Circle 264 information card

Reverberation Enhancement

An Acoustical Control System (ACS) electronically controls reverberation or restores lost reverberation energy to a space without electro-audio effects. The ACS system eliminates the short reverberation, poor intelligibility, dead spots, and short echoes in auditoriums, concert halls, and churches by spreading an even electronic reverberation "structure" over the entire space. The system compensates for the absorption and distortion caused by building materials and design through the placement of a variety of microphones and loudspeakers along the walls.

A typical ACS installation has loudspeakers mounted in walls, rims, upper ledges, or any other places where natural sound reflection would occur. They are installed to blend in with the interior. The number of speakers is determined by the dimensions of the space, the distance from the walls to the people, and the reverberation level required. Microphones placed in certain areas can be switched on and off as needed. All sound signals captured by the microphones are directed toward a central control board that creates and supports a natural reverberation level, synchronizing the natural reflection of sound from the walls with the supplemental sound released by the loudspeakers.

Delegated Marketing Corporation
Circle 265 on information card

Telephone Enclosure

The "Freedom Series" enclosure system for pay telephones is designed to allow normal conversation in areas of high ambient noise. The stainless steel interior treatment features perforated acoustical panels with sound-absorbing glass fiber insulation. The telephone enclosure is molded, one-piece, dark blue polyethylene construction and may be either wall or pedestal mounted. It is available with or without illumination.

Fortec Inc.
Circle 267 on information card

NEW AND NOTEWORTHY

Exterior Wall Systems

Durock exterior wall systems serve as a base for curtain-wall finishes in ceramic and thin-stone tile, thin brick, and epoxy matrix stone aggregate.

The lightweight, fire-resistant assemblies for wood or non-load-bearing, steel-framed exterior walls include a 4x8-foot Durock exterior cement board and the system's own line of coated screws, exterior tape, and—for ceramic tile, thin-stone tile, or thin brick—a latex-fortified mortar and grout.

Testing and evaluation by the manufacturer, Underwriter's Laboratory, and the construction technology laboratories of the Portland Cement Association demonstrated that the systems achieved a one-hour fire-resistance rating with wood or non-load-bearing steel studs. Additional testing for weather resistance indicated the system can withstand repeated freeze-thaw cycles, high temperature, and humidity.

USG Company
Circle 270 on information card

Glass Fiber Arch

Insta-Arch reduces the time it takes to install arches in framed and drywalled doorways by eliminating the need to construct an arch with framing material, wallboard, and corner head. With Insta-Arch, after the wallboard is installed on the framed doorway the arch is slipped into place, nailed, and finished with a joint compound.

The lightweight glass fiber arch is available in five sizes: 32, 36, and 48 inches for 2x4 framing, 60 inches for 2x6 framing, and a 36-inch arch for 2x6 framing. Insta-Arch can be used in both interior and exterior installations.

Fiberglass Plus Inc.
Circle 271 on information card

Automatic Exit Device

Automatic-exit lowering devices provide an escape from buildings up to 12 stories high should exits be blocked by fire or smoke or for other reasons. A device for buildings up to 100 stories (or 1,100 feet) will be available soon.

All three models offered—Exit Permanent, Exit Traveler, and Exit Home—are made of materials tested and approved by TNO and TUV (National Test Institutes in Holland and West Germany) for up to 2,000 pounds and up to 1,830 degrees Fahrenheit. All models come in sealed plastic containers with international pictogram instructions, a window center punch for breaking sealed windows, and a safety light, and are available in any length up to 130 feet. Exit Permanent contains a mounting bracket, fisher plugs and bolts, and three center rings.

The user applies the harness belting around the body by pulling a ring at the

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Circle 58 on information card

Products *from page 133*
bottom of the container. An arm sling falls free for adjustment to the body. The device lowers a person automatically at a steady walking pace to the ground, and is guaranteed for persons weighing between 40 and 300 pounds. It is possible for two persons to use the device if the weight of both is within the acceptable weight limit.

Since they are one-time-use devices, the manufacturer will replace used devices when sent back with verification by authorities that the exit was used for emergency purposes. The devices come in light gray or cream or may be custom ordered in any color, and the client's logo or symbol can be imprinted upon request. The devices have been tested and used in Europe since the early '80s.
R.A.W. Rescue Products Inc.
Circle 272 on information card

CREDITS

Smithsonian Institution, New Museum and Research Complex, Washington, D.C. (page 42). *Architect: Shepley Bulfinch Richardson & Abbott, Boston.* Principal in charge: Richard Potter, AIA. Design principal: Jean-Paul Carlhian, FAIA. Project architect: Robert T. Holloran, AIA. Designers: Albert Huang, Robert Finiw, AIA, Lawrence Man, Ralph Jackson, AIA. Architectural/mechanical coordinator: Fred Montague. Structural engineer: Ewell W. Finley. Geotechnical engineer: Mueser Rutledge, Johnston & DiSimone. Mechanical and electrical engineer: Shooshanian Engineering Associates. Landscape architects of record: Sasaki & Associates. Garden design and architectural features: Shepley Bulfinch Richardson & Abbott. Landscape architect: Lester Collins. Horticulture director: James Buckler. Museum lighting: Jules Fischer & Paul Marantz. General contractor: Blake Construction.

Roach Residence, Pound Ridge, N.Y. (page 66). *Architect: Haverson/Rockwell, New York City.* Project team: Jay M. Haverson, AIA, David S. Rockwell, AIA. Interior designer: David Briggs. Mechanical engineer: Thomas A. Polise. Structural engineer: Weisenseld & Leon. Landscape architect: James S. Kennedy.

Hunt Stable Residences, Ligonier, Pa. (page 69). *Architect: MacLachlan, Cornelius & Filoni, Pittsburgh.* Principal in charge of design: Albert L. Filoni, AIA. Design team: Marybeth Barrett, Frank J. Becker Jr., AIA, Robert H. Holt, Richard A. Moninger, David L. Schwing, Christopher Snowber, M. Kenneth Stephenson. Structural engineer: Brace Engineering. Interior design consultants: Shandra S. Mellon, Marigil Walsh. Landscape architect: Henry Hanson. General contractor: Mellon-Stuart Co.

Monadnock Building, San Francisco (page 76). *Architect for renovation: Whisler-Patri, San Francisco.* Tenant architect: Robinson Mills & Williams Architecture. Design consultant: Charles Pfister. Trompe l'Oeil: Evans & Brown. Construction Management: Jack Scott & Associates. Landscape architect: Robert La Rocca & Associates. General contractor: Swinerton & Walberg. Artists (sculpture garden): Charley Brown, Anthony Caro, Bryan Hunt, Nathan Oliveira, Herk Van Tongeren. Art adviser: Ann Kohs & Associates. Original architect: Frederick H. Meyer and Smith O'Brian.

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Allied Bank Interior, Fountain Place, Dallas (page 113). *Architect: Skidmore, Owings & Merrill/Houston.* Partner in charge: Richard Keating, FAIA. Project designer: Debra Lehman-Smith. Technical Coordinator: Steven B. Ronsen. Design team: Steve Zimmerman, Sheri Schwartzberg. Contractor: Mavco. Building architect: I.M. Pei & Partners. □

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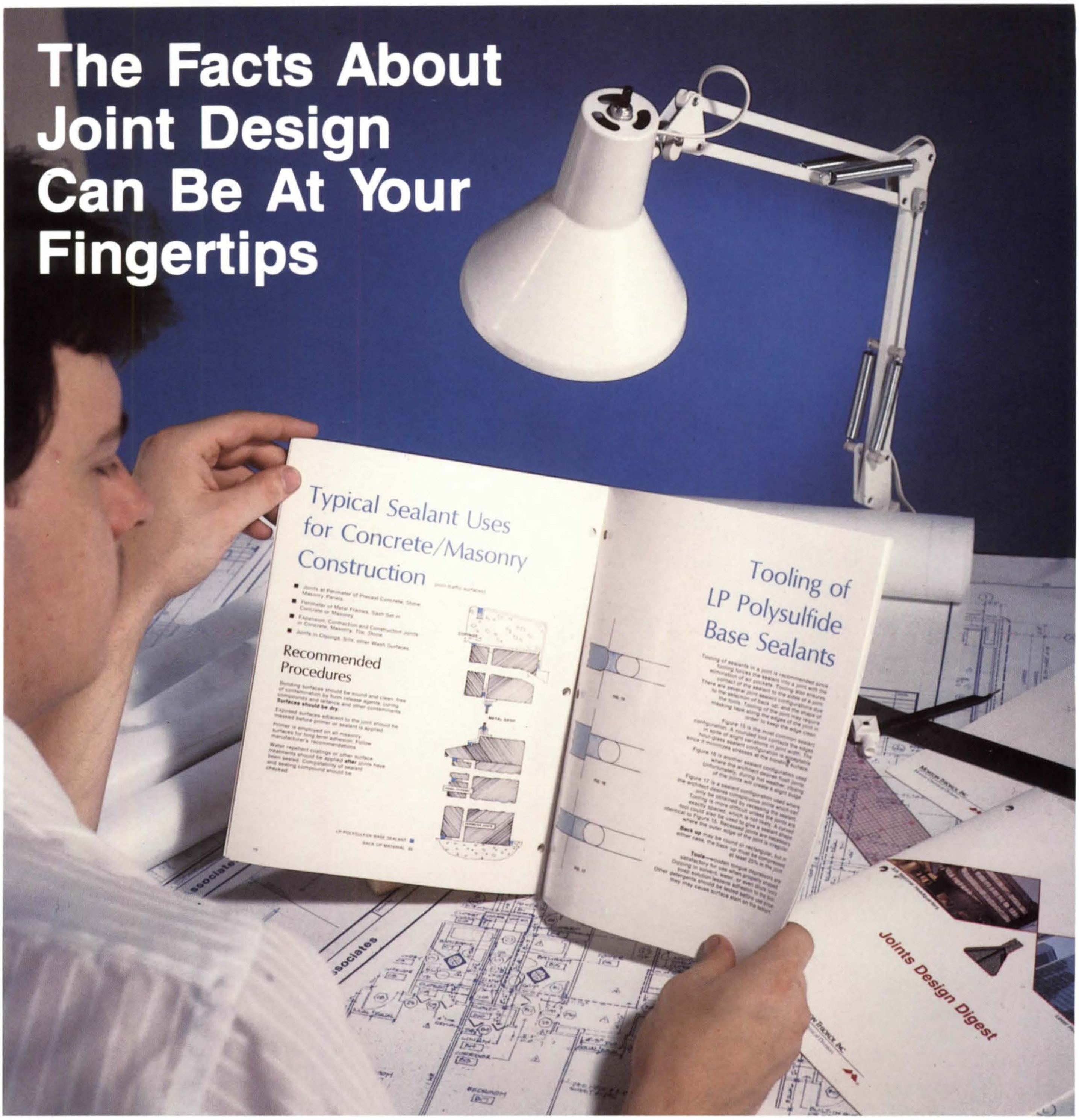

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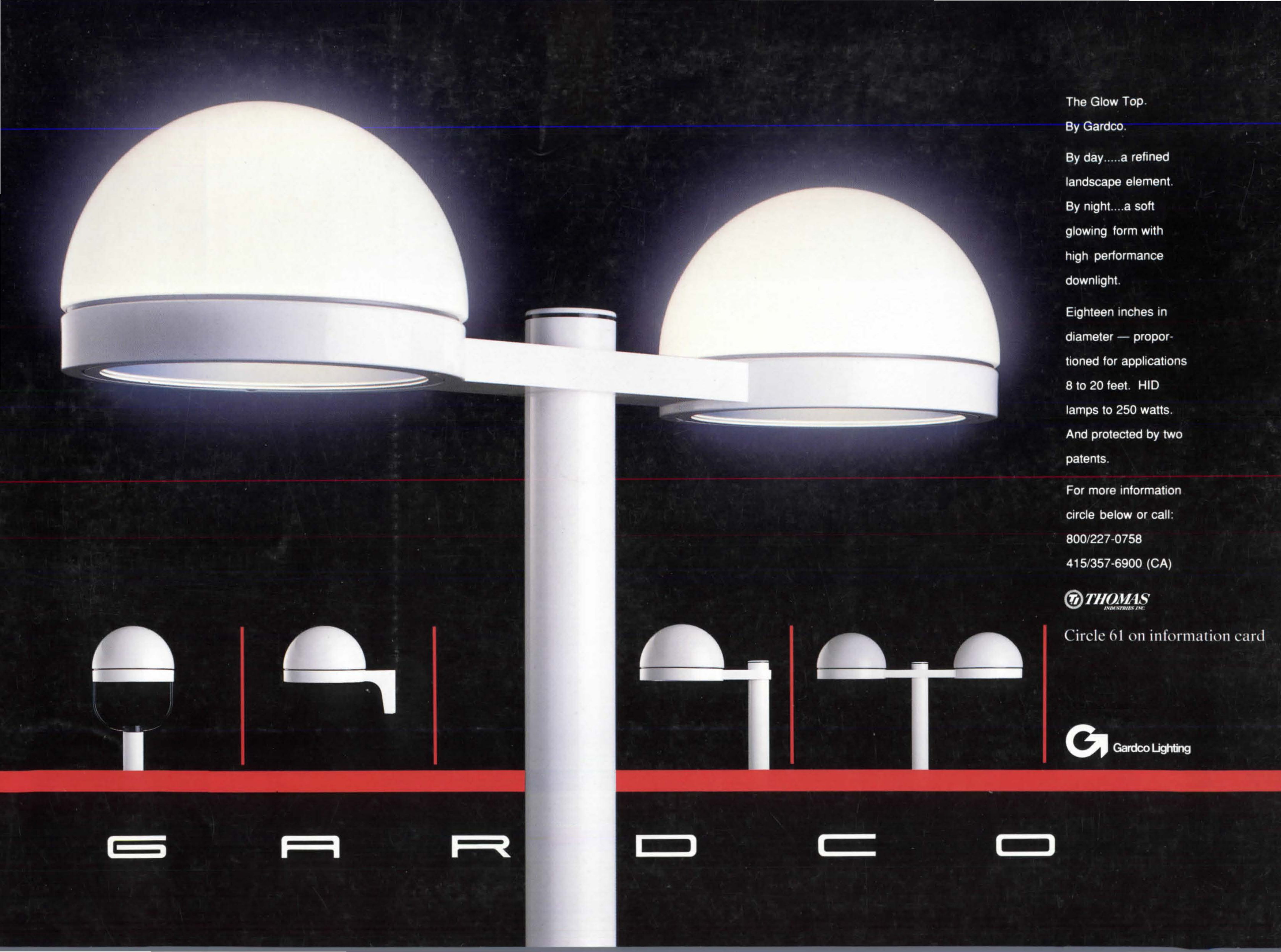

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