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Preservation's New Frontier

AS A FORMER PRESERVATION ACTIVIST IN WASHINGTON, D.C., I WAS curious to see what had happened to my favorite landmarks when I moved back to the nation's capital three years ago. Happily, I found once-threatened buildings such as the Old Post Office and Union Station reinvigorated by new commercial uses. I was disheartened, however, to discover that local landmarks of recent vintage had succumbed to the wrecker's ball. Even worse, some of the more innovative postwar structures in the area, such as the Chevy Chase Shopping Center (below) where I held my first job, had been obliterated by insensitive Postmodern renovations.

CHEVY CHASE SHOPPING CENTER, 1956 (TOP); 1989 (ABOVE)

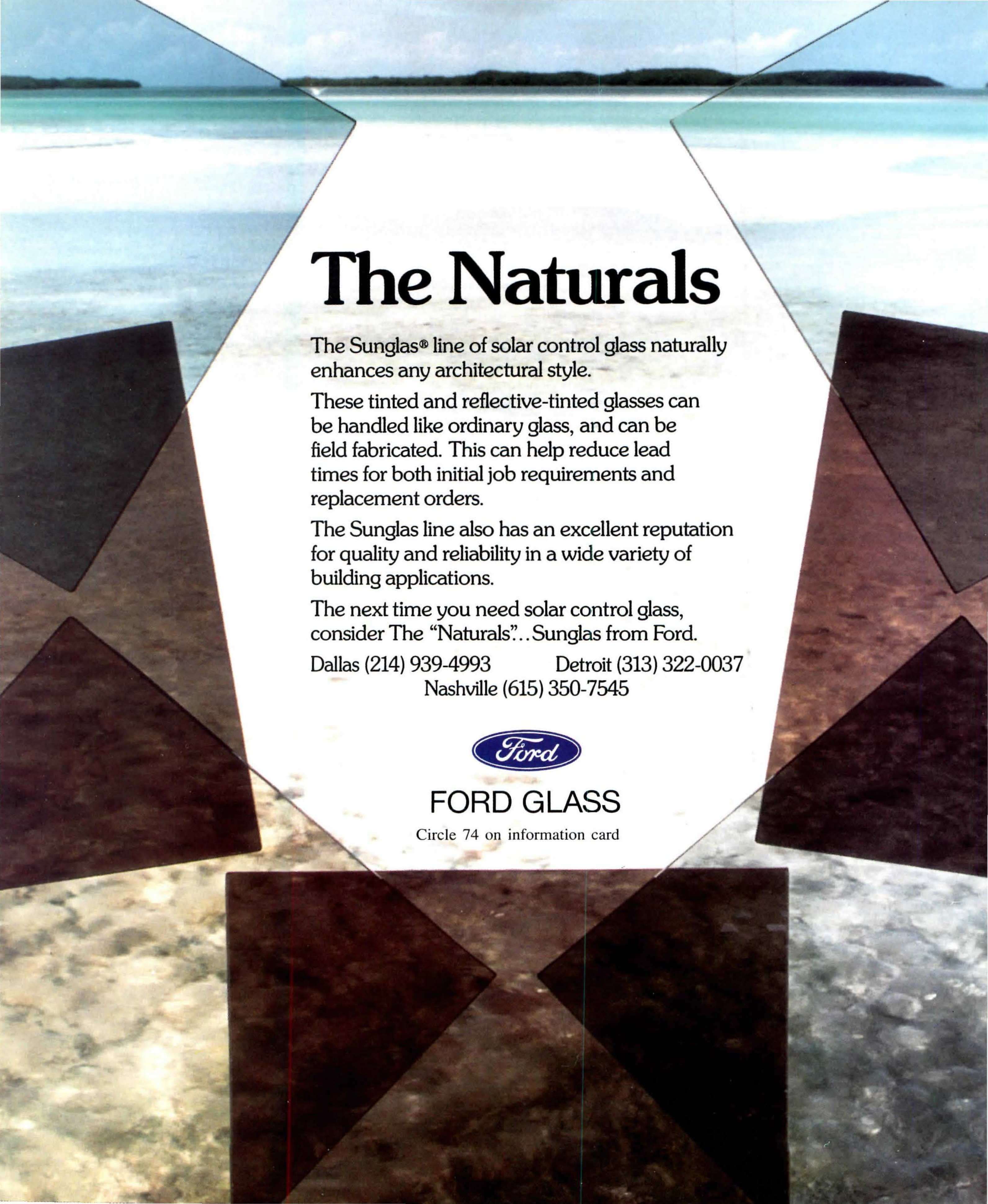
KEN WYNER

Modern architecture, it turns out, is low on the list of preservation priorities. The National Register of Historic Places, the country's most comprehensive landmarks guardian, for example, generally recognizes only properties that are at least 50 years old. But many of our most treasured landmarks are younger, representing this country's most confident era; the corporate office towers, cultural centers, and campus buildings that were built in the 1950s and '60s. Without landmark protection, some of the best examples of these decades are increasingly being torn down or altered beyond recognition without so much as a whimper from preservationists.

Modernism, of course, had its dark side, and many of the buildings it spawned are sterile, anti-urban, and downright ugly. But as this month's issue attests, a new appreciation of postwar-era design is being spurred by architects involved in rehabilitating selected 1950s and '60s structures. In fact, some of the most publicized recent preservation battles have been waged by architects over Modern jewels such as Louis Kahn's Kimbell Museum in Fort Worth, Texas, and Marcel Breuer's Whitney Museum in New York. While these high-style examples are being saved, lesser known icons of the postwar period are being neglected, altered, or razed, as pointed out in a news article in this issue. Many younger landmarks, such as early corporate high rises, lack traditional sentimental value, and therefore fail to elicit the same outpouring of public sympathy as historic houses and public institutions.

How can we stop the neglect and demolition of one-of-a-kind Modern buildings? One way is to expand the definition of historic preservation, and eliminate an arbitrary time frame in which buildings are considered for landmark status. Another is to educate ourselves and the public about the existing stock of postwar structures in our cities and towns. Just as Georgian and Victorian architecture is routinely surveyed and appraised, International Style, Brutalist, and soon, even Postmodern buildings must be systematically cataloged to determine their value as potential landmarks. It is up to architects to promote preservation and public awareness of these younger landmarks to avoid the loss that has already cost us so much of our architectural heritage. ■

—DEBORAH K. DIETSCH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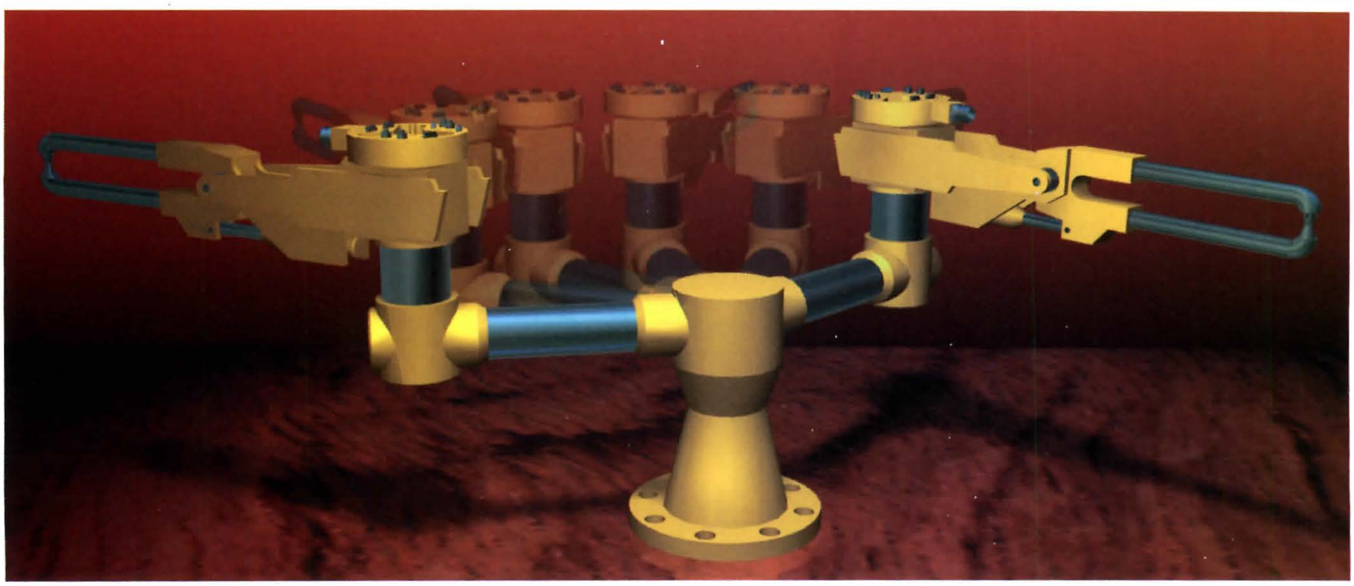

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Hectic over metric

Perhaps the 900-by-1,200-millimeter doors you promote in your article "Moving to Metric," (September 1992, pages 117-119) could be exported. The AIA would certainly prohibit us from installing such doors in the United States, as they would be impassable to people more than 4 feet tall.

Your gaff illustrates the problem with over-promoting the metric system as the savior of the planet. For all its apparent rationality, the meter is an arbitrary length defined as 1,650,763.73 vacelengths in a vacuum of the orange-red radiation of krypton 86; hardly a dimension humans can relate to. One English-system foot, however, is about the size of one human foot.

The difficulty with converting to the metric system is that the construction industry is tooled up for Imperial-sized products, which makes a metric conversion messy, expensive, and disruptive for the industry. Architects, on the other hand, might be able to benefit from the chaos by offering a new service to their clients of sorting out and coordinating all the differently dimensioned building components that may appear on the job. But would that really be the best use of our creative talents?

Ron Shattil, AIA
Oakland, California

In "Moving to Metric," you state that metric dimensions based on units of ten are easier, faster, and more accurate to use.

But the fact is that base-ten mathematics has fewer factors than base 12. You cannot divide a meter by three, six, seven, or nine and ever be accurate, whereas such factoring is easy under the English system.

Since the rest of the world doesn't wish to revert to English, I suggest we use decimeters to ease the transition. A decimeter is almost exactly 4 inches—a common building dimension (2 by 4 studs, 4 by 8 bricks, 8 by 16 blocks, etc.) and also the approximate width of a human hand.

Jerome Morley Larson, Sr., AIA
Jerome Morley Larson, Sr., Architect
Red Bank, New Jersey

If the federal government wishes to demonstrate a commitment to metric conversion as "Moving to Metric" suggests, it should work to enable architectural firms to acquire experience in metric design.

A recent advertisement in the *Commerce Business Daily* required demonstrated "familiarity with the metric system and the ability to design in metric units" as one of the architect/engineer selection criteria. In other words, if you haven't done one before, you can't do this one. This approach will not promote the use of the metric system.

Joseph G. Weiss, AIA
Coastal Design, Ltd.
Bethesda, Maryland

Corrections:

Community Design Services (September 1992, page 91) is a committee of the Washington Architectural Forum, a nonprofit group founded by the Washington Chapter/AIA, and was inspired by the Baltimore Neighborhood Design Center. CDS coordinator Christopher Snowber is a partner with

Cynthia N. Hamilton in the firm Design Collaborative. The BEAT House (Page 96) was designed by Nolanda Hatcher, who belongs to Tuesday Group, a group of volunteer architects in Birmingham, Alabama. The Institute of Business Designers contributed furnishings and coordinated donations of materials for the AIDS Services building in Oakland, California (page 93).

FTL Architects is not involved with Zeidler Roberts Partnership's design of the Christopher Columbus Center in Baltimore, Maryland (September 1992, page 34). The firm was involved with a previous scheme for the same site.

Guy Nordenson and Caroline Fitzgerald of Ove Arup & Partners' New York office contributed to the first prize winner of the New York State Solar Canopy Competition (September 1992, page 87). The second and third prize winners of the canopy competition were Anthony R. Moody, AIA, and David S. Koralek, AIA, respectively.

November 14: "Seismic Design for Georgia," a course offered by Georgia Tech to introduce new provisions to the Standard Building Code. Contact: Georgia Institute of Technology Department of Continuing Education, (404) 894-2547.
November 19-22: "The New Generation of Healthcare and Design," at the San Diego Marriott Hotel & Marina, sponsored by the National Symposium on Healthcare Design. Contact: (510) 370-0345.
December 1: Deadline to request application forms for the 1992 Gabriel Prize Competition sponsored by the Western European Architecture Foundation. Contact: Boston Society of Architects (617) 951-1433.
December 1: Deadline for submitting papers for presentation at the 14th International Making Cities Livable Conference. Contact: Susan Crowhurst, (408) 626-9080.
December 2-4: "Construct Canada '92," Canadian exposition for building construction, property management, and real estate professionals, at the Metro Toronto Convention Center. Contact: (416) 869-1660.
December 30: Submission deadline for the Rudy Bruner Award for excellence in the urban environment. Open to any project demonstrating urban excellence. Contact: The Bruner Foundation, (212) 334-9844.
January 30: Deadline for the San Francisco Embarcadero Waterfront Competition. Contact: CCA, (415) 863-1502.
January 29-30: Housing conference at the Yale School of Architecture in New Haven, Connecticut. Contact: (203) 432-2291.
February 17-19: The Interiors Conference for Historic Buildings, sponsored by the National Park Service, Preservation Assistance Division. Contact: Sharon Parks, (202) 343-9570.
February 19-22: The National Association of Home Builders 49th Annual Convention and Exposition in Las Vegas, Nevada. Contact: NAHB, (202) 822-0200.
March 19-21: Monterey Design Conference sponsored by the California Council/American Institute of Architects to be held in Asimilar, California. Contact: Donalee Hallenbeck, (916) 429-1414.

NEWS

Endangered Modern Landmarks • Washington, D.C., Visions

Arkansas Town Welcomes Housing Assistance

AIA UPDATE WHILE THE HOT GLARE OF media attention has been directed at Bill Clinton's native Arkansas, one of its smaller towns recently came under the scrutiny of the AIA. Helena, Arkansas, an agricultural town of 7,491 in desperate need of revitalization, has received a jump-start from a 12-person Housing Assistance Team (HAT) that convened in the historic Mississippi River port. As part of a two-year commitment termed "Rebuild Helena," the interdisciplinary group met with local citizens to survey the community's economic, social, and physical landscape, forging a renewed vision for a depressed area.

Included among the team members recruited by Cochair Charles Zucker, AIA's senior director of community design and development, were architects, bankers, public housing experts, community planners, and developers. Over four days, the diverse group prepared a blueprint for change, which was presented at a lively town meeting attended by more than 100 local citizens on September 28. Volunteers distributed a 28-page tabloid, ink barely dry, to all visitors. The paper's front-page headline, "Rebuild Helena Project Recommends Housing," summarized the team's findings.

The document clarified HAT's mission, the significant features of its plan, and a clear catalog of affordable housing options, including guidelines for housing development, financing mechanisms, and construction. "Before" and "after" drawings of landmark buildings, many sketched by Los Angeles architect Francisco Behr, principal of Behr Browers Partnership, showed how a multiblock housing zone adjacent to the city's main commercial area could reinvigorate downtown Helena.

According to Charles Buki, the AIA's director of affordable housing, the publication is very much like an "automobile catalog and an owner's manual, all in one." Each suggested housing type, from rental to single-family home to multi-unit housing for the elderly, is built around an economic model that considers a maximum affordable rent or house payment. Only then, with Helena's building and financing costs in mind, were buildings designed. South Carolina architect Christopher Rose devised simple, two- and three-bedroom plans in keeping with the local vernacular.

PHOTOS: TIMOTHY HURSLEY

HAT members proposed new middle- and low-income housing to occupy vacant blocks in downtown Helena (top left). Despite the deterioration of retail buildings (top right and bottom left) and existing housing (bottom right), the small Arkansas agricultural town retains much of its community fabric. In addition to a new residential zone, the HAT plan calls for an expansion to Helena's commercial district.

When jobs in agriculture, shipping, and timber industries declined, scores of Helena's younger generation left for the brighter lights of Memphis, Little Rock, or Chicago. Ironically, lower census figures and reduced personal income have allowed Helena to qualify for favorable federal and state assistance programs, such as housing loans offered by Arkansas's enlightened Farmer's Home Administration. "There are many issues that this community faces that are not different from neighborhood issues in metropolitan areas," Cochair and Boston architect David Lee explained. The HAT team proposed, for example, that empty lots be transformed into communal and market gardens, like those in large cities around the country.

Helena's roadways and the streetscape of its major thoroughfares were considered vital parts of the new vision. A primary entranceway, dominated by a transformed water tower, was proposed, and the plan suggested that housing be built within the neglected upper floors of commercial buildings downtown. Additional schemes included a job training and day-care center, new parks, relocated public works, and a blues center for the community, whose annual King Biscuit Festival draws 50,000 every October.

Not only is physical change needed to fuel Helena's rebirth, but new ways of organizing the Arkansas town's human and financial resources. HAT Cochair Lee sees the chance to share information, from funding sources to new legislation, as among his team's most valuable offerings. In a report to Helena's Community Renewal Corporation, a new community development agency, the HAT lists financing tools currently available for the city—from federal highway funds and Farmer's Home Administration loans to local banks.

A public meeting held on the final evening brought bank presidents and the unemployed together. When one citizen informally raised the question, "What do we do when they've left?" local automobile dealer West Horner quietly answered, "If this program is economically sound, it will be seized. The people were here tonight, and the town's hungry for this."

—ROBERT A. IVY, JR.

DETAILS

Venturi, Scott Brown and Associates' 106-foot-high stainless steel obelisk honoring Christopher Columbus was dedicated at Penn's Landing in Philadelphia on October 11. Houston-based **PGAL Architects** has been selected to develop the preliminary design for up to $167 million in streetscape improvements in downtown Houston. **Garfield Hacker Architects** of Portland, Oregon, has been commissioned to design the Western Treasure Valley Cultural Center, a 75,000-square-foot arts facility in Ontario, Oregon. New York architect **Jack Travis** is designing office and showroom space in Brooklyn for new record and fashion companies owned by Spike Lee, and a 6,000-square-foot house for actor Wesley Snipes in Orlando, Florida. **Johnson Fain and Pereira Associates** is devising a master plan for 400 acres of the Norton Air Force Base in San Bernardino County, California, to be converted to commercial uses in 1996. **Duany Plater-Zyberk Architects** of Miami, Florida, is planning a 28-acre resort, including a school and town hall, in Istanbul, Turkey. **Richard Buford**, former executive director of the New York City Planning Department, will succeed **Gwendolyn Wright** as the director of Columbia University's Temple Hoyne Buell Center for the Study of American Architecture. **William Mitchell**, former director of Harvard's Master in Design Studies program, has been named dean of the Massachusetts Institute of Technology's School of Architecture and Planning. **Donna Robertson**, former director of Barnard College's architecture program, has been appointed dean of Tulane University's School of Architecture in New Orleans, Louisiana. Architect **Harry Weese** has sold his Chicago-based firm to five company principals; the firm's name, Harry Weese Associates, will be retained. **Sizemore Floyd Architects** of Atlanta and **Conroy Associates** of Chicago have announced the formation of **Sizemore Floyd Conroy Architects** in Chicago. **August E. Komendant**, the structural engineer who worked with Louis Kahn on the Kimbell Art Museum in Fort Worth and with Moshe Safdie on Habitat '67 in Montreal, died on September 14th.

Endangered Modern Landmarks

PRESERVING MODERNISM

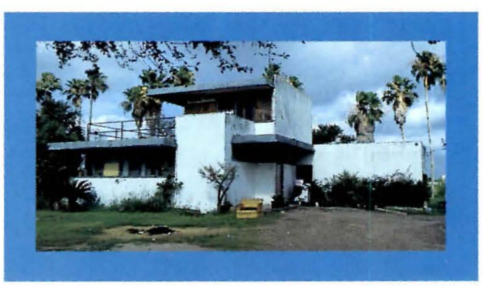
SAVING MODERN BUILDINGS IS BECOMING THE preservation issue of the decade, as America moves far enough away from the International Style to understand its worth. Since the federal government and many states do not consider a building eligible for landmark status until it is half a century old, structures by such Modern masters as Mies van der Rohe and Richard Neutra face uncertain futures. The recession, however, is buying time for threatened structures, and preservationists are pushing for more potent measures to protect young monuments, proving their fight is more about architectural stature than nostalgia. —K.S.

Kraigher House, 1937
Brownsville, Texas
Richard Neutra, Architect

RICHARD NEUTRA'S KRAIGHER HOUSE WAS one of the earliest Modern structures to be built in Texas, completed in 1937 for George Kraigher, a commercial pilot. Over the past decade, the stucco and glass structure, oriented to take advantage of southeastern breezes, has been occasionally vacant and is now badly deteriorated (below).

While a celebration of the 100th anniversary of Neutra's birth this year has drawn attention to the plight of the Kraigher House, its owners, Richard and Dennis Franke, two real estate developers who grew up in the building, are not committed to restoring it. "The house is of no economic value," Dennis Franke maintains, although he and his brother would consider preserving the structure as part of a commercial redevelopment. "It would make an excellent office," Franke notes.

Meanwhile, Mark Lund, Brownsville's heritage officer, plans to propose a zoning ordinance by December, requiring the Frankes to prove that they would incur financial loss by restoring the house. Lund states that the house is eligible for the city's 50 percent tax exemption for historic preservation.



BRAD DOHERTY

JULIUS SHULMAN

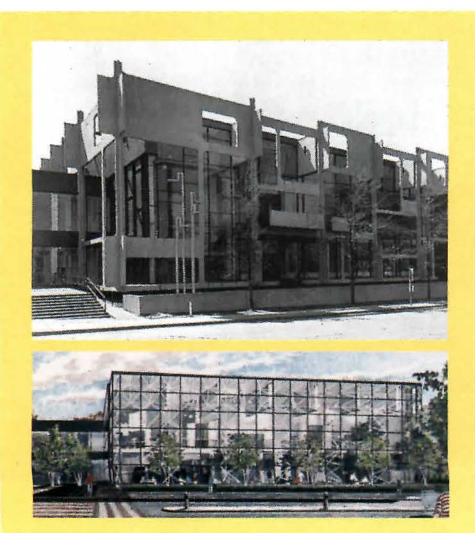
May Company, 1947
Los Angeles, California
Albert C. Martin, Architect

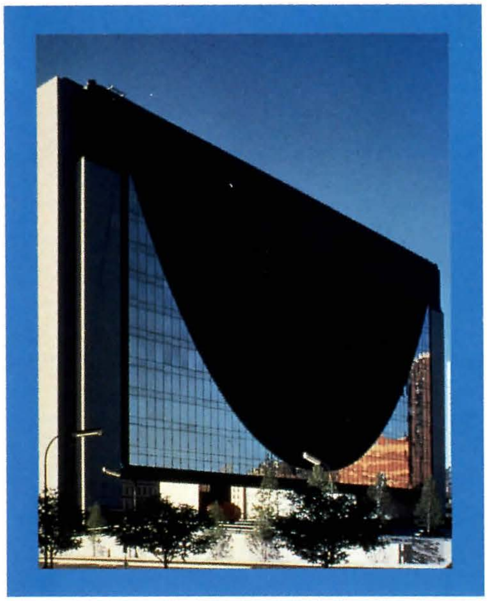
A RECENT DECISION BY THE LOS ANGELES City Council to designate the May Company department store as a local cultural and historic monument has cheered preservationists who, over the past 18 months, have mobilized residents and pressured the city to support a redevelopment plan that would save the building. Since the mid-1980s, developers have threatened to raze Albert C. Martin's Streamlined Moderne masterpiece, located at the western end of Wilshire Boulevard's Miracle Mile. Built in 1939 and renovated by Martin in 1947, the five-story department store was designed to attract motorists: uninterrupted showcase windows wrap around its south and west facades, and its gold tiled, curved corner (above) is visible from a great distance. Preservationists hope a pending agreement between the city and Forest City Development will save the building. The proposal, designed by Los Angeles-based Johnson Fain and Pereira Associates, would convert the May Company to offices and retail, and add offices and a hotel on nearby parcels.

Tyrone Guthrie Theater, 1963
Minneapolis, Minnesota
Ralph Rapson, Architect

RALPH RAPSON'S LANDMARK REPERTORY THEater, completed in 1963 (below), will receive a $3.5-million facelift this winter. In addition to eliminating seats with poor sight lines, recarpeting the lobby, and repainting the interior, the Minneapolis firm Hammel Green and Abrahamson will replace failing elements such as the building's custom-designed mullions, improve the acoustics, and significantly alter the main facade.

Rapson originally shielded his north-facing glass elevation with a plywood screen, intended to frame the movements of people behind the two-story glazed curtain wall, but the screen has since decayed and been removed. HGA plans to extend the existing facade 8 feet to where the screen once stood, and replace Rapson's asymmetrical glazing with a grid of double-glazed rectangular panels (bottom). The new facade will be supported by a system of tubular steel trusses that echo the facade of the Walker Art Center's conservatory across the street, designed by Edward Larrabee Barnes in 1988. The architects have also incorporated into their renovation scheme an indoor refreshment counter and an outdoor dining terrace spanning the length of the new extension. The remodeling is expected to be completed in time for the Guthrie Theater's 1993 spring performance schedule.





BALTHAZAR KORAB

Federal Reserve Bank, 1972
Minneapolis, Minnesota
Gunnar Birkerts and Associates, Architects

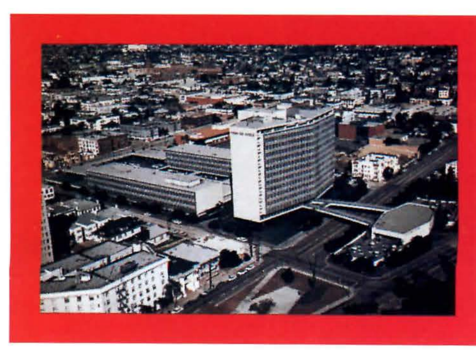
CITING CRAMPED QUARTERS, ASBESTOS HAZards, and the need for extensive repairs, the Minneapolis branch of the Federal Reserve Bank put its 1972 headquarters up for sale last year. Designed by Gunnar Birkerts, the $31 million facility has drawn international attention for its unique catenary construction. Eleven stories of granite, steel, and glass hang from giant cables that are suspended from the building's four corner towers (above). This structural system, which is similar to that of a suspension bridge, creates wide, column-free work spaces above grade for clerical and administrative functions, and three levels below grade, where the facility's high-security operations are housed.

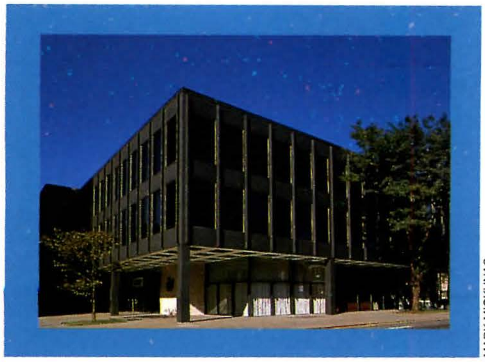
Last year, after the Federal Reserve Bank announced its intention to build new Minneapolis offices, which are estimated to cost $100 million, a group of nine local architects formed a task force to study alternative uses for the 370,000-square-foot structure and its adjoining 2.5-acre granite plaza. In October, the team presented several preservation alternatives to the bank, such as turning the building's lower floors over to the city's public library or to Minneapolis's public transit system for use as a transfer station. The local task force currently awaits a response from the federal agency.

Union Oil Center, 1958
Los Angeles, California
William Pereira & Associates

FOUR YEARS AGO, THE UNION OIL COMPANY sold its 1958 headquarters (bottom), located west of the Harbor Freeway in downtown Los Angeles, to Hillman Properties and the Smith & Hricik Urban Development company with the intention of moving its offices to a new complex on the same site. A 5-million-square-foot commercial development known as Los Angeles Center is scheduled to replace the 12-story Unocal building, the city's first post-World War II high rise, designed by William Pereira & Associates.

Los Angeles Center, being designed by Scott Johnson of Pereira's successor firm, Johnson Fain and Pereira Associates, will comprise five office towers and a 500-room hotel on one-third of the 12.6-acre site. Johnson has reserved the remaining two-thirds of the property for parks and plazas, and cut pedestrian axes through the development to connect surrounding neighborhoods. Despite such amenities, some preservationists decry the impending loss of the existing glass and steel building. They prize the crescent-shaped structure as an example of high-density, site-responsive architecture within their sprawling city, which is not known for its urban sensitivity. Johnson, on the other hand, does not view the structure as a particularly noteworthy example of its period, and emphasizes that the building no longer meets the Union Oil Company's spatial, computer, and telecommunications needs. Pending financing, construction of the first phase of the development—a 43-story office tower—is due to begin next year on a vacant portion of the site. Demolition of Pereira's 1958 building is not planned until 1997.





MARK MICKUNAS

American Federal Savings and Loan Association, 1962
Des Moines, Iowa
Ludwig Mies van der Rohe, Architect

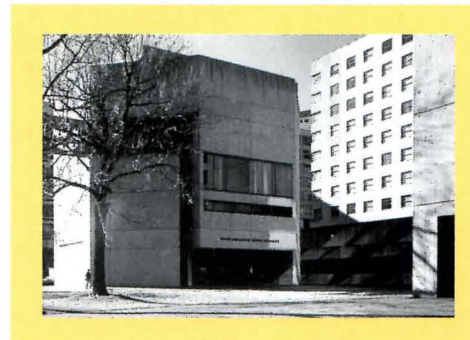
IT TOOK LETTERS FROM FIGURES LIKE LORD Palumbo, the chairman of the Arts Council of Great Britain, to convince enough Des Moines city council members of the value of Ludwig Mies van der Rohe's 1962 American Federal Savings and Loan Association (above). The building became endangered after the bank failed in 1989. "It just looks like all the other buildings that were built in the 1960s," asserts Des Moines Mayor John Dorrian, who was outvoted by four city council members in a decision to designate the Mies-designed bank a local landmark last April.

The vote came after Patrick Fox, president of a Des Moines neighborhood association, and Ralph Christian, architectural historian for the Iowa State Historical Society, led a campaign to save the landmark structure. Fox began collecting signatures and writing to AIA chapters and business leaders late last year, after he heard that a local developer was planning to replace the bank with a parking lot. The building had already been acquired by the Resolution Trust Corporation, and its original furnishings, including several Barcelona chairs, had been sold.

In designing the bank, Mies carefully angled the east facade to preserve views of a nearby Richardsonian cathedral. Appropriately, the Catholic Diocese of Des Moines has offered to buy the structure for its offices.

Third Church of Christ, Scientist and Christian Science Monitor Building, 1971
Washington, D.C.
I.M. Pei & Partners

IN 1990, AFTER WASHINGTON'S CHRISTIAN Science Church complex by I.M. Pei & Partners (below) was nearly sold to the Trammell Crow Company for a new development, local preservationists nominated the octagonal worship hall and its adjacent office building and plaza for District of Columbia landmark



RICHARD LONGSTRETH

status. While not as significant as Pei's Christian Science Church Center in downtown Boston or his East Wing of the National Gallery of Art, the 82,000-square-foot development is a rare example of Brutalism in the nation's capital. Located two blocks from the White House along a major thoroughfare, the poured-in-place concrete structures are an essay in bold urbanism and austere geometry that reflect the philosophy of Pei's partner, Aldo Cossutta, who designed the project. An open plaza with a triangular lawn links the two buildings and serves as a public gathering space.

Both the First Church of Christ, Scientist and two local preservation groups—the D.C. Preservation League and the Committee of 100 on the Federal City—report that the site is not in imminent danger of development, due to its pending landmark designation and the sluggish economy. The parties have agreed to postpone the landmark hearing indefinitely, and are currently negotiating the future of the site.

JULIUS SHULMAN

Entenza House, 1949
Pacific Palisades, California
Eero Saarinen and Charles Eames, Architects

CALIFORNIA CASE STUDY HOUSE 9 (TOP), designed by Eero Saarinen and Charles Eames for John Entenza, editor and publisher of *Arts & Architecture* who launched the Case Study program, is about to be stripped of 2,500 feet of additions, restored to its original 1949 condition, and linked to a 7,300-square-foot addition (below left) on the south end of its ocean bluff site in Pacific Palisades. The refurbished house will serve as guest quarters for owners of a new, two-story structure designed by Barry Berkus of the Berkus Group in Santa Barbara. The new residence will be linked to the Case Study House by a glass-enclosed colonnade attached to its east facade.

Berkus explains that Saarinen and Eames' floor plan has been significantly altered over the years, and nearly half of the original exteriors have been demolished or modified. To lessen the impact of his design for a building more than twice the size of Entenza's house, the Santa Barbara architect has recessed the addition 4 feet below grade and placed its mass away from the site's entrance. While Berkus's scheme will not exactly recapture the rapport that Entenza cherished between his house and the adjacent Case Study 8, also designed by Saarinen and Eames, the new scheme will restore 9's original appearance from the street. ■

Washington Architects' Visions

BEGINNING 200 YEARS AGO WITH PIERRE L'Enfant's original plan for the District of Columbia, Washington, D.C., has long been fertile ground for grand urban schemes. The McMillan Commission of 1901, for example, enhanced the capital city's monumental core, and even Frank Lloyd Wright proposed a bold but never realized scheme in the 1930s for apartments on a prominent knoll overlooking the city's downtown.

Against this background of visionary tradition, the National Building Museum and the Washington Chapter/AIA mounted an exhibition this fall of local architects' ideas. "Visions/Revisions" interprets what could have been and what might be. Presentations of drawings, photographs, and models from more than 50 firms range from commissioned works that were never built to symbolic and practical suggestions for improving the city.

The exhibition is divided into three categories—contextual, monumental, and ideological—each introduced with a well-known historical proposal. The section entitled "ideological" begins with the McMillan Commission's plan. Not surprisingly, many of the architects addressed prominent sites within the jurisdiction of the 1901 scheme. Adamstein & Demetriou, and Maria Laura D'Attilio and Michael Lawrence, designed monuments to freedom of speech on the Mall. In the event D.C. is afforded statehood, Rixey-Rixey Architects proposed an ambitious state government complex, marked with a striking tower beacon on the edge of Georgetown.

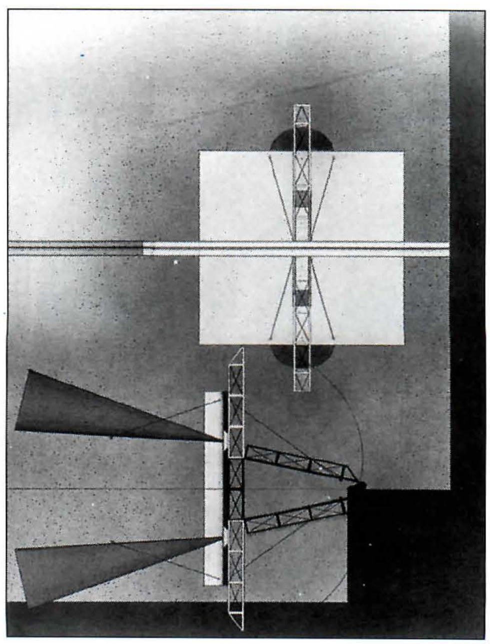
Acknowledging that the city has grown beyond its monumental core without the advantage of a cohesive plan, several architects proposed schemes to rectify the damage of suburban sprawl. With the Capital Beltway as the present-day symbolic border of the city, Neal I. Payton devised a series of "gateways" at the freeway's important traffic interchanges, including a prison for corrupt government officials and a "college for democracy." Cass & Associates and Patrick L. Pinnell designed a music pavilion at Duany & Plater-Zyberk Architects' Kentlands, a new town in Gaithersburg, Maryland (ARCHITECTURE, December 1992, pages 74-77).

The exhibition's three distinct categories, however, seem highly arbitrary, given the collection of historic proposals and current schemes. James L. Palmer's proposal for a new stadium fell under the ideological heading, while the Weihe Partnership's stadium expansion scheme was considered monumental.

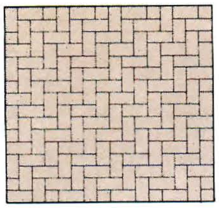
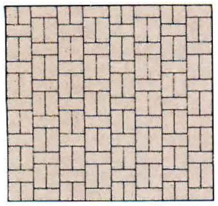
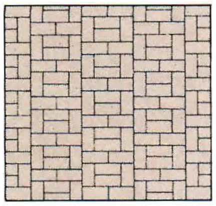
The exhibition remains on display at the National Building Museum through January 31, 1993. —L.N.

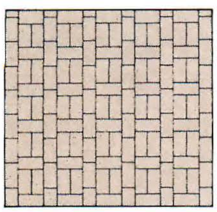
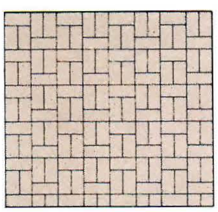
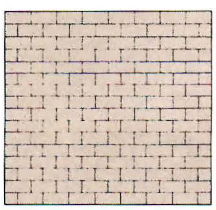
ANICE HOACHLANDER

State of New Columbia
Rixey-Rixey Architects



Monument to Freedom of Speech/Expression
Adamstein & Demetriou

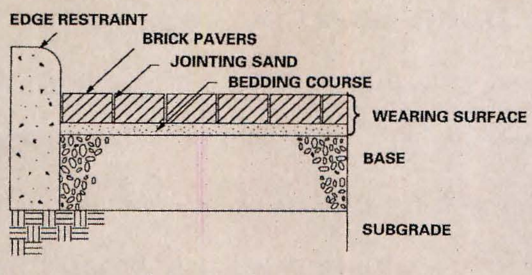




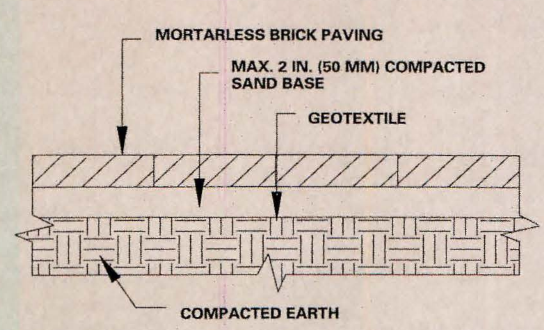

Brick has been used as paving for thousands of years.

The Romans are known to have laid brick in roads crisscrossing their vast empire, some of which still exist. Americans have employed the material since the earliest Colonial days, and brick pathways and sidewalks thread through landmark sites and historic areas across the country. ■ Today, as many property owners and architects attest, brick is timeless, especially for mortarless applications such as sidewalks, patios, plazas, and driveways where vehicular traffic is light. One advantage of brick paving lies in the flexible nature of its foundation and the action of the pavers themselves. In such flexible brick pavements, the subgrade is compacted and may be covered with a layer of crushed aggregate. A layer of bedding sand is added, and brick pavers are arranged upon the bedding in the desired pattern. Sand is then spread into the spaces between the pavers as jointing material. ■ As the whole paving system compacts with time and use, the bricks interact with the jointing sand and base materials to achieve the unique quality of "interlock," which holds the pavers in place and distributes the load through the layers down to the subgrade, enabling the surface to contribute to the strength of the whole system. When properly installed, brick pavements are highly stable and durable. ■ This basic advantage spawns others: because flexible paving is generally used in light-load areas and its interlock provides a strong, stable pavement, no rigid concrete base is required. Because no mortar is involved, a flexible brick pavement may be installed with semi- or unskilled labor, producing a cost savings that supplements the savings afforded by the brick itself. ■ As an architect's design medium, brick is equally flexible. Its basic esthetic appeal is legendary as a material that exudes warmth and elegance. It can be installed in such popular basic patterns as herringbone, running bond, or basket weave, or in creative applications that employ polychromy, ornate patterns, and other paving materials.

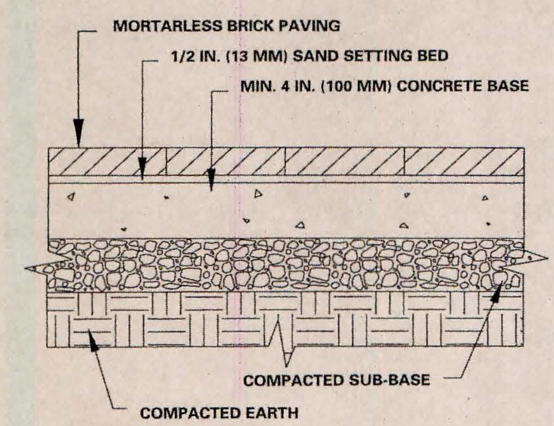
Figure 1.
A flexible brick pavement requires a carefully planned, well-prepared foundation. The top diagram illustrates the basic components of a flexible system, while those below indicate several base *preparations*. Various combinations of gravel, sand, and pavers are used to design a flexible system suited to specific requirements of load, drainage, and subgrade stability.



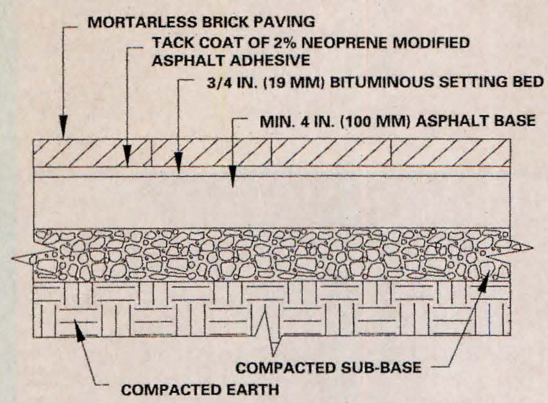
COMPONENTS OF FLEXIBLE BRICK PAVING



MORTARLESS BRICK PAVING—SAND BASE



MORTARLESS BRICK PAVING—CONCRETE BASE



MORTARLESS BRICK PAVING—ASPHALT BASE

Brick is highly practical, as well. I accommodates quick access to under ground public utilities, permitting simpl reconstruction after the work is complete Without mortar joints, damaged brick pa ers are easily replaced. Flexible paving als allows water to filter down to the subgrad thereby reducing puddles, alleviating floo ing and runoff, and eventually replenis ing the water table. Cleaning usually r quires only a simple hose-down. Brick pa ers provide a safe, slip-resistant surface i pedestrian areas.

Planning a Brick Pavement

Designs for flexible brick pavements are varied as their uses, from basic colors an patterns, to other, newer application Whether employed in Colonial, Moder or contemporary projects consisting buildings and pavements, brick has prove itself a medium that's kept pace with t latest design trends.

Apart from some specific traffic co siderations that will be discussed later, t choice of standard bond patterns genera follows taste. Running bond, basket weav herringbone, stack bond, and variations all these patterns exploit brick's modular and aura of tradition.

Brick paving sections can alterna patterns or colors, or may be used wi other paving materials to achieve intere ing effects and to delineate such speci areas as plazas and paths. One popul variation combines running bond with c cular bond placed around planting be and fountains. Round-edged, "chamfere pavers produce bolder lines, enhanci many bond patterns.

Flexible brick systems cover the f breadth of pavement uses. They are m often used in—but by no means limit to—applications where the load is limit to pedestrians, cars, and other light vehi lar traffic. In any application, it is criti that the ground and grade be analyz carefully, that the foundation be plann properly (figure 1), that the correct b materials and pavers be specified, and t the installation be carried out correctly.

Residential applications offer a wealth of opportunities for the use of flexible brick paving. Standard pavers laid in elegant, traditional patterns enhance the appearance of any residential project, be it a herringbone-patterned driveway outside a classic Colonial-style garage (top); a patio of herringbone (above left); or a path in running bond, edged with a mortared brick border (left).

Photo: Maxwell MacKenzie

Brick paving draws on the same time-honored richness that defines brick buildings, walls, and steps. Traditional bond patterns blend well with myriad projects and designs, from a Postmodern commercial development (above left) to a sleek wall and sweeping staircase (above right), to a public park and sculpture garden (left).

Many of the variables to be considered n the design of a flexible pavement are site lependent. Optimally, the **subgrade** will be ree of tree roots or rocks (they should be emoved, and holes should be filled with ppropriate backfill). Proper drainage is esential in all pavements. In areas with a high vater table or soils with high moisture retenion, sub-surface **drainage systems** should be lanned. Depending on the site, drainage an include a layer of washed gravel in the ase or a clay drainpipe (figure 2). Adequate ope should be included in the design to void standing water (a minimum slope of $^1/_4$ ıch per foot is recommended, with a maxiıum grade of 10 percent).

The thickness of the entire paving sysm should be calculated according to its affic load. Considerations should also adress the potential for frost heave, which can ave permanent changes in the soil and ıerefore the paving surface.

A rigid **edge restraint** is required to cure the whole paving system laterally. nce it extends down below the level of the edding course, the edge also serves to hold at crucial layer in place. Concrete, stone, or soldier course of mortared brick set in oncrete may be applied, and the border can planned not only to complement the sign of the pavement, but also to provide a annel for surface runoff. Proprietary borr systems of rigid plastic have also been veloped.

A mock-up of the pavement should be ecuted to illustrate just how the paving will ok, and samples of the actual pavers and dding materials should be inspected closely fore work begins. For brick driveways, lol codes should be consulted.

ecifying the Proper Materials

art from correct planning, a successful xible brick pavement depends on the right iterials, both in its wearing surface and undation. For an outdoor brick pavement signed for pedestrian and light traffic, the hitect should specify pavers in accordance h the American Society for Testing and iterials (ASTM) C902, Class SX. Many brick ipes, colors, and sizes are available with

Figure 2.
Subsurface drainage is critical in a flexible brick pavement. These diagrams illustrate various drainage options employing gravel in the bedding or base, a clay drainpipe, roofing felt, and perimeter drain. Since these elements also affect the strength of the whole system, they should be specified carefully.

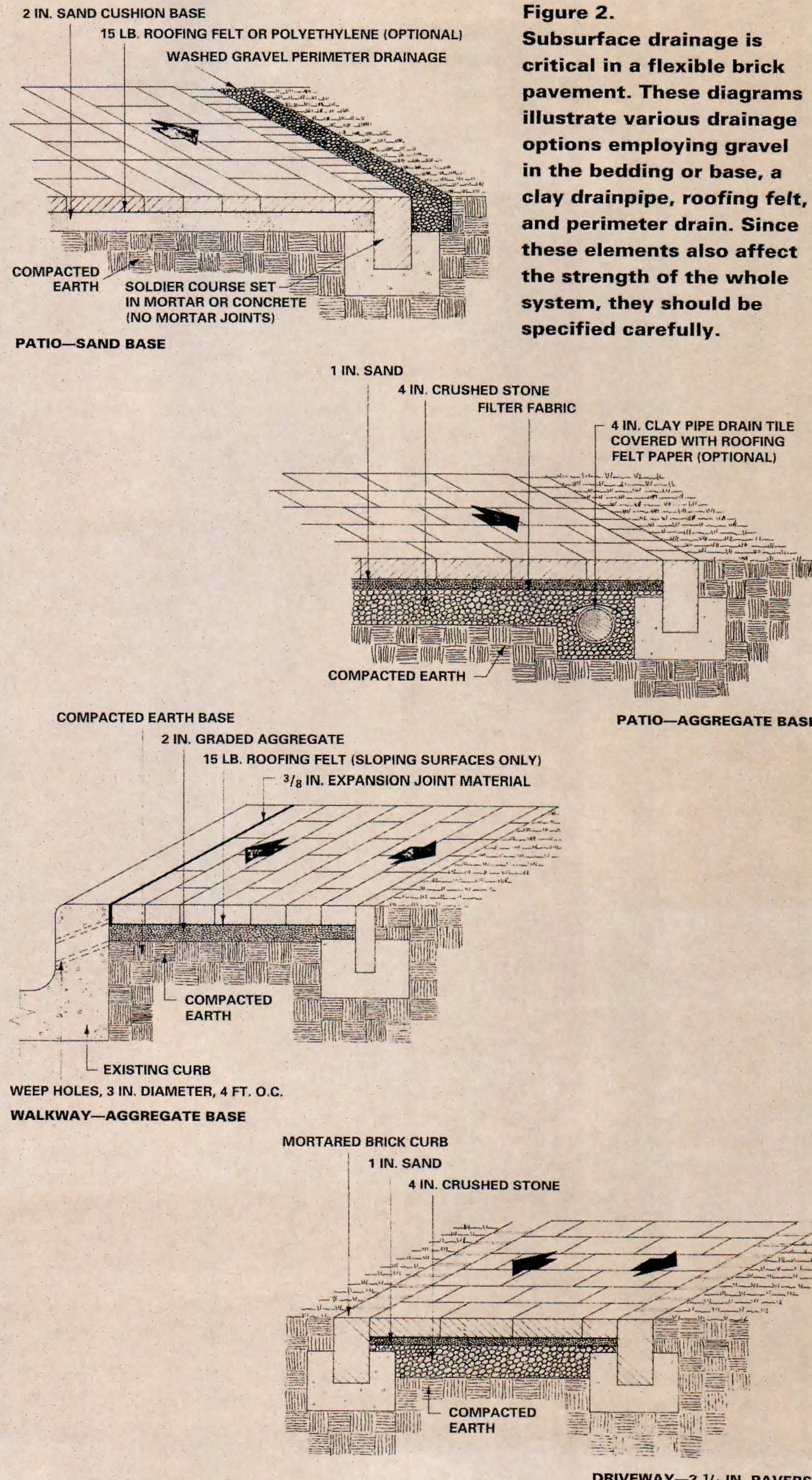


TABLE 1 **Physical Requirements**

Designation	Average Compressive Strength, min, (ps)	Average Cold Water Absorption, max, (%)	Saturation Coefficient, max
Class SX	8,000	8	0.78
Class MX	3,000	14	no limit
Class NX	3,000	no limit	no limit

Physical durability requirements are denoted by "Class" as follows: Class SX is brick intended for use in freezing conditions; Class MX is brick used where resistance to freezing is not a factor; Class NX is brick used for interior applications.

TABLE 2 **Abrasion Requirements**

	(1) Abrasion Index, max	(2) Volume Abrasion Loss, max, cm^3/cm^2
Type I	0.11	1.7
Type II	0.25	2.7
Type III	0.50	4.0

"Type" describes traffic demands. Type I denotes brick exposed to extensive traffic; Type II represents intermediate traffic; Type III signifies low traffic.

TABLE 3 **Tolerances on Dimensions**

Dimension, in. (inclusive)	Maximum Permissible Variation from Specified Dimension, plus or minus, in.		
	Application PS	Application PX	Application PA
3 and under	1/8	1/16	no limit
Over 3 to 4	3/16	3/32	no limit
Over 5 to 8	1/4	1/8	no limit

"Application" describes use. Application PS represents general use (usually with a mortar joint); Application PX denotes use in a mortarless system or with a special bond pattern; Application PA signifies special architectural effect.

this rating, and the standard signifies th paver's strength and ability to withstan weathering elements (tables 1–3).

C902, Class SX is defined as a pave "intended for use where the brick may b frozen while saturated with water" and ma be specified for walkways, patios, pedestria plazas and residential driveways. Specifi physical requirements in C902 include a average compressive strength of 8,000 pound per square inch and a maximum averag cold water absorption of 8 percent.

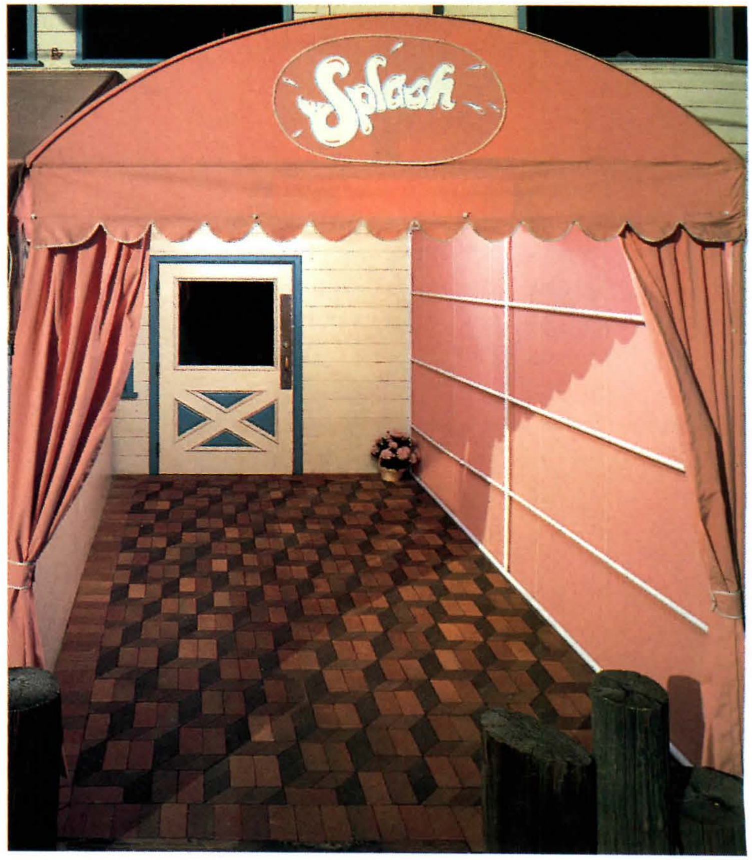
Paving bricks, used flat or on edg should be specified according to the desire pattern. For maximum design flexibility, it recommended that the brick be twice as lon as it is wide. Pavers can be specified wit rounded or beveled edges called **chamfer** These chamfers emphasize bond patter and reduce standing water, which in tur assists in drainage and reduces slippery pav ments and limits the height variation b tween pavers. In areas where snow remov must be considered, the chamfers help pr vent chippage due to shoveling.

A flexible brick pavement is only good as the **base** beneath it. In areas of hig pedestrian traffic, in residential driveways, in areas where drainage poses a problem, base layer of 3/4-inch or smaller aggrega should be laid over the compacted eart For the **bedding course**, which is laid over t compacted earth or gravel base, washed sa no larger than 3/16 of an inch should be us (ASTM C33 Concrete Aggregate is accep able). The **jointing sand**, which will be spre over the brick pavers and into the spac between them, should be smaller than th used in the bedding course, and maso sand graded to ASTM C144 is the standa

In some instances, a membrane may useful. When laid between the sand setti bed and the base, this material helps to ke sand from sifting down into the base.

Pavement Installation

Once planning has been completed and t appropriate materials obtained, a flexib brick pavement can be installed relativ quickly. Because there is no mortar involv brick pavement doesn't require the skill



Paving has been enhanced by new brick colors and shapes. Some allow bond patterns to alternate colors (below), while others create ornate designs (left), adding an extra dimension to the esthetic impact of a brick pavement. Trompe l'oeil cubes lead diners into a fine restaurant (above).

labor of masons, doesn't need to be completed at one time, and requires no curing.

On site, brick pavers should be stored off the ground. Base and bedding course materials should be stored separately and covered with weighted plastic to maintain dryness and wind protection. Installation during rain or snowfall should be avoided.

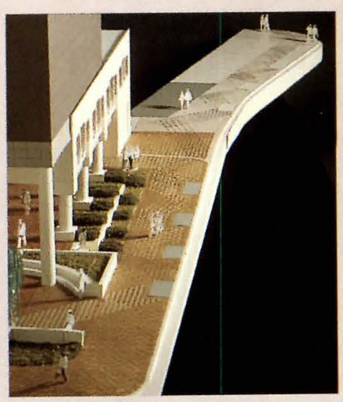
The ground must be compacted and stabilized both for strength and drainage. The base should also be well-compacted to avoid filtering-down of the bedding sand. Rammers, vibratory plates, or rollers may be used, depending on the compaction needed—95 percent maximum density is recommended.

The total thickness of the base should be calculated according to specific strength, drainage, and heave-resistance requirements, and should be no less than 4 inches. Base materials should be laid in consistent, well-packed layers that build up to a surface that will match the intended elevation. Rigid **edge restraints** are installed next, and if they consist of or include concrete, they should be well-cured before pavers are laid. One or two sides should be left unedged, with a board set as a temporary form. The final edge restraints will be set in place after the bricks are installed, so that less brick cutting is required for final adjustments.

Bedding course sand is then spread over the base materials. It is smoothed over with a board known as a "screeder," which runs along the edge restraints and is notched a bit higher than the height of bedding sand. This layer, which typically measures 1 to 1.5 inches, should follow the intended grade of the final wearing surface.

Pavers may now be placed in the desired pattern. A space of $^1/_8$ of an inch or less should be left between pavers. Bricklaying varies with specific patterns. A 45-degree herringbone pattern, for instance, should be laid parallel to an edge, while a 90-degree herringbone should start at a corner or the centerline. When using a running bond pattern, the pavers' long edges should be placed perpendicular to the flow of traffic. Whole pavers should be placed first, and then partials cut cleanly to

The brick pavement at Bethesda Gateway serves to integrate sidewalk, plaza, and structure, employing the same palette as the office building (above). The pattern, which weaves red, gray, cream, black, and blue, extends through an arcade and right up a wall mural (right). Seen in a model (bottom), the pavement pattern wraps around the project's corner frontage.

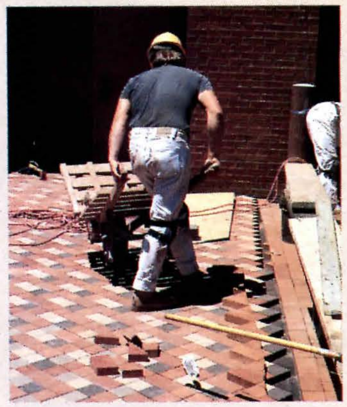


;idewalk Art

;outhbound pedestrians on he east side of Wisconsin venue in Bethesda, Mary-and, notice something un-sual as they approach the Villow Street intersection: he sidewalk changes. Bands f color run through the tandard brick found along he rest of the avenue. A loser look shows this pat-ern extending into the plaza f the Bethesda Gateway ffice building and around he corner.

Artist Jerry Clapsaddle esigned this pavement after udying the material palette at architect Leo Sagasti of 'ard Hall Associates in airfax, Virginia, had devel-ped for the structure: red ick, cream or gray concrete olumns, black window ames, and blue tile accents. he artist worked the colors to a series of modified her-ngbone-bond patterns that ift according to sidewalk ction, plaza, and arcade.

Clapsaddle's artful mix brick paving and building ements not only pleases the e and instills a sense of ace, but also reflects nlinear pedestrian pat-ns. The inclusion of this rk was part of a broad ef-t by local planners to inte-te art into public and com-ercial spaces.



Careful installation of a brick pavement is always critical, especially at Bethesda Gateway, where workers had to *follow an* intricate design (below, left). The range of brick paver shapes and sizes employed in the modified herringbone-bond pattern required careful bedding preparation (left).

Artist Jerry Clapsaddle developed the pavement design from a style of painting that weaves colors into intricate patterns. As his drawings (right) attest, the pavement, when taken as a whole, resembles a fine tweed fabric. The design serves to echo pedestrian movements through the project, down the street, and around the corner.

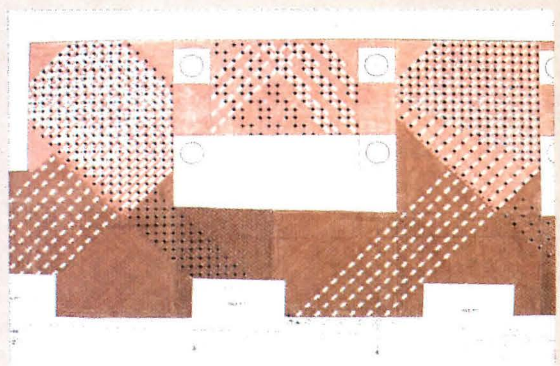
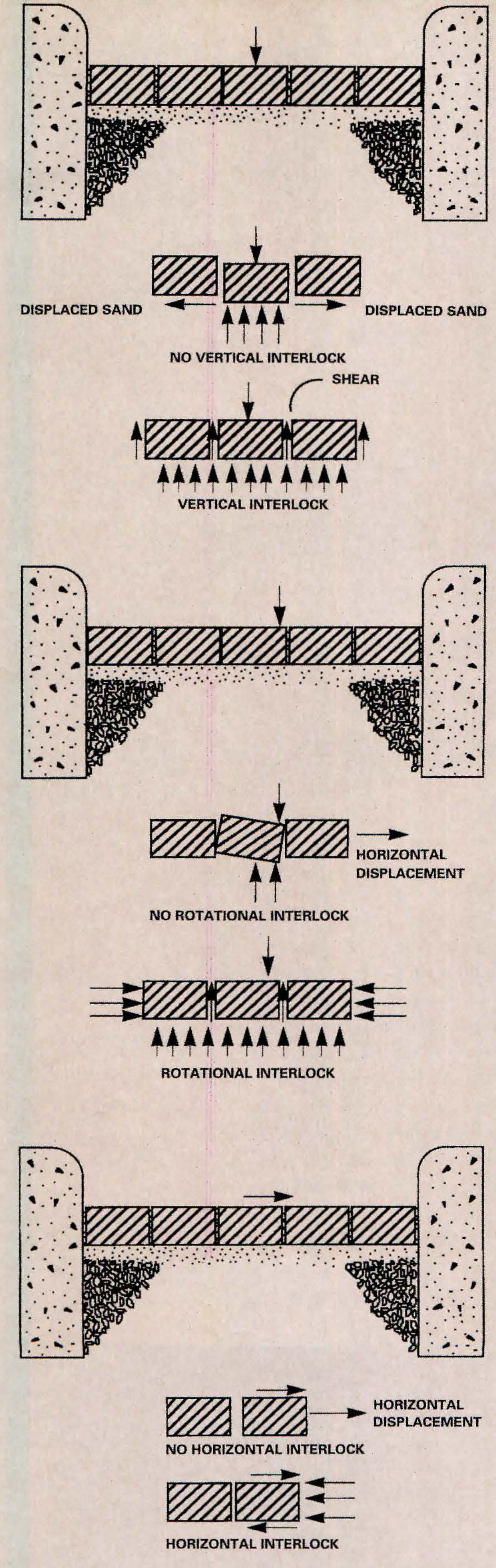


Figure 3.
Interlock, the key to a stable flexible brick pavement, is formed by the interaction of pavers, base and bedding materials, and jointing sand. As these diagrams illustrate, interlock distributes vertical and rotational loads down to the subgrade and shifts horizontal forces out to rigid edge restraints.



size. Alignment should be checked fron time to time during the process, so tha simple adjustments (either shifting the siz of gaps or redoing single paver rows) can b made to assure a clean, consistent bon pattern throughout.

Jointing sand is then spread into th spaces, usually several times, until the brick are fully stabilized. A plate vibrator shoul be used to compact the pavement syster and initiate the process of interlock fo vehicular pavements. To avoid shifting o breaking, the compactor's plate area shoul be at least 2 feet square and produce 3,00 to 5,000 pounds of centrifugal force. Th compactor should be used at least 3 fe away from an unrestrained edge. Befor compaction begins, temporary edge guid should be removed and replaced with pe manent edge restraints.

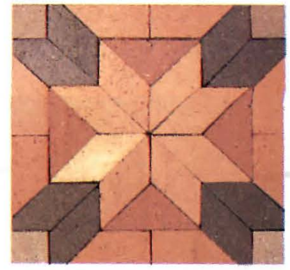
The brick pavement should be planne to lie flush with any adjacent pavement, an pavers abutting drains or gutters should b calculated to lie no more than $^{3}/_{16}$ of an inc above (and not below) the level of the drainage systems.

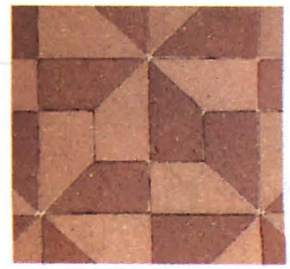
System Interlock

Once the pavement is completed, the fle ible brick system itself goes to work to achie the desired threefold state of interlock. Ve tical, rotational, and horizontal interlo occur as the pavers settle and the beddi and jointing materials interact, aided by t rigidity of the edge restraints (figure 3).

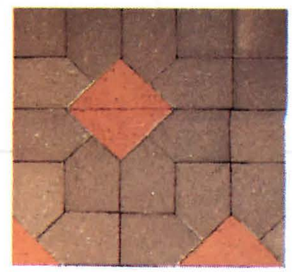
Vertical interlock is present when single paver doesn't sink under a load—t system's compactness and interaction d tribute the load beyond the single pav and down through layers to the subgrad With rotational interlock, the paver wo tilt or rotate on its horizontal axes wh force is applied to an edge, but will alwa remain flat.

Horizontal interlock is most critical areas where traffic may force the pavers shift laterally. Most common in roadwa this condition, known as "creep," occu where horizontal braking and accelerati forces put great strain on individual pave Horizontal interlock transfers these for

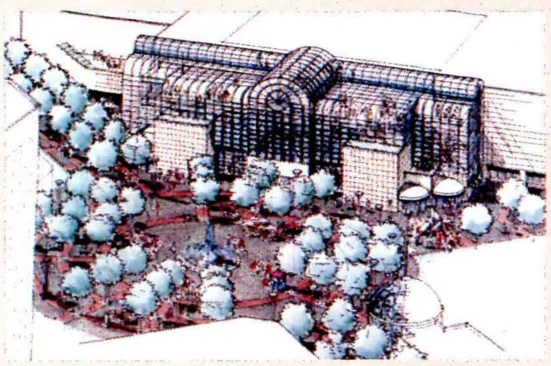


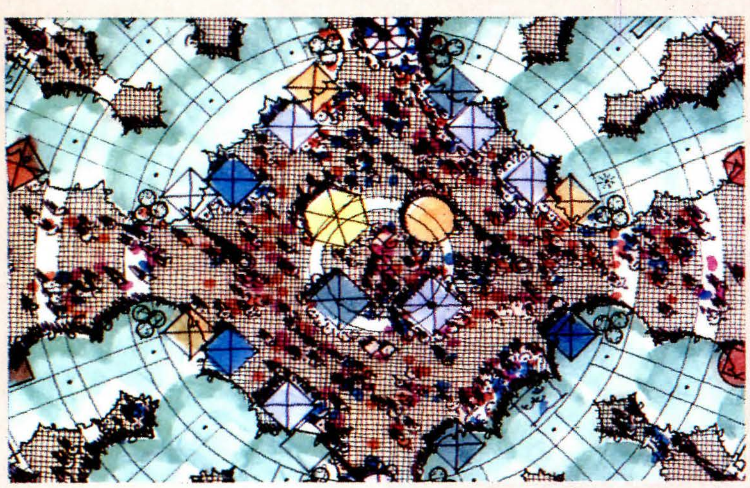


They may not look it, but these festive, colorful pavements are made entirely of flexible brick systems. Composed of precut component bricks combined to form intricate patterns (right), these pavements are also highly stable because their pieces fit snugly together like the pieces of jigsaw puzzles.



Flexible brick sidewalks extend to a series of transit malls at the Grove (left). Drawings illustrate how the pavement was incorporated into the overall creation of a downtown public space (below). A bird's-eye view reveals the circular pavement pattern radiating from the central fountain (bottom).





Classic Plaza

The Grove is the first open public space in downtown Boise, Idaho. A thriving area of open-air markets, performances, and public gatherings, it owes much of its success to an extensive flexible brick pavement.

The Portland, Oregon, office of Zimmer Gunsul Frasca Partnership, in association with Hummel, La Marche, Hunsucker Architects and Jensen-Belts Landscape Architects, chose brick pavers and bond patterns to define specific areas. Border strips of gray 4 by 8 pavers laid in a herringbone pattern are combined with fields of brown I-shaped bricks laid in running bond, creating square sections along walkways and transit malls and a large circle in the main plaza.

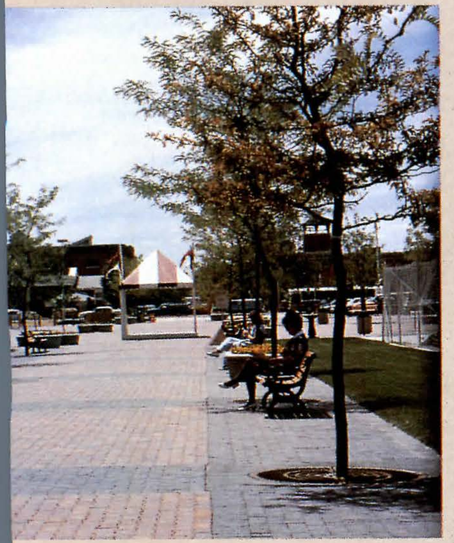
The flexible system's strength and economy have proven ideal for this extensive project, and the pavers' colors and scale help to set the inviting tone of what ZGF architect Brian McCarter calls a "classic plaza." Designers have extended the system to new phases of the development.

through the joints and pavers to the rigid edge restraints.

In areas sustaining vehicular loads, pavement pattern is as critical to interlock as are the quality of materials and installation. Herringbone is known to distribute "creep" forces more evenly than running bond or basket weave and is recommended for driveways.

Maintenance Advantages

Brick pavements are easy to maintain. Cleanup usually requires only hosing them down. When a cleanser is deemed necessary, acid solutions should be avoided. Light brushing with plain water will remove most surface dirt. One advantage of brick is its quick drying capacity, so in general, coatings should not be applied—they may trap moisture or salts that could damage the bricks and make stains more difficult to remove.



The Grove exploits brick's human-scale appeal, even in the fountain, which children can walk through (above). A walkway of square design elements (left) employs the same variation of brick colors, shapes, and bond patterns used in the circular motif shown in detail (below).

Design Opportunities

Brick manufacturers are working hard to expand pavement design possibilities. Many paver sizes and colors are available, as are such shapes as squares, rectangles, and hexagons. Some pavement systems come designed in ornate patterns that integrate component pavers of different colors and shapes. These are precut to fit together tightly and securely like the pieces of a jigsaw puzzle, which serves the pavement's stability as well as its design.

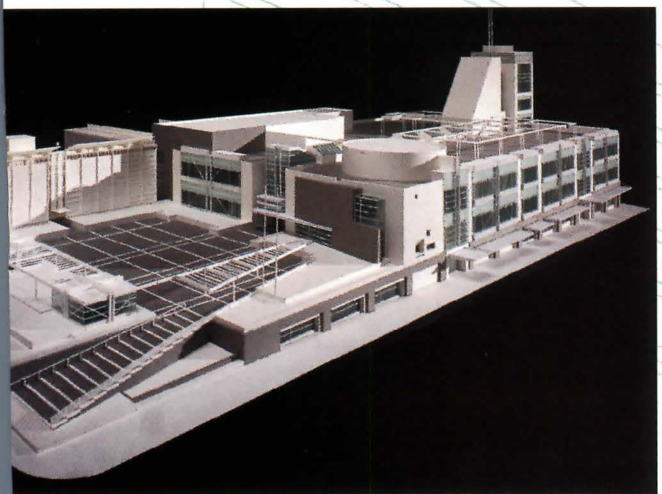
Offering a variety of styles, structural stability, and economic value, flexible brick pavements are anything but pedestrian. Ingenuity, proper planning, and careful installation will almost always assure their success.

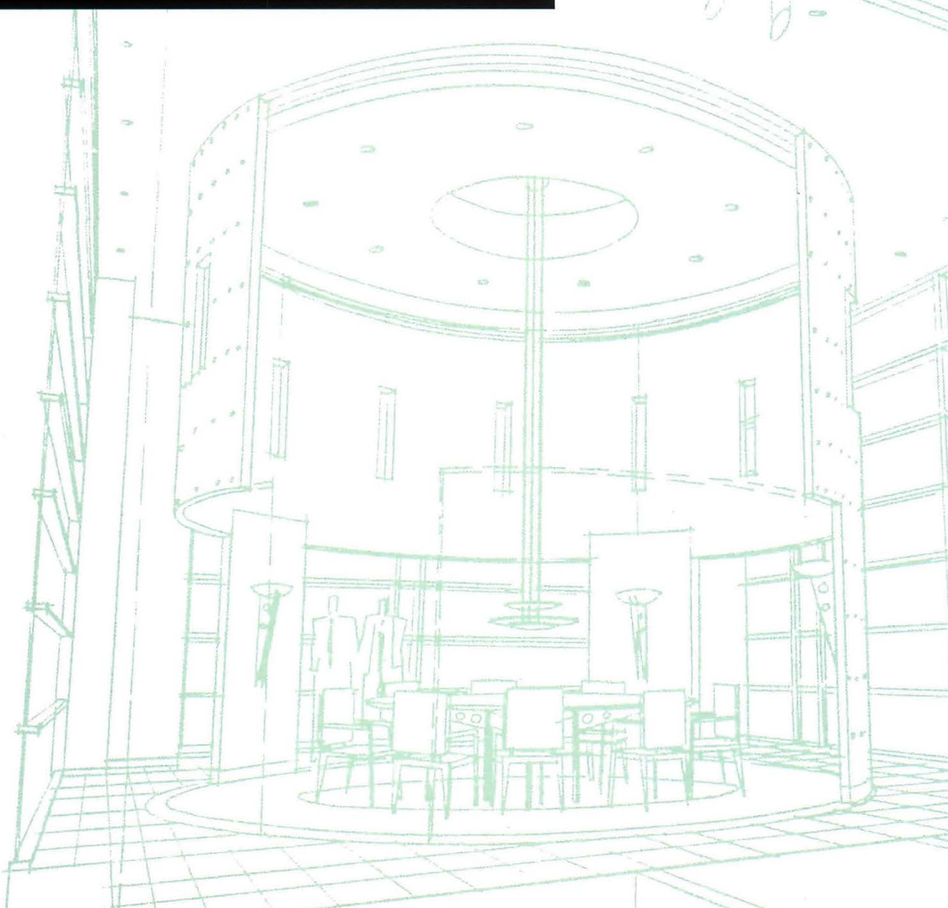
For more information regarding brick paving systems or any other brick applications, the Brick Institute of America can provide the architect or contractor with a wide range of detailed publications.

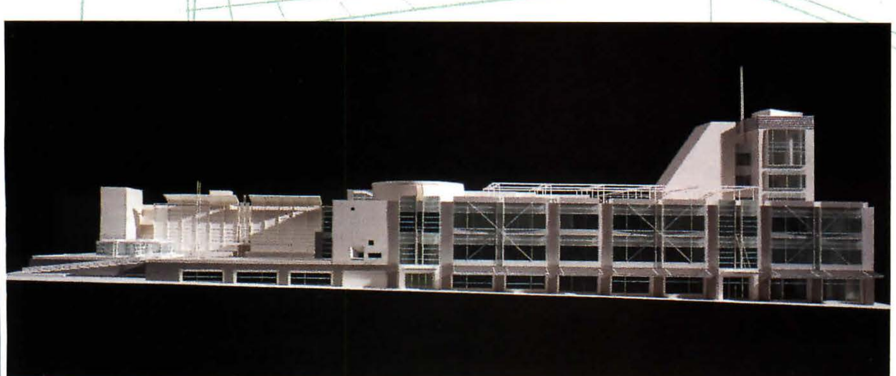
For a complete catalog and list of services available to architects, contact:

The Brick Institute of America
11490 Commerce Park Drive, Suite 300
Reston, VA 22091; (703) 620-0010.

Municipal Conversion







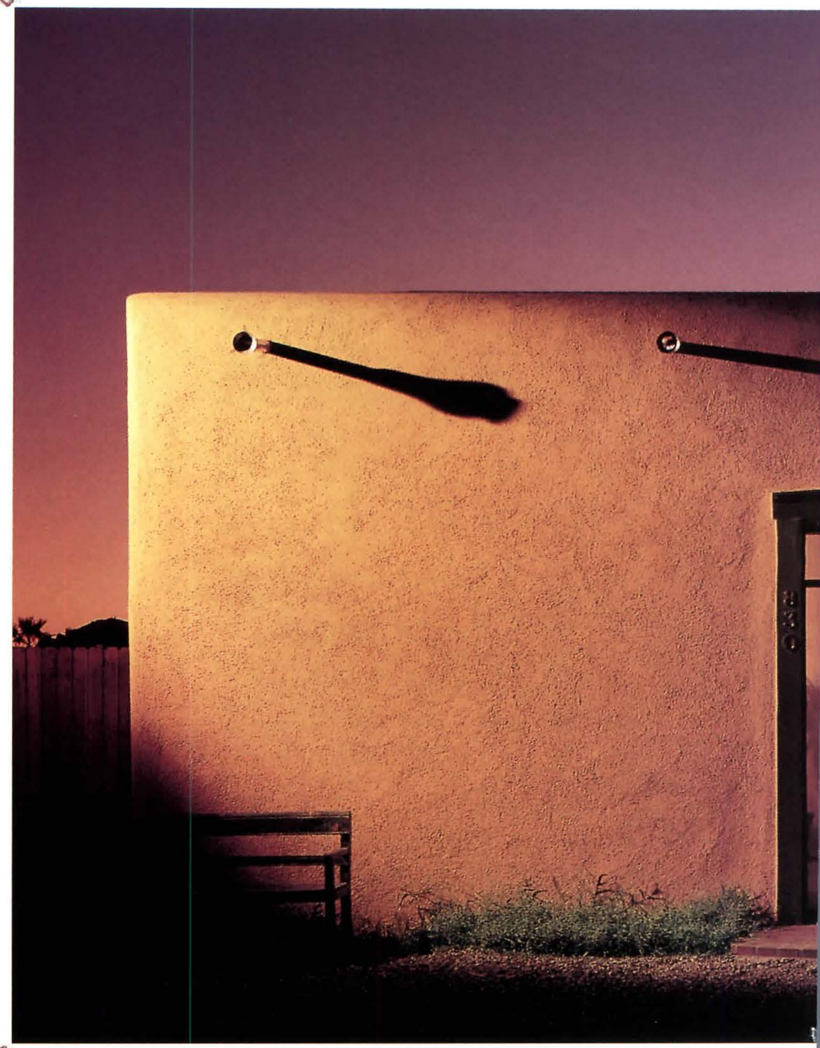
Metro Headquarters
Portland, Oregon
Thompson Vaivoda Cole and Associates

PORTLAND'S MUNICIPAL AUTHORITY, THE Metropolitan Service District, oversees the city's public transportation system, the Performing Arts Center, and the Oregon Convention Center. Two years ago, Metro commissioned the local firm of Thompson Vaivoda Cole and Associates to convert an abandoned Sears department store (below) into a new headquarters for the municipal body, charging the architects to develop a strong visual presence appropriate to the building's prominent downtown location in Portland's Lloyd District. Comprising a block-long site, the existing Sears store was an amalgamation of four undistinguished buildings completed from 1929 to 1966.

Thompson Vaivoda and Cole stripped the existing building down to its original concrete structural frame and is now recladding the entire complex in stone, white brick, and metal panels, inserting large windows of pale green glass. Along the south elevation, they incorporated an existing, six-story stair tower (below and bottom) to house a staff lounge and a circular conference room (left).

To create a ceremonial entrance on the north elevation, the architects carved out a new landscaped courtyard (top left). An existing, one-story addition to the east was converted to house a daycare center. To accommodate the growing agency, they created 85,000 square feet of office space atop two floors of parking, which will be leased when needed. The headquarters is currently under construction and scheduled for completion next year. —LYNN NESMITH

IN THIS CASE, THE BEST WINDOWS ON EARTH ARE ALSO THE BES



When Tom Wuelpern of Rammed Earth Solar Homes, Inc. began planning the Meyer Street Project, one goal was uppermost in his mind. Tom wanted the new buildings to blend seamlessly with those in the adjacent Barrio Libre National Historic District; an area that was once the heart of Tucson, Arizona's Hispanic community. Tom and his partners were immediately drawn to Marvin Windows and Doors, given Marvin's reputation for historical replications.

From the outset, they knew that getting the right windows and doors would require some tough demands. But as the project progressed, they learned a few things about their supplier.

They learned that Marvin could provide virtually any shape or size jamb extension — even those for adobe walls up to 26" thick. And Marvin could save them time and money by factory-mulling all the assemblies and by factory-installing the special casings and crown molding Tom requested.

And, they learned Marvin could provide a Southern Low E glass coating specially formulated for the hot, desert climate. Plus, the coating was virtually invisible, so energy costs could be reduced without sacrificing aesthetics.

Above all, the people at Rammed Earth learned of Marvin's willingness to tailor its products to their

PRESERVING MODERNISM

The phrase "historic preservation" stirs up images of dilapidated Georgian, Queen Anne, or Art Deco structures saved from the wrecking ball by injunction-wielding activists. But aging Modern buildings—the children and grandchildren of the Bauhaus—are becoming preservation's latest challenge. As yet unprotected by landmark laws, post World War II architecture is increasingly being recognized as a valuable resource, saved by owners and architects sensitive to the merits of its high-minded design.

One of the advantages of preserving Modern buildings is that, in many cases, the original architects are available to modify their projects, as was the case with Boston architect Charles F. Rogers, who recently added another colorful wing to his 1977 Science Center at Wellesley College.

However, some clients bypass the original architect, deciding a fresh look for their aging buildings is needed. John Johansen's 1971 Mummers Theater in Oklahoma City, which was closed, shuttered, and narrowly escaped demolition, now finds itself reopened as Stage Center, thanks to the efforts of the Arts Council of Oklahoma City. Local architect Rand Elliott refurbished the quirky assemblage (above), fine-tuning only the functional aspects of Johansen's structure while remaining faithful to its original design. Similarly, a school district in Columbus, Indiana, decided to tap Boston architects Leers, Weinzapfel Associates to enliven a pair of schools originally designed by Chicago architect Harry Weese.

Other renovations are spurring reinterpretations of postwar abstraction for new buildings. A group of four buildings dating from 1928 to 1981 that made up the St. Paul Companies' St. Paul, Minnesota, corporate headquarters, encouraged Kohn Pedersen Fox Associates to return to its Modernist roots in designing a new complex for the downtown insurance agency. Craig Hartman of SOM was similarly inspired by Pietro Belluschi's 1974 IBM tower in Baltimore, the harbinger of the city's Inner Harbor revival, in adding a new tower to the site.

Even the most mundane Modern office high rises are being upgraded, as an article in our technology section reveals. Changes in zoning laws for new construction are prompting owners of aging 1960s and '70s downtown towers to retrofit their properties instead of razing them to build anew. But whether the reasons be esthetic or economic, preservation of Modern landmarks will continue to demand architects' attention. ■

Stage Center
Oklahoma City, Oklahoma
Elliott + Associates, Architects

STAGING A COMEBACK

PRESERVING MODERNISM

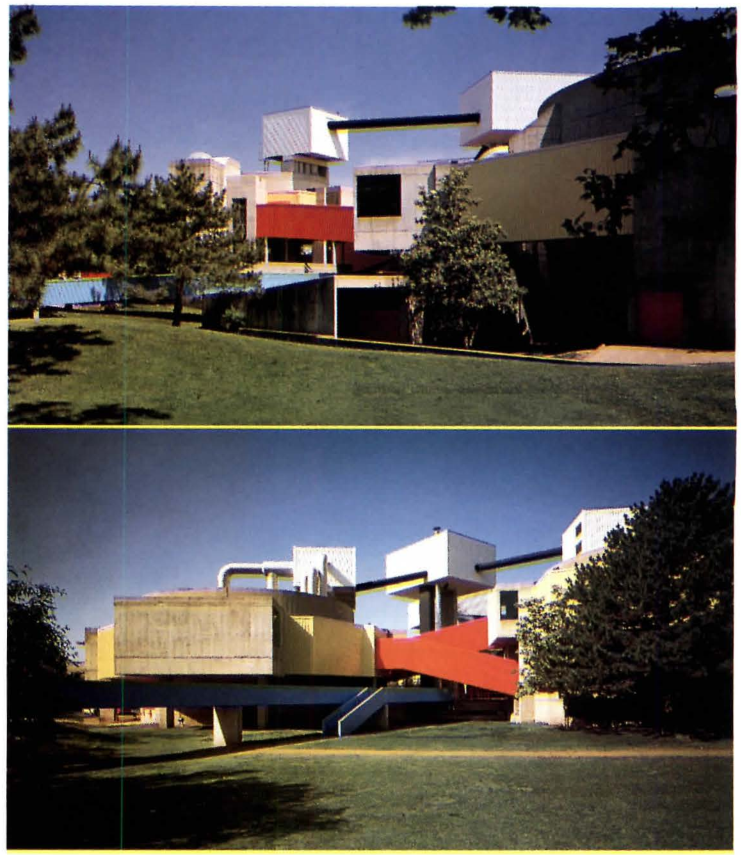
ARCHITECT JOHN JOHANSEN DESIGNED HIS acrobatic Mummers Theater to be altered, but not even he could have foreseen the misfortunes that would befall his masterpiece over the next 20 years. Opened in 1971, and widely acclaimed as one of America's great Modern theaters, the Mummers was subsequently reviled, neglected, nearly demolished, and eventually locked and shuttered as an embarrassment. "Oklahoma City was coaxing culture to come in and had in mind an image of Lincoln Center," Johansen explains, "I gave them this instead. I can sympathize with them."

But Johansen's run of bad luck has finally ended with the sparkling renovation and reopening of the Mummers as Stage Center. Oklahoma City architect Rand Elliott has preserved the building's tough, industrial exterior while tactfully solving most of its structural, mechanical, and functional problems. Deferring to Johansen's design with a light touch wherever he intervened, Elliott has saved a Modern architectural landmark that Oklahoma City may not have deserved but may finally learn to love.

The original Mummers violated most of the rules of traditional theater design, substituting brashness and calculated imperfection for Beaux-Arts formality. Instead of porticoes, foyers, prosceniums, and classical symmetry, Johansen offered three discrete concrete pods, linked by colorful ramps and bridges and crowned by two tall cooling towers that were clearly inspired by nearby grain elevators and cotton gins. One unit housed a 650-seat thrust stage, the second a 400-seat theater-in-the-round, the third an experimental children's theater. Offices, rehearsal space, and a dance studio were all shoehorned into the basement. Johansen insisted that the basic plan derived from electronics, and indeed the original drawings display some of the intricacy of a circuit board, with the theaters as terminals and the ramps and bridges as the wiring.

The Mummers was complex, quirky, and challenging. Patrons complained that they didn't know how to get into it, and once they did, they immediately got lost. Members of the city's powerful Petroleum Club wrote $1,000 checks to plant out its concrete and steel exterior with trees and shrubs. Having almost no insulation, the theater proved extraordinarily expensive to operate. And as the coup de grace, the repertory company for which it had been designed folded after two seasons, to be succeeded by well-meaning amateur groups that hadn't a clue as to how to use Johansen's innovative spaces.

The Mummers might have remained an exotic architectural relic except for the tireless efforts of the Arts Council of Oklahoma City. The council bought the theater from a local foundation in 1987 and embarked on a $2.6 million fund-raising campaign to restore it as the



Rand Elliott repaired the 1971 theater's colorful metal ramps (above) and added a new concrete-enclosed elevator tower and metal-clad bridge (left in top photo) to provide handicapped access to the theaters. He installed a new thermal storage system for the building that relies on cheaper nighttime electricity. Obsolete cooling towers remain intact (facing page) as important architectural elements of the Johansen original. Oklahoma City's Arts Council will eventually remove dense landscaping (top) now obscuring multipurpose Stage Center.

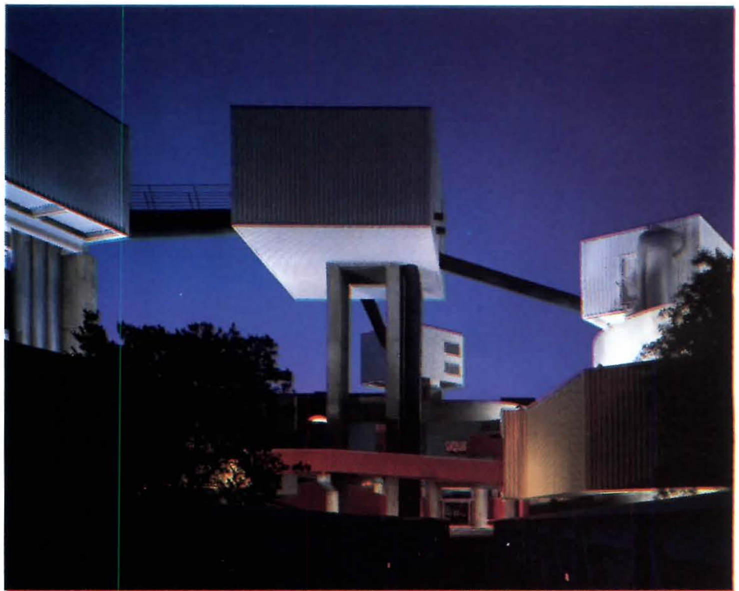
centerpiece of a new downtown cultural district. The following year, the council sponsored a limited design competition and chose Elliott + Associates as the architects. "We knew we could not force Oklahoma City to like the building," Principal Rand Elliott recalls, "but at least we had a chance to erase all the old problems." Elliott solved the problem of Johansen's inscrutable entrance with a new concrete porte-cochere that gives the building a commanding presence on the street and also eases the public's anxieties about security and bad weather. The architect cleaned the concrete, repainted and rebuilt the ramps and bridges, and installed a new exterior lighting system that animates the building's bold sculptural forms. To meet the needs of the disabled, Elliott installed ramps and elevators in the lobby without violating the integrity of the original structure. A new elevator tower and metal tube on the west side, for example, look as if they had existed from the beginning.

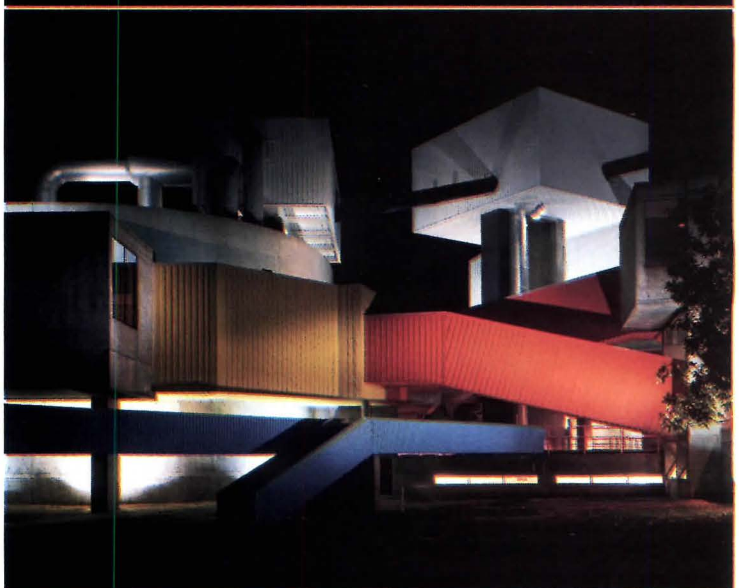
Elliott designed a new exterior lighting system to dramatize Johansen's kinetic composition at night (right, top to bottom), installing 176 metal halide fixtures. To connect new elevator in reception pod (facing page) to theater, he enclosed an existing open-air bridge in metal (above) to simulate original ramps.

Originally, the theater was heated and cooled by massive units set on pedestals above the building. Dramatic architectural sculptures, they worked poorly. Elliott kept them as important architectural elements while installing a new thermal storage system, which makes ice at night, when electricity is cheapest, and releases cool air during the day. The theater now has 32 zones instead of only two, and its energy costs are a fraction of what they were originally.

Inside, Elliott's modifications are equally discreet and self-effacing. Johansen's Art Deco-inspired ticket booth, designed but never built, was constructed in the lobby, a few steps from the original coatroom, transformed into a gift shop. The upstairs rehearsal room has been converted into a cabaret room, with a dome of string lights and a new circular skylight that looks straight up at the cooling towers. The walls and floors of the walkways, originally a uniform dull gold, have been refinished in bold primary colors, while all the interior concrete has been sandblasted to add texture and warmth. None of these changes detracts from the intimacy and playfulness that made the original Mummers so memorable.

The two theaters are still spare, intimate rooms, with seating that reaches out into the





performance area. On the main stage, Elliott cut back two wing walls to improve sight lines and ease the rake of the stairs. He also rebuilt the arena stage floor. Otherwise, the theaters look as they did on opening night, right down to the chair upholstery.

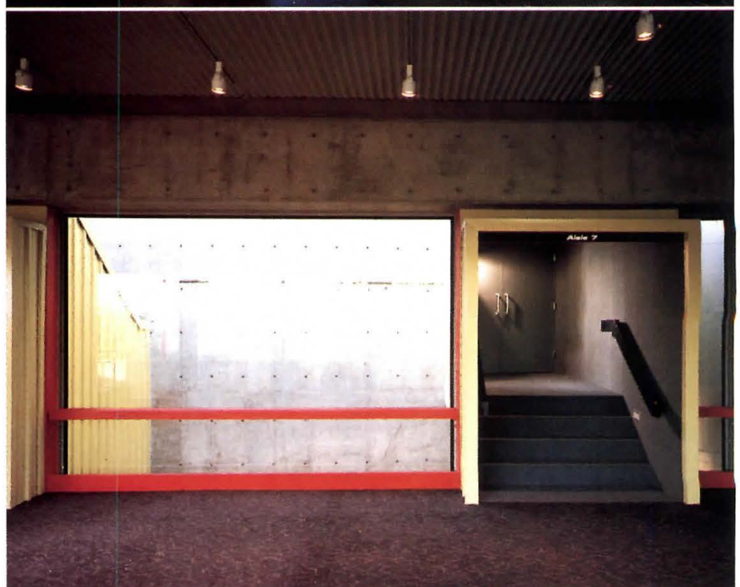
Yet Johansen never intended for all the drama to be on stage. He wanted the building to be a set, too, filled with benign surprises that left some playgoers feeling like Alice after she'd fallen down the rabbit hole. Elliott has done his best to normalize circulation with signs and color. But the basement level remains a maze, and deciding which ramp to use still requires an act of divination.

When the theater reopened this spring, the brilliance of Johansen's original design and deftness of Elliott's renovations were both confirmed. The ramps and balconies became stages on which a barbershop quartet and an a cappella chorus took turns entertaining audiences. Actors rehearsed scenes in the lobby while a jazz quartet swung softly in the arena stage. The entire building became a swirl of music and movement, a genuine playhouse that belied its tough, dense exterior.

The Arts Council continues to raise money for landscaping and a new sound system for the main theater, and by next year hopes to have a new resident company. In the meantime, Stage Center has become a temporary home for concerts, touring shows and amateur theatricals. To help balance its books, the Arts Council hosts conferences and seminars in the theater. It is also leasing its unused office space to other nonprofit arts groups, including the local chapter of the AIA.

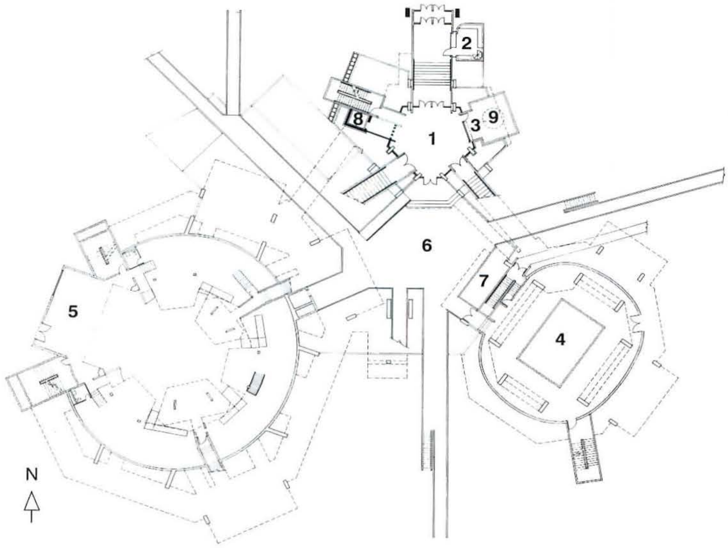
Johansen says that he is delighted with Elliott + Associates' renovation, pointing out that his bold, eccentric signature has been underscored, not erased. Adds Elliott, "We wanted to make old and new into a seamless piece so that people would perceive nothing except that we had freshened and lightened it up." While it is too soon to say whether Stage Center will be an artistic and financial success, this Modern landmark can once again be experienced as one of the most original and provocative American buildings of the last 25 years. ■

—DAVID DILLON

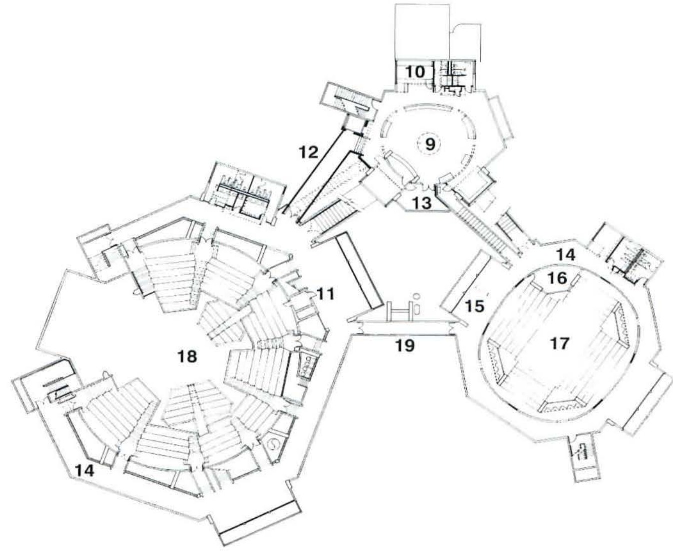


Elliott converted coatroom into gift shop (top right). Corridors surrounding theaters are refinished (center right) and double as art galleries (bottom right). Original rehearsal room is now a cabaret, with new skylight and dome of string lights (facing page). Basement level (above) has been remodeled into offices for theater and spaces for nonprofit groups.


Mary Noble
Theatre



GRADE-LEVEL PLAN



GALLERY-LEVEL PLAN

Pinwheel plan recalls electronic circuitry (top). Elliott improved sight lines and seating rake in main theater (facing page) and arena stage (bottom right), without altering their original character. Johansen-designed ticket booth was built in lobby (below). Stairways from lobby to stage are painted and carpeted to orient theatergoers (top right).

1 LOBBY
2 BOX OFFICE
3 STORE
4 ARENA STAGE
5 BACK STAGE
6 PLAZA
7 POOLS
8 ELEVATOR
9 SKYLIGHT
10 KITCHEN/BAR
11 WHEELCHAIR LIFT
12 RAMP
13 BALCONY
14 GALLERY CORRIDOR
15 LOUNGE
16 CONTROL ROOM
17 ARENA STAGE THEATER
18 THRUST STAGE
19 BRIDGE

STAGE CENTER
OKLAHOMA CITY, OKLAHOMA
ELLIOTT + ASSOCIATES, ARCHITECTS

CLIENT: The Arts Council of Oklahoma City
ARCHITECT: Elliott + Associates Architects, Oklahoma City, Oklahoma—Rand Elliott, David Flotz, Bill Yen, Eva Osborn (design team)
LANDSCAPE ARCHITECT: Warren Edwards
ENGINEER: PSA
CONSULTANTS: Ken Dresser (theater); Phil Easion, Hunzicker Lighting (lighting); On-Line Graphics (signage fabrication)
GENERAL CONTRACTOR: Yordi Smith Pickel
COST: \$1.9 million—\$29.68/square foot
PHOTOGRAPHER: Bob Shimer/Hedrich-Blessing

Wellesley College Science Center Expansion
Wellesley, Massachusetts
Perry Dean Rogers & Partners, Architects

COLLEGIATE PROGENY

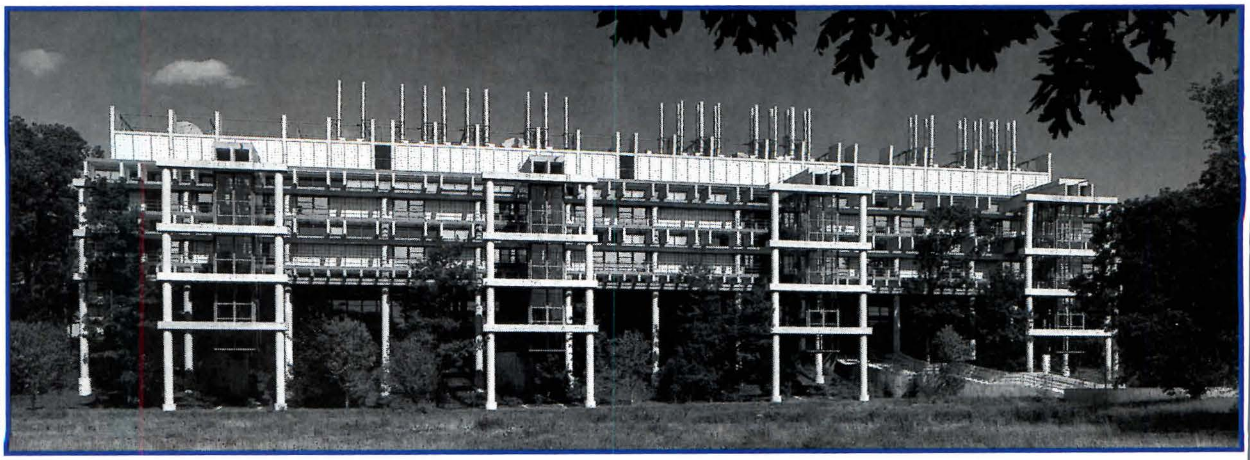
New addition's corrugated, metal-clad facade (right in facing page photo) contrasts with open concrete frame of 1977 Wellesley College Science Center (below). Interior spiral staircases are daylit through sculptural roof monitors (above).

PRESERVING MODERNISM

WHEN COMPLETED IN 1977, THE WELLESLEY College Science Center in Wellesley, Massachusetts, was considered a landmark Modern building for its vigorous structural exhibitionism, public spaces of Piranesian scale and mood, and open, flexible laboratories with workstations that could be knocked down, moved, and reassembled within a few hours. Designed by Charles F. Rogers of Boston-based Perry Dean Rogers & Partners, the 149,000-square-foot center—an addition to Sage Hall, a 1923 classroom and lab building—raised the hackles of many loyal Wellesley alumnae, who felt that Rogers' concrete, Tinker-Toy assemblage was an affront to the college's neo-Gothic campus.

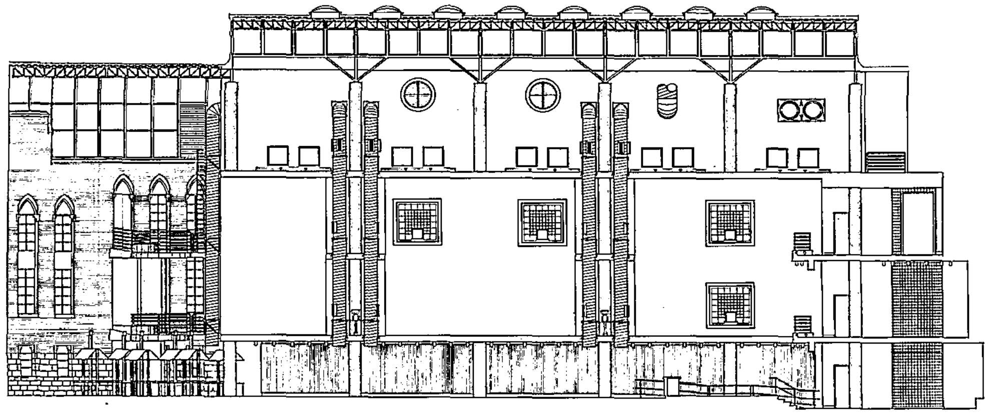
Fifteen years later, Rogers has returned to Wellesley with another uncompromisingly Modern building: a 40,000-square-foot expansion of his Science Center that, although on the surface appears quite sympathetic to his original design, contains its own set of internal contradictions when compared to its Modern parent. Both additions comprise rectangular blocks containing classrooms, offices, and labs sited at an angle to the sprawling brick volume of Sage Hall.

Rogers turned the residual space between these blocks and Sage into an atrium: foreground space that allows his latest addition and the 1923 block to be read as separate buildings, facing one another across a divide. "My interest in juxtaposition and irony has remained constant since the Science Center," comments Rogers, who adds that he has organized many of his campus projects, including the Seeley G. Mudd Chemistry Building at Vassar College (ARCHITECTURE, May 1986, page 134) and the Row Art Building at Furman University,



EDWARD JACOBY

Addition's most dramatic space is light-filled atrium with computer workstations (facing page and elevation, right) created between east wall of 1923 Sage Hall and west elevation of new classroom and lab block. Computer workstations comprise metal frames with canvas awnings to protect VDT screens from glare. At night, indirect lights under the awnings illuminate workstations like festive, electronic fruit stands. Blue metal ceiling suggests sky.



WEST ELEVATION

around large public spaces as circulatory reference points.

The spatial porosity of the additions at Wellesley, Rogers explains, is driven by program. Where the 15-year-old building exudes flexibility and openness, appropriate for its laboratories shared by nearly a dozen scientific disciplines, the new addition conceals spaces within a boxy form, since its labs for laser study, molecular biology, and computer science require controlled lighting conditions.

Rogers' dichotomy of open and closed spaces at the Wellesley Science Center complex is also apparent in the two atriums. The older atrium is vast and gloomy, crisscrossed with exposed concrete bridges. In contrast, the new atrium is smaller, more intimate, and boasts a variety of light. "I strove for a shifting intensity and quality of light in the new atrium," remarks Rogers, who says that light was far less of a design concern in the older addition. "Beyond the contrast of static materials, light and its reflection can radically change the mood of a space." The architect reflected light in the atrium by replacing metal spandrels between Sage's arched windows with mirrors.

Natural light admitted through clerestory windows on all sides elevates the atrium to a spatial landmark for orientation within the rambling science complex. This daylight, however, posed a glare problem for the 32 computer stations that occupy the atrium floor, so Rogers shaded each with a canvas awning. Artificial light dramatically accents exposed mechanical systems, the roof structure, and the stations.

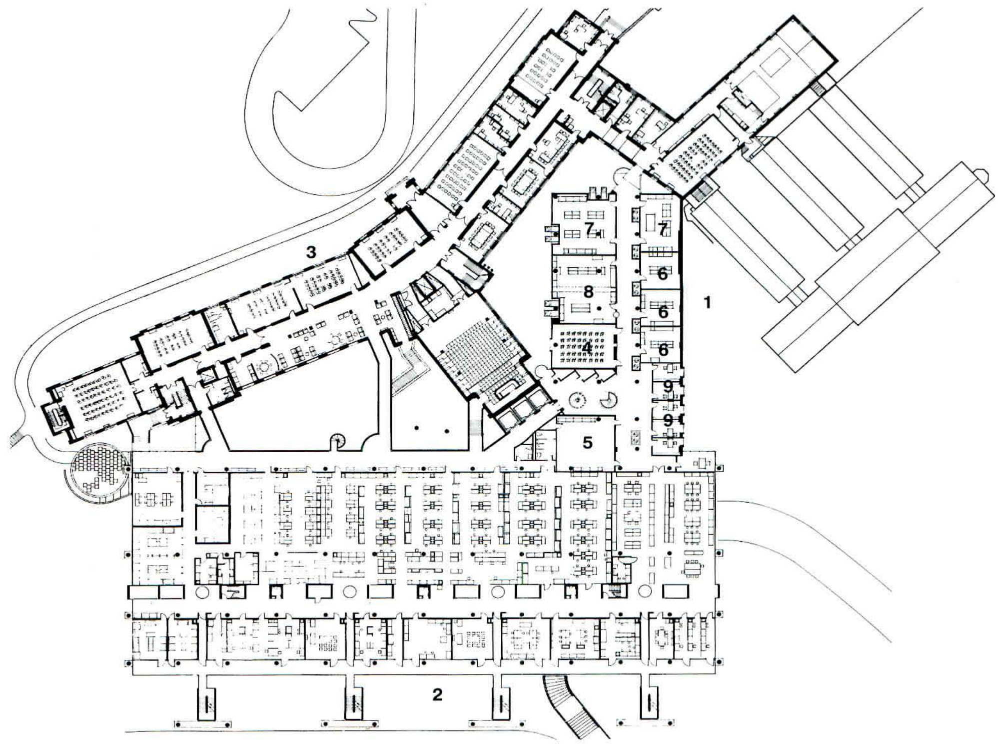
The new atrium also demonstrates Rogers' penchant for aggressive Modernism, distinguished by bold forms, vivid primary colors, sculptural mechanical equipment, and juxtapositions of new and old. Sage's brick and ashlar stone wall, with its pointed arches and limestone accents, is the perfect foil for the new addition's serpentine wall of corrugated sheet aluminum, concrete columns and slabs, glass block windows, and exposed air ducts rising the full height of the space. "I wanted the maximum contrast between the two walls," explains Rogers. Indeed, the atrium appears to be occupied by an alien building—a big white box wagging its ducts.

While the 1977 center and the new addition share an esthetic of exposed materials, large public spaces, and bright colors, their exteriors couldn't be more dissimilar. Unlike the older building, which reveals its interior through an open concrete structural frame with glazed infill, the addition's only exterior facade, facing east, is an inscrutable box of continuous corrugated metal siding, glass block windows framed like pictures on a solid wall, and punctuated by stainless-steel exhaust ducts. There isn't a clue as to what's going on inside, yet the regular window pattern hints at the cell-like faculty offices behind the facade.

Another contrast between Rogers' two additions is that, unlike the 1977 center, the new wing has been immediately and enthusiastically accepted by students, faculty, and alumnae. People gravitate to its sunlit atrium, and delight in ascending the two glass block and brushed aluminum circular staircases, awash in light from roof monitors. "They enjoy the new building to the extent that I think I'm losing it," muses Rogers, who worries that his newest addition to Wellesley College may lack the power to infuriate as his 1977 Science Center did. The earlier building was successful in opening academic eyes to nontraditional architecture on the Wellesley campus, smoothing the way for the innovations of the new addition. Or maybe Charles Rogers is just getting better with age. ■

—MICHAEL J. CROSBIE

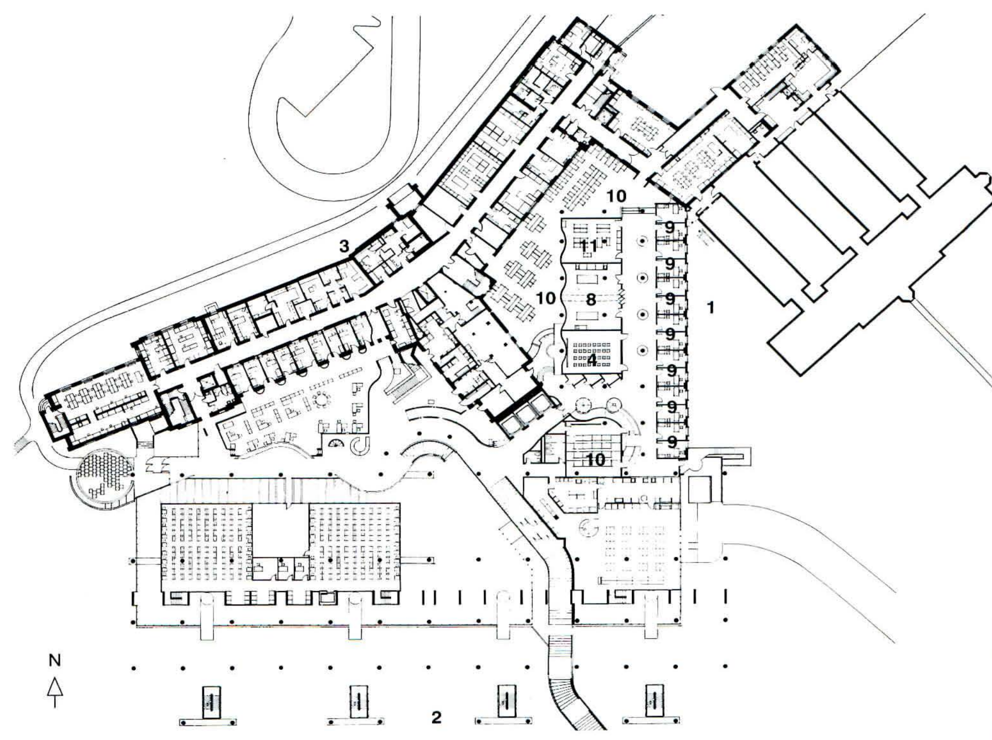
New addition is sited between east end of rectilinear Science Center (bottom of plans) and Y-shaped Sage Hall laboratory and classroom building. West elevation of new addition is divided by riser ducts (facing page, bottom left and right) that soar above computer workstations. A pair of stainless steel spiral staircases is enclosed in glass block (facing page, top left). As in the 1977 Science Center, color-coded pipes signify different utilities; doorway leads to small faculty office (facing page, top right).



SECOND FLOOR

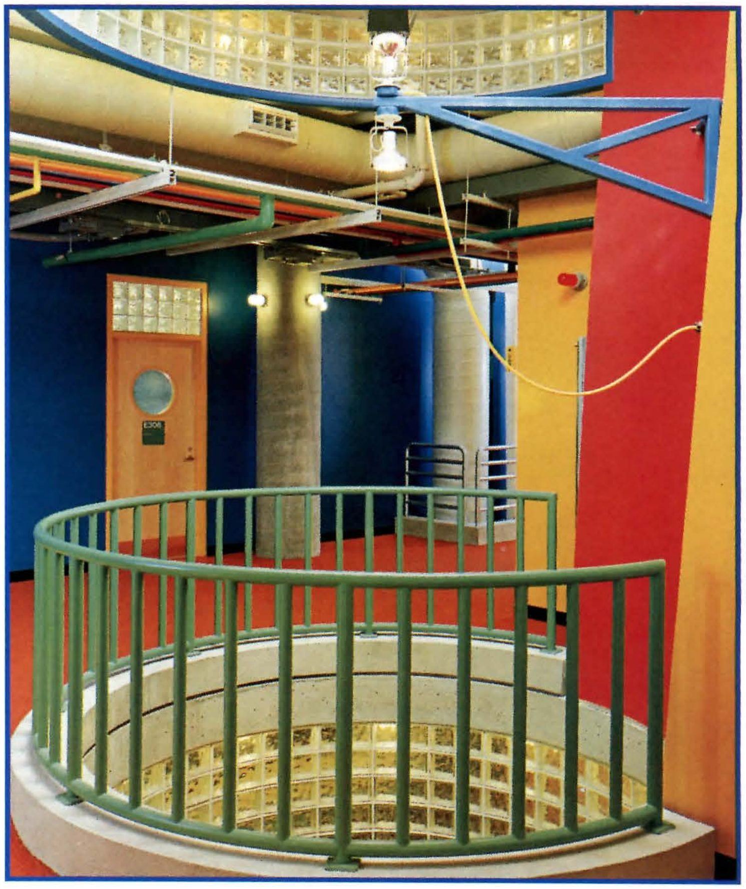
WELLESLEY COLLEGE SCIENCE CENTER EXPANSION
WELLESLEY, MASSACHUSETTS
PERRY DEAN ROGERS & PARTNERS, ARCHITECTS

ARCHITECT: Perry Dean Rogers & Partners, Boston, Massachusetts—Charles H. Rogers II, Peter A. Ringenbach (principals); J. Michael Sullivan, Jeffrey Heyne, Lisa Abeles, Elizabeth Mahon, Gretchen Neeley, Paul Viccica, Martha Pilgreen (project team)
ENGINEERS: BR+A Consulting Engineers (mechanical/electrical); Simpson Gumpertz and Heger (structural); R. W. Sullivan (plumbing/fire protection); Haley and Aldrich (geotechnical/environmental)
CONSULTANTS: Jerry Kugler Associates (lighting); Acentech Incorporated (acoustics); Campbell Hardware (hardware); Hanscomb Associates (cost estimating); Todisco Associates (specifications); Ralph Rowland (code compliance)
CONSTRUCTION MANAGER: George Macomber Company
COST: $12 million (addition and renovation)—$217/square foot
PHOTOGRAPHER: Richard Mandelkorn



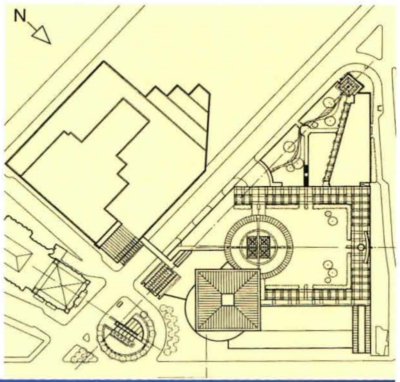
FIRST FLOOR

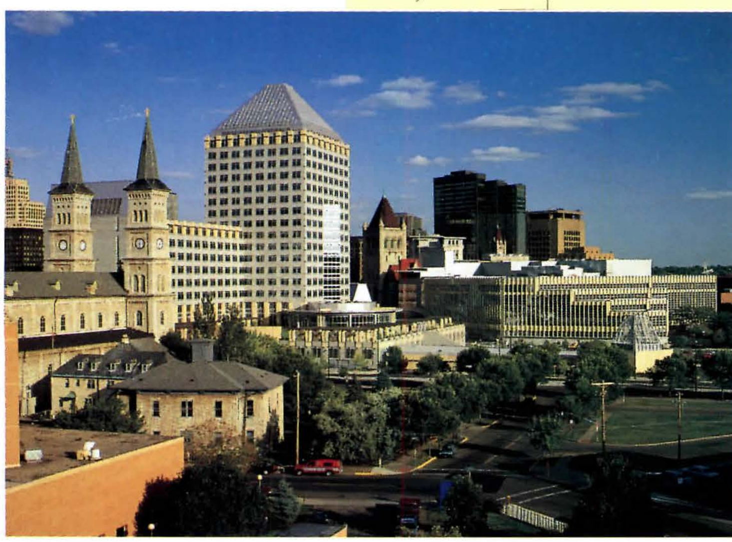
1 1992 ADDITION
2 1977 ADDITION
3 SAGE HALL
4 GENERAL CLASSROOM
5 GEOLOGY
6 PHYSICS RESEARCH
7 PHYSICS TEACHING
8 LASER LAB
9 FACULTY OFFICES
10 COMPUTER SCIENCE
11 ELECTRONICS LAB



The St. Paul Companies
St. Paul, Minnesota
Kohn Pedersen Fox Associates, Architects

MODERN HOMECOMING





PRESERVING MODERNISM

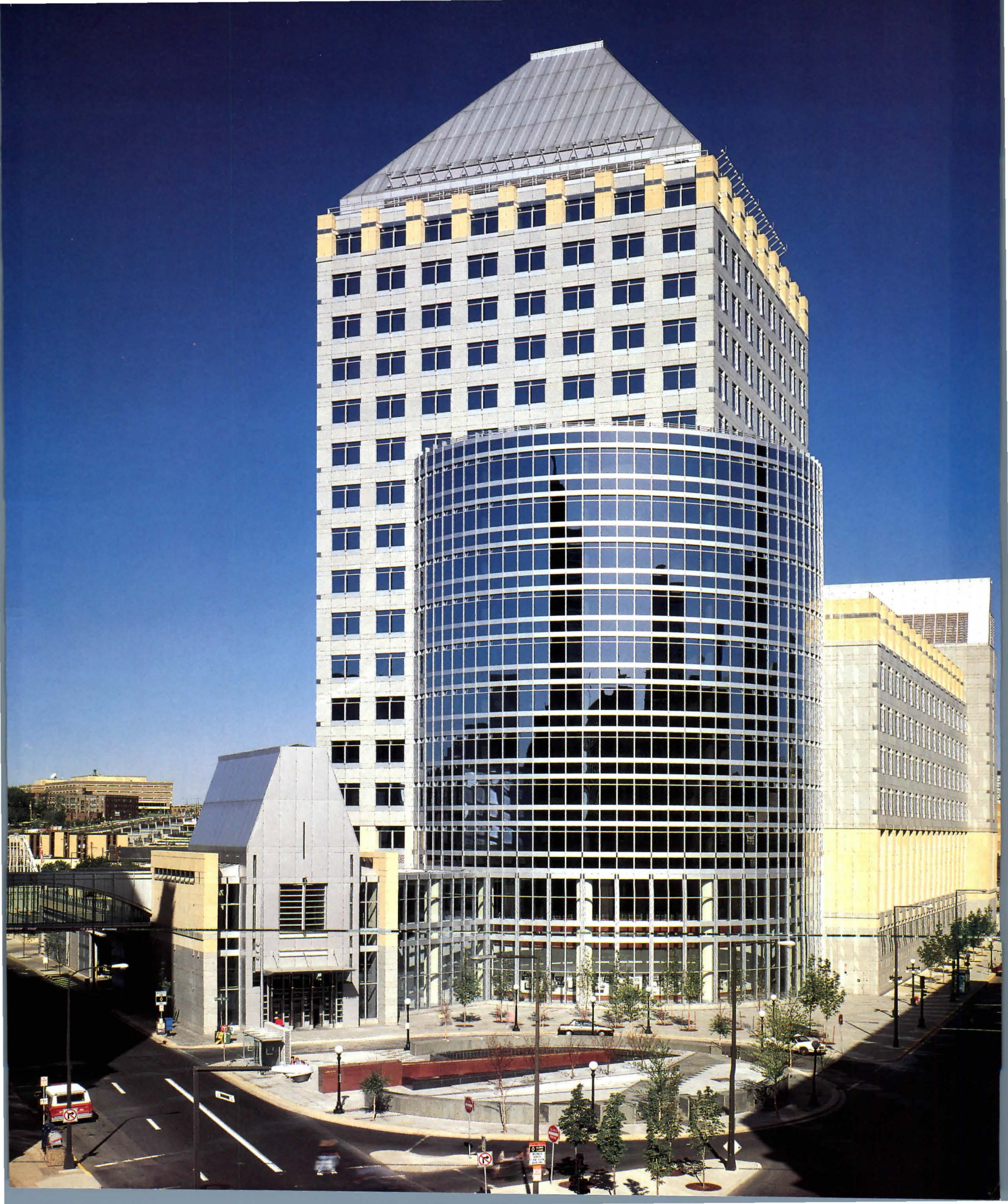
LIKE THE PRODIGAL SON, KOHN PEDERSEN Fox Design Principal William Pedersen returned to his hometown of St. Paul five years ago to design his first building in that city—a corporate headquarters for the St. Paul Companies. More significant than his geographical return, however, is Pedersen's reexamination of his strong Modernist roots. "I went through a period in the mid-1980s that I'm not particularly proud of," the 54-year-old architect candidly remarks. "Some of my buildings became excessively decorative and a bit too nostalgic." With the completion of his bulding for the St. Paul Companies, an insurance agency, Pedersen clearly signals KPF's change of direction, which is further advanced with the recently completed 1250 Boulevard René-Lévesque in Montreal and a regional branch building for the Federal Reserve in Dallas, Texas.

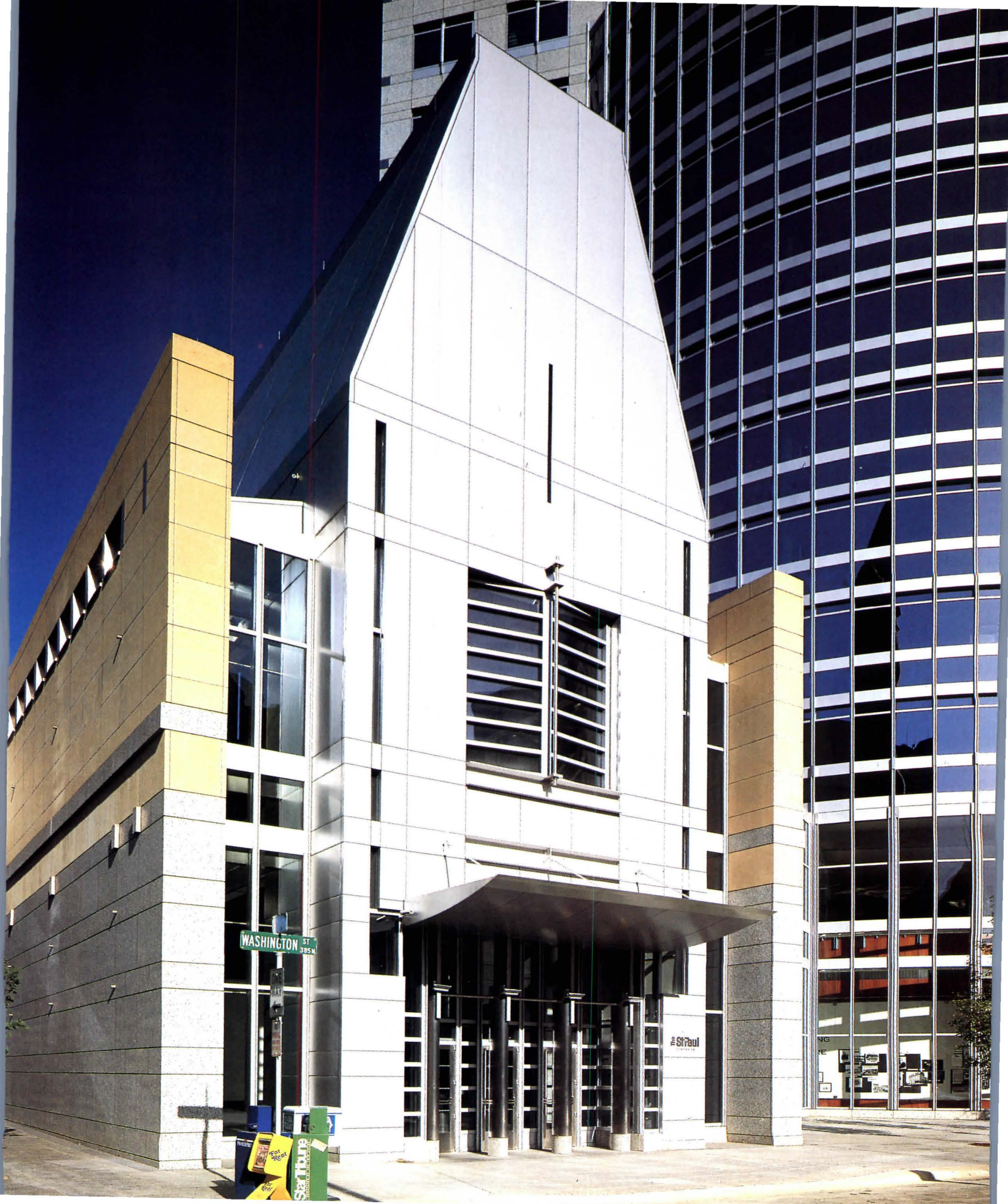
St. Paul Companies' initial program called for 500,000 square feet of new office space, doubling the size of its current facility. The challenge was similar to the one posed to KPF a decade ago by Procter & Gamble, which the architects met so successfully with a hallmark office building in downtown Cincinnati, Ohio. Like the Procter & Gamble project, the St. Paul Companies headquarters occupies a prominent approach to the city, requiring a sensitive urban design.

However, KPF approached the St. Paul headquarters quite differently from Procter & Gamble. "Our idea for the St. Paul Companies building was for the parts to speak more than the total composition,"

ELLERBE BECKET

St. Paul Companies' headquarters fronts a new urban plaza to the east (facing page) and is connected to its renovated 1981 building by a skywalk. West view (above) reveals circular cafeteria amid garden and original head-quarters (top right), reclad by KPF (right).

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explains Pedersen. "It is unlike a Classical composition, in which every part is leading toward a greater whole." Accordingly, Pedersen designed the complex as site-responsive segments that express the functional complexity of the program and establish a formal tension with the context. Initially tapped to design a new building, KPF was subsequently asked to renovate the existing 500,000-square-foot headquarters, an amalgamation of four undistinguished postwar structures. The 18 months between the two commissions proved serendipitous, allowing an evolutionary scheme to emerge that reflects how the New York firm's design philosophy changed during the same period. Although the exteriors of the new headquarters are signature KPF with articulated fenestration and impeccable detailing, it is the taut recladding of the old building and cool minimalist interiors of the new that portend the firm's current Modernist perspective.

Daycare center at west corner (above) culminates in a steel crown; de Stijl-like composition terminates building's eastern corner (left). Entry pavilion (facing page) echoes stone-clad mechanical tower (bottom left) on north elevation (below).

JOCK POTTLE/ESTO

The new St. Paul Companies complex sits on two full blocks, adjacent to several of the city's most cherished monuments—the 1906 neo-Romanesque Landmark Center, 1873 Assumption Church, 1919 Hamm Building, and Benjamin Thompson's 1984 Ordway Theater. Rather than mimic the architectural vocabulary of a particular neighbor, Pedersen chose to capitalize on the disparity of the urban context, and developed an architecture that encourages a "coexistence of both the dull and the exciting, which is more capable

JOCK POTTLE/ESTO

of being an architecture of inclusion."

The resulting assemblage focuses on a 17-story tower crowned with a pyramidal metal roof; a nine-story rectangular wing and a freestanding daycare pavilion. An 11-story circular office wing serves as the pivotal hinge between the disparate volumes; its curves are repeated in an employee cafeteria that extends into a second-story garden. Hamm Plaza, a new urban plaza designed in association with artist Jackie Ferrara, reinforces the abstracted geometric forms of the building. The only drawback to the new complex is the client's insistence on avoiding retail space at ground level, resulting in an austere northeast elevation, in spite of KPF's best efforts to scale and detail the nine-story street wall.

DON WONG

The strongest design element in this new composition is the smallest in stature—a 45-foot-high, basilicalike entry pavilion. Pedersen enclosed this centerpiece in screens of the same granite and Mankato stone as the central tower, and then inserted a steeply pitched roof of the same gleaming aluminum that crowns the office wing. As a transitional object, the pavilion is the perfect mediator between old and new with its intimate scale, figural form, and autonomous stance.

Across the street, Pedersen sheathed the original five-story headquarters with glass and the same stone as the new construction. He interrupted its horizontal mass with repetitive precast vertical fins. At the building's crucial eastern edge adjacent to Hamm Plaza, he created a de Stijl-like composition that gives this corner its own identity.

Once inside the building, KPF's Modernist metamorphosis is nearly complete, starting with the layered walls of the entrance pavil-

Neo-Romanesque Landmark Tower rises beyond KPF's taut recladding (facing page). At the heart of new complex atop a 450-car garage, the architects created a landscaped garden with trellises (center right) and a circular cafeteria (right). Playground (top) for daycare center (top right) is located to the south at grade.

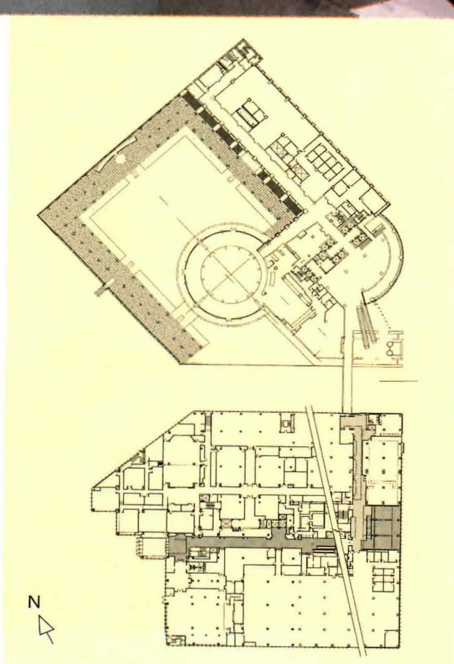

RADISSON

ion and the hovering ceiling planes of the second-floor lobby. The Alliance, a local firm, remodeled the old building's interiors, taking cues from KPF's new spaces.

The St. Paul Companies' new complex is a strong addition to the city's downtown, recalling the site-specific geometry that KPF created on the banks of the Chicago River with 333 South Wacker a decade ago. In St. Paul, the major pieces are arranged in a highly asymmetrical manner, but possess a symmetry unto themselves with Classical overtones. This is Modernism with a humanizing quality, proving that KPF has learned from its past projects in developing a new direction for the future. ■

—LYNN NESMITH

KPF detailed entry pavilion (facing page) with steel moldings and brackets; tower's main second-floor lobby (above) has layered ceiling. The Alliance renovated 1981 lobby (bottom plan) as reception area (top right) and designed a corridor to house exhibition space (center).



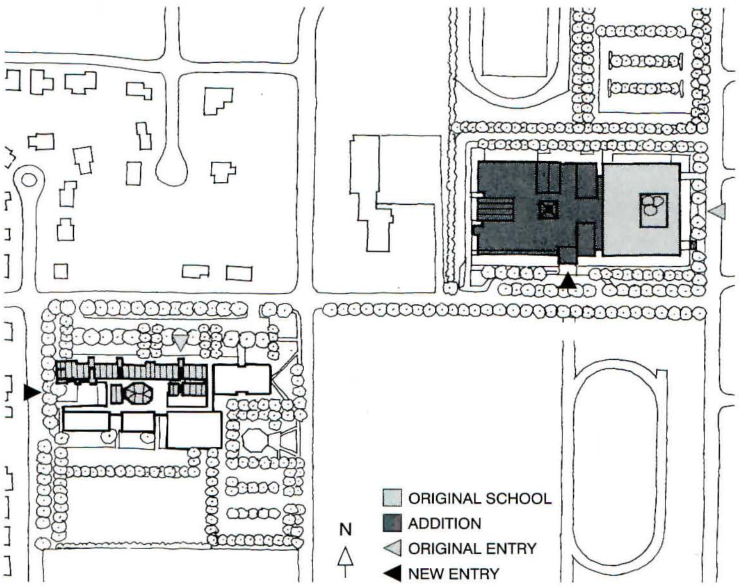
SECOND FLOOR PLAN

ST. PAUL COMPANIES HEADQUARTERS
ST. PAUL, MINNESOTA

ARCHITECT: Kohn Pedersen Fox Associates, New York City—Robert Cioppa (partner-in-charge); William Pedersen (design partner); Richard del Monte (senior designer); Glenn Garrison (project manager); Walter Chabla (job captain); Lidia Abello, Robin Andrade, Mark Chaney, Deborah Delnevo, Armando Gutierrez, Jim Jorganson, Lucien Keldany, Kevin Kennon, Andrey Shen, Alexis Briski, Tamara Budecz, Max Cardillo, Roger Cooner, Gerritt Geurs, Marie Richter, Stephanie Spoto, Scott Teman (project team)
INTERIOR ARCHITECT: Kohn Pedersen Fox Conway—Patricia Conway (partner-in-charge); Ruxandra Panaitescu (project manager); Keith Rosen (senior designer); Merrie Hevrdejs (project designer); Katherine Sanford (project architect); Helen Chung (designer); The Alliance—Carl Remick (principal-in-charge); Tom DeAngelo (design principal); Jerry Hagen, Sharry Cooper (project managers); Scott Sorenson (project designer); Ann Rutten, Gerry Ewald, Roger Christensen, Darcy Ferrill, Carolyn Berman (project team)
ENGINEERS: Weiskopf & Pickworth; Bakke, Koppe, Ballou & McFarlin (structural); Michaud Cooley Erickson (mechanical/electrical)
CONSULTANT: John C. Tietz (construction)
GENERAL CONTRACTOR: McGough Construction Company
COST: $72 million (new construction)
PHOTOGRAPHER: George Heinrich, except as noted

Lillian C. Schmitt Elementary School
Northside Middle School
Columbus, Indiana
Leers, Weinzapfel Associates, Architects

EDUCATING COLUMBUS



Leers, Weinzapfel Associates reoriented the entrance of Harry Weese's Schmitt Elementary School (facing page, top inset) within a west-facing courtyard. The architects announced the new front door of existing Northside Middle School (facing page, bottom inset) with a portico. The two additions define the northern edge of a school precinct (site plan, above), that shares a playing field with a high school to the south. Dan Kiley updated his original landscape for the schools.

PRESERVING MODERNISM

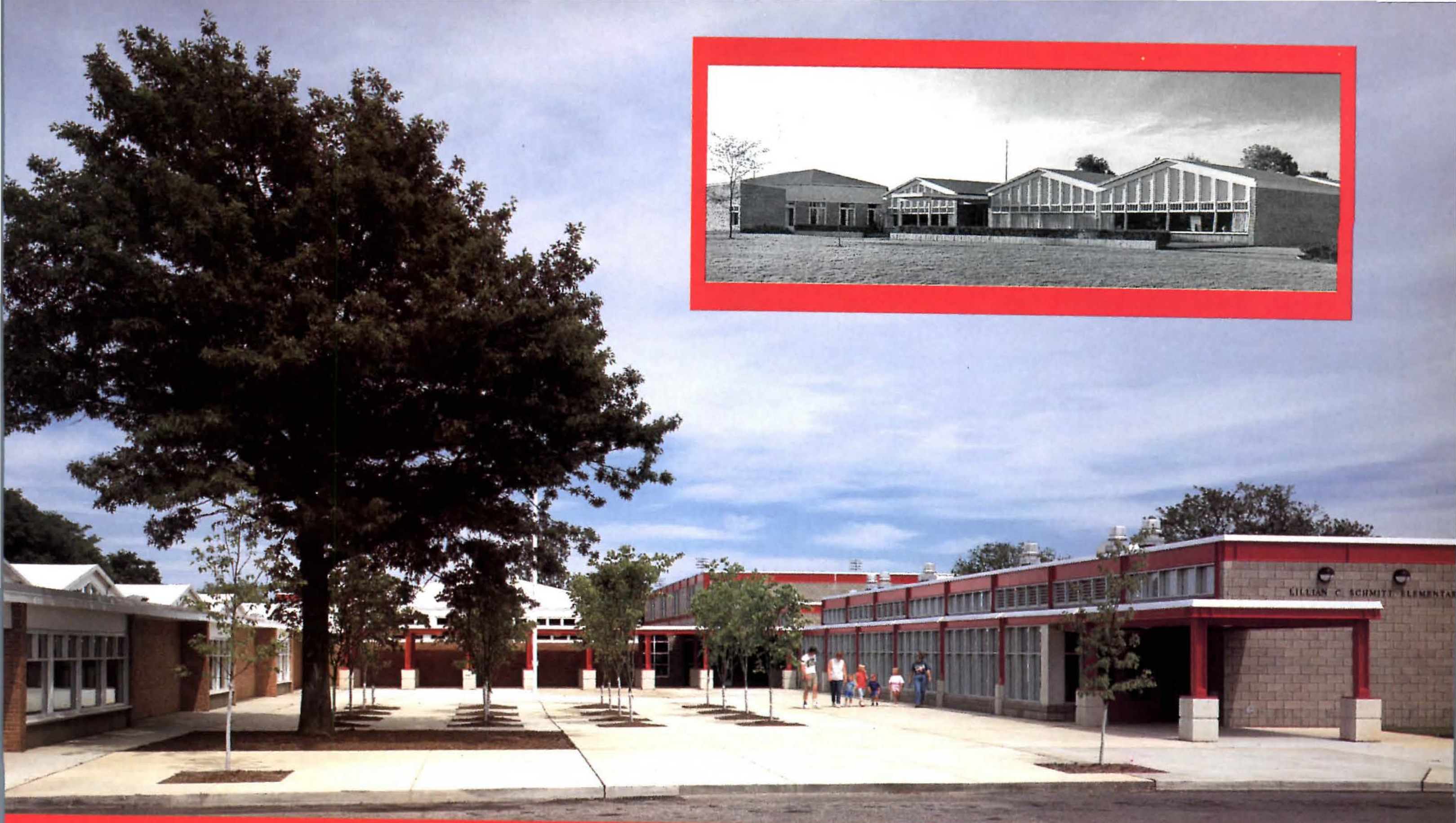
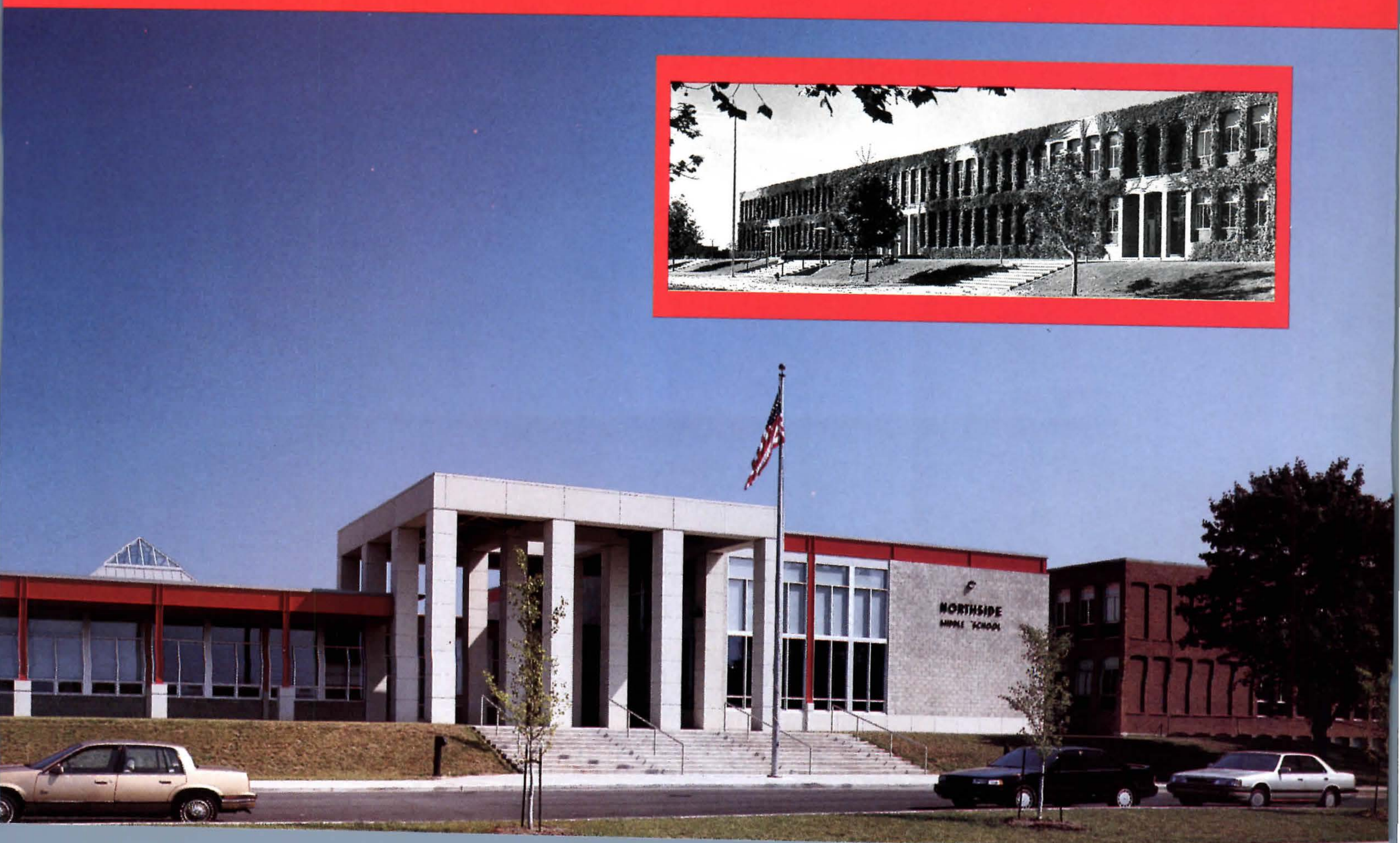
A 1991 AIA SURVEY OF ARCHITECTS RANKED Columbus, Indiana, as the sixth-best American city for architectural quality and innovation. This community's collective affinity for commissioning the country's leading architects began with patron J. Irwin Miller, who more than 50 years ago was influential in persuading the First Christian Church to commission Eliel Saarinen to design the congregation's new sanctuary, completed in 1942.

In the mid-1950s, Miller's patronage extended to Columbus's public school system. Alarmed that the city's most recent educational facilities were of poor quality, Miller told the school board that his company's philanthropic arm, the Cummins Engine Foundation, would pay the architectural fees for the next school if the board chose an architect from a list furnished by the foundation. The school was the Lillian C. Schmitt Elementary School, and the firm selected was Harry Weese & Associates. Completed in 1957, the Schmitt school (facing page, top inset) featured a gabled silhouette and child-oriented scale. Four years later, Weese was selected to design Northside Middle School (facing page, bottom inset). Rather than repeat his earlier effort, Weese created a more monolithic building.

Thirty years later when both schools needed to expand, the Cummins Foundation again developed a list of six architects. This time, the school board had the option to select a different firm for each school or one architect for both, and board members chose Leers, Weinzapfel Associates to design both schools. Rather than favor one Weese-designed school over the other for inspiration, the Boston architects drew from Columbus's rich tradition of Modernism to develop an intense, Miesian vocabulary for the additions. Acknowledging Eero Saarinen's 1954 Irwin Union Bank and Myron Goldsmith's 1973 Republic Building as inspiration, Leers designed two light steel-frame structures infilled with concrete block and glass and aluminum window walls that echo the rhythm of their respective originals.

These low additions hug the flat Midwestern landscape, but present a more aggressive profile than the minimalist glass boxes that served as Leers's source of reference—as if their Modern details and materials were collaged and hybridized, rather than smoothly integrated. Portico, skylights, and vaults, for example, break the horizontality of the simple volumes. By developing this bold, shared expression, the neighboring buildings now appear as continuous elements of an emerging educational complex, rather than unrelated objects. Leers, Weinzapfel Associates has left a self-assured imprint in a city that for 50 years has encouraged such strong architectural statements.

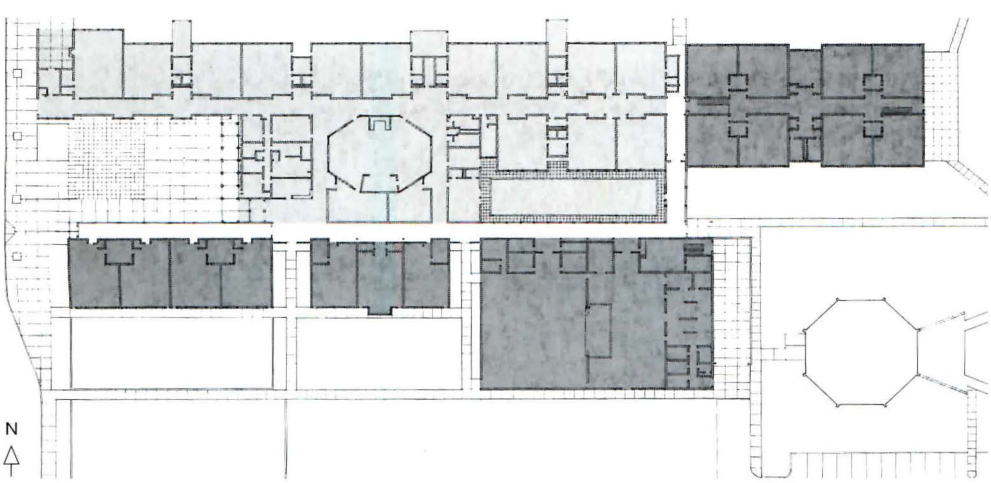
—LYNN NESMITH


LILLIAN C. SCHMITT ELEMENTAR

NORTHSIDE
MIDDLE SCHOOL

Leers, Weinzapfel set Schmitt's two-story gymnasium and cafeteria (right in photo below) and two classroom wings (left in photo below) to the south of the original school (top elevation), creating a second circulation spine (plan, bottom). Classrooms echo modularity of Weese original. South-facing arcades with steel columns on precast concrete bases (facing page, top left) give the school its bold new identity (facing page, bottom). New kindergarten classroom (facing page, top right) incorporates concrete block bearing walls and steel roof decking.

SOUTH ELEVATION

NORTH ELEVATION



FIRST FLOOR PLAN

ORIGINAL SCHOOL ADDITION

Lillian C. Schmitt Elementary School

COMPLETED 35 YEARS AGO, THE MODULAR classrooms of Schmitt Elementary School, each crowned with its own gabled roof, were typical of 1950s schools. Harry Weese, who studied at Cranbrook Academy of Art in 1939, loosely based his design on the Saarinens' influential Crow Island School.

The Schmitt school was originally designed for 250 students, but by the late 1980s, due to a shrinking school-age population, it was scheduled to merge with another facility. The consolidation required additional classrooms, updated science, music, arts, and more recreational spaces for an expanded student body of approximately 650 children. Since the 53,000-square-foot addition is significantly larger than the 31,500-square-foot original, Leers decided to break with Weese's palette of materials and his single corridor configuration. Leers countered Weese's active roofline with a series of flat-roofed pavilions that echo the paired classrooms of the existing school without endlessly multiplying its original gable forms, to establish a Miesian idiom that respects the original architect's notion of an expressed structural system.

Drawing upon the elementary school's original load-bearing brick and glue-lam construction, Leers, Weinzapfel developed a steel framing system with exposed steel roof decking. Within this lightweight structure, the architects inserted load-bearing concrete block for the addition's interior party walls and incorporated a highly articulated curtain wall of clear and fretted glass, cedar panels, and aluminum mullions for new exterior walls. The window detailing continues the transom line established by Weese and repeats his proportions and arrangement of 10 vertical panes to differentiate each classroom.

The architects divided the linear addition into two sections with a two-story block of 16 paired classrooms to the east of the original classroom wing and a spine of new special-function rooms—gymnasium, cafeteria, kindergarten, music, and art rooms—to the south of the original school's central corridor. The addition of this second wing, parallel to the original, created a new entrance courtyard along the west elevation, responding to the school's request to reorient its main approach. By shifting the circulation patterns to two parallel axes, the architect transformed the original, hexagon-shaped multipurpose room, appropriately renovated into a new library and computer center, into the heart of the new facility.



Northside Middle School

COMPLETED ONLY FOUR YEARS AFTER Schmitt, Harry Weese's Northside Middle School shared little with its neighbor one block to the west. Its monolithic two-and a-half-story brick structure, arranged around a central courtyard, sharply contrasted with the architect's more intimately scaled elementary school. "We initially thought it would be more difficult to develop an architectural response to Northside than Schmitt," recalls Leers. "Yet it was Northside's absolutely brutal exterior that formed a strong ground line and provided a datum for inventing a transformation."

Unlike Schmitt, Northside School was not programmed for an increase in student population, which will remain at approximately 900 students, but to accommodate a range of special educational functions that require something other than traditional classrooms. Leers, Weinzapfel organized the 83,000-square-foot addition around a central skylit common area, a plan similar to Weese's courtyard scheme, and connected old and new with a central concourse.

The architects adapted their Miesian vocabulary for Schmitt, incorporating a light steel-frame structure infilled with concrete block, precast concrete, and 11-by-6-foot windows that echo the proportions of the original. They increased the middle school's scale to accommodate larger spaces, such as the library, swimming pool, band room, science labs, industrial shop facilities, and cafeteria. They also punctuated the addition's roofline with a series of geometric volumes that rise above its horizontal profile and contrast with the unrelieved envelope of Weese's brick building.

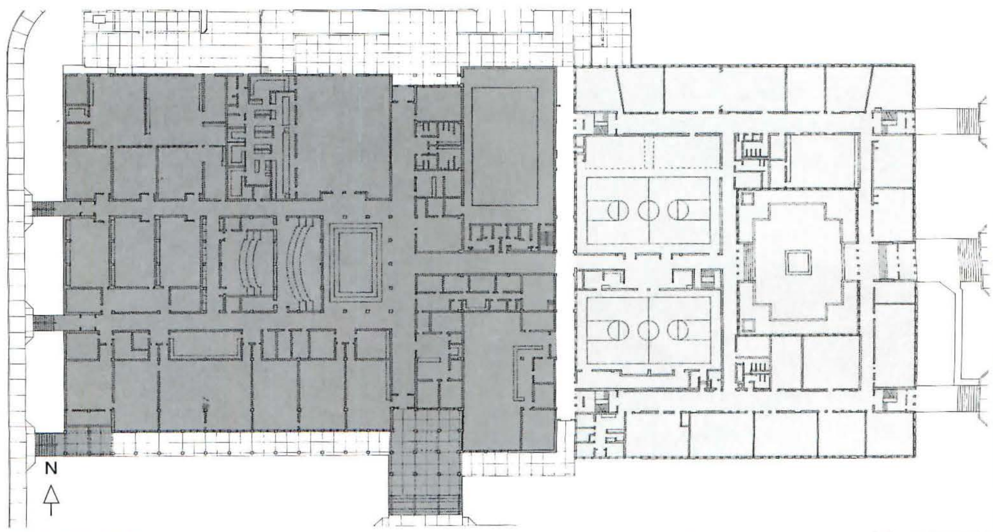
To accentuate a new main entrance along a primary street to the south, the architects added a 29-foot-tall, south-facing portico of precast concrete. To further articulate the sprawling, one-story addition, Leers designed special rooms to be noticed from the exterior—a pyramidal skylight signals the common area, four industrial light monitors illuminate the art studios, double barrel vaults announce the cafeteria, and a greenhouse anchors the horticulture department at the southeast corner. Leers, Weinzapfel Associates respected Weese's original building by defining a clear boundary between the old and new. The architects transformed this 1961 freestanding structure into a background against which their new inventions figure all the more vividly. ■

Leers, Weinzapfel extended the cornice line of Weese's original brick school, accentuating the new entrance with a 29-foot-high precast concrete portico (below and facing page, bottom left). The simple, rectangular addition is punctuated with a greenhouse at the southwest corner (*facing page, top*) and four light monitors to the north that bring daylight into the art department. On the north elevation, the architects located a vehicular drop-off (bottom) and enlivened the facade with barrel vaults that shelter a new cafeteria (facing page, bottom right).

BALTHAZAR KORAB PHOTOS

Leers, Weinzapfel's new structure of precast concrete, steel, glass, and rough-faced concrete block contrasts with Weese's original brick school (photo and elevation below). Circulation of existing school is extended into addition to form an urban model of streets and public plazas (plan), with new skylit common room (facing page, top right) that recalls the central courtyard of original school. New library is housed in a double-height room that faces the entrance portico (facing page, top left); maple-finished barrel vaults crown new cafeteria (facing page, bottom).

SOUTH ELEVATION



FIRST FLOOR PLAN

ORIGINAL SCHOOL ADDITION

SCHMITT ELEMENTARY SCHOOL. NORTHSIDE MIDDLE SCHOOL

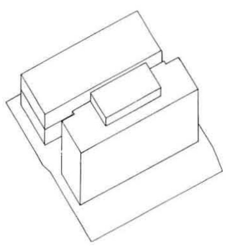
CLIENT: Bartholomew Consolidated Schools Corporation
ARCHITECT: Leers, Weinzapfel Associates, Architects, Boston, Massachusetts—Andrea Leers (principal-in-charge); Jane Weinzapfel (consulting principal); Karen Moore (consulting associate); Eric Gresla, Joe Pryse (co-project managers); David Buchanan (project architect/Northside); Karen Swett (project architect/Schmitt) Sabir Kahn, Renee Mierzejewski (design team); Jim Vogel, Alex Adkins (construction administration)
LANDSCAPE ARCHITECT: Office of Dan Kiley
ENGINEERS: Souza, True & Partners (structural); TMP (mechanical); Lottero & Mason Associates (electrical); Fanning/Howey Associates (civil/site planning)
CONSULTANT: Cavanaugh Tocci Associates (acoustics)
CONSTRUCTION MANAGER: Construction Control
COST: $8.6 million—$102/square foot (Schmitt addition/renovation); $14.8 million—$79/square foot (Northside addition/renovation)
PHOTOGRAPHER: Ron Forth, except as noted

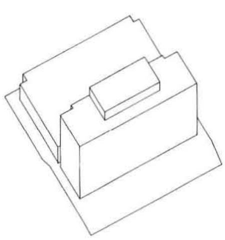


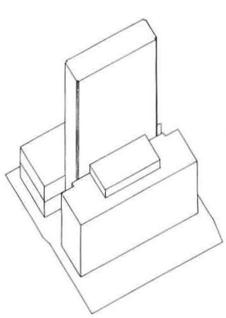
100 East Pratt Street
Baltimore, Maryland
Skidmore, Owings & Merrill, Architects

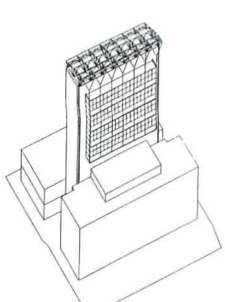
HARBOR MODEL

PRESERVING MODERNISM









WHEN COMPLETED IN 1974, IBM'S PIETRO BELluschi-designed headquarters in downtown Baltimore was surrounded by warehouses, parking lots, and construction sites. As part of the city's 1967 urban renewal plan, the 10-story Modernist flattop, designed with Emery Roth & Sons, adhered to design guidelines calling for buildings that would not obstruct harbor views. It was a harbinger of Baltimore's successful Inner Harbor redevelopment, which grew to encompass mid-rise office towers, Cambridge Seven's trend-setting aquarium, and Harborplace, the vaunted festival marketplace by Benjamin Thompson & Associates.

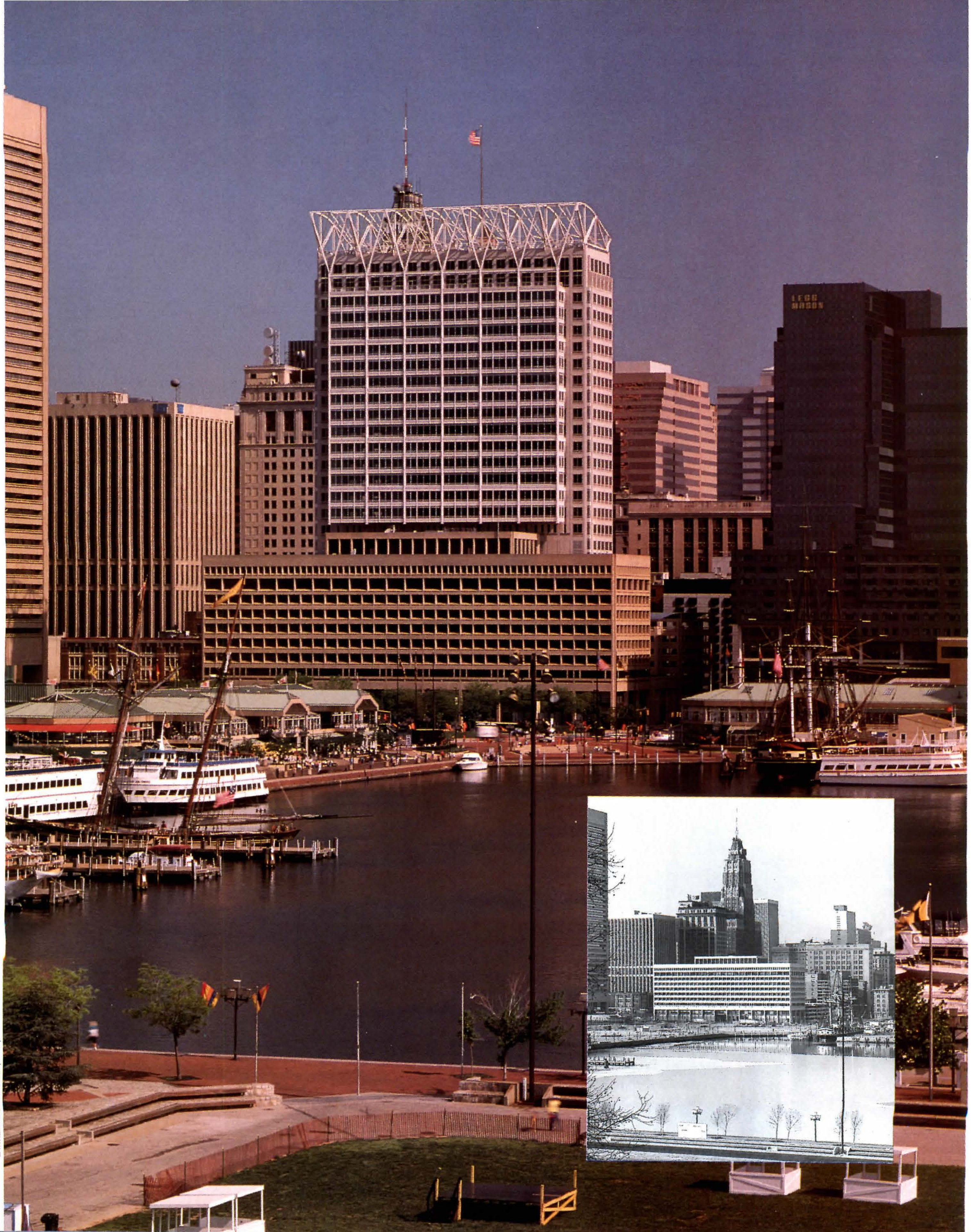
Four years ago, when joint owners IBM Corporation and T. Rowe Price decided to expand the Belluschi building, the site had become one of the most desirable in Baltimore, across Pratt Street from the animated Harborplace. Capitalizing on their sought-after location, the owners commissioned the Washington, D.C., office of Skidmore, Owings & Merrill to expand the owners' own offices by 135,000 feet, add spec-office space with harbor views, and upgrade the parking garage to accommodate the new occupants.

SOM complied by exhibiting structural bravado heretofore unknown in this staunch, hardworking city of 600,000. The architects erected a slender, 28-story tower above the Belluschi original, bringing to the skyline a fresh profile crowned by 30-foot-high steel trusses. It is a very lively top for Baltimore, whose other new architectural landmark is Oriole Park at Camden Yards (ARCHITECTURE, July 1992, pages 67–71), the city's highly nostalgic ballpark rendered in turn-of-the-century style.

SOM Partner-in-charge Craig Hartman explains that his inclinations are indeed toward "qualities of invention," creating buildings that are of our time, rather than historicist or referential. But since the Belluschi structure helps define the edge of the harbor, Hartman designed a tower that, though stepped back from its 1974 base, maintains the east-west linearity of the original building. "There is a resonance between the two," the architect explains. "It was very important that the two buildings reinforce one another, and that the tower did not become an independent piece." At the completion of the design stage, Hartman sent drawings to 93-year-old Pietro Belluschi in Portland, Oregon, who responded that the design "creates a convincing volumetric relationship between two different buildings."

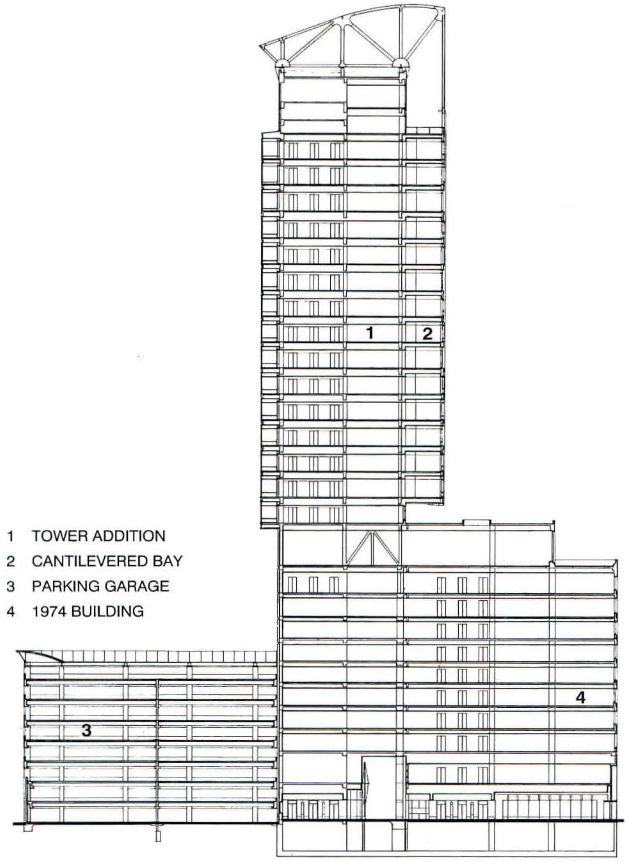
Because the Belluschi-designed structure could support only six additional floors—too few for speculative office rentals—Hartman inserted his narrow slab between the existing, south-facing building and the new parking garage at the north end of the site. The architect constructed the tower in concrete on its lowest 10 stories to align its

SOM tower is inserted between Belluschi's 10-story building (top drawing, left), and new parking garage (second and third drawings). Bay is supported by trusses (fourth drawing). Window rhythm reflects 1974 building (facing page, inset), while shaft harmonizes with neighboring towers (above and right).



LAWRENCE S. WILLIAMS (INSET)

SOM's 28-story shaft (section) is braced by concrete shear walls on lower 10 stories, allowing new floors to line up with those in original, post-tensioned concrete structure. Top 18 stories are supported by K-braced vertical steel trusses. Parking garage on north side is topped by canopy that echoes steel crown 20 floors higher (below). West elevation (facing page) reveals new parking garage, tower's slim profile with recessed building entrance, and Belluschi original.



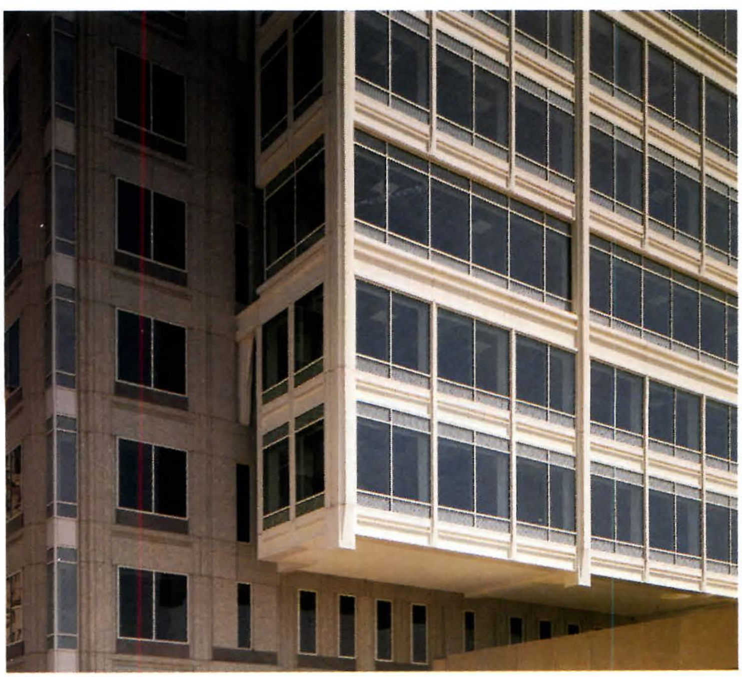
floors with those of the post-tensioned lightweight concrete original, and supported floors 11 through 28 with a steel frame for economical high-rise construction.

To break out of the narrow floor plan of his tower, Hartman initially conceived a cantilevered bay on the southern facade, overlooking the harbor. However, the 60-foot-width of the new structure would only permit a 10-foot cantilever. To achieve a wider projection, the architects developed a system of steel trusses and hangers to suspend a 20-foot bay from the top of the building. At first, Hartman thought he would bury the trusses in a mechanical floor capping the building, but began tinkering with the notion of "outrigger" trusses that would expose the structure, revealing the means of support for the cantilevered bay. Although the crown has been criticized as trendy, Hartman contends that it is very much anchored within Baltimore's context, and the trusses do evoke the image of shipyard cranes and nautical rigging. "If this building were anywhere but Baltimore," notes Hartman, "it would have a different top."

The new tower's hat truss is far from being purely ornamental. In addition to supporting the bay, the trusses tie the columns of the tower together at the top, stiffening the structure against winds off the harbor. Although only 370 feet tall, the building is very slender in its 60-foot, north-south dimension, giving it a height aspect ratio of 6.5—the same as that of the Sears Tower, which is 1,454 feet tall. This ratio means that, although only a mid-rise, the structure has the potential to act like a tall building, swaying and twisting in the harbor winds. "In the IBM building," explains SOM Associate Partner Jerome Rasgus, who engineered the building, "the hat truss reduces overall building drift by approximately 5 percent."

Cladding the harborfront bay in clear, double-coated low-E glass and aluminum panels, Hartman created a syncopated window rhythm that corresponds to Belluschi's 1974 original. Less successful is the choice of color for the tower—white-painted aluminum for the bay, pinkish-beige granite for the base of the shaft, with matching precast concrete panels above. Rather than take its color cues from the Belluschi office block, the tower corresponds more to its neighbors on the skyline, resulting in a pink-beige slab sandwiched between the buff-colored 1974 building and new parking garage. Since the older building appears to form the tower's base when viewed from the harbor, the color con-

Eight custom-designed trusses (right), composed of bolted wide-flange steel members, support south-facing bay and stiffen shaft by tying core bracing to columns along the building's perimeter. Twenty-foot bay cantilevers from 60-foot-wide shaft (bottom), supported by steel trusses. Twenty-seventh story porch permits views of harbor and V-shaped members from which floors are suspended on hanger columns (facing page).



trast is disorienting; the two could be interpreted as separate, unrelated structures.

Hartman deferred to two nearby towers—Baltimore's tallest, the 40-story United States Fidelity and Guaranty headquarters, by Washington, D.C., architect Vlastimil Koubek, and the 30-story World Trade Center by I.M. Pei—in more than color choice. Believing these two buildings should remain the principle point towers of the Inner Harbor, he established his structure as a lower building that defines the harbor skyline, much as Ziedler Roberts' 28-story Legg Mason building does one block to the east.

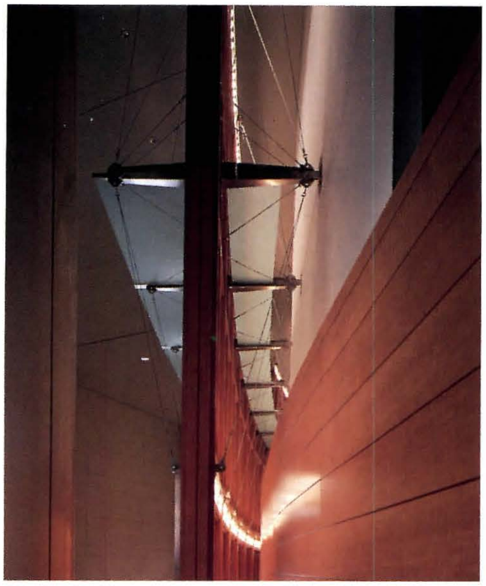
But some Baltimoreans have complained that the 120-foot-wide east-west dimension of the new IBM tower blocks harbor views, and that its 370-foot-height, topped by the additional 30-foot-tall hat truss, unabashedly violates restrictions spelled out in the 1967 plan for Inner Harbor development. Alfred W. Barry, assistant director of Baltimore City Planning, points out, "If companies invest in downtown based on a plan that includes view corridors and that plan is changed, they have a legitimate reason for opposition." Hartman responds that the nearby Legg Mason building had in 1988 established a precedent of placing a mid-rise between downtown and the harbor, with a tower set back from a 10-story cornice line. "Had that precedent not existed, we might have done something very different," he explains. In fact, both the IBM tower and the Legg Mason building required amendments to the city's 1967 urban renewal plan in order to be built, which helped persuade City Hall to update its guidelines for downtown redevelopment.

While the IBM tower may seem obtrusive to some, it is a forward-looking building that anticipates a day when the city's urban core contains not just mid-rise towers, but skyscrapers. The city's Inner Harbor is still developing, and towers that exceed 40 stories are inevitable. In the future, the harbor will need not only its edge defined but its skyline defined, by buildings that step down in height from the downtown core to the water.

With its elaborate crown and theatrical nighttime lighting, 100 East Pratt Street, as the building has humbly been named, is a tower dressed for success in the 21st century. The top may not embody the reticent, background qualities of its Belluschi-designed progenitor, but SOM has created a progressive new model for future skyline developments, and challenged a city to rethink its urban design. ■

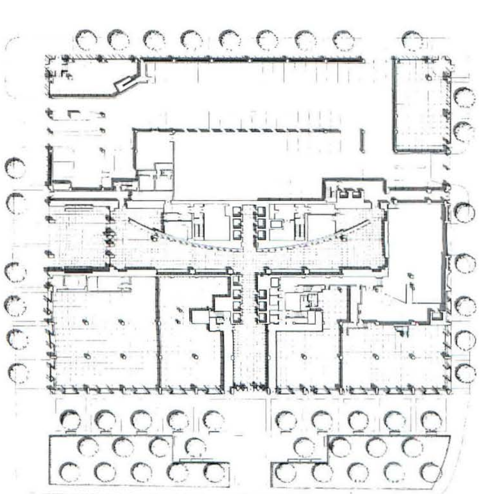
—HEIDI LANDECKER

A 160-foot-long anigre and stainless steel screen extends nautical imagery to lobby (below). Marine cables and stainless steel spreaders support sandblasted glass shelves (right). Laminated rice-paper-glass panels (facing page) glow in reflected light behind 25-foot-high screen. Ground-floor plan (bottom left) reveals link between new and original lobbies. Third-floor plan (bottom center) shows contiguous floor of original building and addition. Thirteenth-floor plan (bottom right) reveals slenderness of shaft.

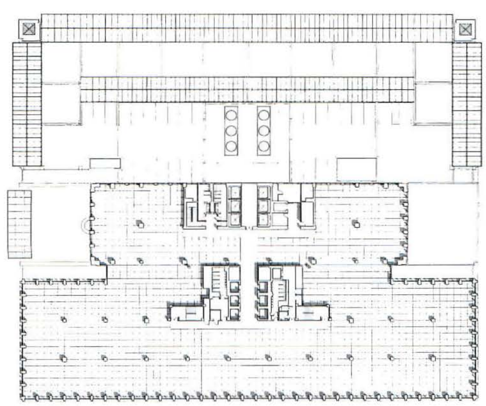


100 EAST PRATT STREET
BALTIMORE, MARYLAND
SKIDMORE, OWINGS & MERRILL, ARCHITECTS

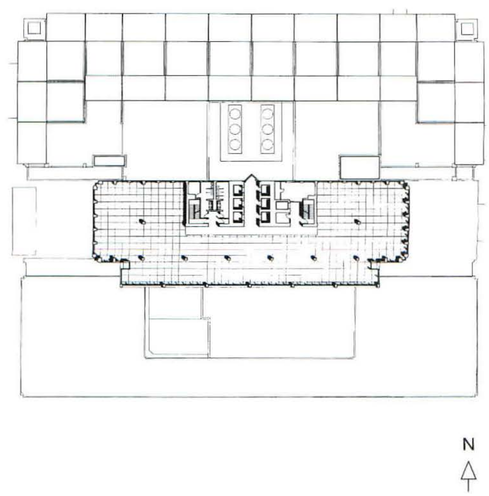
CLIENT: 100 East Pratt Street Limited Partnership
ARCHITECT: Skidmore, Owings & Merrill, Washington, D.C.—Craig W. Hartman (partner-in-charge of design); John Winkler, Robert Holmes (project partners); Mike Keselica (project manager); Randall Gay (senior designer); Lee Quill (technical coordinator); Dean Johnson, Carl Hensler, Sandeep Chawla, Michael Collins, Ron Fiegenschuh, Doug Graham, Derrick Gray, Perla Hertel, W. Lee Jones, Paul Langland, Debra Lehman-Smith, Loretta Leung, James Ngu, Irma Ortega, Jeffrey Owens, Bryan Phillips, Tim Taylor, Mike Zajkowski (project team)
ENGINEERS: Skidmore, Owings & Merrill, Washington, D.C.(structural)—Robert Halvorson (partner); Jerome Rasgus (senior structural designer); John Dennington, Greg Cocco, Sommai Tuamsuk (technical team); Michaud Cooley Erickson & Associates (mechanical/electrical/plumbing); Wiles, Dailey, Pronske (civil)
CONSULTANTS: Lerch, Bates & Associates (elevators); Jules Fisher & Paul Marantz (lighting); Graelic, Inc. (parking); Rolf Jensen & Associates (fire protection)
GENERAL CONTRACTOR: Whiting-Turner Contracting Company
COST: Withheld at owner's request
PHOTOGRAPHER: Nick Merrick/Hedrich-Blessing, except as noted



GROUND FLOOR



FLOORS 3-10



FLOORS 13-26


10-26

After Hugo blew the roof off the Little Bay Resort, Galvalume™ sheet took it by storm.

Hurricane Hugo virtually destroyed everything it touched. Including the roof of the Little Bay Resort in St. Maarten, Netherland Antilles. Management had to act fast–and within tight budget constraints. The tourist season was just weeks away.

But replacing the old clay tiles with new ones for the 52,000 sq. ft. project was out of the question. Not only was it too time consuming to have them shipped from the mainland, but too costly.

Plus, the owners wanted the new roof system to be stronger and able to withstand high winds better than the original clay tile roof.

They went with a facsimile tile system–the ATAS SCANROOF panel system, fabricated from Bethlehem's 24-gauge prepainted Galvalume sheet an coated with a Mission Red PVF2 fluorocarbon finish.

THE SYSTEM IS THE SOLUTION.

The panels, measuring 13 ft. 10 in. by 22 in., are installed horizontally and designed with a structural integral "Z" purlin. This unique configuration makes the panels completely walkable. And since they can b installed directly to roof trusses and rafters, plywood sheathing wasn't needed–which resulted in a substanti savings for the owner.

SCANROOF is also capable of withstanding winds to 170 mph., thanks to its UL 90 rating.

Technology & Practice info

Information on building construction, professional development, and events

Sustainable Architecture Symposium at Ball State

"MAKE NO LITTLE PLANS," was Daniel H. Burnham's credo for the 1893 World's Columbian Exposition in Chicago. The same advice was heeded by the environmentally conscious architects, planners, developers, and scientists who convened September 11 and 12 at the College of Architecture and Planning at Ball State University in Muncie, Indiana. Speakers at the two-day conference, entitled "Building to Save the Earth: A Symposium on Environmentally Conscious Architecture," addressed virtually every environmental issue affected by construction—from site planning, conservation, and waste management, to indoor air quality —and proposed no less than a total rethinking of the role of the architect. "For millennia," observed Marvin E. Rosenman, chair of Ball State's architecture department and symposium coordinator, in his opening remarks to an audience of 450, "we built to protect ourselves from the environment. Now, our delicate environment must be protected from us."

Other conference speakers underscored the message that architects play a pivotal role in the fate of our earth. Robert Simmons, a Denver-based EPA senior policy advisor on pollution prevention, believes that society will increasingly value people such as architects who combine creative and technical talents. "As communicators and artists, architects have the opportunity to link science and culture," Simmons noted.

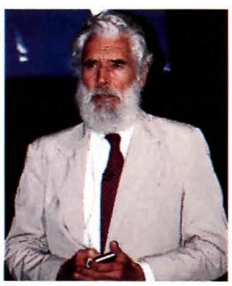
With such skills, architects must assume a greater role as stewards of the built environment. Architect Frederic P. Lyman of Santa Monica, California, proposed that practitioners act as ombudsmen for local citizens seeking to bring public attention to environmental pollution in their neighborhoods. He also suggested that architects be appointed to cabinet positions, leading federal departments such as Interior, Housing and Urban Development, Transportation, and Energy.

And as designers, architects have the ability to stop pollution in the planning stages, before it occurs. This opportunity was reflected in current projects and research presented by several speakers. Architect Martin Liefhebber of Toronto, for example, discussed his design for the Codicile House, which will incorporate photovoltaics, gray-water recycling, rainwater collection, and composting systems in an urban location when completed next June. And Paul Bierman-Lytle, principal of the Masters Corporation in New Canaan, Connecticut, reviewed environmentally sensitive materials, many of which can be ordered through the architect's own company, Environmental Outfitters; its Manhattan showroom is open to architects and contractors.

Stressing the holistic thinking required to solve the ecological challenges before us, AIA President-Elect Susan Maxman linked the problems of the environment with the crisis in our cities: "We can never have sustainable design if the urban continues to decline and the suburban continues to sprawl."

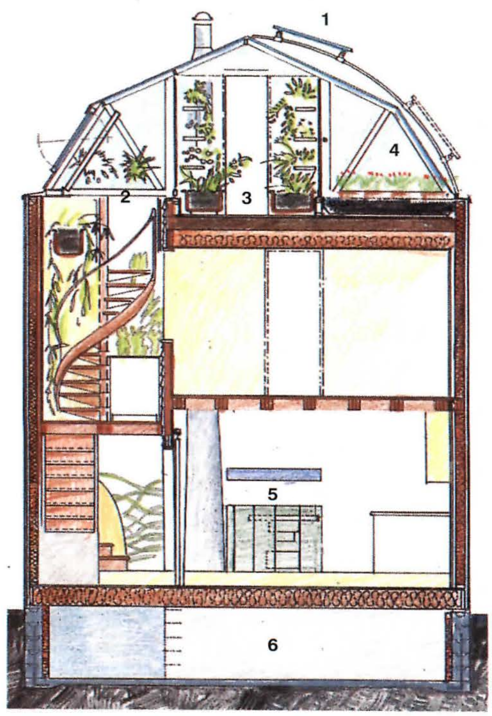
Highlights of the conference, which was sponsored by the U.S. Environmental Protection Agency, the AIA, and Ball State University, will be included in a three-part AIA videoconference beginning January 14, 1993. These educational programs are intended to prepare architects for further discussion at the next national AIA convention, entitled "Architecture at the Crossroads: Designing for a Sustainable Future," scheduled for June 18-21 in Chicago. Burnham would be pleased that on the centennial of the Columbian Exposition, the architectural community is making plans for nothing less than saving the world. ■

—NANCY B. SOLOMON



STEVE TALLEY PHOTOS

Malcolm Wells (top left) illustrated how people can live comfortably underground in harmony with nature. Robert J. Berkebile (top right), chair of the AIA Committee on the Environment, challenged all architects to strive for sustainable design. Martin Liefhebber presented the Codicile House (far right), a self-sufficient home planned for Toronto. Speakers toured a solar aquatic system (right) that purifies waste water through tanks stocked with plants, snails, and fish.



1 SOLAR COLLECTOR
2 LIGHT WELL
3 BIOREGENERATIVE SYSTEM
4 GREENHOUSE
5 BIOMASS BURNING STOVE
6 COMPOSTER

Towering Improvements

Postwar office buildings are upgraded to meet current codes and standards.

PRESERVING MODERNISM

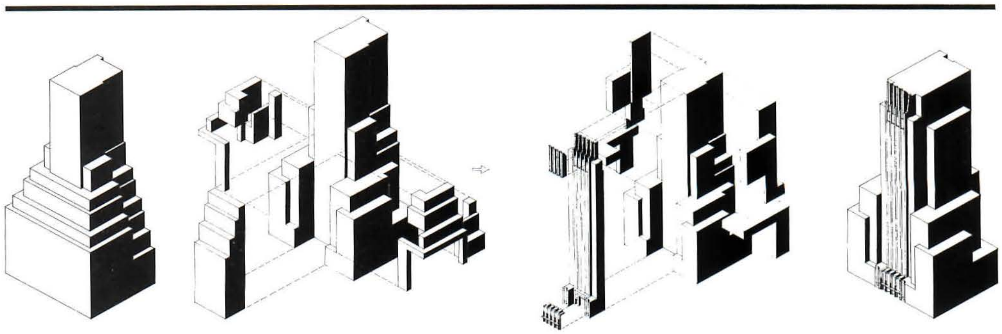
MODERN OFFICE towers are increasingly becoming major targets of renovation. Although these metal and glass monoliths define the skylines of most American cities, their images have become dated, and their once-innovative building components are worn out or obsolete. However, these buildings from the 1960s and 1970s are not yet old enough to warrant protection under local landmark laws. As a result, many have been torn down to make way for new towers or altered beyond recognition to conform to current standards of style and performance. But recessionary times are prompting owners to turn to this existing stock of towers as an economical means of attracting tenants. They are upgrading older high rises by installing improved curtain walls; more energy-efficient, insulated glazings; and the latest generation of heating and lighting controls. More importantly, architects are improving the circulation and detailing of public spaces in older high rises to conform to new attitudes about such buildings' urban design responsibilities.

Location, location

OWNERS REALIZE THAT THESE 20-AND 30-year-old office towers occupy prime urban sites and were built before zoning severely limited the square-footage allowed for new construction.

The owner of California Federal Plaza in Los Angeles, completed in 1963 on Wilshire Boulevard, for example, knew that any new building constructed on the site could only be built to one quarter the size of the existing tower, according to existing zoning laws. The client therefore commissioned the Nadel Partnership to upgrade the 27-story structure to comply with current commercial building safety regulations.

The architects removed asbestos, installed sprinklers, updated lobby finishes, refurbished the exterior's precast concrete panels by cleaning and repainting them, and substituted now-outdated '60s-era glazing with more energy-efficient, tinted glass.



320 Park Avenue
New York City
Skidmore, Owings & Merrill

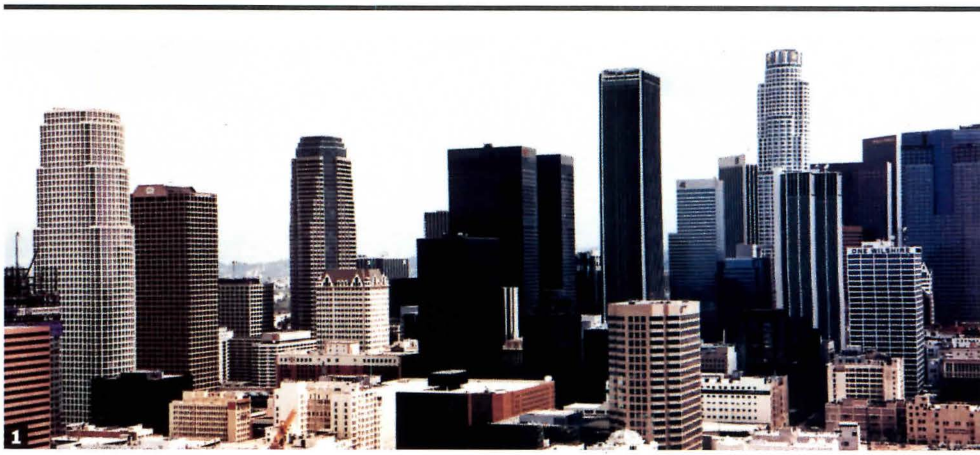
SKIDMORE, OWINGS & MERRILL'S PROPOSED renovation of a 1960 Park Avenue office tower, designed by Emery Roth & Sons, calls for stripping the building to its skeleton in order to transform its original, wedding-cake profile (above left) into a more slender volume (top and above right). The architects sought to reduce the large, difficult-to-lease floor plates at the building's base and increase the square footage of impractical floor plates at its top. To give the structure greater presence at street level, SOM designed a three-story glass-entry pavilion at its base. Renovating the structure proved more economical than building anew, since current zoning restrictions would require a building 40 percent smaller than the existing tower. As with many such speculative real estate ventures, however, the project is currently on hold, pending an upswing in the economy.

Enhancing public image

WHILE THE LOCATION OF PROMINENT, OLDER office towers is valuable, their Modern images usually need to be updated to current market expectations of quality. "In essence, you are competing with newer buildings," explains Richard Keating, partner of the Los Angeles-based architecture firm Keating Mann Jernigan Rottet, which is currently renovating five such office towers. Even those '60s and '70s buildings that have been well-maintained and are structurally sound must be upgraded to hold onto existing tenants or to attract a more upscale clientele. Some office high rises, perceived as bland or dowdy in comparison to successors built to eclipse them, suffer from a tarnished image that can be simply polished by subtle alterations to existing facade materials and detailing.

Architects are therefore increasingly being called upon to upgrade these buildings' envelopes and public spaces. Since many office tower renovations are driven by the need to attract tenants, owners can ill-afford to relocate existing tenants or have their buildings vacant for long, while spending additional funds to improve or add amenities. As a result, design decisions are often predicated on the most expedient and least disruptive methods of constructing and scheduling proposed renovations. Features common to the office tower, such as curtain walls, open office plan, nonstructural partitions, suspended ceilings, and central service core for consolidating elevators, bathrooms, storage, and electrical and mechanical equipment, are easily upgraded without requiring major structural changes.

Most office high rises of the 1960s and 1970s were designed as isolated objects, separated from the street by plazas and sunken courtyards. Now that attitudes about urbanism have shifted to emphasize pedestrian connections, architects are adapting towers to a more human scale at the sidewalk level. SOM's renovation of 1301 Avenue of the Americas (pages 108-109) and Gensler Associates' modifications to Arco Tower (pages 108-109) both illustrate ways of upgrading such outdoor spaces. Likewise, functional but meagerly proportioned, drab lobbies have given way to prominent entry sequences. Monumental, rich interiors have become a necessity to compete with those constructed in the 1980s. The Sears Tower in Chicago, for example, is being revitalized by DeStefano Associates, a local firm that has proposed adding two 50-foot-tall, stainless steel-clad canopies over its entrance. Similarly, Keating's approach to renovating the base and top of 707 Wilshire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707 Wilshire Boulevard
Los Angeles, California
Keating Mann Jernigan & Rottet


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LIKE MANY OLDER SKYSCRAPERS, 707 WILSHIRE has been crowded on the skyline of downtown Los Angeles, as new office buildings burgeoned in the 1980s (1). To restore the structure after a 1987 fire and increase its recognition as a local landmark, the architects proposed modifying the 62-story tower's base (2) and top (3). Changes will enhance the expression of the building's slender, vertical proportions and its connections to the street. Existing mullions will be capped with white aluminum to create contrasting pinstripes against the dark brown tinted glass of the original curtain wall. A 40-foot-high parapet wall will be replaced by a cantilevered helicopter pad over the roof, introducing a more articulated top. The architects plan to enhance the entrance's visibility from the street by replacing tinted glass in the four-story lobby (4) with clear glass (5). Cantilevered fourth-floor projections will enhance the 1.1-million-square-foot building's appearance when viewed from the outdoor plaza and surrounding sidewalks.

First National Bank
San Diego, California
Keating Mann Jernigan & Rottet


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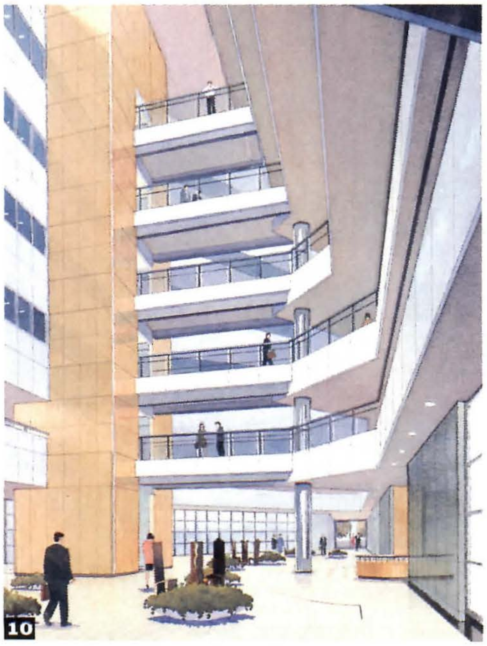
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WITH THE EXCEPTION OF THE BUILDING'S sliced-off corner, the simple geometry and unadorned mirrored glass facade of the 1980 First National Bank designed by Hope Consulting Group provide few clues as to the location of its principle entry (6). Furthermore, the office tower's sunken entrance makes it indistinguishable from the rest of its base, while the building's recessed side door is equally obscure to pedestrians (7). Once visitors and tenants reach the building's interior, they are greeted by a narrow, dark lobby and disorienting, six-story atrium (9). To improve circulation within the 580,000-square-foot office building, the architects focused on enhancing the clarity of the entry sequence. The elevator and stair core will become more visible by eliminating a walkway in the lobby. Lighter granite will replace existing brick and wood finishes, and open balconies in the atrium (10) will increase daylight from the perimeter. The same granite will clad principle entry points, making them appear more distinctive in the glass-paneled curtain wall.

(pages 106-107) and RTKL's modifications to 525 B Street (pages 110-111), indicate that improvements to existing office towers must address the scale of the street as much as their image on the skyline.

System components

THE MOST IDENTIFIABLE COMPONENTS OF 1960s and 1970s buildings are their ubiquitous curtain walls. The flush profiles of curtain walls typical of the period were often constructed with single-pane, uninsulated glazings; lack of thermal breaks between window mullions; and "watertight" wall systems connected by panel anchors, caulking, and sealants such as PVC and neoprene gaskets. Once touted to last the life of the building, such components are now in need of repair or replacement, and newer and better insulated curtain wall panel systems can be substituted. As SOM Associate Partner T.J. Gottesdiener notes, "Curtain walls of the 1960s were still somewhat experimental. There is now a higher standard for what is considered acceptable air infiltration and water leakage." Decisions regarding the most appropriate design and specification options for window size, type, and mullion placement also effect the building's overall energy efficiency and the future flexibility of partitioning space behind its exterior wall.

In addition to upgrading the appearance and performance of an office tower's skin and interior finishes, internal and often invisible systems are subject to retrofits as well. Providing tenants with up-to-date electrical and telecommunication systems and ensuring adequate power distribution per floor has become a virtual necessity in the modern workplace. Architects are therefore also faced with the challenges of relocating equipment storage closets and making more room for increased wiring through raceways within raised access floors and dropped ceilings.

Owners must also increasingly provide adequate emergency or auxiliary power supplies so offices can remain fully operational during temporary power outages. Mechanical and lighting systems have become more energy-efficient and capable of more individualized control to suit tenants' particular needs. Likewise, more automated security and fire systems have improved building safety. And today's tenants are savvy enough to ask about enhanced performance and flexibility when considering leasing space in an older office tower, explains Carl Galioto, SOM's senior technical designer for 320 Park Avenue (page 105). More efficient, smaller equipment also

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WOLFGANG HOYT

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ERIC FIGGE


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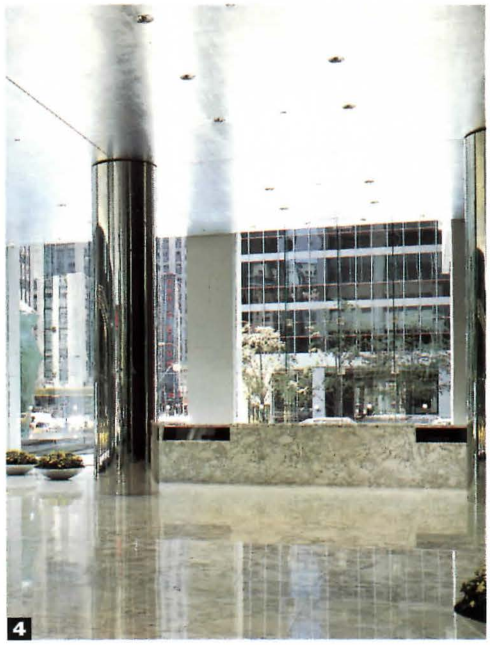
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WOLFGAND HOYT

1301 Avenue of the Americas
New York City
Skidmore, Owings & Merrill, Architects

IN 1988, J.C. PENNEY RELOCATED ITS HEADquarters from a 46-story office tower in Manhattan to a new complex in Plano, Texas. The vacated 1964 structure offers 1.8 million square feet of speculative office space which would be impossible to build under current zoning law. In renovating the structure, SOM sought to correct several deficiencies common to 1960s office towers. The existing building, for example, featured a recessed arcade and sunken entrance that failed to take advantage of its prominent streetfront (2). The architects designed a new, street-level plaza over the existing forecourt to reclaim the space for an expanded lobby, providing a more prominent entry from Sixth Avenue under a stainless-steel and glass canopy (1). They coated the fading curtain wall, composed of porcelain panels, with a new fluoropolymer-based paint that provides a 10-year life expectancy at a fraction of the cost of new cladding. The original lobby interior (3) now boasts a contemporary image with marble flooring and an aluminum-finished ceiling (4).


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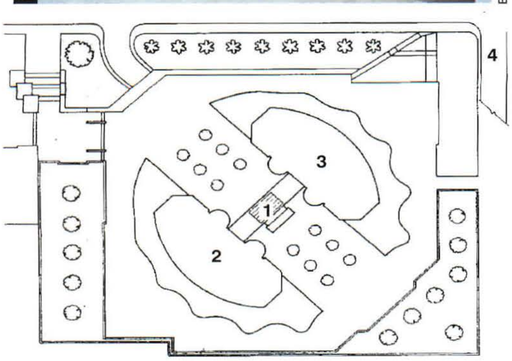
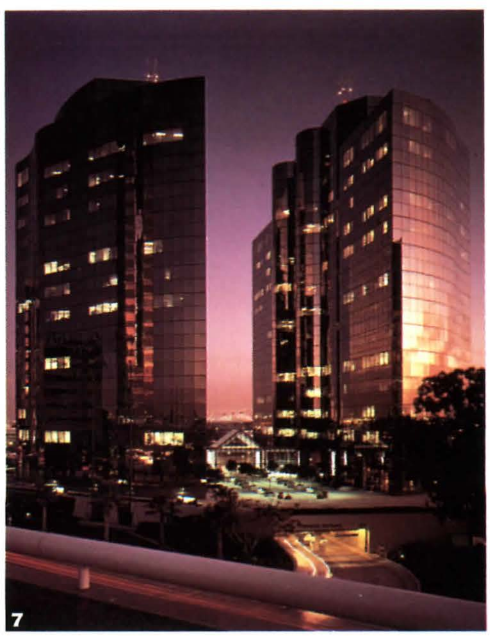
ERIC FIGGE



1 NEW LOBBY
2 EXISTING WEST TOWER
3 EXISTING EAST TOWER
4 GARAGE ENTRANCE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ERIC FIGGE

Arco Center
Long Beach, California
Gensler and Associates, Architects

SINCE THE LUCKMAN PARTNERSHIP DESIGNED Arco's twin office towers in 1975, most of the company's employees have bypassed an expansive outdoor plaza originally intended as the principal entry to the side-by-side glass structures (7). Instead, they usually drive into the underground parking lot and enter the 15-story building directly from garage elevators (plan, bottom left). To enliven the otherwise desolate plaza by encouraging increased pedestrian circulation, Gensler and Associates designed a new glass-enclosed entrance (5) to connect the previously isolated buildings to their surrounding terraces. Separate elevators originally serviced the two towers from the garage; the architects relocated them to create a shared bank midway between the structures. Tenants and visitors now enter the buildings through a gabled pavilion. This system also centralizes security and access to lobbies and offices (6). Travertine walls and floors in both lobbies and pavilion extension provide continuity between the principal public spaces of the complex.

lends itself to reducing the building's service core, thereby increasing rentable square footage for tenants.

New code compliance

RECENT REFORMS IN HEALTH, SAFETY, AND welfare regulations, particularly the Americans with Disabilities Act of 1990, have prompted owners of 20- and 30-year-old buildings to redesign perimeter entries, lobbies, public corridors, and elevator and bathroom cores. They are also often faced with the dilemma of removing hazardous materials, explains Mark Boekenheide, director of Brennan Beer Gorman/Architects' Washington office. Boekenheide notes that removal of asbestos, lead paint, or PCBs also provides the opportunity to improve other deficiencies which may include inefficient circulation, outdated finishes, inadequate amenities, and aging building components. Scheduling multiple improvements to coincide with one another also reduces inconvenience to tenants, alleviating owners' leasing concerns.

By providing retail space on the ground floor, many such 1960s and 1970s towers were precursors to today's mixed-use office tower. But the placement of elevators and escalators to accommodate both upper-office tenants and street-level consumers was often complicated in these older high rises. Architects are modifying these service cores to increase public accessibility with more straightforward circulation patterns.

Providing balanced solutions

REGARDING THE PRESERVATION OF MOST post-World War II office towers, Gottesdiener remarks, "I don't think many people would miss them. There are other buildings considered far more precious. But I suspect if such buildings manage to survive another 30 years, the public will begin to look back on them more fondly."

Therefore, architects should preserve the integrity of these postwar buildings by working within their existing Modern vocabulary, and take the opportunity to "solve these buildings' problems and also improve the city," as Keating points out. Few 1960s or '70s high rises merit protection as classic examples of Modern skyscrapers. But, as evidenced on these pages, architects are already resolving flaws in many of their original designs by preserving essential Modern elements, instead of discarding them to suit the changeable whims of fashion. ■

—MARC S. HARRIMAN


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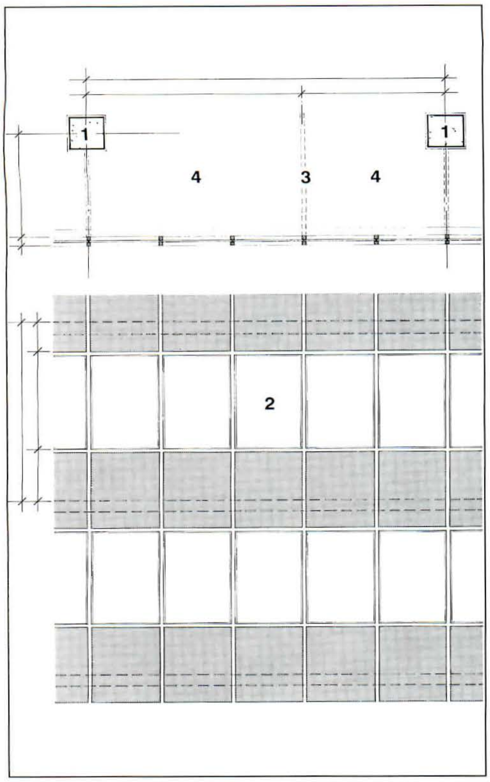
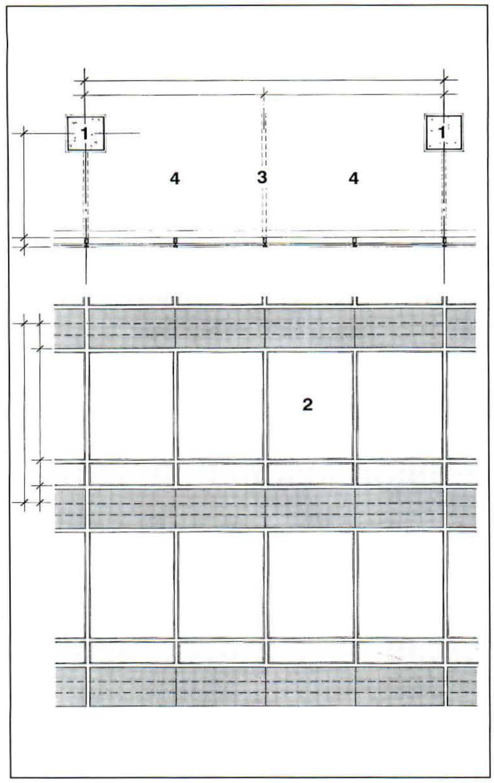
DAVID HARRISON

International Place
Rosslyn, Virginia
Brennan Beer Gorman/Architects



1 EXISTING COLUMN
2 4-FT. PANEL MODULE
3 TYPICAL PARTITION WALL
4 OFFICE SPACE



1 EXISTING COLUMN
2 5-FT. PANEL MODULE
3 TYPICAL PARTITION WALL
4 OFFICE SPACE

IN 1990, THE OWNERS OF INTERNATIONAL Place decided to reposition the 24-year-old building, formerly leased by the General Services Administration, and market it to the private sector. Brennan Beer Gorman reclad the building's original, single-pane curtain wall (1) with energy-efficient, low-E insulated glazings, widening the original panel module from 4 to 5 feet (drawings at left). This arrangement provided more flexibility inside the building, allowing tenants to align standard 10-foot-wide office partitions between existing interior columns. The architects designed a more efficient elevator and bathroom core to create additional rentable square-footage. They notched the upper two floors of the 12-story building at the center and edges of the facades to break up the scale of the 312-foot-long structure (3), increasing corner office space and terraces. Faux wood paneling (2) in the lobby was replaced with travertine marble walls and floors to create a more grand entrance (4).

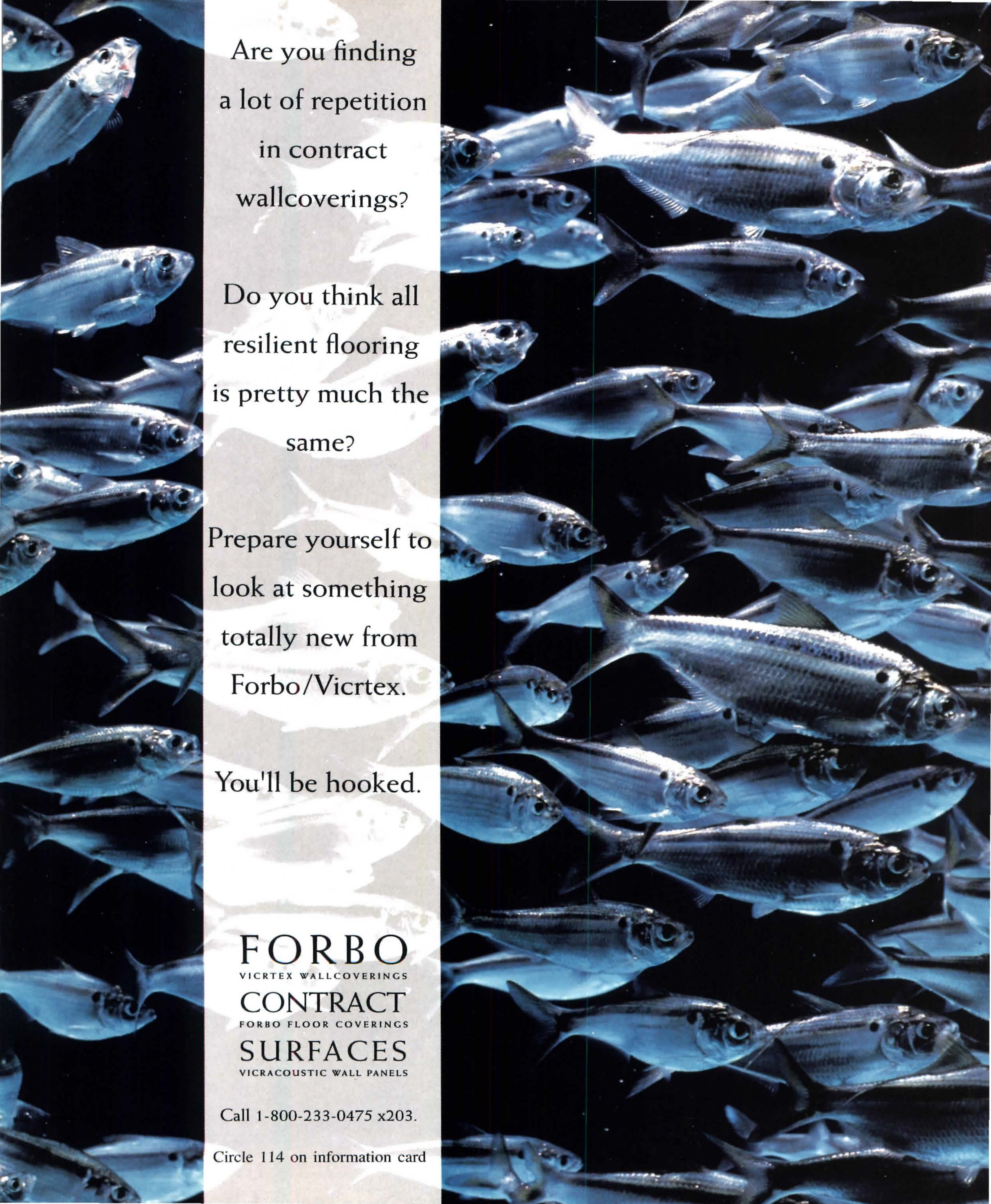
525 B Street
San Diego, California
RTKL, Architects

DAVID HARRISON

DAVID HARRISON

DAVID HARRISON

THE RELOCATION OF UNION BANK, THE MAjor tenant of the 1962 San Diego Tower, allowed RTKL to modernize the building's outdated profile (5). Because the 22-story property still offered 400,000 square feet of commercial space in downtown San Diego, the architects decided to not only upgrade its building systems, but to refine its proportions. To further articulate the building's crown, they projected fins from its squared-off top to create a more distinctive silhouette on the skyline (7). At night, exterior-mounted lighting fixtures accentuate the new cornice with backlighting. On the ground floor, RTKL reclad the entrance with limestone and polished steel accents to differentiate it from the rest of the concrete tower. They also chose to recoat the dark brown painted panels of its shaft with a lighter beige (6). Floor-to-ceiling glass further defines the entry and introduces more natural light to the interior (9). Prominent exterior lighting fixtures also brighten the original lobby (8), renovated in marble to appear monumental (10).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Stratified Restoration

The restoration of Boston's Old State House preserves layers of history.

FEW OF OUR NATIONAL LANDMARKS CARRY the preservation responsibilities of the Old State House in Boston. Erected in 1713 as the seat of the British government in the Massachusetts Bay Colony, the Georgian building witnessed tremendous changes—from the reading of the Declaration of Independence on its east balcony in 1776, to the establishment of a Boston history museum in 1882, to the completion of a subway below its foundation in 1905. A need to stabilize and preserve the building and modernize the museum environment led the National Park Service to commission Boston-based Goody, Clancy & Associates to restore the landmark in 1987. The task of the architects and their multidisplinary team of consultants was to convey the building's multifaceted history, deciphering its physical and social transformations over the course of its 279 years.

"A building represents layers of time," observes Principal Joan Goody. "We don't have to freeze it in one moment—pretending that changes never took place." Never losing sight of the State House's Colonial roots, Goody, Clancy restored architectural elements that were added long after the building was completed, such as an 1831 Simon Willard clock, and retained certain signs of change, such as variations in brick and mortar that occurred as new windows and doors were inserted into the original structure.

Goody and her project team worked extensively with three organizations to determine those elements to be repaired, replicated, or added: the City of Boston, which owns the building; the National Park Service, which funded the restoration and has contributed to the maintenance of the state house since 1974; and the Bostonian Society, which operates the historical museum.

Structural stabilization

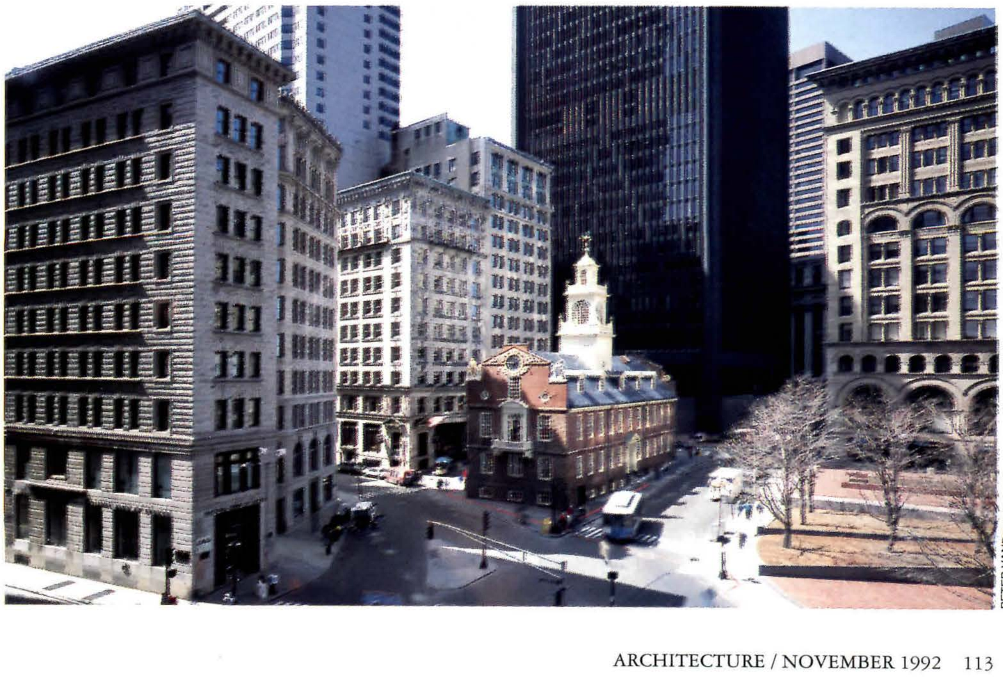
THE ARCHITECTS' FIRST PRIORITY WAS TO stabilize the loadbearing brick structure of the Old State House. The masonry had deteriorated significantly in the window spandrels and flat arches of the north and south walls, with severe cracks up to a 1/2-inch wide. Studying the patterns of these cracks, the engineers observed that the southwest section of the wall was shifting upward, recalls project engineer John Coote of LeMessurier Consultants in Cambridge, Massachusetts.

To determine the cause, the preservation team looked between the foundation and the cracking walls and discovered a sandwich of sawed-off needle beams, plates, rail sections, and shims running between the Old State House's original masonry foundation wall and the steel beams that had been inserted during subway construction. Instead of replacing their temporary shoring with a cementitious material, the original subway builders had left their bracing in place and filled the gaps with steel or wrought iron elements to refound the old building.

Although this underpinning remained stable in most areas, water had penetrated a 10-foot-long portion of the ferrous assembly at the southwest corner, causing each plate and shim surface in this area to rust. Occupying more space than the base metal, the rust triggered a phenomenon known as rustjacking, lifting portions of the building by about 3/8 of an inch. "That does not sound like very much," acknowledges project architect Ralph Tolbert, "but when it only occurs in isolated areas, it has the effect of producing instability in the foundation and severe masonry cracking at the upper reaches of the building." The engineers specified that the rusted underpinning be removed and the 6-inch gap filled with cementitious grout.

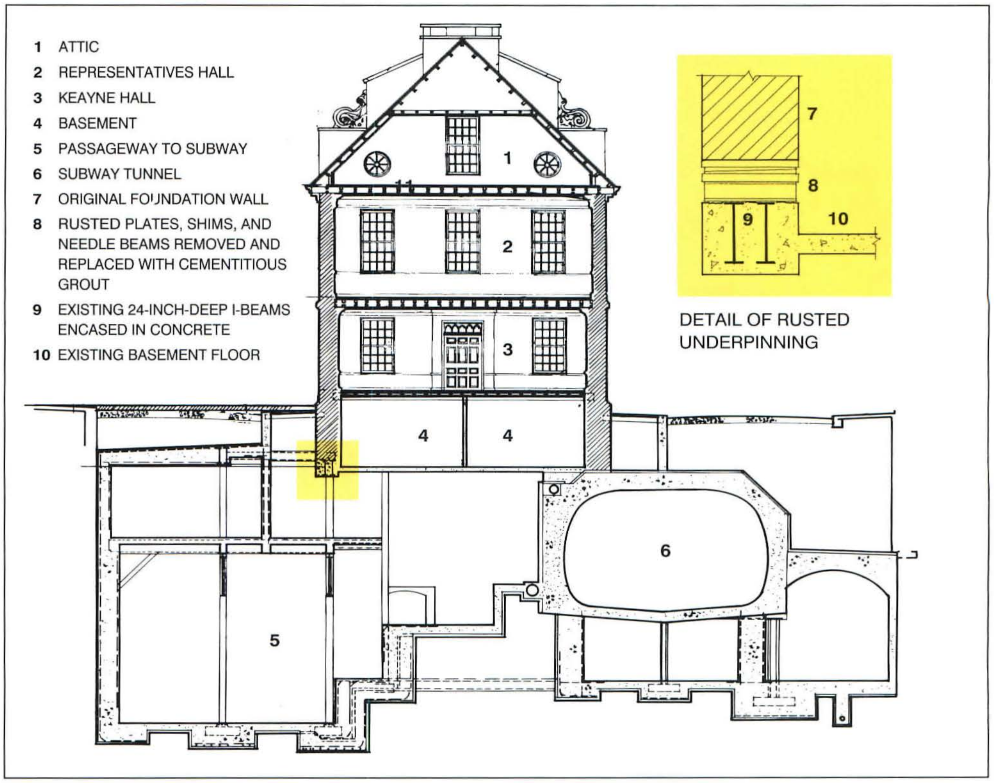
In some instances, the project team structurally improved the original construction. The north and south walls, for example, were not stiff enough to transfer all wind loads to the foundation. As a result, accumulated lateral forces over the past two centuries had caused them to lean several inches out of plumb. The engineers proposed that a diaphragm of plywood sheathing be attached to existing attic floor planks to distribute some of these horizontal loads to the end walls. Along the north and south eaves, they bolted the plywood deck and existing subfloor

At the crossroads of State and Washington Streets in downtown Boston, the Old State House (below) has witnessed tremendous changes in its 279 years. Goody, Clancy & Associates preserved the building's essential Colonial construction and revived architectural highlights from later periods.

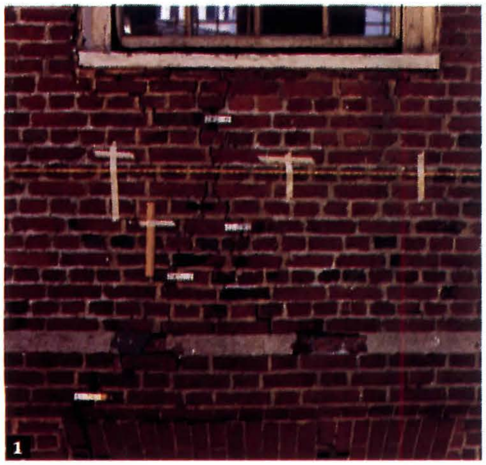


PETER VANDERWARKER

Goody, Clancy's restoration addressed severe masonry cracking and wood deterioration. Although vibration from a subway built below the building between 1903 and 1905 (section) seemed a likely suspect, testing and analysis proved that this movement was not strong enough to cause masonry damage. Upon further investigation, the restoration team discovered rusted steel or wrought iron elements inserted within the underpinnings during subway construction (detail). This deteriorated bracing had lifted portions of the foundation wall by 3/8 of an inch, causing cracking in the masonry wall above. Sections of the foundation wall were waterproofed and the rusted material was replaced with cementitious grout. Special measuring devices known as telltales were positioned across the masonry cracks (1) for over a year to determine if the cracking was seasonal or longterm. Bricks from damaged areas were removed and their positions labeled (2) so that they could be replaced correctly during the repair (3). Weather-worn Corinthian capitals (4) at the east balcony were chemically stripped of paint (5) and repaired with epoxy and wood dutchman (6) techniques.



SOUTH-NORTH SECTION



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between continuous 1-by-6-inch steel plates above and joists below. Like a horizontal beam, the plates on the north and south function as the top and bottom flanges, and the plywood as a web. Under wind pressure, the "beam" tries to bend, with one plate in tension, the other in compression, and the plywood in shear. These shear loads are transmitted from the plywood to the end walls, which help resist the forces, through a steel angle.

The engineers also strengthened the connections between the roof trusses and the north and south walls. The wood trusses, which had never been mechanically fastened to these walls, had begun to move relative to their vertical supports as the once-parallel walls began to tilt.

To connect the trusses to the walls, while avoiding undue stress on the weakened brick and mortar, the engineers developed a two-legged clasp that was bolted to the truss. One steel leg extends several inches along the masonry wall exterior, the other along the interior. Like a pair of bookends, the two extensions hug the brick wall, preventing the truss from moving horizontally.

Material conservation

ONCE THE STRUCTURE WAS STABILIZED, Goody, Clancy repaired deteriorated materials, particularly masonry and woodwork, in consultation with architectural conservator Judith Selwyn of Preservation Technology Associates in Boston. Deep areas of masonry abutting the interior wainscoting were removed where cracking was most severe. Only a few bricks on each side of a crack were removed where damage was more limited. Any bricks that were removed were labeled, and about 85 percent reinstalled in their original locations. The remaining 15 percent were replaced with matching brick from salvaged sources. Crevices less than 1/16 of an inch wide were filled with a soft grout.

Cracked, weathered, and in some cases obscured by more than 60 layers of paint, the exterior woodwork was also restored. Paint was carefully removed with nonalkaline chemicals, except in select areas where the finish was retained as historical evidence for future preservationists. Dislodged pieces were repositioned, and small gaps were filled with a wood restoration epoxy consisting of a consolidating and priming liquid followed by a pastelike filler. Larger missing sections were replaced by a new wood "dutchman," an element that matches the species, grain, and carved profile of the original. Each step was documented with photographs.

PETER VANDERWARKER PHOTOS

In the 1950s, well-intentioned preservationists substituted 1831 Simon Willard clock with a plywood sundial (inset, above), meant to replicate appearance of original. Goody, Clancy discovered the Willard clockworks in the Old State House's attic, and recreated the face and hands from extensive documentation (top left). Ornamental lion and unicorn on the east wall (top left), symbols of the British monarchy, had been torn down by an angry mob in 1770 and reinstalled in 1881. A wheelchair lift was located at the west door to comply with federal accessibility requirements (left).

PETER VANDERWARKER PHOTOS

Recognizing that the Old State House represents not only Colonial architecture, but subsequent generations' interpretations of that period, the team returned each of the major rooms back to its most important restoration. On the first floor, Keayne Hall (top) was detailed according to architect Joseph Everett Chandler's 1907 interpretation. The Council Chamber (bottom) illustrates the 1943 remodeling by architects Perry Shaw and Hepburn. A rotunda (center) links the chamber to Representatives Hall, which was refurbished according to the 1881 restoration by architect George Clough.

Interior intervention

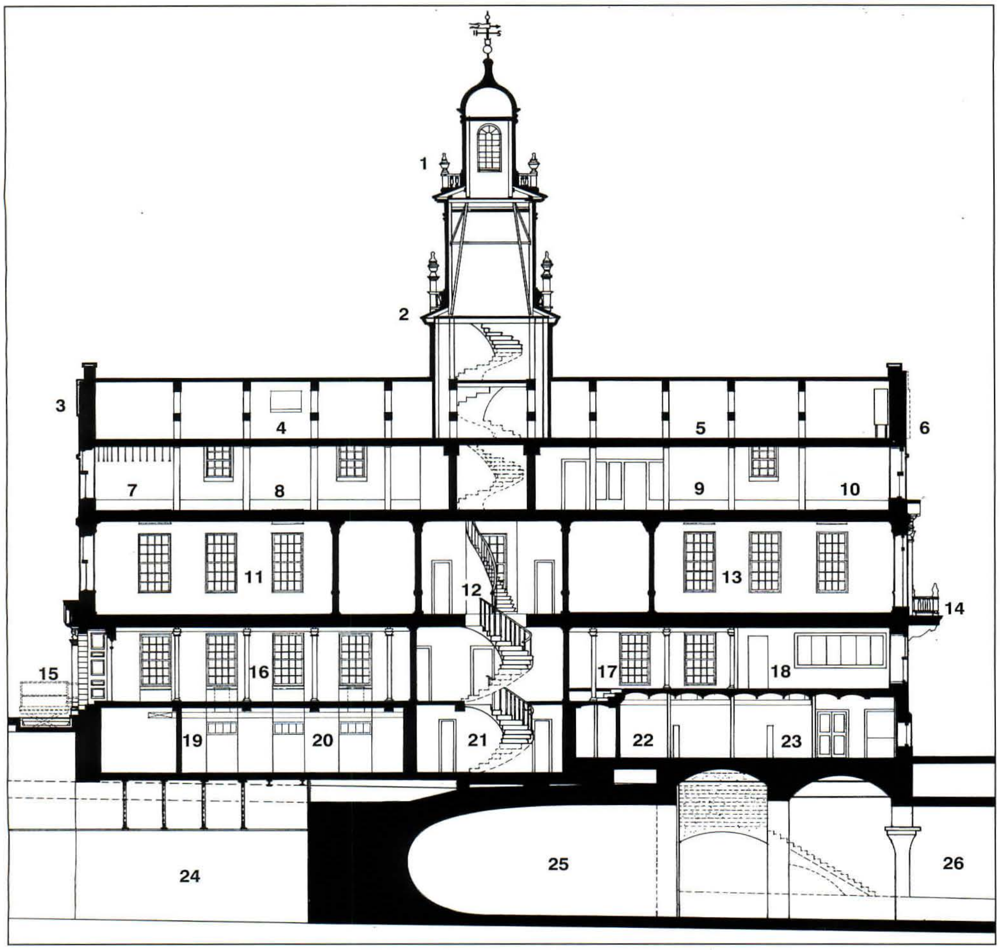
TO MODERNIZE THE EXISTING MUSEUM'S storage, office, and exhibit facilities, Goody, Clancy inserted new technologies—including HVAC, glazings, and lighting—into the building with minimal disruption to historic material. The architects were able to locate the condensing unit for the Old State House across the street on the roof of the Park Service's regional headquarters, mitigating the HVAC system's architectural impact. The likelihood of moisture damage was reduced by specifying a direct digital control HVAC system in which relative humidity and temperature are continuously monitored. Additionally, the relative humidity is set at 25 to 30 percent, not at the 50 percent ideal for a new museum environment.

Goody, Clancy integrated a variety of lighting systems into the gallery rooms to address the needs of the collection without detracting from the building itself, the museum's most important artifact. In the Council Chamber, for example, they installed small point lights in the ceiling, inserted uplighting in the freestanding exhibit cases, and reinstalled a chandelier from the 1941 restoration to its central position. An eight-sided chandelier with small track lights was specially developed for the anterooms.

The architects restored each of the building's major rooms to its most important and best-documented period. On the first floor, for example, Keayne Hall was restored to architect Joseph Everett Chandler's 1907 vision of Colonial architecture. On the second floor, the Council Chamber was preserved to reflect the 1943 remodeling by architects Perry Shaw and Hepburn. Across the hall from the chamber, Representatives Hall captures architect George Clough's 1881 interpretation of the Georgian era. Notes Goody, "We now have three rooms, each in different 'Colonial' colors, that illustrate what was considered Colonial in three time periods."

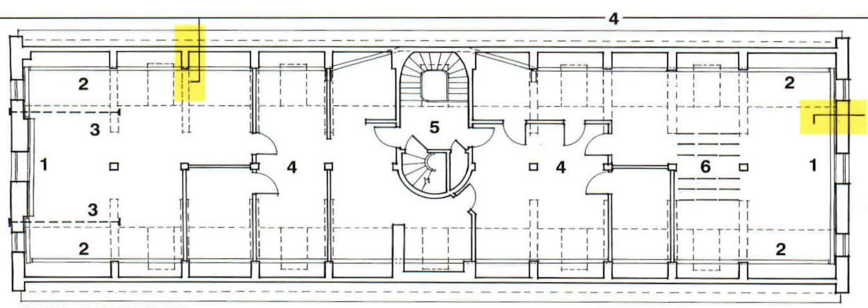
Goody, Clancy's approach contrasts sharply with the 1950s when the original Simon Willard clock was removed from the Old State House and replaced with a plywood replica of the original Colonial sundial. Such a narrow interpretation of preservation actually destroyed a portion of the very fabric it was intended to save. By taking an inclusionary view, Goody, Clancy and the project team have protected the Old State House for the future, giving visitors not only a view of this country's political beginnings, but diverse preservation history. ■

—NANCY B. SOLOMON



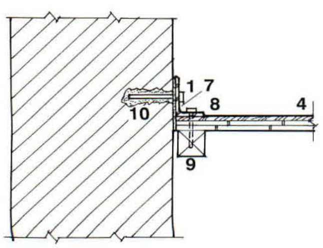
WEST-EAST SECTION

1 REPAIRED AND RESTORED TOWER BALUSTRADE AND EXTERIOR TRIM
2 PAINT REMOVED FROM EXTERIOR OF BUILDING TRIM AND TOWER, AND WOODWORK REPAINTED
3 REPLICATED STATE SEAL REINSTALLED ON WEST PEDIMENT
4 NEW FRESH-AIR INTAKE IN ROOF
5 STRUCTURAL STABILIZATION OF WALLS AND ROOF
6 SUNDIAL REMOVED; SIMON WILLARD CLOCK RESTORED
7 ART STORAGE RACKS AND MUSEUM STORAGE SHELVING
8 NEW OFFICES IN ATTIC FOR BOSTONIAN SOCIETY
9 AIR-CONDITIONING SYSTEM IN ATTIC FEEDS DOWN TO SECOND FLOOR ROOMS
10 NEW SPRINKLERS IN ATTIC FOR FIRE PROTECTION
11 NEW BOSTONIAN SOCIETY COLLECTIONS DISPLAY AND CHANGING EXHIBITS IN REPRESENTATIVES HALL
12 ROTUNDA
13 NEW EXHIBITS IN COUNCIL CHAMBER
14 EAST BALCONY WOODWORK REFURBISHED AND REPAIRED
15 NEW WHEELCHAIR LIFT IN SIDEWALK FOR IMPROVED ACCESSIBILITY
16 NEW EXHIBIT ON AMERICAN REVOLUTION IN KEAYNE HALL
17 NEW ADMISSIONS, MUSEUM SHOP, AND EXHIBITS AREAS IN WHITMORE HALL
18 NEW AUDIOVISUAL EXHIBIT
19 NEW OFFICES AND MUSEUM STORAGE FOR BOSTONIAN SOCIETY
20 NEW SPRINKLER IN BASEMENT FOR FIRE PROTECTION
21 NEW ELECTRICAL AND PLUMBING SYSTEMS
22 NEW DUCTS IN BASEMENT FOR AIR-CONDITIONING SUPPLY TO FIRST FLOOR
23 EXISTING SUBWAY STATION ENTRY
24 EXISTING SUBWAY STATION AND TUNNEL SUPPORT OLD STATE HOUSE FOUNDATION
25 EXISTING SUBWAY TUNNEL
26 EXISTING SUBWAY PLATFORM

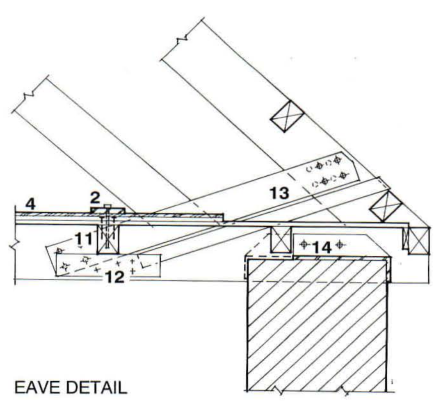


ATTIC FLOOR PLAN

With basement offices and attic art storage, the Bostonian Society is better equipped to mount exhibits on local history (section, top). Plywood diaphragm (plan left) covering the attic floor and steel plates along north and south eaves function as a horizontal beam, distributing lateral loads to end walls. Roof trusses are secured to masonry walls by a two-pronged clamp (details, bottom).



END WALL DETAIL



EAVE DETAIL

1 6" BY 4" BY 3/8" STEEL ANGLE
2 CONTINUOUS 1" BY 6" STEEL PLATE
3 1" DIAMETER TIE ROD IN UPPER ATTIC
4 NEW 1/2" PLYWOOD FLOOR
5 OMITTED PLYWOOD AT STAIR HALL
6 NEW 2" BY 6" MEMBER BOLTED TO EACH OF 6 DAMAGED PURLINS
7 1/2" DIAMETER ADHESIVE ANCHORS AT 2' o.c.
8 7/16"-DIAMETER LAG BOLTS AT 1' o.c. BY 6" LONG
9 EXISTING 3 1/2" BY 5" JOIST OR NEW 4" BY 4" TIMBER
10 EPOXY GROUT APPLIED TO ANGLE IN A PASTE-LIKE CONSISTENCY BEFORE ANGLE ATTACHED TO WALL
11 EXISTING FLOOR NAILED TO JOIST
12 EXISTING 3 1/2" BY 5" JOIST OR NEW 4" BY 6" TIMBER
13 NEW 3/8" BY 6" PLATE ON EACH SIDE OF TRUSS
14 NEW 1/2" PLATE BOLTED TO EITHER SIDE OF TRUSS

Quakeproofing Landmarks

Protecting historic buildings from earthquakes without destroying original features.

RENOVATING HISTORIC LANDMARKS TO comply with seismic codes often becomes a balancing act between preservation of historic fabric and contemporary measures to strengthen structure. Architects are often confounded as to how to protect an historic building from earthquakes without destroying the very qualities that make it worth saving—such as plan configuration, structural integrity, and historic materials and finishes. However, the new technology of base isolation is making it easier to seismically upgrade older buildings with a minimum of intrusion.

Traditionally, overcoming an earthquake's lateral force requires strengthening or stiffening an existing structure with either steel bracing, concrete shear walls inserted at critical weak points such as corners, or a heavy movement-resisting frame of reinforced concrete or steel.

"The goal of stiffening the structure is to protect vulnerable historic elements that are deformation-sensitive," notes Eric Elsesser, a structural engineer and partner of Forell/Elsesser Engineers in San Francisco. Such elements include terra-cotta walls and ornament, stone and brick walls, and other brittle, nonductile materials.

But stiffening an old structure can make it more susceptible to seismic forces—the stiffer a structure becomes, the shorter its period of vibration and the more vibrations are magnified. "A more pliant structure dissipates forces better," explains Elsesser, "but at the expense of brittle materials."

Another way to make an historic building more quake-resistant is to change its seismic response by isolating the existing structure from the lateral forces transmitted through the ground in an earthquake.

Base isolators, which generally consist of 12- to 24-inch-square blocks of sandwiched rubber and steel layers, are positioned between a building's footings and foundation walls and columns. These "structural shock absorbers" contain lateral forces, dampening and controlling the building's movement. An excavated moat around the building separates the isolated structure from the surrounding earth, allowing the foundation to move laterally during a quake. Although expensive, base isolators can be installed without disrupting a building's use, saving temporary relocation costs.

As with most new ideas, the rudiments of base isolation technology have been around for some time. The most historic use of base isolation was in Frank Lloyd Wright's 1922 Imperial Hotel in Tokyo, which survived a severe earthquake a year after it was completed. The basic principles were inherent in the geologic composition of the site: a thin layer of soil atop a 70-foot-deep stratum of shock-absorbing mud. Now, isolation systems are part of the 1991 Uniform Building Code, and are gaining favor in older buildings because they can make them quake-resistant without radical alteration.

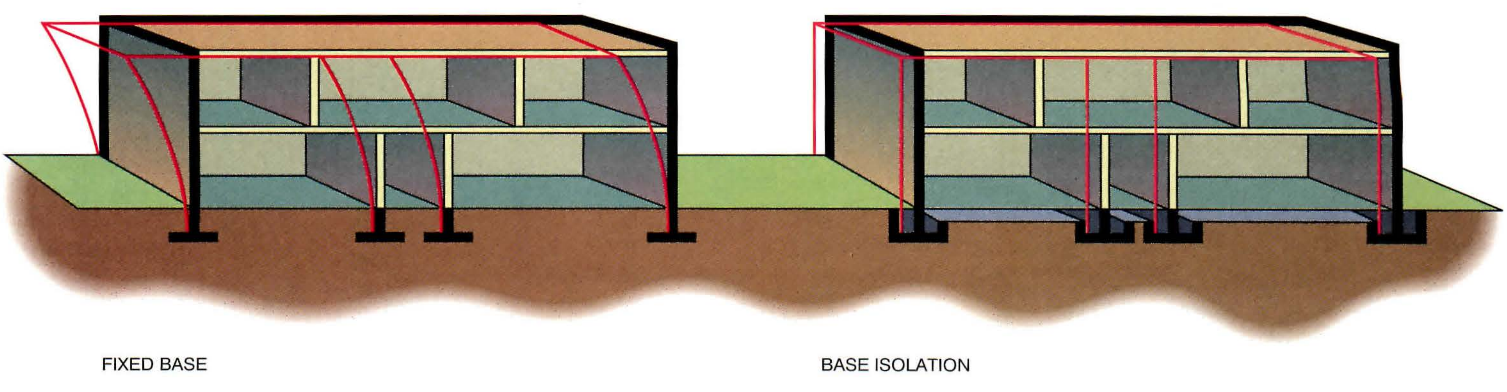
However, they are not a blanket solution for every earthquake-prone historic building. Base isolators are most suitable for simple, rectilinear buildings with uncomplicated transfers of load. Easily accessible, unoccupied basement space is ideal for isolators, although they can also be installed in buildings without basements at grade level. Architects should allow space for maintenance access to the isolators.

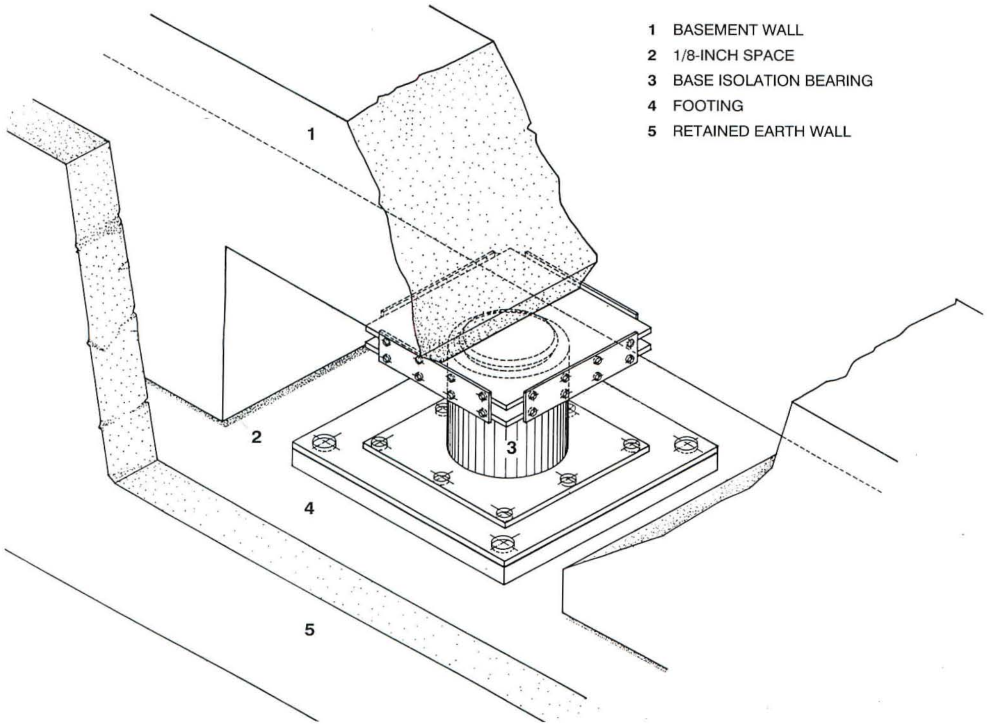
The required moat around the building's periphery for lateral movement may not be possible in older buildings, given the close proximity of adjacent structures. Base isolation also requires a stable, rigid structure throughout the building, and can not be expected to compensate for deficiencies in the original construction. For older, asymmetrical buildings unsuited for base isolation, more conventional strengthening and stiffening methods may be necessary.

The following case studies are recent examples of conventional strengthening techniques and base isolation in buildings prone to earthquakes, accomplished with a minimum of intrusion into their historic fabric. Just as there is no "average" earthquake, there is no one solution to the problems of upgrading an older building to meet seismic codes. Most historic buildings require a combination of strategies to maintain a balance between history and safety.

—MICHAEL J. CROSBIE

Fixed foundations (below left) magnify earthquake shocks to the structure, which must distort to dissipate them. Base isolation (below right) separates structure from foundation, allowing controlled lateral movement during an earthquake.





1 BASEMENT WALL
2 1/8-INCH SPACE
3 BASE ISOLATION BEARING
4 FOOTING
5 RETAINED EARTH WALL

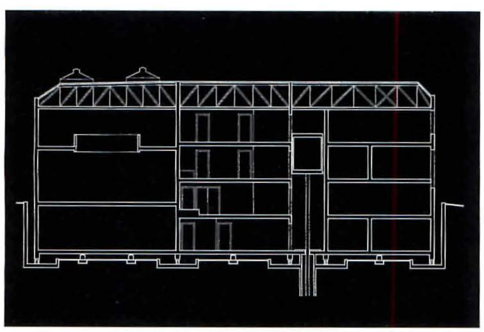
Mackay School of Mines
University of Nevada, Reno
Casazza Peetz & Hancock, Architects

COMPLETED IN 1908, THE MACKAY SCHOOL of Mines building at the University of Nevada in Reno was designed by McKim, Mead & White, and is believed to be the only extant example of the firm's work in Nevada. Shortly before his death in 1906, Stanford White developed a plan for the university's quadrangle, and Mackay's restrained Neoclassicism (center left) became the model for campus buildings through the 1930s. One of the building's distinctive features is a Guastavino tile vault in the portico.

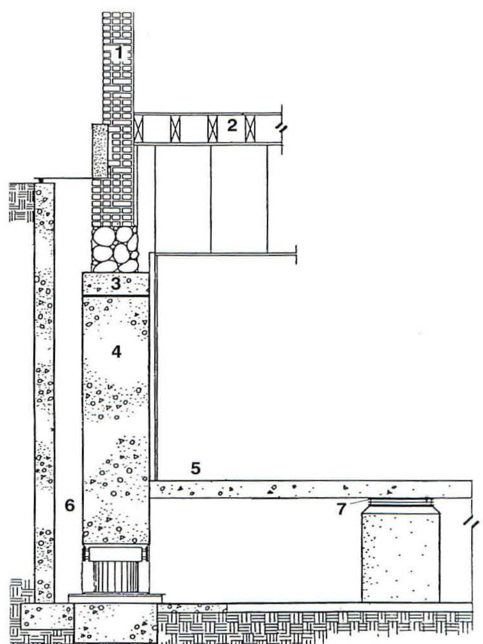
Mackay was built of loadbearing, unreinforced brick walls on a rubble stone foundation, and did not meet the current seismic code. Casazza Peetz & Hancock Architects of Reno, in collaboration with local structural engineer Jack Howard & Associates, determined that the building's nearly square plan and the school's decision to expand its basement made Mackay an excellent candidate for base isolation. The team anchored the building on a new foundation, installed slider plates under the basement floor to help the building move laterally in an earthquake, and placed base isolators around the perimeter.

The first step was excavating a 12-foot-deep moat around the exterior and *installing* concrete grade beams directly beneath the existing foundation and bearing wall, which supported the structure as the new foundation was built. The moat was then deepened by approximately 8 more feet, and concrete retaining walls were constructed 2 feet outside the new foundation and footings, allowing the building to move laterally in an earthquake. Between the bottom of the new foundation wall and the top of the footing, 66 base isolators were installed around the foundation perimeter, beneath a north-south brick bearing wall through the building, and under columns.

The 16-inch-high isolators, composed of alternating layers of rubber and steel plate (top, center right, and detail, left), measure 20 inches in diameter. Hydraulic jacks at the top of each isolator were filled with epoxy, raising the 7,000-ton building approximately 1/8 of an inch, separating the foundation wall from the footing. The epoxy then hardened, holding the building in place. Beneath the new basement's 8-inch-thick concrete floor, 43 Teflon plates were installed, each on its own concrete pad, allowing the floor to glide over the ground in an earthquake.



NORTH-SOUTH SECTION



1 EXISTING WALL
2 EXISTING FLOOR
3 EXISTING FOOTING
4 BASEMENT WALL
5 BASEMENT SLAB
6 MOAT
7 SLIDER

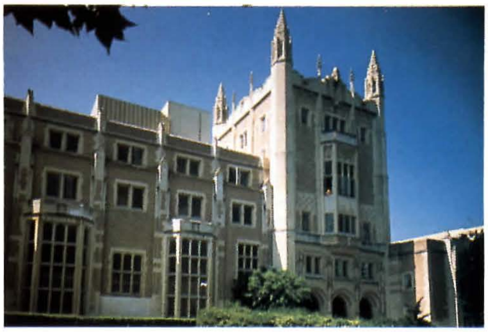
FOUNDATION WALL DETAIL

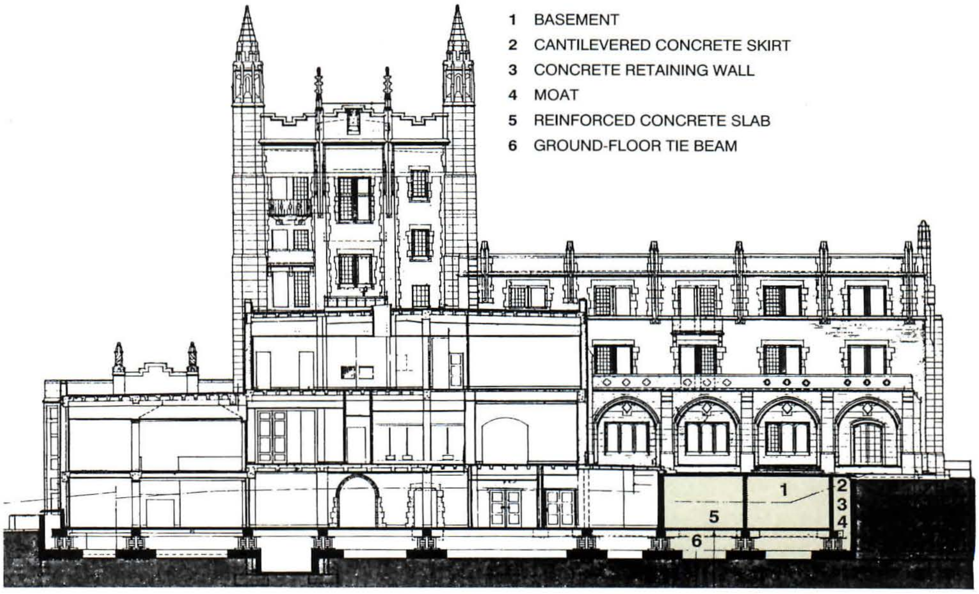
Kerckhoff Hall
University of California, Los Angeles
Widom Wein Cohen, Architects

A LANDMARK ON THE UNIVERSITY OF CALIfornia, Los Angeles campus, Kerckhoff Hall was completed in 1929, the work of the local firm Allison & Allison. The Collegiate Gothic building (top), which now houses student offices and activities, was built of reinforced, poured-in-place concrete and unreinforced, hollow terra-cotta tile. A recent survey of the seismic condition of all buildings on the UCLA campus identified Kerckhoff as seismically unsound. The Santa Monica-based architecture firm of Widom Wein Cohen, in conjunction with structural engineers Brandow & Johnston of Los Angeles, chose a base isolation system for seismic upgrading. "Base isolation allows for little intrusion on Kerckhoff's historic interiors," notes partner Chester Widom, "and permits the building to remain in use while the base isolators are placed." Stiffening the structure with shear walls, on the other hand, would have altered Kerckhoff's decorative interiors of vaulted ceilings, painted ornament, and oak trim. The isolators are to be installed in the basement, column-by-column (section, center), next year.

The entire existing concrete and flagstone ground floor slab will be removed to expose the existing spread footings. Major columns will be braced laterally while the footings are exposed and widened, and a continuous concrete grade beam inserted to knit them together. New steel beams will be placed under the new concrete floor slab. Base isolators will then be installed between the footings and the steel beams, under each existing column. Approximately 170 isolators will be employed, one under every column in the building, ranging in size from 18 to 24 inches square.

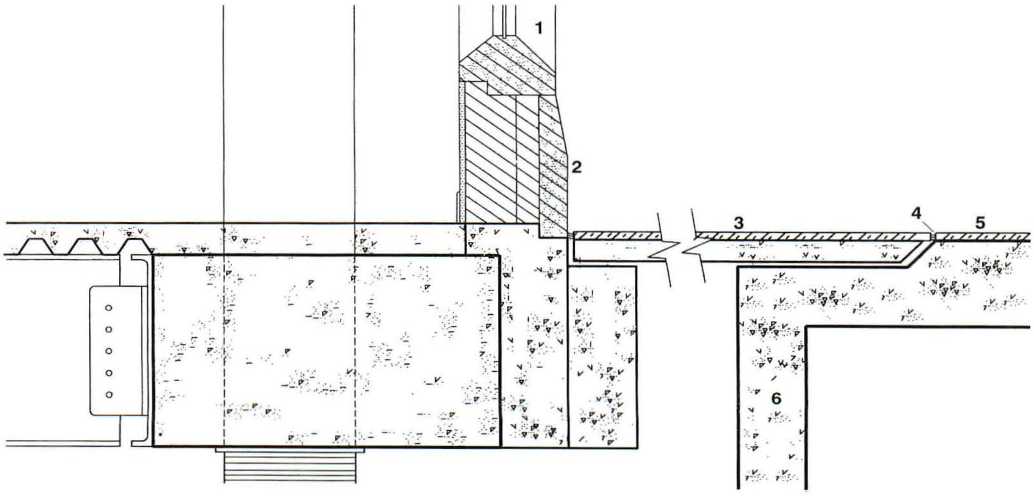
Around the building's periphery, a moat will be constructed of concrete retaining walls, varying in thickness from 8 to 18 inches, depending on the depth of the moat, which will be 20 feet at its deepest point, reaching down to the level of the isolators. The moat will allow approximately 24 inches of clearance between the retaining wall and the building to permit lateral movement during an earthquake (section, bottom). It will be concealed at grade level with cantilevered skirts of concrete or cast stone to match Kerckhoff's adjacent exterior materials. These concrete covers will rest on top of the moat's retaining wall in a slip joint, allowing movement during an earthquake.





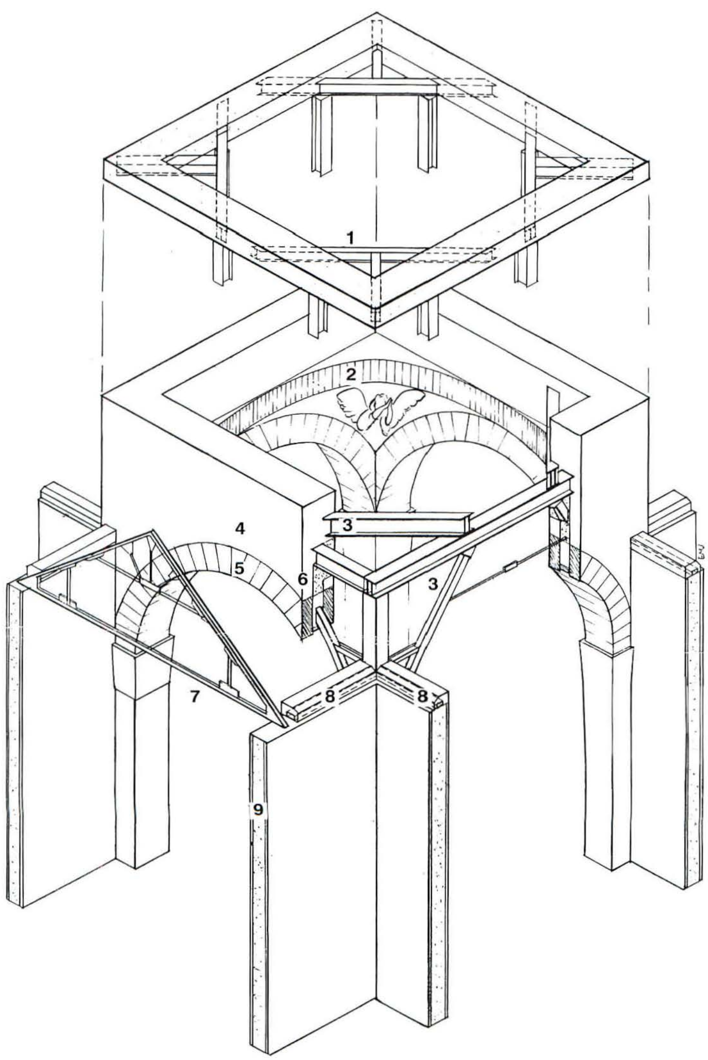
1 BASEMENT
2 CANTILEVERED CONCRETE SKIRT
3 CONCRETE RETAINING WALL
4 MOAT
5 REINFORCED CONCRETE SLAB
6 GROUND-FLOOR TIE BEAM

EAST-WEST SECTION



FOUNDATION DETAIL

1 GRADE BEAM AND FOOTINGS
2 EXISTING STONE AND BRICK
3 STONE PAVING OVER CONCRETE
4 SEALANT AND BACKER ROD
5 ASHLAR STONE PAVING
6 MOAT RETAINING WALL



1 STEEL BRACE
2 PLASTER DRUM
3 STEEL FRAMING
4 BRICK ARCHES
5 VOUSSOIRS
6 REINFORCED CONCRETE INFILL BETWEEN BRICK
7 ROOF TRUSS
8 CONCRETE AND STEEL COLLECTORS
9 CONCRETE WALLS

ISOMETRIC OF CROSSING ARCHES

Stanford Memorial Church
Stanford, California
Hardy Holzman Pfeiffer Associates, Architects

LOCATED AT THE HEART OF FREDERICK LAW Olmsted's quadrangle at Stanford University, the 1903 Stanford Memorial Church was designed by H.H. Richardson protégé Charles A. Coolidge. Noted for its intricate mosaics and stained glass, the church suffered severe damage in the 1906 earthquake, which caused its 80-foot-high spire to topple. Except for the undamaged domed crossing, the church was reconstructed with a new steel structure and reinforced concrete walls.

In 1989, the church was again the victim of a major earthquake that damaged the crossing and nonstructural elements. The San Francisco-based structural engineering firm of Degenkolb Associates, later joined by the Los Angeles office of Hardy Holzman Pfeiffer, first proposed removing the roofs and installing steel trusses around the crossing. But this scenario would have intruded upon original mosaics and stone carvings. The team then decided to reinforce the crossing by inserting steel bracing above the brick arches and infilling the walls with concrete. This work was completed without disturbing the historic finishes.

To increase the lateral stability of the crossing, the cavity inside the brick walls above the arches was filled with reinforced concrete, providing a monolithic structure continuous within the four walls. At the four connecting walls above the arches, steel bracing was inserted into the wall in the form of eight 14-inch-deep "strongback" columns, a pair placed in each corner. Above each pair of columns, a new steel brace spans diagonally across each corner of the brick crossing, and is tied back into the corner with a perpendicular piece of steel. All of this new bracing is knitted together with a continuous 18-inch-high by 54-inch-wide concrete beam that caps the top of the crossing.

To better channel the forces being resisted by the four arches, the connections between the crossing's outside corners and the walls that abut the crossing were strengthened with concrete and steel, installed to pin the arches and walls together. This support was accomplished by removing the roofs over the walls of the nave, chancel, and transept and connecting the structure from above. The roof of the entire church was seismically strengthened by installing new 1/2-inch plywood sheathing between the rafters and the tile roof to act as a diaphragm (center left).

Folger Building
San Francisco, California
Corwin Booth & Associates, Architects

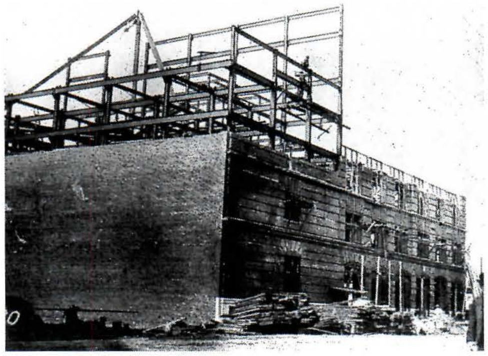
THE FOLGER BUILDING IN SAN FRANCISCO was constructed in 1905 and survived the city's catastrophic earthquake a year later primarily due to its ductile steel girders and columns, accompanied by wood timber joists and reinforced concrete floors. Originally designed by local architect Henry A. Schulze, the building comprised two wings: a five-story brick building with arched windows (top right) and a four-story annex, separated from the main building by a full-height steel frame and brick infill wall.

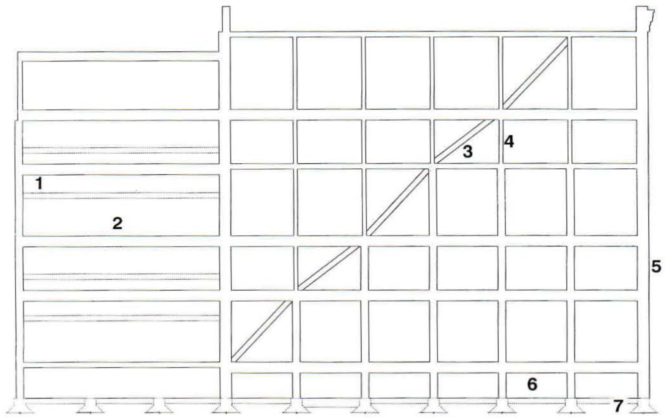
The building remained the headquarters of the Folger Coffee Company until 1965, when it was renovated as commercial offices. In 1989, the Loma Prieta earthquake damaged the Folger's structural system so badly that demolition was considered. Corwin Booth & Associates Architects worked closely with structural engineers Hratch Kouyoumdjian & Associates to determine that the structure could be saved through a variety of seismic retrofit strategies.

Extensive on-site structural tests revealed that the Folger's unreinforced exterior brick wall was intact and that the wooden foundation pilings, which extend 40 feet deep, were sound. The building's lateral stability, however, was less than the local building code required, and the structure in general needed strengthening.

The architects reinforced the existing brick exterior wall by filling unused ventilation cavities in the piers between the windows with steel reinforcing and concrete. The existing steel frame in the brick infill wall between the building's two wings was exposed (top left), and an 8-inch-thick wall of pneumatically applied concrete was poured against it, increasing the wall's capacity to resist shear forces. In the basement, 12-inch-thick concrete shear walls were constructed to distribute the building's loads more evenly. On the top floor, the existing concrete floor was edged with a steel frame to transfer torsional forces.

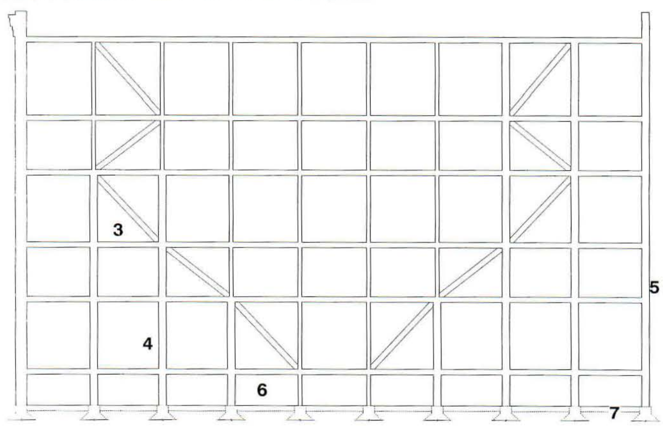
The architects and engineers developed a system of steel bracing throughout the main building (sections). The team specified 14-inch-thick steel sections to be welded to the existing structure and extend diagonally through 15-foot bays from the roof to ground level. Diagonal steel bracing was installed in two column lines running north-south and in one running east-west, minimizing the bracing's intrusion into existing spaces. ■



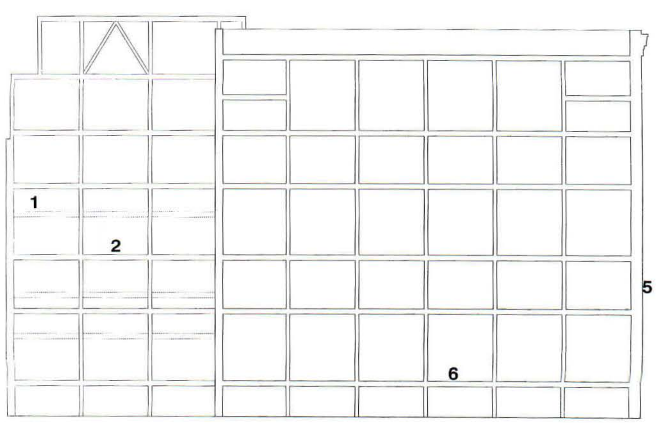


1 ORIGINAL FLOOR LEVEL
2 NEW FLOOR LEVEL
3 NEW STEEL BRACING
4 NEW CONCRETE
5 EXISTING BRICK FACADE
6 NEW CONCRETE INFILL WALL COLUMN ENCASEMENT
7 EXISTING FOOTING

NORTH-SOUTH SECTION STEEL BRACING

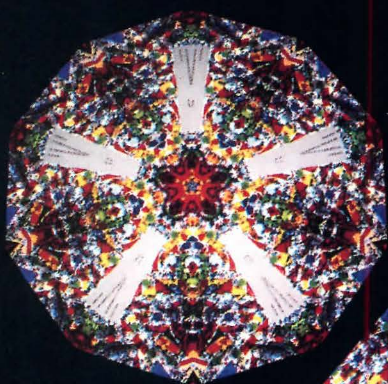


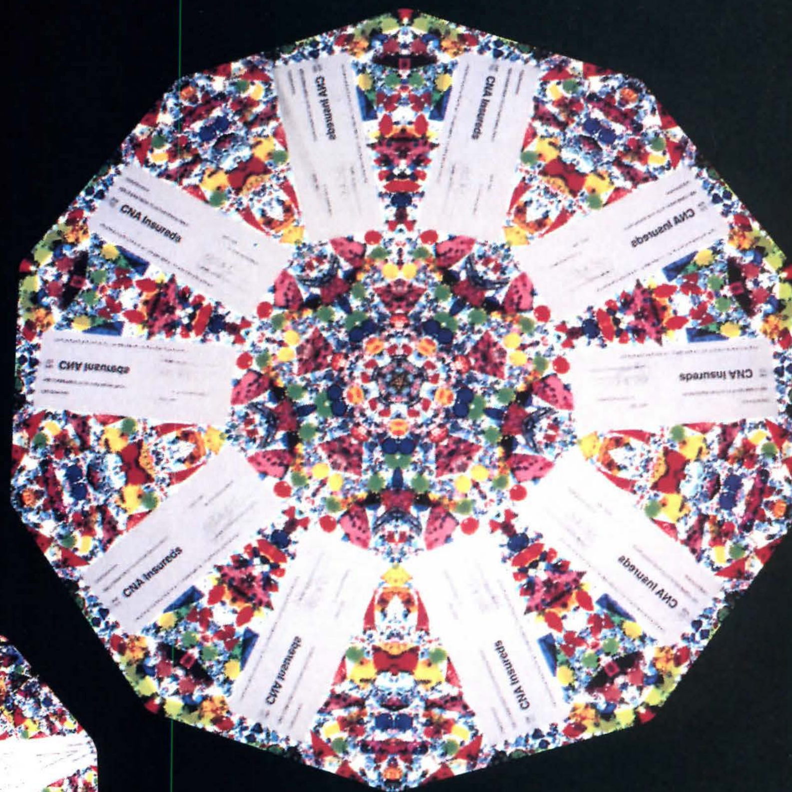
EAST-WEST SECTION STEEL BRACING



EAST-WEST SECTION CONCRETE INFILL

YOUR NEEDS EVOLVE.





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Product Manufacturer Software

Electronic media help architects improve specifications and construction documents.

FOR SEVERAL YEARS, BUILDING PRODUCT manufacturers have been supplying architects with proprietary specifications and details on disc. Although this data has proved helpful in preparing construction documents, many electronic offerings are limited in scope and frustrating to use. Specifiers have been overwhelmed by the number of floppy discs they received, each with its unique set of procedures to learn. As a result, some manufacturers have recently turned to software companies to develop systems with greater consistency and ease of use. Examples include product catalogs and "expert systems" that make product information more relevant to design development. Although complete standardization may never be achieved, electronic data has become easier for manufacturers to distribute and for architects to process. For an architecturel firm that has acquired the appropriate equipment and can integrate new information with its own standard details and specifications, this technology has the potential to improve the quality of construction documents and resulting buildings.

Experts may disagree about how best to present product data, but most foresee a decline in paper media. As Joseph Thompson, president of Electronic Product Information Corporation (EPIC) in Nashville, Tennessee, argues, "Every business accumulates a mountain of paper, and the new can barely be exchanged with the old before it is itself outdated." An electronic alternative reduces the bulk of information, conserves paper, and makes product cut-sheets and specifications easier to store, retrieve, and distribute.

Electronic data evolution

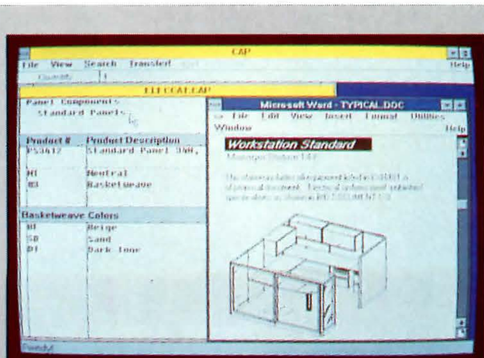
ACCORDING TO MICHAEL CHUSID, A VAN Nuys, California-based building product consultant, many manufacturers first began using CADD for shop drawings and product development. "But after they had produced those details," Chusid relates, "they wanted to share them with their customers." In 1988 he knew of 10 companies with some form of product information on disc. By 1990, he stopped counting because the number had exceeded 1,000, and manufacturers with plans to automate became commonplace.

One aim of proprietary software is to share the manufacturer's expertise with the architect or engineer. Most commonly, manufacturer-provided software, such as Clestra Hauserman's program for its full-height movable wall systems, includes details for application in CADD drawings and text that can be copied into word-processing documents. Goodyear of Akron, Ohio, offers AutoCad-compatible roofing details and Medford, Wisconsin-based Weather Shield provides CADD software that produces window and door schedules as well as drawing symbols.

Some building product manufacturers have determined that helping architects select and design building components requires more than disc-based specifications and details. These companies have developed additional offerings such as databases of cost information or calculation routines that determine the required number or size of elements. For example, Wilmington, North Carolina-based Louisiana Pacific distributes its engineering software, Wood-E, to registered architects and engineers to facilitate the design of laminated wood joists and beams. Steelcase of Grand Rapids, Michigan, provides CADD tools for developing furniture layouts and for linking CADD symbols to a nongraphic database. Hurd Millwork Company

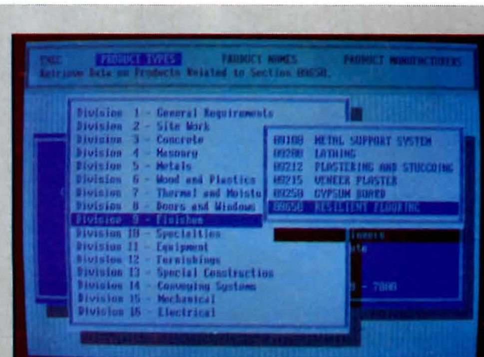
CD-ROM Technology

A compact disc-read only memory, or CD-ROM, looks like the now-familiar audio CDs, but instead of music, it contains text, numeric data, and images. Architectural software developers have taken advantage of CD-ROM storage capacity to package architectural information, including many multi-manufacturer building product catalogs. Two examples are discs from CAP Electronic Sweet's (right) and the National Institute of Building Sciences (far right). The software that helps architects manipulate large databases, with sophisticated links between types of information, has facilitated a growing trend toward the integration of drawings and building product data. The equipment required for CD-ROMs is both reliable and affordable, making CD-ROM players increasingly commonplace in architectural firms.



CAP ELECTRONIC SWEET'S

One of the oldest electronic catalogs, the CAP Electronic Sweet's CD-ROM, includes product information from 40 system furniture manufacturers. Data include details, specifications, plan views, isometrics, and ordering information. Within the Windows environment, text and images can be integrated for proposals.



NIBS CONSTRUCTION CRITERIA BASE

Four CD-ROM discs from the National Institute of Building Sciences include proprietary building product and equipment data. This descriptive and technical information, including software *and full-color images, is cross-referenced* by product name, manufacturer, and CSI Masterformat division and section.

of Medford, Wisconsin, offers energy performance data to help architects select glazing options. The Livonia, Michigan, vinyl siding company, Wolverine Technologies, provides graphic software that allows the architect to compare various siding and trim color combinations.

Standardization issues

MOST EARLY PRODUCT INFORMATION SOFTware was idiosyncratic, such as a program from Philadelphia-based Penn Ventilator that provides details and sizing calculations for fans and louvers. This system is one of the oldest written by product manufacturers for designers. Jon McKinley, systems programmer for Penn Ventilator, believes that his company enjoys a competitive advantage in having a stand-alone program and a unique user interface. HVAC designers usually exhibit brand loyalty, he claims, so they don't need to learn many software systems. "We're always going to remain slightly different from our competitors," McKinley explains, "because we've got too much invested in our unique approach. In a few years, all manufacturers will probably settle on a Microsoft Windows-like environment. But that standardizing factor will still allow us to maintain our particular innovations."

Now, most programs incorporate standard DXF graphics and ASCII text formats. However, to further unify the way product data is stored and communicated, more detailed standards are being developed. The international Standard for the Exchange of Product Model Data (STEP) facilitates a complete description of products and their application through graphics and technical information databases. STEP is instrumental, for example, in the move toward standardization within the European Economic Community and in the U.S. Department of Defense. The U.S. contribution, called Product Data Exchange Using STEP (PDES) is being developed primarily for aircraft, automotive, and shipbuilding applications.

With a true standard, building product manufacturers and architects could rely on a single data format, and communications between specifiers, suppliers, and builders would improve. However, progress in architectural applications is slow because of lack of funding, according to Barbara Warthen of Warthen Communications, a PDES/STEP applications consultant based in Albany, Wisconsin. "The way an industry expresses a need for this technology," Warthen states, "is to provide people to work on it. But the American architectural community doesn't have resources comparable to those of the Defense Department, and architects appear to be content with DXF as a standard."

Even without the thoroughness and discipline of PDES/STEP, consistent user interfaces, such as graphic menus, are making some software, if not standard, at least more accessible for architects engaged in design and specification. Although specifics vary by manufacturer, consistency is apparent in the Computer Intelligent Details from EPIC and in the Electronic CADalogs from Sausalito, California-based ASG, which recently merged with Vertex Design Systems.

Catalog collections

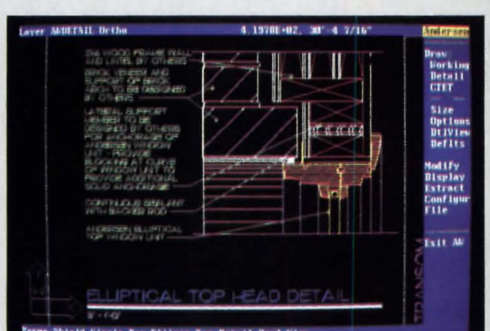
THE TREND TOWARD CONSISTENCY IS ALSO evident in multivendor electronic catalogs. Such catalogs satisfy both the manufacturer's desire to distribute proprietary data and the architect's need for single-source access to product information. The large quantity of data required for these collections requires high-capacity CD-ROM technology, soon to be commonplace in architectural firms, according to experts. Earle Kennett, a vice president of the National Institute of Building Sciences (NIBS) claims that electronic distribution is now 1/20 the cost of paper. "And the great thing about CD-ROM," Kennett states, "is that when you double the number of users, you halve the price. When manufacturers see architects buy CD-ROM players as a matter of course, they'll begin putting their material on disc instead of paper."

One of the newest multivendor catalogs is an addition to the NIBS Construction Criteria Base (CCB). For several years, quarterly updates of the CCB have contained huge volumes of nonproprietary information for the federal construction industry, including codes, specification systems, and design manuals. With electronic search capabilities, architects can find specific reference information more easily than by thumbing through books. Now grown to four CD-ROM discs, the equivalent of a million printed pages, the CCB includes manufacturers' product brochures. CCB software provides links between the proprietary specifications and federal standards and code documents.

The Eclat CD-ROM product catalog has

CADD-I

The Andersen CADD-I program creates elevation and plan drawings of windows and patio doors from user-specified parameters. It runs in AutoCad or any DXF-compatible CADD software on both DOS and Macintosh equipment. The system prepares a window schedule and generates construction details.



VELCAD

Velcad, from Velux-America, is one of several expert systems for the design and specification of windows from Electronic Product Information Corporation (EPIC). Running under windows, either within or outside AutoCad, Velcad offers guidance to novice specifiers and efficiency to experts.

PELLA DESIGNER

The Pella Designer, from Rolscreen, works within AutoCad or ASG Architectural, producing plans, elevations, sections, schedules, and technical specifications of standard windows or complete sunrooms, and includes nonstandard product dimensions and unconventional window and door groupings.

been recently discontinued. However, the company, restructuring under the name Darwin, will continue to produce the Windows-based product search software for manufacturers to distribute on a proprietary basis.

The CAP Division of Sweet's, based in Grand Rapids, Michigan, produces a catalog on CD-ROM of more than 40 contract furniture manufacturers, with specifications and graphics for use in AutoCad and Cadvance. SweetSource, the electronic equivalent of the traditional Sweet's Catalog, is scheduled for publication in 1993. Manufacturers also distribute proprietary product information through specification-writing systems (ARCHITECTURE, March 1991, pages 157-160).

Nonproprietary information

BESIDES MULTIVENDOR CATALOGS, ANOTHER force for standardization is found in the generic specifications and electronic selection procedures developed by industrywide associations. An example is Window 4.0, produced by Lawrence Berkeley Laboratory, in Berkeley, California, with a procedure from the National Fenestration Rating Council. This program calculates thermal performance indices such as U-values, solar heat gain, and shading coefficients. The software compares the performance of window products from any manufacturer that provides spectral data.

Three building materials associations, the Gypsum Association, the Concrete Paver Institute, and the Brick Institute of America, have commissioned design manuals in the form of Vertex Reference CADalogs, available from ASG. The electronic manuals provide nonproprietary construction information, design guidelines, specifications, and details. Other groups that have developed nonproprietary standards include the Illuminating Engineering Society (ARCHITECTURE, June 1992, pages 114-117) and the National Roofing Contractors Association (ARCHITECTURE, February 1992, pages 101-104).

Because these associations represent competing building product manufacturers, agreeing on common goals and formats can be very difficult. One organization that has solved this problem is the American Architectural Manufacturers Association (AAMA). An AAMA task group composed of manufacturers of heavy commercial and architectural aluminum windows has been working for several years on an electronic guide specification, to be released in early 1993. This expert system leads an architect through the process of selecting and specifying a product by asking a series of questions about project and product requirements, each question influenced by previous answers. The program concludes by assembling a complete specification based on the responses.

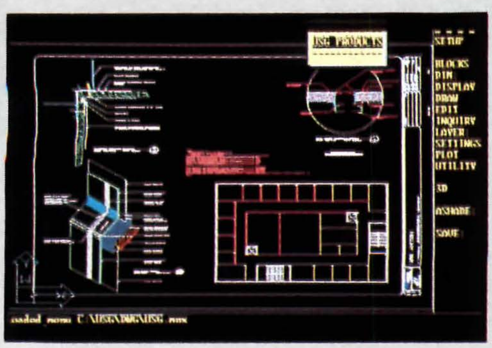
According to EPIC's Joseph Thompson, software developer for AAMA, this system is unique in that it can generate either performance or proprietary specifications. While the core software satisfies AAMA's goal of ensuring complete and correct specifications for its technically complex products, each participating manufacturer, with a supplemental disc, can promote the special features that make it competitive. "It was very difficult to do this the first time," Thompson admits, "but now we know how to apply the team approach to solve product information problems in other industries." He reports that many manufacturers are using the recession to develop better software in preparation for the coming upturn in construction.

Future prospects

ELECTRONIC MEDIA WILL EVENTUALLY SURpass paper for product information distribution, and CD-ROM collections are on the rise. As software developers converge on a few standards, the fragmentation of building product software will become less burdensome to architects navigating the deep ocean of product data.

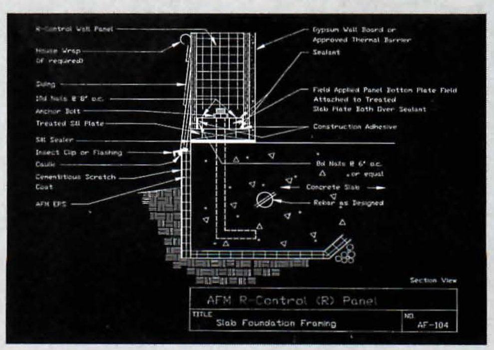
One expected benefit of accessible product information will be improved construction communications, as details and specifications become more complete and accurate, as expert systems help architects design more buildable components, and as international standards improve data exchange between trades within the whole life cycle of a building. Such automation will change professional practice in a variety of ways, according to architect Dennis Neeley, president of ASG. For example, in the future, architects' CADD files may be sent directly to manufacturers' milling machines, reducing reliance on stock components. "What's most exciting," asserts Neeley, "is that electronic information may actually enhance design creativity." No doubt other benefits will emerge as the profession is gradually but inevitably changed by developing technology for product information. ■

—B.J. NOVITSKI



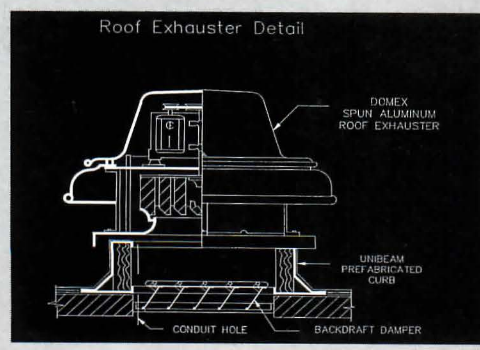
USG ACTION

USG Action, from USG Interiors, is AutoCad-compatible design software for use under Microsoft Windows that provides construction details, specification text, information about fire and sound ratings, model code reports, technical notes, and tools for stud sizing, thermal calculations, and costing.



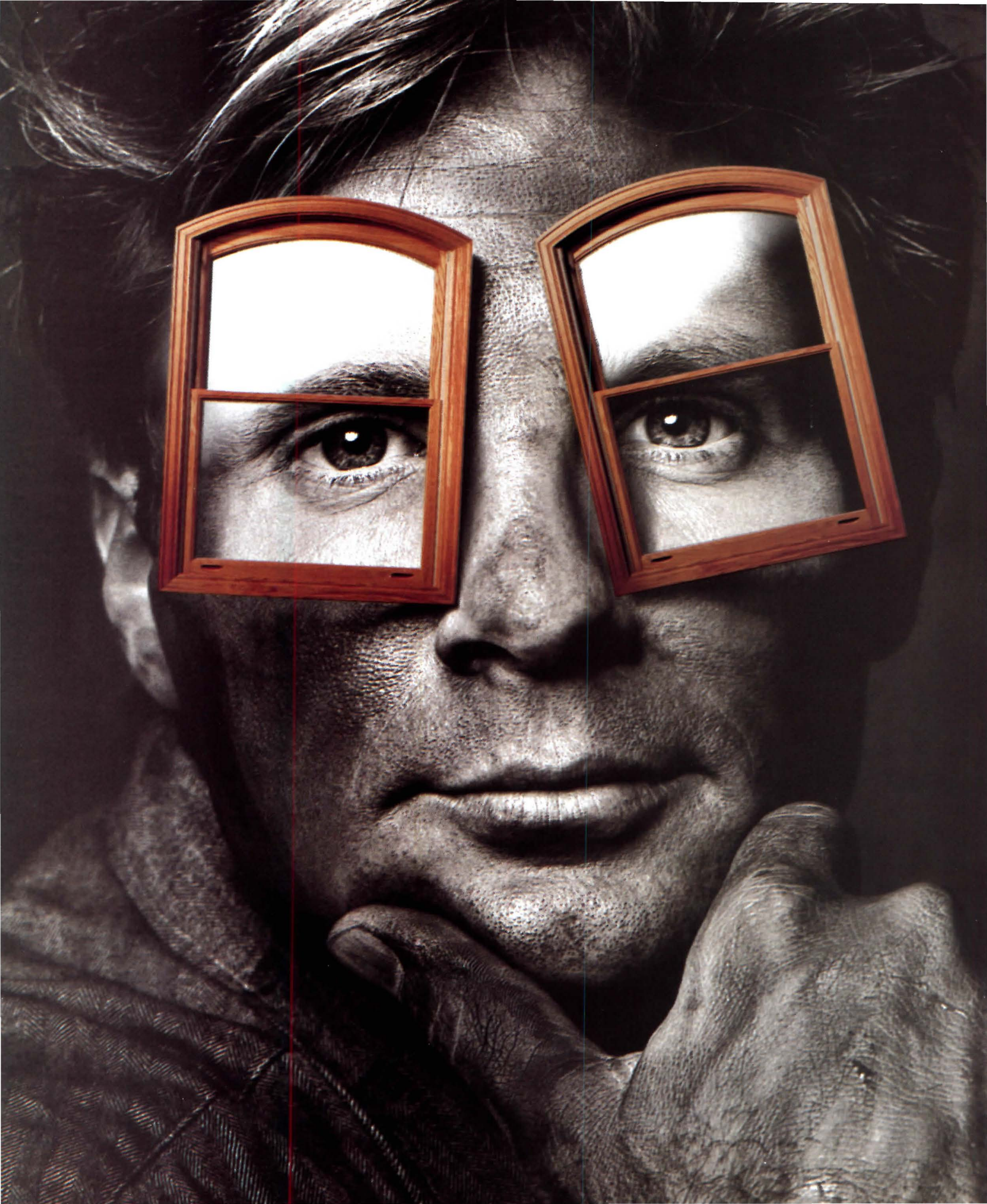
AFM CORPORATION ELECTRONIC CADALOG

AFM Corporation's Electronic CADalog, from ASG's Vertex Division, provides a guide specification and dozens of application details for R-Control structural building panels. The specs and CADD drawings can be transferred into word-processing or CADD software for incorporation into project documents.



FANCAD

Penn Ventilator, one of the first companies to offer electronic product information to design professionals, provides HVAC design software for sizing and detailing proprietary fans and louvers. Such proprietary product information is most useful for designers who have already selected a manufacturer.



Merging Firms

Joining two practices requires an understanding of firm compatibility.

THE SPATE OF DESIGN-FIRM ACQUISITIONS that occurred in the 1980s rivalled the merger mania in business and industry, as architectural practices followed the Wall Street model. Easy money, a booming economy, and a culture of acquisition fueled this activity through the end of the decade. The action was so intense that in 1990, the *Professional Services Management Journal* suspended its index of mergers and acquisitions within the design field because there were too many to track.

Now that easy sources of financing have vanished, firms looking for acquisitions must draw on their own financial resources, and because of the slow economy, fewer firms have sufficient funds. This lack of ready cash has caused a change in the conditions of acquisition: where once the seller could receive payment quickly, the typical terms today involve a small initial cash settlement with future payments tied to the profitability of the new firm. As a result, mergers and acquisitions are still proceeding, but it is a buyer's market. Frank Stasiowski, publisher of the *Professional Services Management Journal*, reports that firm values have declined as much as 50 percent since 1990. During that same period, the average price of a firm has declined 20 to 40 percent.

Most of the current activity centers on larger firms taking over medium-sized firms in an effort to extend their geographic reach or enter new markets. Small firms that want to sell are finding the market for their wares very limited.

Buy-and-sell challenges

MERGERS AND ACQUISITIONS INVOLVE THE joining of two firms. In an acquisition, one firm purchases another outright, and the owners of the acquired firm have a limited role in the new firm. In a merger, the relationship between the two firms is equal and ownership is shared among the new partners.

Acquisitions and mergers pose challenges for both buyer and seller. According to Hugh Hochberg, Seattle-based principal of the Coxe Group management consultants, 80 percent of potential mergers won't work. To have the greatest chance of success, Hochberg maintains, the acquisition must fit the clear strategic purposes of both buyer and seller.

NBBJ, the 460-person architectural firm based in Seattle, Washington, has acquired seven firms in the past 15 years. The key to their success, says NBBJ's CEO for Western operations James Jonassen, is "having a very clear idea of why you want to merge." NBBJ's recent acquisition of Wyatt & Associates, a Seattle interior architecture firm, for example, was based on the need for strong leadership in interiors. For Scott Wyatt, the change was prompted by the conditions of the marketplace and the fact that his small, independent firm could be more cost-effective and competitive as a studio in a larger practice.

Other acquisitions are based on market expansion. Einhorn Yaffee Prescott, a 120-person architectural-engineering firm in Albany, New York, for example, wanted to move to a new geographic area that offered opportunities in its principal market of historic restoration, renovation, and adaptive reuse. Its acquisition in 1989 of Kemnitzer Reid & Haffler, an established 12-person office in Washington, D.C., enabled the architects to move into that market more quickly than they would have by starting from scratch. Managers of the acquired firm, too, had specific purposes in mind: they wanted to be able to compete for more substantial projects, and they wanted to integrate mechanical and electrical engineering into their practice but lacked the expertise to do so.

Merging for the wrong reasons decreases the odds for success. Frederick White, senior vice president of the consulting firm Mark Zweig & Associates, says that the most common wrong reason is desperation. Practices in distress make poor candidates for acquisition; no one wants to buy problems. Firms often want to sell when their principals have reached the limits of their ability and energy after 15 or 20 years. But such offices are unattractive precisely for the reason they want to sell—they haven't groomed a new generation of entrepreneurial leaders. Another bad reason is the desire to take advantage of a

short-term market opportunity, especially in an unrelated discipline, which usually results in poorly considered arrangements between firms that have little in common.

Acquisitions based on purely financial considerations also have a high failure probability. Historically, such economically driven growth has motivated purchases of architectural firms by unrelated businesses. These unions are notorious for failure because the parent firm usually lacks the knowledge or understanding of, or sensitivity toward, the values and processes that are essential to the success of an architectural practice.

Once the reasons for the merger are clear, the next steps are to develop specific criteria for candidates and research the available practices. Firms get together in many ways—through word-of-mouth, discussions among long-time collaborators, recommendations by clients and consultants, and the services of brokers. However firms learn of one another, Frederick White advises, "Do your shopping before you buy. Remember the criteria for selection, and don't get caught up in the hunt."

NBBJ, for example, considered more than 20 potential candidates in the Los Angeles area, examining a variety of factors including project type and size, client list, design philosophy and approach, standards of quality and service, and culture of the firm before focusing on Irvine-based LPA's Los Angeles office.

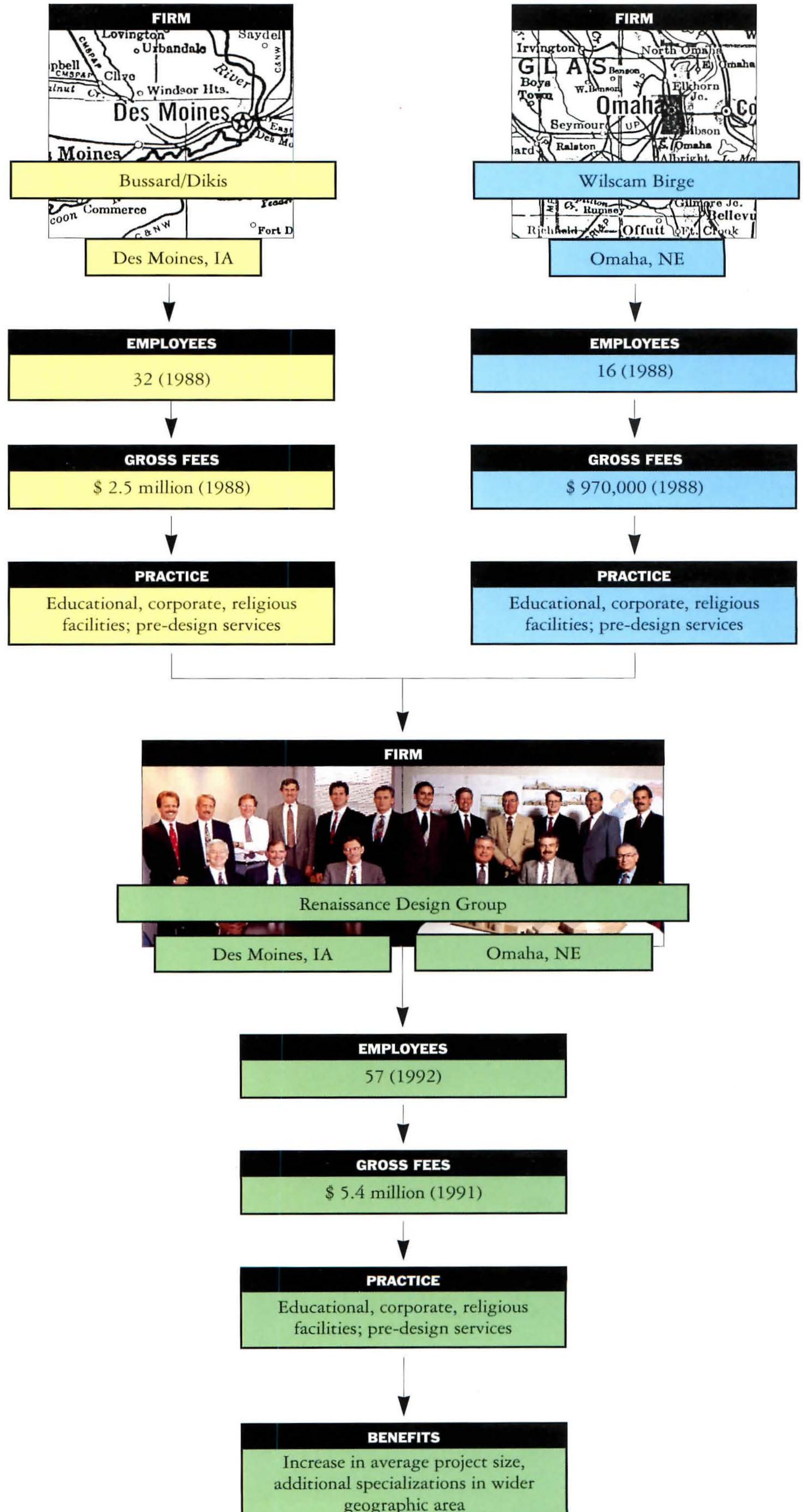
Similarly, Einhorn Yaffee Prescott began its search for an acquisition in Washington, D.C., by asking potential clients for suggestions of firms whose work on older buildings was respected. The firm generated a list of 15 potential candidates, and thoroughly investigated each before focusing on Kemnitzer Reid & Haffler.

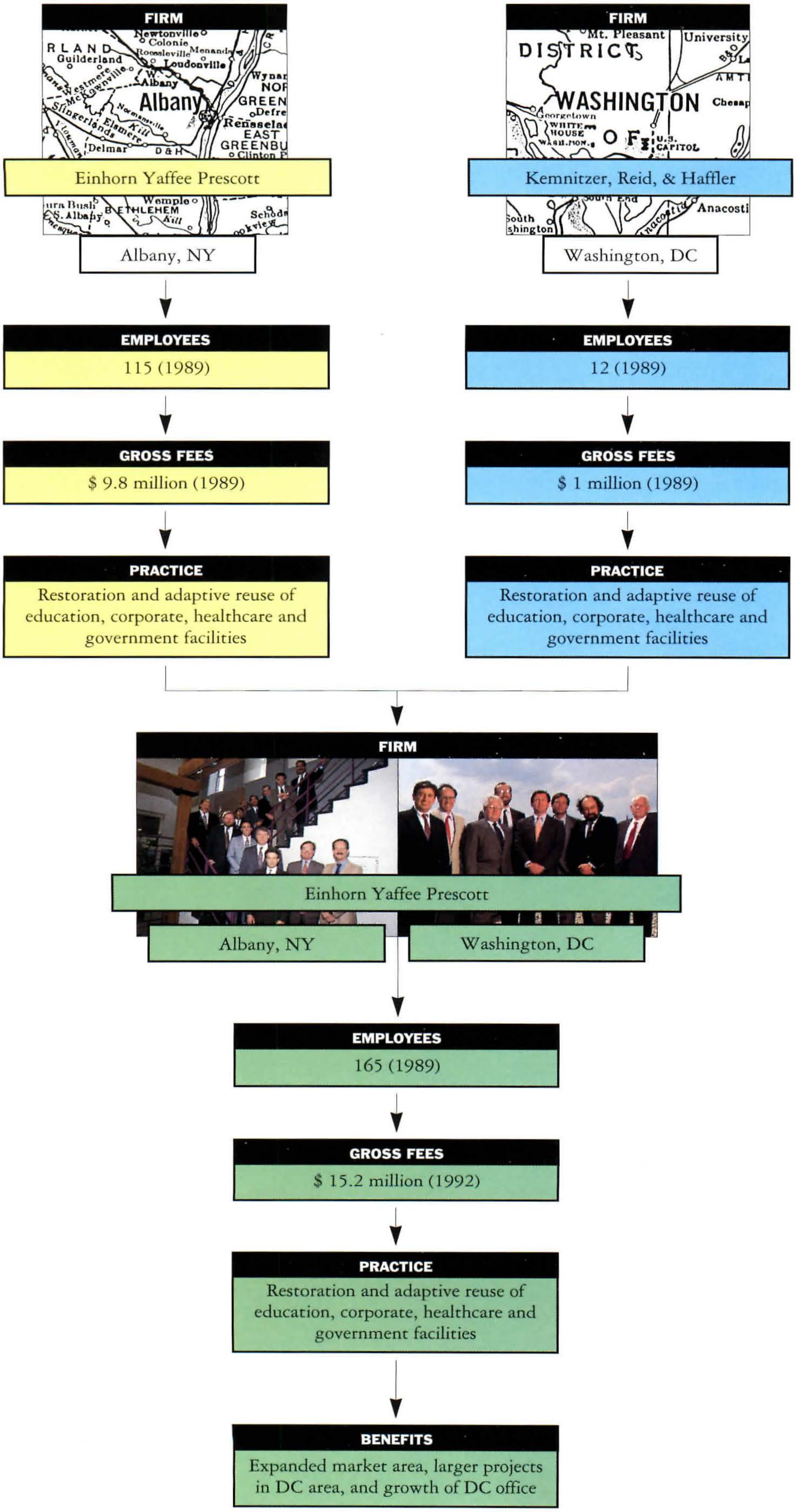
Matching corporate cultures

THE SINGLE-MOST CRITICAL FACTOR IN THE success of an acquisition is the compatibility of the cultures of the two firms. Lowell Getz, a Houston–based financial consultant and one of the design industry's foremost valuation experts, explains that people make a merger a success.

"If the cultures of the two firms don't fit together, there is no sense in going any further," Getz maintains. "If they do fit, the deal is halfway there, and the mechanics usually fall into place."

An assessment of firm culture begins after an extensive discussion among principals of their respective visions, values, and philosophy of architecture and design. Other areas for exploration include personal and profes-





sional goals, career development ideas, and an exploration of how the principals and their staffs will work together. It is critical that the principals of each firm know and have respect for the motivation of the other in entering into the new arrangement.

Bussard/Dikis Associates of Des Moines, Iowa, for example, merged with Wilscam Birge of Omaha, Nebraska, in 1989 (facing page). They formed Renaissance Design Group, putting into practice their notion that the two firms could accomplish more together than they could independently.

Though the firms already had a long relationship, their stockholders held a two-day retreat before the merger to discuss the issues raised by their union. One of the ground rules was that each participant granted the others permission to criticize, openly dealing with perceptions and concerns.

Another good way to get to know the other firm is through joint ventures on specific projects. Einhorn Yaffee Prescott used this approach with Kemnitzer Reid & Haffler (left). The two firms jointly pursued a project together, and although they only made the short list, the experience encouraged both firms to proceed with the merger.

Doing due diligence

IF THE FIRMS AGREE THAT THERE IS ENOUGH of a fit to continue, the next step is "due diligence," assessing the other firm's finances and marketing potential. Einhorn Yaffee Prescott and Kemnitzer Reid & Haffler traded lists of economic data, for example. They drew up a letter of intent that outlined how the merger would work, conceptually and financially. And they consulted one another's clients and accountants.

The merger team should prepare a comprehensive set of financial statements and projections describing the type of work the new office will undertake, the backlog and carryover from current work, and projections of marketing opportunities with new and repeat clients. Revenue and expense projections should be prepared using both cash and accrual methods. These calculations provide a comprehensive picture of the financial status of the merged firm and a framework for determining staffing needs.

Attention to people

ONCE THE PRINCIPALS HAVE SET THE MERGER's direction, it is necessary to gain the commitment of the second-tier leadership in each firm. Hugh Hochberg recommends the development of a plan for staffwide integration to minimize us-versus-them resentment and to assuage the staff's natural anxieties. The plan should provide a variety of opportunities for the two staffs to get to know one another in both professional and social settings and to become involved in the merger process. As Hugh Hochberg points out, "You can buy people into a merger, but you can't buy their hearts and their spirits; these must be won."

Prior to the formal merger, principals of Einhorn Yaffee Prescott met with each employee in Washington to explain the operational details and the financial aspects of the new arrangements. Staff from Washington visited Albany to see that operation firsthand. The technical staffs of the two offices worked together to determine the best way of integrating operations. The investment paid off, claims Steve Einhorn: "The backbone of our success was spending time with people on a person-to-person basis."

The arrangement between NBBJ and LPA illustrates a different approach to dealing with staff anxieties. Rather than acquiring LPA's Los Angeles office outright, the two firms entered into a three-year joint venture. Their agreement provides that one of the two firms will buy out the joint venture for a price that is predetermined by formula. The Los Angeles staff knows they will still have jobs—only the ownership of their firm remains in question.

Integrating operations

THE CONCEPT OF THE MERGER PROVIDES A destination for the two firms; but to get there, the parties need a detailed map. It is important to begin with a good grasp of financial issues: how the money will flow, to whom it will flow, and who will pay for what. John Birge of RDG Wilscam Birge in Omaha recommends the principals write a memo of understanding outlining the issues and resulting agreements. This document should include the name of the new firm, how people will be paid, where the offices will be located, how profits will be divided, what issues remain unsettled, and how they will be resolved.

Marketing the merger

THE ULTIMATE SUCCESS OF AN ACQUISITION is measured by the new firm's ability to retain its client base and establish credibility in the marketplace. Clients are wary of change; they need to be convinced that the new arrangement has value for them, especially during the turbulent period of transition.

The first step is to make sure that everyone on staff understands the reasons and benefits of the merger. Develop a plan to inform and reassure past, current, and future clients. To insure a consistent message, the plan should be specific about who will call whom and in what sequence. Inform key clients and referral sources before the merger is made public so they will not be surprised. The language of all proposals, presentations, and news releases should present the best case possible about both the fact that the merger is taking place and the reasons for the change.

Mergers and acquisitions can succeed. After two years, Einhorn Yaffee Prescott has achieved a presence in Washington, D.C. The office has expanded from 10 to 40 people and is now doing significantly larger projects than before the merger. The Renaissance Design Group has also seen substantial benefits: a growth in the average size of projects, expanded geographic scope, and lower overhead.

Architects contemplating a merger or acquisition should do their homework. Make sure that you understand the other firm as well as your own: determine mutual goals, values, dreams, motivations, and passions. Pay attention to the details of finances, marketing, operations, and management. Know when to proceed and when to quit. Finally, have the patience and willingness to spend the necessary time and money to make the merger work. ■

—NORMAN KADERLAN

PLOTTERS

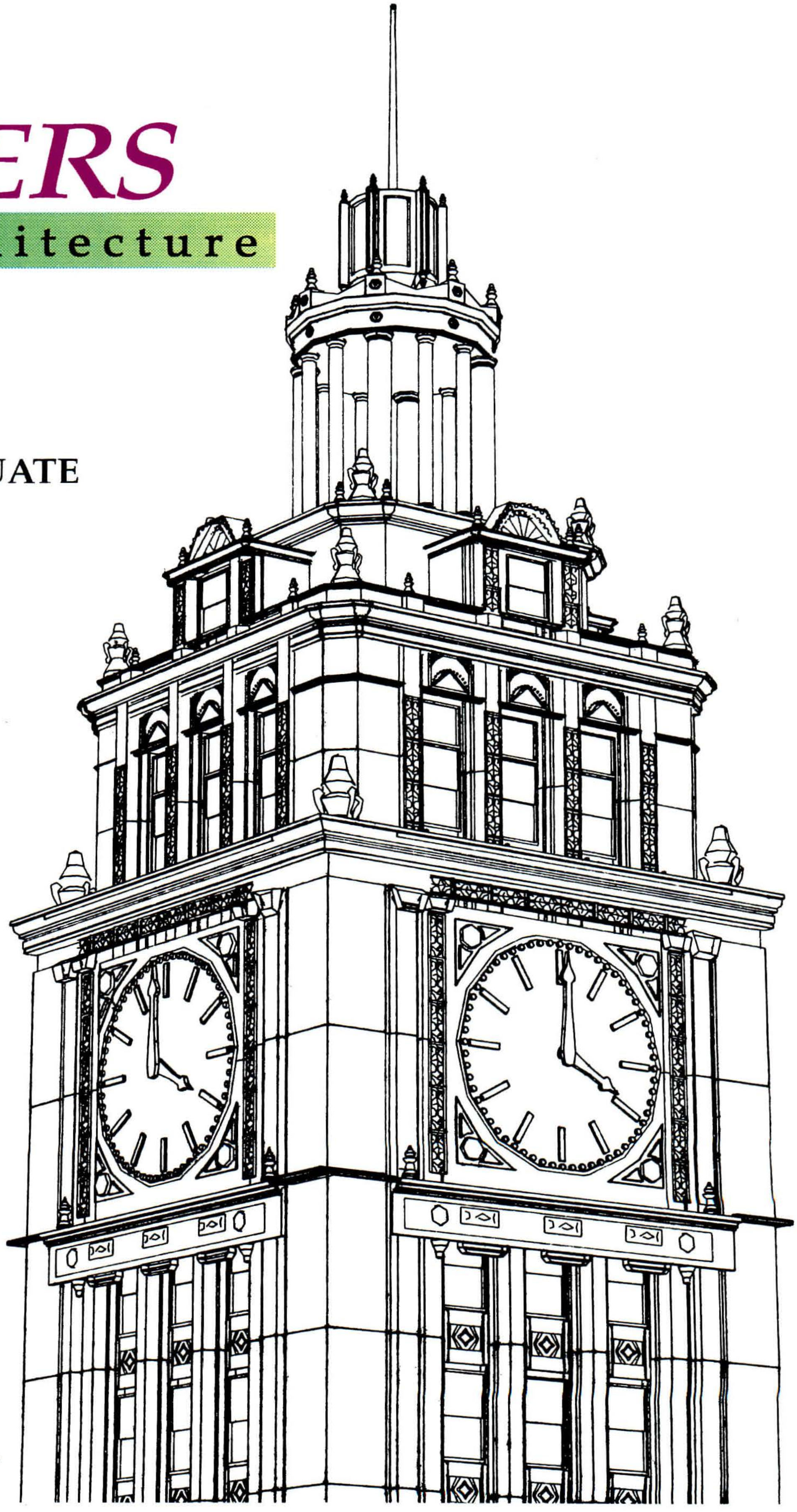
in Architecture

Advertorial Supplement to

ARCHITECTURE
INCORPORATING ARCHITECTURAL TECHNOLOGY

ARCHITECTS EVALUATE 7 NEW PLOTTERS:

- DRAWINGMASTER
- DESIGNMATE
- NOVAJET
- JETPRO V100
- EXPRESSPLOTTER II
- XP-500
- PROTRACER



The Wrigley Building tower in Chicago was drawn by Jeff Berta for Jack Train Associates, Chicago architects. Like all drawings in this supplement, the plot is shown at the same size it came from the plotter. Details on a following page.

THE PLOT THICKENS

NEW GENERATION OF PLOTTERS CUTS COSTS, BOOSTS QUALITY

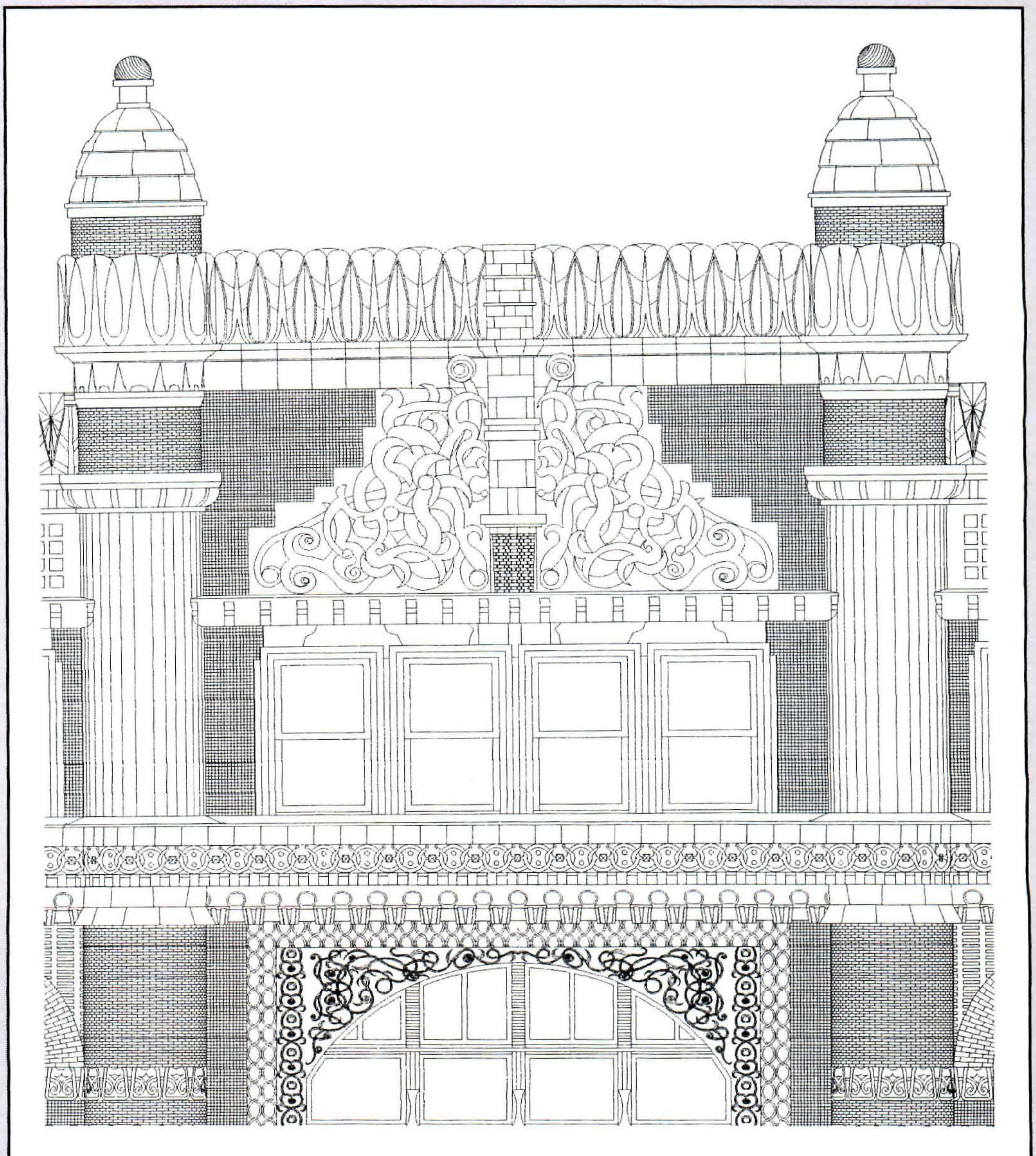
Four of the architects who volunteered to serve as evaluators of the plotters discussed in this supplement huddle (above) to inspect a plot. From the left: Laurence E. Dieckmann, AIA, principal of his firm in Chicago; Gene L. Montgomery, AIA, partner in Jack Train Associates, Chicago; David J. Engelke, AIA, vice president of Potter Lawson Architects, Madison, Wis.; Charles R. Newman, AIA, principal of his firm in Naperville, Ill. In the background, Cheryl B. Cornell, applications engineer for Encad, adjusts a NovaJet plotter. The 19-inch monitor, with adjustable virtual screen, is new from E-Machines. Not shown: Michael F. Kaufman, AIA, associate principal, Lohan Associates, Chicago; Walter J. Foran, AIA, chief executive of Gelick Foran, Chicago; John C. Voosen, principal of his firm in Chicago; Michael Tzanetis, principal of his firm in Elmhurst, Ill.

On the cover:

The drawing of the Wrigley Building tower in Chicago was plotted on Mutoh's XP-500 with a 0.2 mm HG pencil on a new, smoother vellum developed by Mutoh specifically for pen plotters.

All type and ruled lines for this supplement were composed in PageMaker on a Macintosh Quadra and "printed" to a ProTracer "plotter."

Oliver Witte, supplement editor
Sally L. Levine, AIA, art director



This detail of the Rookery in Chicago was plotted on the JetPro, a bubblejet by Houston Instrument. The drawing is by Kalata Bartlomiej, a sophomore in architecture at Triton College, River Grove, Ill.

By Oliver R. Witte

A new generation of plotters, including models introduced in just the past few months, cuts costs, increases speed, improves line quality and eases setup, operation and maintenance, compared to earlier models.

Drawings on these pages illustrate how architects are using the new technology, which permits more information to be included in construction documents than ever before.

To assess the impact of the changes, a panel of architects volunteered to evaluate seven of the plotters under office conditions. The panel met Sept. 18 at Triton College School of Architecture in River Grove, Ill.

The plotters and their evaluators (identified previously), with prices shown at list in the basic configuration:

DesignMate, an eight-pen plotter from CalComp. $1,992. A-D sizes. Evaluator: Newman.

DrawingMaster, a direct thermal from CalComp. $22,995 for E size. Evalutor: Kaufman.

NovaJet, a full-color inkjet plotter from Encad. E size. $9,995. Evaluator: Dieckmann.

JetPro V100, a bubblejet from Houston Instrument. $2,995. A-C size. Evaluator: Foran.

ExpressPlotter II, direct thermal from JDL. $11,995 for the E size. Evaluator: Engelke.

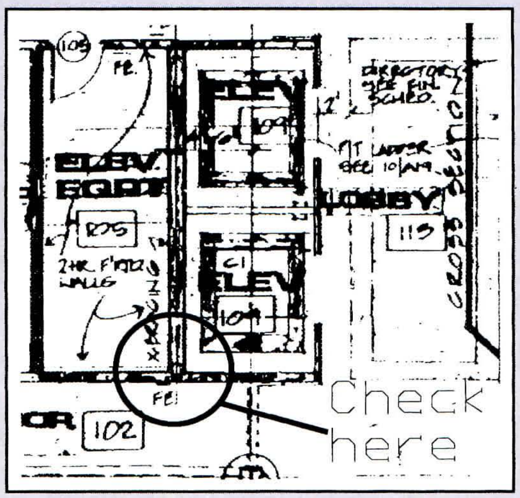
The XP-500, a pencil-and-pen plotter from Mutoh. E size priced at $6,300. Evaluator: Montgomery.

ProTracer, a bubblejet plotter from Pacific Data. $1,499. A-C size. Evaluator: Voosen.

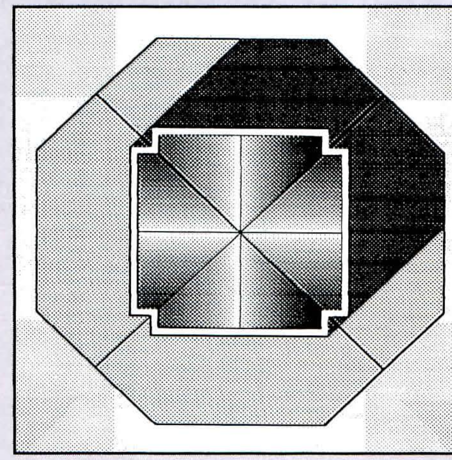
Pen plotters were praised and condemned. Newman sees both sides, but he led the praises, especially for the DesignMate, which he evaluated.

"The DesignMate does everything a small office needs in a plotter," Newman said. "I don't know why anyone would want to spend more unless they needed E size."

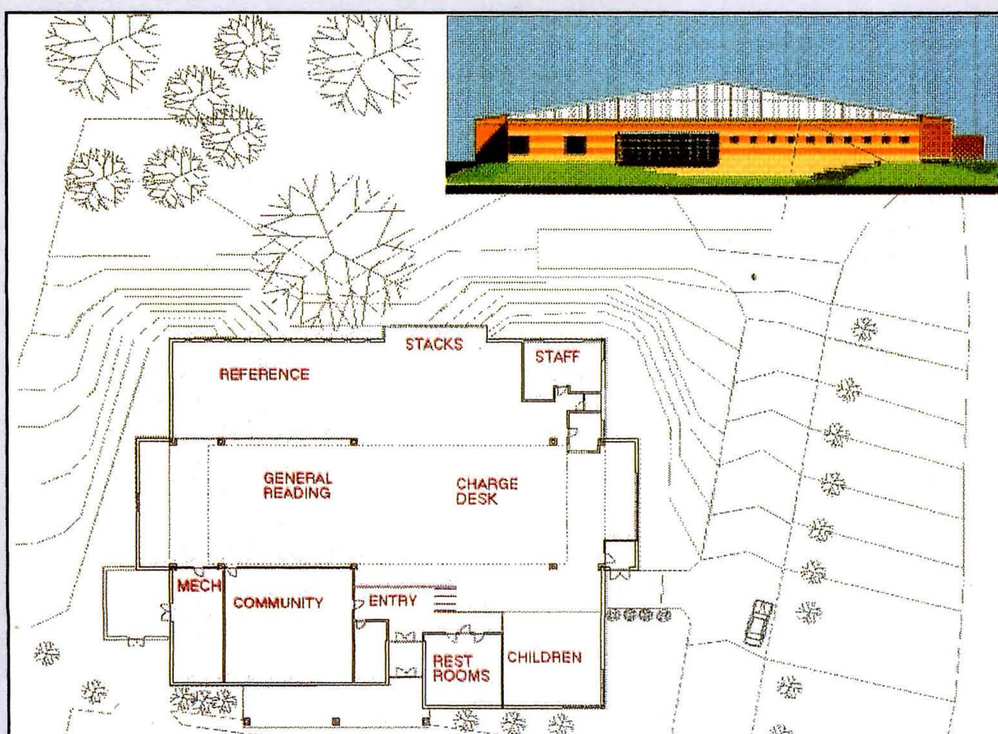
Installing and running the DesignMate couldn't be easier,



The ProTracer, a bubblejet from Pacific Data, plotted this mixed file consisting of a scanned drawing and new vector data (circle, line and text), merged in Cadvance version 5.0 for Windows.

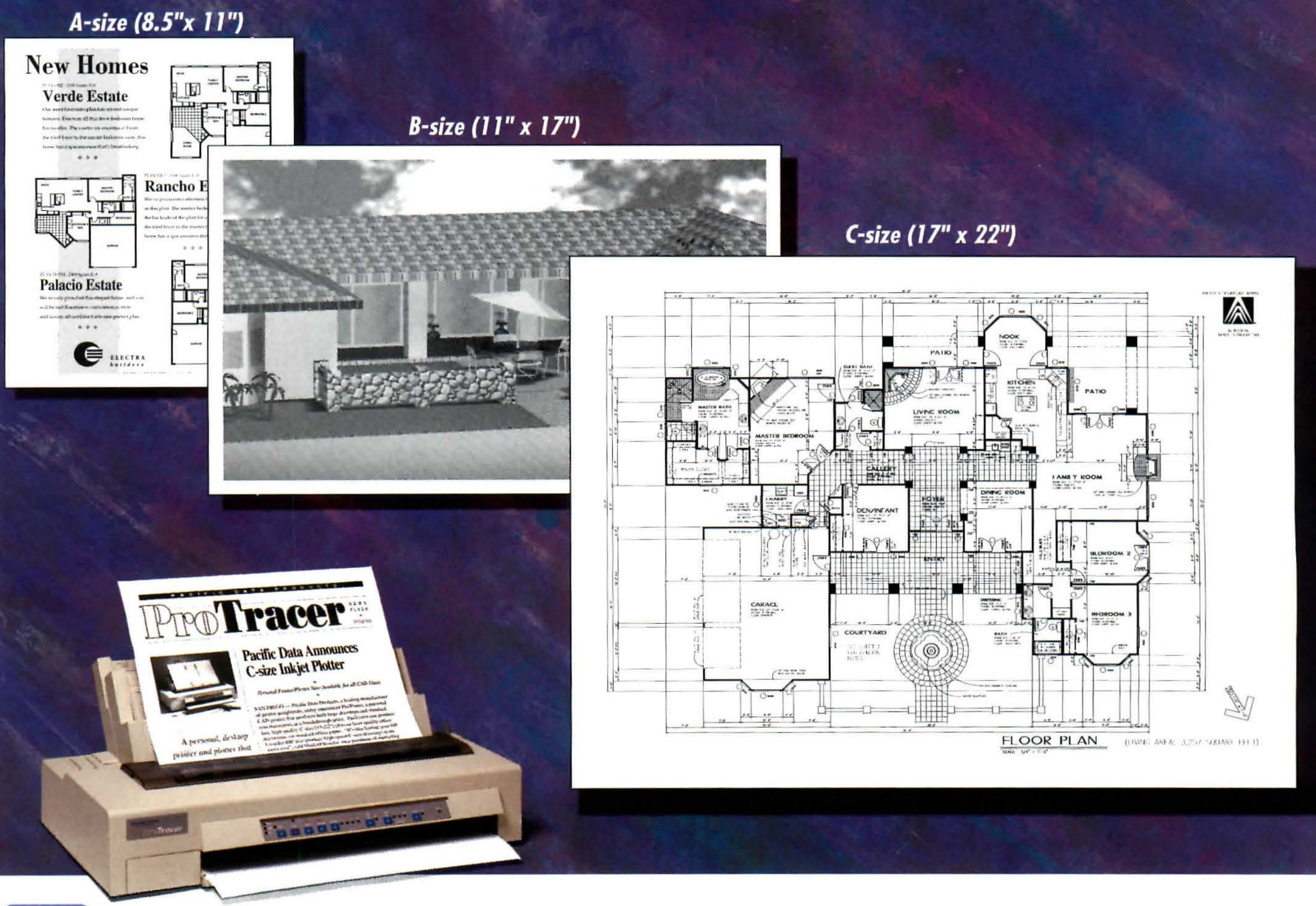


John C. Voosen created this shaded top view of a church tabernacle in CorelDraw and Autocad. He plotted it in PostScript on a ProTracer.



E-size presentation drawings are among the capabilities of the NovaJet , an inkjet plotter from Encad. Part of one such drawing, in which computer renderings of each elevation cluster around a plan view, is shown here. It was created by Laurence E. Dieckmann, AIA , Chicago, on a Macintosh computer.

All the benefits of a laser printer on a much larger scale.



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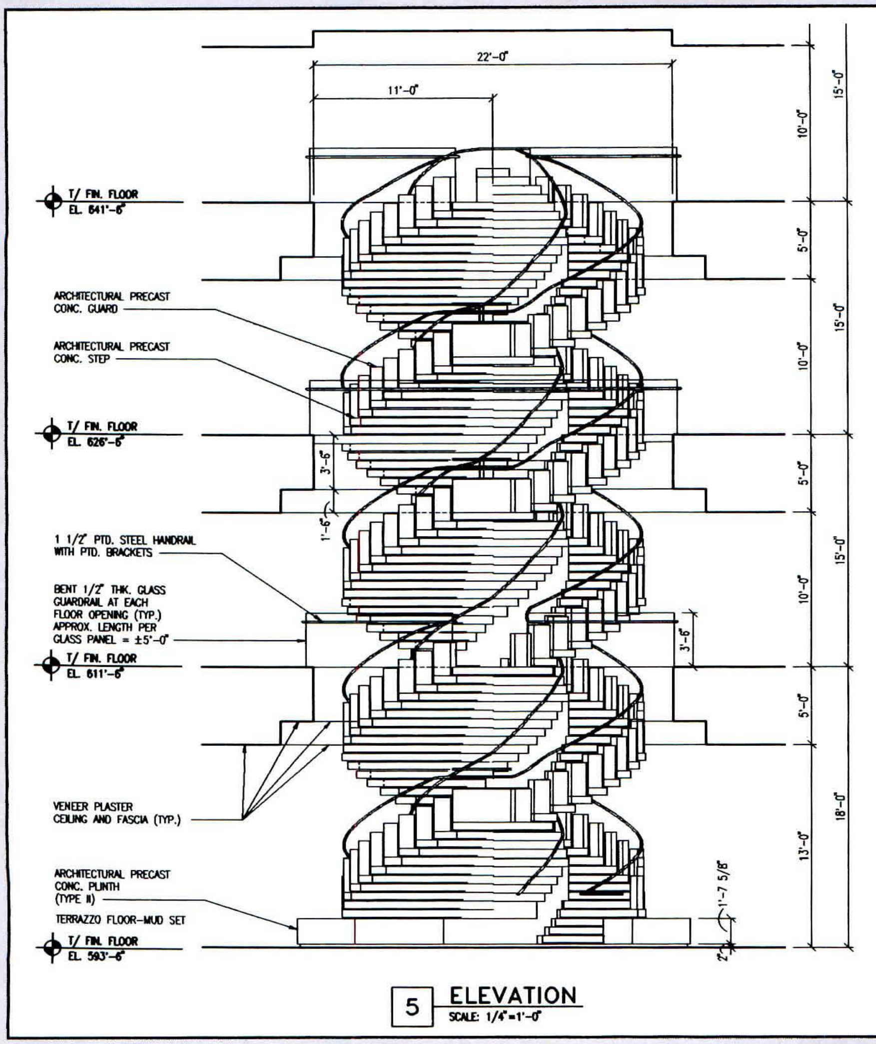
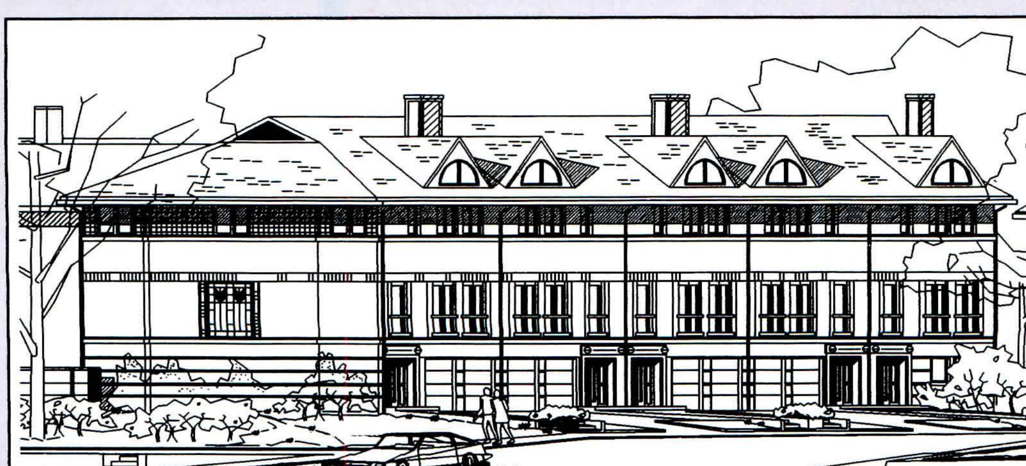
If you'd like to expand your printing and plotting capabilities, call Pacific Data Products at (619) 597-4626, Fax (619) 552-0889.

PACIFIC DATA PRODUCTS



CalComp's direct thermal DrawingMaster plotted this staircase by Lohan Associates.



Michael Gelick's drawing approach, which shows a flat side facade and front projection, is reproduced in this Autocad drawing of six $500,000 townhouses and plotted on the Houston Instrument JetPro.

Newman said. It has only two buttons: One configures it and the other puts it on line.

The only other pen plotter in the evaluation, the XP-500 by Mutoh, was examined more for its capabilities to draw with pencil leads than with pens.

Montgomery liked his XP-500, but he prefers the F-920AR model, which feeds the leads automatically.

"Mutoh pencil plotters are two or three times faster than pens," Montgomery said. "A pencil plot also allows a drawing to be completed manually, which is important to us."

Designers in his office liked the pencil drawings because they didn't look as mechanical as drawings from pen plotters.

Montgomery showed a pencil plot to a designer who mistook it for ink. When the designer brushed the drawing and it smeared, he was surprised.

The two C-size plotters generated the most interest for their low cost and high capability.

Once Foran got the printhead of his JetPro V100 unstuck, he was impressed. "It is superbly suited for our office," he said. "I prefer to get quick checkplots in C size and finished plots from a service bureau."

Foran had a C-size JetPro plot enlarged to D and E sizes. He said he would use the D-size enlargement without hesitation in construction documents, but the E size looked crude to him.

His only complaint about the JetPro was the paper handling, which he said was awkward.

Voosen evaluated the other bubblejet, the ProTracer, which has the lowest base price of any plotter in the evaluation. But with HP-GL and PostScript, the price increases to $3,296.

Pacific Data Products offers a stunning guarantee: money back for 60 days and next-day replacement of the ProTracer if it malfunctions in the first year.

"Quality is excellent and the speed is superb, with PostScript or from Autocad," Voosen said.

Concerned about how Chicago building inspectors would

Volunteer for the Draft, Enlist Here

Vendor/Model	Type	Resolution	Max. size	Image area (at max.)	Colors	RAM	Emulations	Price ($)	Output	Features	Wrnty	Paper Deliv.	Ports	For info:
CalComp														**16**
DrawingMaster	Direct thermal	200 or 400	D/E	35.2" wide	2	2 MB	1,4,5	11,495/22,995	R or V	2,4+,5,7,8,9,11+	1 year	Roll w/cutter	4	
DesignMate	8 pens		D	23.6x34.5	8	64K*	1,2,4,5,6	1,992	Vector	1,7,8,9	1 year	Cut sheet	1*	
68000 series	Electrostatic	400	E/J	43" wide	Full	4 MB*	1,5,6+,8+	52,900-69,900	R or V	2,4,5,7,8,9,11	1 year	Roll w/cutter	4	
67436	Electrostatic	400	E	35.2" wide	Black	4 MB*	1,5,6+,8+	32,900-39,900	R or V	2,4+,5,7,8,9,11+	1 year	Roll w/cutter	4	
Pacesetter	8 pens		D/E	36x47"	8	64K	1,4,5	4,295/5595	Vector	1,7,8,9	1 year	Cut sheet	1*	
Encad														**18**
NovaJet	Inkjet	300&150	E	35.6" wide	Full	4 MB*	1,2,3,5,6,8+,9+	9,995	R or V	2,7,9	1 year	Sheet or roll	2	
SP 1800/2800	8 pens		D/E	35.6x46.4"	8	16K	1	2,995/3,995	Vector	9	1 year	Sheet	1	
General Computer Corp.														**20**
WideWriter 360	Bubblejet	360	C	15" wide	Black	512K	9,12	1,699	QuickDraw	6,8,9	1 year	Roll & sheet		
Hewlett-Packard														**22**
DesignJet 600	Inkjet	600&300	D/E	35.8" wide	Black	4 MB*	1,2,3,4,5,6,8+,9+	8,495/9,995	R and V	2,3, 7,9,11	1 year	Roll & sheet	2	
DraftPro	8 pens		D/E	35x46"	8	7.2K-31K	1, 4	3,795-5,995	Vector		3 yrs.	Cut sheet	1*	
DraftMaster	8 pens		E	35.6" wide	8	1 MB	1, 2, 4, 5	7,495-10,995	Vector	1,2,3,4+,5*,7,8,9,11	3 yrs.	Roll & sheet	1/4	
Houston Instrument														**24**
JetPro V100Δ	Bubblejet	360	C	15.3" wide	Black	2 MB*	1,2,4,5,7,11,12	2,995Δ	R and V+	8,9	1 year	Cut sheet#	2	
DMP-61/62	8 pens		D/E	34.8x46.8"	8	16K*	1,4,5,6	3,495/4,795	Vector		1 year	Cut sheet	1	
DMP-161/162/R	8 pens		D/E	34.8x46.8"	8	512K*	1,2,4,5,6	4,595-7,995	Vector	1,2,7,8,10	1 year	Sheet &/or roll	1	
JDL														**26**
ExpressPlotter II	Direct thermal	400x200	D/E	35.6" wide	Black	4 MB	1,2,4,6+,9+	9,995/11,995	R and V	2,3,5,7,8,9,11	1 year	Roll	3	
ExpressPlotter II	Direct thermal	400x200	D	23.6" wide	Black	4 MB	1,4,6,9	8,995	R and V	2,3,7,8,9,11	1 year	Roll	3	
ExpressPlotter	Direct thermal	400x200	D	23.6" wide	Black	2 MB*	1,4,6,9	5,995	R or V	4+, 5+, 7, 8, 9, 11	1 year	Roll	2*	
OmniPlotter	Dot matrix	360	D	23.6" wide	20	2 MB*	1, 4, 7	6,690	R or V	5+, 7, 8	1 year	Roll or sheet	2*	
AutoPlotter XP	Dot matrix	360	C	16" wide	14	1 MB*	1, 4, 7	3,495	R or V	7, 8	6 mon.	Roll & sheet	2	
Mutoh														**28**
XP-500 series	Pencils & pens		D/E	35.7x46.8"	8	1 MB	1, 4	4,800/6,300	Vector	1, 7, 8, 9	3 yrs.	Cut sheet	1+	
F-920AR	Pencils & pens		E	35.6" wide	8	1 MB	1, 4	10,500	Vector	1,4,7,8,9,11,14	3 yrs.	Sheet or roll	1+	
Oce														**30**
1800 series	Pens, pencils+		D/E	35.6" wide	8	1 MB*	1,2,4,5,6	4,500-8,990	Vector	1,+2,+3,+4,7,8,9,11	1 year	Sheet & +roll	2	
9800 series	Direct thermal	406	D/E	35.6" wide	2	1 MB*	1,2,4,+8,+12	19,990/20,990	R or V	2,+3,4+,5,7,8,9,11	1 year	Roll feed	3	
Pacific Data Products														**32**
ProTracer	Bubblejet	360	C	15" x 21"	Black	512K*	1+,4,5,6,7,8+	1,499	R and V	6+,8,9	1 year*	Sheet#	2	
Raster Graphics														**34**
ColorStation	Electrostatic	400&200	D/E	34.6x47"	Full	36 MB	1,+4,+5,+6,+8	18,500-44,895	R and V	2,3,*5,7,8,9,11	90 da.*	Roll	2*	
Roland Digital Group														**36**
GRX	8 pens		D/E	35.6x63"	8	1 MB	1,4,6	5,995/6,995	Vector	1,8,9	1 year	Cut sheet	2	
DPX flatbed	Pens & pencils		C-E	36.4x48.4"	8	1 MB	1,2,4,6	5,995-11,995	Vector	1,7,8	1 year	Cut sheet	2	
GSX drum feed	Pens & pencils		D/E	35.6x63"	8	1 MB+	1,2,4,6	7,995/8,995	Vector	1,7,8,9,14	1 year	Cut sheet	2	
LTX	Direct thermal	200	D/E	34.8x45.9"	Black	4/8 MB	1,4,6	5,995/8,995	R or V	7,8,9	1 year	Roll	2	
United Innovations														**38**
Mural flatbed	8 pens		D,E	30x48"	8	24K	1	1,995-2,495	Vector		1 year	Cut sheet	2	
Versatec														**40**
8510	Electrostatic	300	E	35.2" wide	Black	512K	1,2,+8,+9	15,995/16,995	R or V	4+	1 year	Roll	2*	
8836-2	Laser	400	E	35.2" wide	Black	8 MB*	1,+8,+9	39,900	R or V	2,3,7,8,9	90 da.	Roll	2*	
Western Graphtec														**42**
GP3005/E	Pens & pencils		D/E	35.6x 46.4"	8	1 MB	1,2,4	4,895/6,395	Vector	1,7,8,9,14	1 year	Cut sheet	2	

Chart indicates the range of options. It is not comprehensive. Resolution shown in dots per inch; higher numbers give smoother diagonal lines. Not applicable for pen plotters.
+ = extra costs may be involved. * = More options available. Δ = JetPro V50 accepts only vector input; priced at $1,995. # = Feeds A and B size sheets; roll feeder is optional. R=raster. V=vector.

Emulations:
1 = HP-GL
2 = HP-GL/2
3 = HP RTL
4 = ADI
5 = Autocad Release 12
6 = Windows
7 = Printers (e.g. Epson)
8 = PostScript
9 = QuickDraw
11 = PCX (outside Windows)
12 = TIFF (outside Windows)

Features:
1 = Optimizes vector and pen sequencing for faster output
2 = Cutter
3 = Stacker
4 = Media take-up real
5 = Hard disk
6 = AppleTalk interface
7 = Holds latest plot in memory
8 = Scaling
9 = Rotation
11 = Nesting
14 = Automatic lead loader

On Your Marks...

A HEADSTART TO CHOOSING A PLOTTER

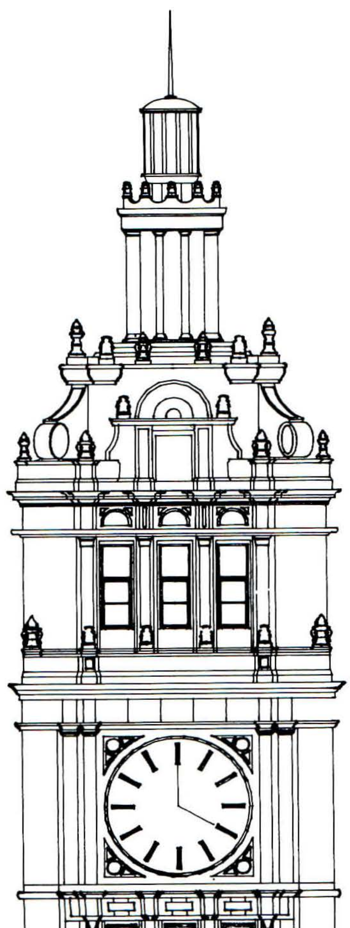
MEET THE PLINTER

Not long ago, plotters were easy to define: They held pens that drew vectors (lines) from CAD programs. Another family of output devices, more like printers, rasterizes the vectors into tiny dots that are applied to the media.

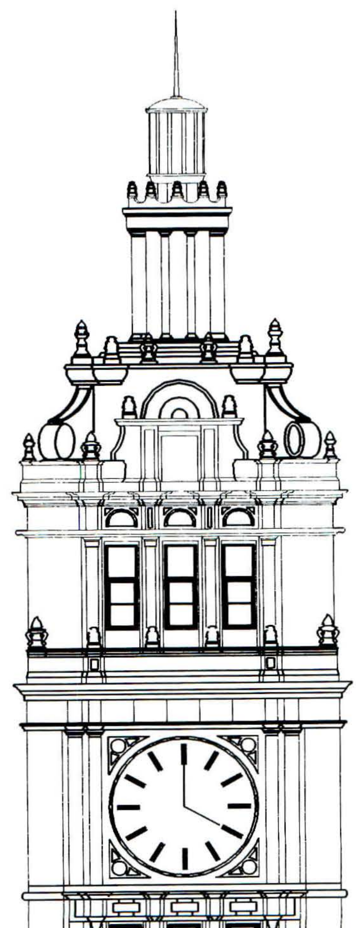
For this supplement, "plotter" is defined as an output device capable of reproducing vector information on C-size media (at least 17" by 22").

Today, architects have their choice of at least seven alternatives to pen plotters to commit their CAD-generated construction documents to paper:

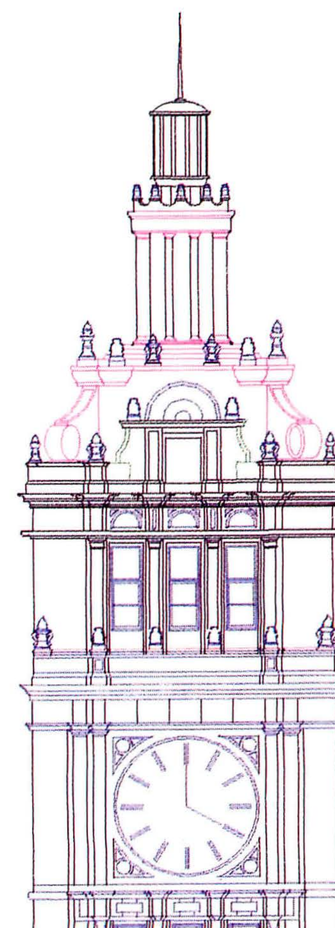
- Pencil plotters, like pen plotters, draw vectors but with lead (graphite) instead of ink.
- Inkjet plotters apply the rasterized dots by spraying ink through nozzles under pressure.
- Bubblejet plotters, cousins to the inkjets, propel the ink with a heat process that explodes bubbles of ink.
- Direct thermal (direct imaging) plotters apply points of heat to thermosensitive paper.
- Dot matrix plotters work with ribbons.
- Laser plotters use dry toner.
- Electrostatics use wet toner.



CalComp
DesignMate 3024S
8 pens. A-D size.
$1,992
0.18 mm Staedtler pen
Time: 12:10



CalComp
DrawingMaster 52436
Direct thermal. Roll fed.
$22,995. 406x406 dpi.
Line weight: 0.1 mm
Time: 0:55



Encad
NovaJet
Inkjet, full color. A-E.
$11,995
Line weight: 0.08 mm
Time: 1:05

/ *Tara Van Dyke*

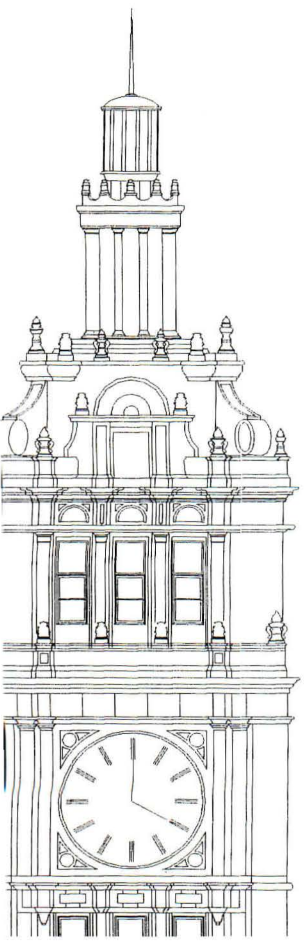
When selecting a plotter, buyers must make a deci-
on according to their needs and priorities — usually
volving line quality, speed and price.

To facilitate a direct comparison based on those quali-
cations, seven plotters drew the same file under the
ipervision of a independent representative, who veri-
ed the plotting times. The differences in line quality
e apparent in the resulting drawings below, arranged
phabetically by vendor.

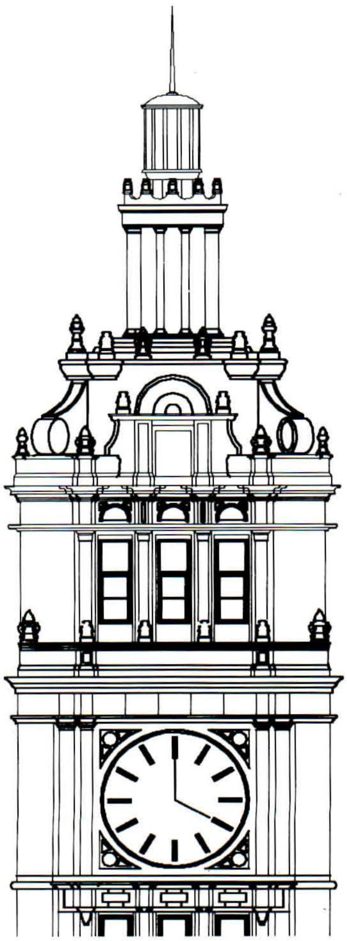
Dan Jutzi, AIA, an architect for Jack Train Associates,
eated the drawing of Chicago's Wrigley Tower. It was
awn in Microstation and saved as an HP-GL plotfile.

For consistency, each plotter used the same 164K plotfile, sent from the hard drive. The timing started as soon as the file was sent to the plotter, and stopped when the drawing was in the operator's hands. Only the upper part of the drawing is shown here. Line weights, colors and media were selected by the vendors. For more information, circle on the information card the number in the right column of the chart on a preceding page.

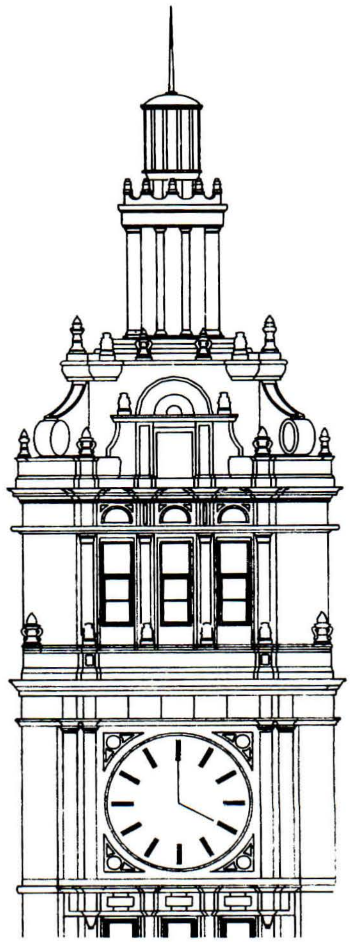
The ornamentation (facing page, upper left) is from the 16th floor parapet of Jutzi's drawing of the South Wrigley Building. The plot was generated by CalComp's DesignMate with a Staedtler 0.18 mm pen.



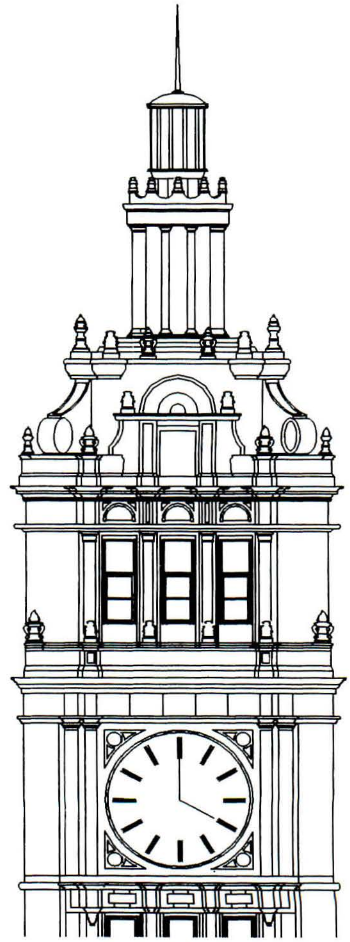
ouston Instrument
tPro V100
kjet, monochrome. A-C.
,995
e weight: 0.07 mm
me: 1:20



Japan Digital Laboratories
Express Plotter II
Direct thermal. Roll fed.
$11,995. 406x203 dpi.
Line weight: 0.127mm
Time: 2:30



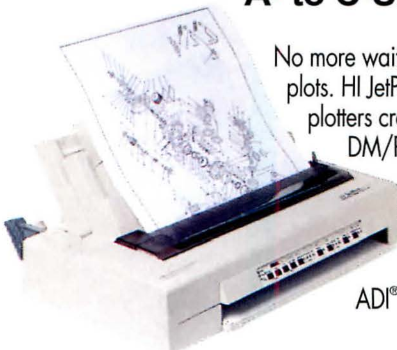
Mutoh America
XP-500
8 pens or pencils. A-E.
$6,300
Line weight: 0.2 mm lead
Time: 5:59



Pacific Data Products
ProTracer
Inkjet, monochrome. A-C.
$2,249
Line weight: 0.21 mm
Time: 1:28

HI JetPro®. A day's work in under an hour.

9:00 AM
A- to C-Size CAD Plots



No more waiting for pen plotter check plots. HI JetPro Series V100 and V50 plotters create HP-GL™/2, HP-GL and DM/PL™ CAD "review plots" at 360 dpi in under five minutes! No options needed. Includes real and protected mode ADI® drivers.

9:05 AM
FAX Output

HI JetPro V100 outputs FAX/modem files directly for high-resolution A- to C-size plain paper copies. Optional sheet feeder for A- and B-size output.

9:10 AM
Spreadsheets

C-size and rollfeed capability allow you to create large, readable spreadsheets. Drivers are available for Windows™ 3.0 and 3.1 compatibility.

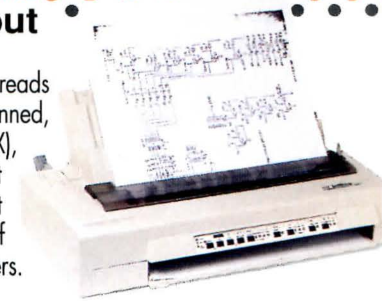
9:15 AM
Multiple Review Copies

For meetings create A-size review copies in one minute; high-quality, C-size review copies in under five minutes.

9:30 AM
Documents

HI JetPro Series emulates the IBM® Proprinter™ XL24 to create high quality reports and letters from a wide range of word processing packages.

9:35 AM
Scanner Output

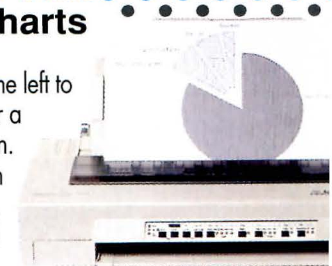


HI JetPro V100 automatically reads and outputs high-resolution, scanned, raster images from hand-held (PCX), desktop (TIFF) and large-format scanners (RLC and CALS). At a fraction of the cost of electrostatic plotters.

9:40 AM
Project Schedules

The rollfeed accessory allows long project management charts to be plotted from rolls of opaque or translucent bond paper.

9:50 AM
Presentation Charts



There's even time left to do large-scale charts for a 10:00 AM presentation. For information on HI JetPro Series plotters, or the name of your local dealer, call 1-800-444-3425.

New HI JetPro® Series Plotters.

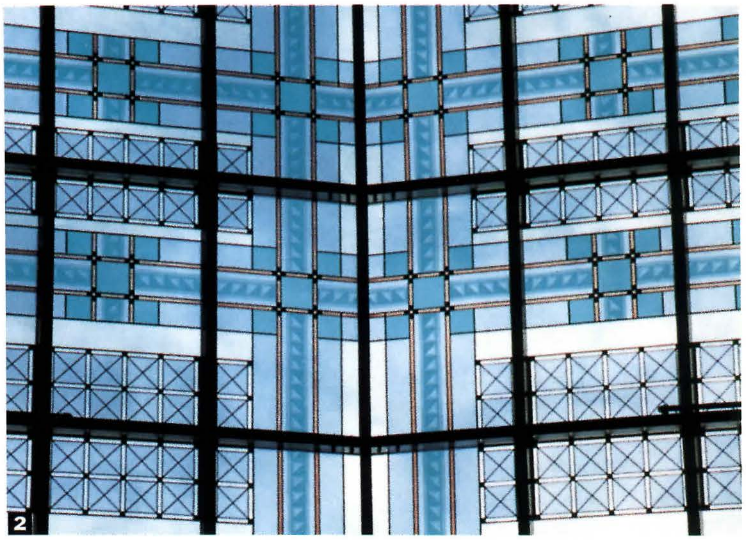
HOUSTON INSTRUMENT®

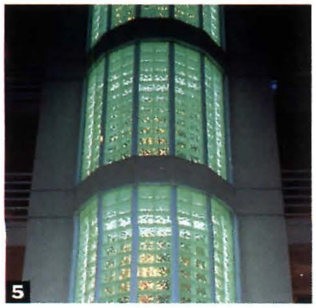
Every decision should be this easy.™

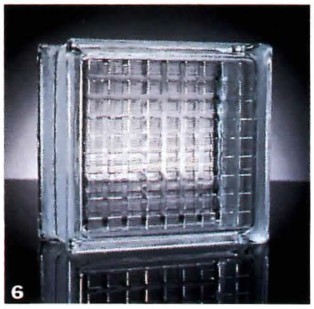
Circle 24 on information card

Glass Innovations

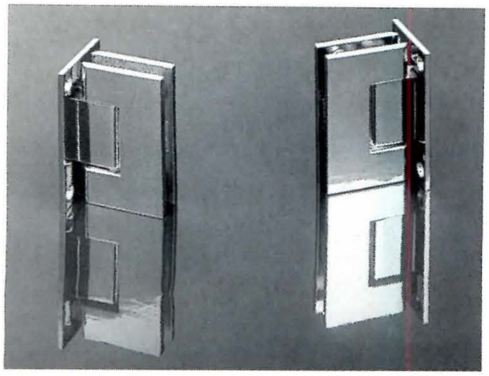
New types of glass block and laminated glazing offer optical variety.







1. Spectrum Block integrates a thermally bonded optical coating with Pittsburgh Corning glass block to refract light, creating a rainbow of color. Circle 401 on information card.
2. Sumitec's laminated Prism Glass comprises layers of glass, adhesive, and printed polyester. The company also manufactures Sumi*glass*, a *line* of translucent and opaque glass. Circle 402 on information card.
3. Stackwall is a floor-loaded structural wall system by Tempglass that incorporates tempered glass mullions to resist wind load and seismic forces. Circle 403 on information card.
4. FireLite Plus by Technical Glass Products is a laminated version of the company's wireless fire-rated glass ceramic panels. Circle 404 on information card.
5. The Acme Brick Company's IBP metal grid system for glass block eliminates mortar construction. Circle 405 on information card.
6. Pittsburgh Corning manufactures Textra, a line of glass block etched with a gridded checkerboard pattern. Circle 406 on information card.
7. Saflex by the Monsanto Company is a clear laminated glass designed to prevent shattering. Circle 407 on information card.



Glass-door hinges

ACI GLASS INTRODUCES A LINE OF HINGES for glass shower doors, display cases, and additional lightweight door applications. Available in brass or chrome, the hinges will accommodate $^3/_8$-inch- or $^1/_2$-inch-thick glass panels. *Circle 408 on information card.*

ADA fixtures

MOEN OFFERS A BROCHURE ON THE COMPANY'S ADA-compliant commercial products including kitchen and lavatory faucets, bath valves, and deck-supported and wall-mounted fixtures.

Circle 409 on information card.

Pipe protection

BROCAR PRODUCTS MANUFACTURES VINYL pipe covers for lavatory supply and waste lines that are designed to protect individuals in wheelchairs from burns or injury. Known as Trap Wrap, the ADA-compliant system completely covers pipe surface joints and valves and accommodates all pipe sizes.

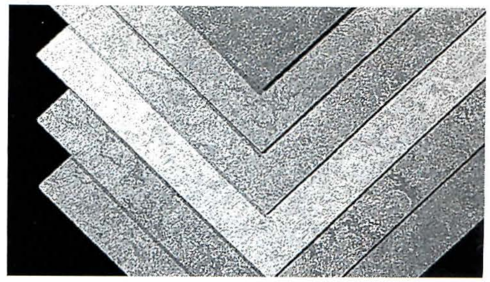
Circle 410 on information card.

Steel joist manual

THE STEEL JOIST INSTITUTE (SJI) HAS PUBlished the *60-Year Steel Joist Manual*, a 318-page guide that includes a chronological compilation of all SJI specifications and load tables between 1928 and 1988. The manual also contains detailed information on the original "K" series and the expanded "H" series, which is not included in the institute's 50-year manual. *Circle 411 on information card.*

Period pendant

THE REJUVENATION LAMP & FIXTURE COMPANY introduces the Fifth Avenue pendant, manufactured in solid brass. Suitable for residential and office interiors, the fixture is available in a variety of metal finishes and glass shades. *Circle 412 on information card.*



Environmental floorcovering

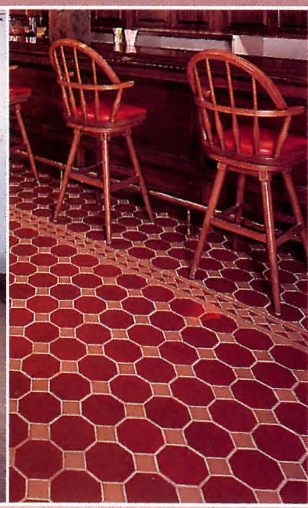
CREATED FROM NATURAL ELEMENTS SUCH AS linseed oil, pine resin, and cork, Forbo Industries' Fresco Collection of Marmoleum floorcoverings is biodegradable and free of hazardous chemicals. Available in 12 colors, the product can be seam-welded to form watertight, hygienic installations. Forbo also manufactures vinyl floorcoverings, Vicrtex wallcoverings, and acoustical panel systems.

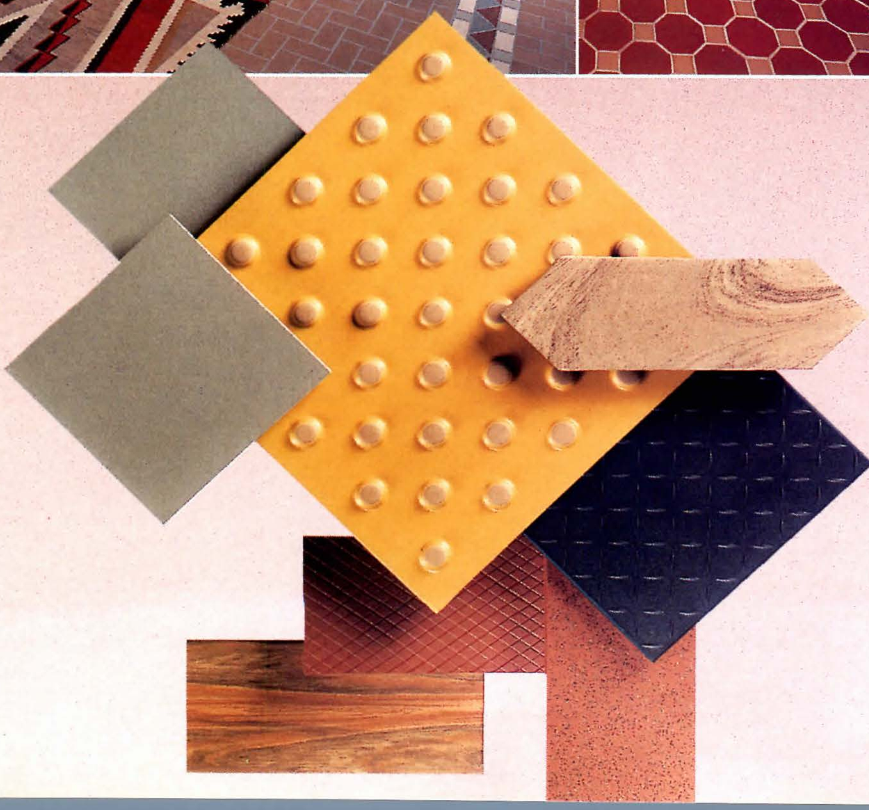
Circle 413 on information card.

Versatile covering

CONCOURSE BY EUROTEX IS A TIGHTLY WOVEN wool and nylon material suitable for covering floors and walls. It is available in a variety of colors and backing options.

Circle 414 on information card.





Drawer system

HETTICH INTERNATIONAL, A MANUFACturer of European furniture hardware, offers the Multi-tech steel drawer system for kitchen or file storage. Drawer sides are either $2^1/_4$ inches or $3^3/_8$ inches high and are epoxy-coated in white, gray, or black. Drawers are self-closing. *Circle 415 on information card.*

Energy-efficient lamps

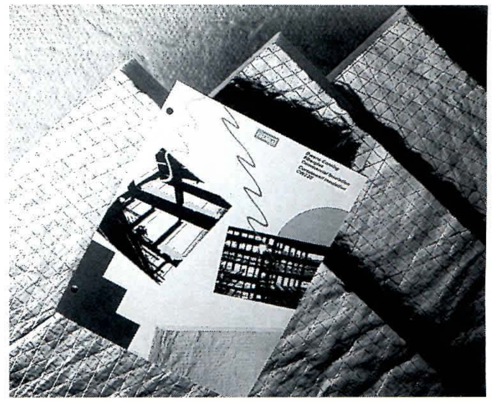
THE MASTERLINE 60-WATT PAR-38 AND PAR-16 lamps, recently introduced by Philips Lighting, are energy-efficient halogen accent lamps for retail interiors, hotels, restaurants, and exhibits. The lamps offer even beam patterns due to their reflector design. They are intended to replace the 90-watt standard halogen PAR and 150-watt incandescent PAR lamps for a savings of $6 and $18 respectively over the life of the lamps when calculated at 10¢ per kilowatt hour.

Circle 416 on information card.

Thermal doors

VIITAPUU, A FINNISH COMPANY, MANUFACtures thermal wood doors for a range of applications. Available in six standard colors, the doors can be constructed with a variety of 6-millimeter-deep patterns on their exterior faces. The line also includes thermal doors with double-pane insulation glass.

Circle 417 on information card.



Curtainwall insulation

OWENS-CORNING FIBERGLAS CORPORATION offers a six-page brochure on fire safety issues related to the company's Curtainwall Insulation/CW 225. A semi-rigid thermal insulation created for glass, metal panel, and precast panel curtainwall systems, CW 225 is available in 1-inch or 3-inch thicknesses and with the option of a factory-applied vapor barrier. The material can conform to irregular shapes and will not warp or shrink, according to the manufacturer.

Circle 418 on information card.

Gypsum Guide

THE GOLD BOND BUILDING PRODUCTS NAtional Gypsum Company has developed the *Gypsum Construction Guide* for residential and commercial structures. Written in the CSI/Master Format System, the 140-page reference manual offers product descriptions, technical data, specifications, installation tips, and detailed drawings.

Circle 419 on information card.

Vinyl siding

TRIPLE-3 DESIGNER COLLECTION VINYL SIDing by the Rollex Corporation is designed to resemble Victorian wood clapboards, and is available in seven colors. The product, which is manufactured with a low-gloss matte finish, is accompanied by a lifetime warranty.

Circle 420 on information card.

Classical proportions

CHADSWORTH PRODUCES THE TUSCAN LINE of wood pedestals to support a variety of objects. Constructed from pine or poplar, the pedestals replicate the Tuscan order of Classical architecture, and are available in 16 different sizes and shapes. The company also manufactures a selection of columns up to 36 inches wide and 40 feet high, and a variety of marble, granite, and onyx table tops. ■

Circle 421 on information card.

The people at Xerox are experts at enlarging and reducing things. Just look what they've done for the child abuse problem in Kansas City.

Every hug, each bit of praise, every minute of one-to-one attention Xerox employees give the children at the Niles Home helps lessen the pain these abused children must suffer. But, more important perhaps, is the impact their time and effort has on the battered children problem as a whole.

That's what Xerox Chief Executive Officer and President Paul Allaire had in mind when he helped pioneer Xerox's Community Involvement Program (XCIP) in 1974. XCIP provides a means to channel funds to employees for community projects.

Some of the social problems on which Xerox employees have already had meaningful impact are youth at risk, environmental problems, illiteracy, AIDS, and the disabled.

This is the kind of corporate activism that the Points of Light Foundation is hoping to promote. The Foundation is a non-profit, non-partisan organization founded in 1990 in hopes of encouraging community service. And like Xerox we are committed to solving serious social problems on a local level — with innovative solutions.

And although employees often donate time to these social programs during business hours, companies have reported only positive effects on their businesses, such as enhanced employee self-esteem and morale, and improved leadership and teamwork. Of course, without the support and participation of people such as Xerox's President and CEO, Paul Allaire, programs like these would never be possible. It takes the power only our nation's business leaders can provide to solve their communities' problems.

For more information on corporate involvement in community service, contact the Points of Light Foundation at 1-800-888-7700.

But please call us soon. Because although a program like Xerox's may be very difficult to duplicate, we would really *like to help you try.*

POINTS OF LIGHT FOUNDATION

Ad Council

LAST CHANCE!

Did you miss valuable information offered by advertisers in last month's issue of ARCHITECTURE?

The manufacturers listed below were advertisers in last month's issue who are anxious to provide you with their latest product information and literature for your planning needs. To receive this information, circle the appropriate numbers on the self-addressed, postage-paid response card. For product information and literature from advertisers in this issue of ARCHITECTURE, circle the appropriate numbers shown on the advertisements.

ACCESS INDUSTRIES. We can provide accessibility products and systems effectively and economically. *Circle No. 103*

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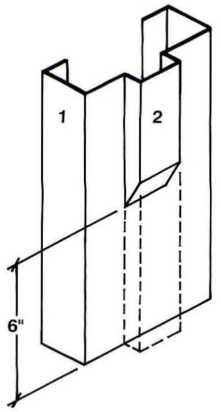
GROHE AMERICA INC. Our commercial faucets have no equal when it comes to design, engineering and reliability. *Circle No. 145*

Neat file

ARCHITECTURE's "No Excuses After This" information exchange

Metal Doors and Frames *CSI Division 08110*

Institutional door stops



HOSPITAL STOP DETAIL

For institutional buildings such as hospitals, where floors are mopped often, we specify hospital stops for all hollow metal door frames. Such stops end approximately 6 inches above the finished floor (left) and are cut at a 45-degree angle. They are positioned to allow mops to pass underneath, preventing the collection of dirt around the stop. They also allow easy installation of sheet flooring, reducing the trimming necessary around the frame. Hospital stops should not be used for doors that control light, sound, fire, and smoke.

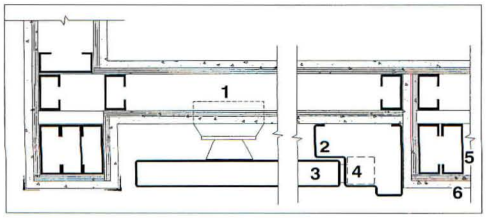
1 HOLLOW METAL DOOR FRAME
2 ANGLED DOOR STOP

J. Herbert Ogden, AIA
Taylor Clark Architects
New York City

Recessed doors

Current Fire Protection Association standards for healthcare facilities require patient corridors to maintain an 8-foot clear width. Standards also require smoke compartments separated by double egress doors. Unfortunately, these doors are often held open, compromising design intent. According to our firm's survey of recessed-door manufacturers, 8-foot-wide, fully recessed doors are not available on the market. Our alternative was to detail a pair of 4-foot-by-7-foot-10-inch doors hung from hollow metal frames on pivot hinges. The entire assembly recesses into wall pockets and protrudes only 5/8 of an inch into the corridor (below). We specified hollow metal doors to achieve the appropriate fire ratings, accommodate fully recessed exit hardware, and provide flexibility for door finish selection.

Steven N. Throne, AIA
Flad & Associates
Madison, Wisconsin



DOOR PLAN

1 ELECTROMAGNETIC DOOR HOLDER
2 DOOR FRAME
3 HOLLOW METAL DOOR
4 PIVOT HINGE
5 4 1/4-INCH-DEEP POCKET
6 5/8-INCH-DEEP REVEAL

Plumbing *CSI Division 15400*

Freezing pipes

After years of practicing in a cold climate, we've found we should never rely on building insulation in exterior walls to keep pipes from freezing. Even if pipes located in exterior walls are kept on the warm side of the vapor barrier and insulation, drafts or thermal "short circuits" can freeze the pipes. Wrapping the pipes with electrically heated tape is also risky if there is a power failure. The only foolproof method is to keep pipes out of exterior walls and to run them on the warm side of interior wall sheathing, or within interior partitions that have heated spaces on both sides.

Donald R. McGilvery
Terrien Architects
Portland, Maine

Sizing chases

The size of a plumbing chase in toilet rooms is usually not determined by the piping inside the chase, but by the carriers that support wall-hung fixtures. These chases often contain ducts and other mechanical equipment. The final size of all chases must be confirmed with the plumbing and mechanical engineers, but in the early stages of design, it is common to show all toilet-room chases with 24 inches clear inside, which will accommodate most commonly used carriers. More space should be provided if the chase is to be accessible to maintenance personnel. It is fairly easy to reduce the size of a chase at a later time, but very difficult to enlarge it at the expense of the room being served. It is also important that the walls of the chase be acoustically rated and that the sound insulation extend to the structure above the ceiling. We have seen instances where both chase walls consisted of a single layer of drywall on steel studs, which stopped at the acoustical ceiling. Sound was easily transmitted between the two toilet rooms to the embarrassment of their occupants.

Thomas McCune, AIA
Hellmuth, Obata & Kassabaum
St. Louis, Missouri

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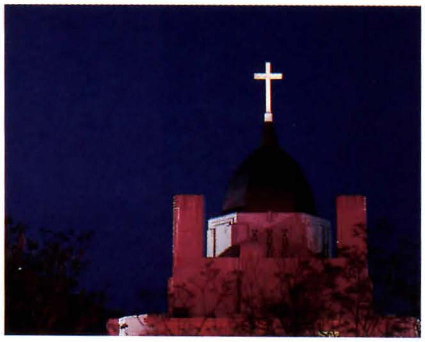

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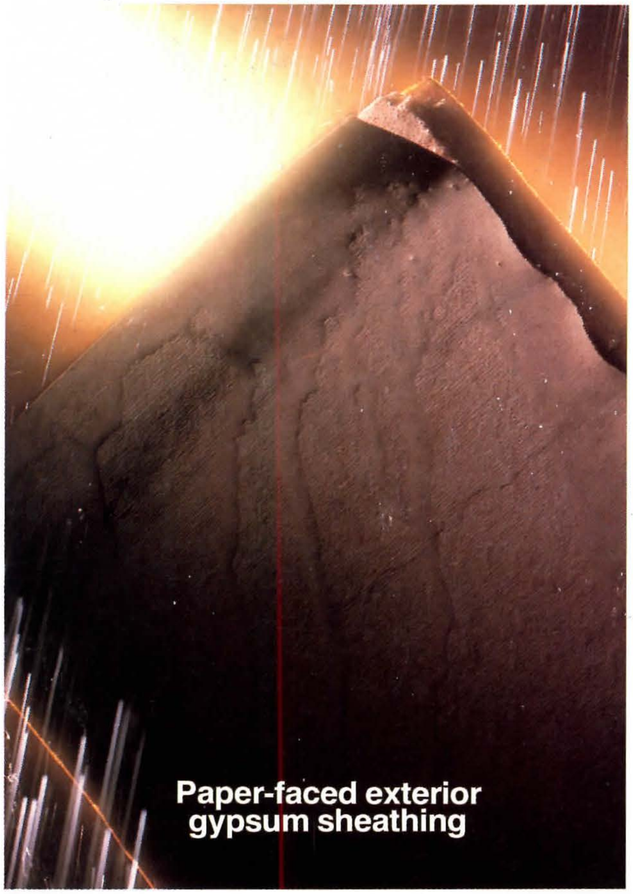
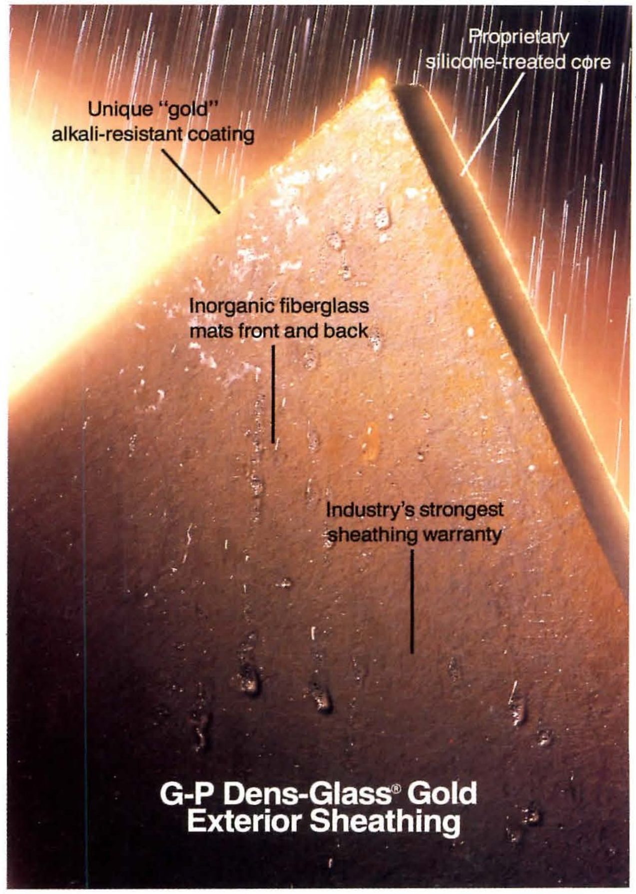
GAMBLE



GUARANTEE



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face up	100	40[1]
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face up	141	110[1]
face down	151	110[1]
Hardness, lbs. core	29	15[1]
end	25	15[1]
edge	41	15[1]
Water Absorption, % by weight	5.0	10.0[2]
Surface Water Absorption	.83	1.6
Humidified Deflection, inches	1/4″	10/8″
Flamespread	0	15

NOTE: Tests conducted in accordance with ASTM guidelines.
[1] Minimum requirements for ASTM C-79 standards specification.
[2] Maximum requirements for ASTM C-79 standards specification.

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