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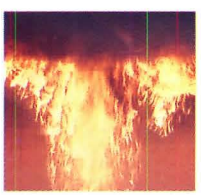

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Disney's New Urban Influence

The entertainment giant's success is luring cities to spawn their own theme parks—downtown.

MICHAEL LEWIS

ABOVE RIGHT: Denver's Elitch Gardens, a 70-acre amusement park, exemplifies the urban entertainment trend.

The 1990s may well be remembered as the Disney decade. In addition to purchasing the television network Capital Cities/ABC this summer, the owner of "The Happiest Place on Earth," as Disneyland is called, secured a deal to clean up the country's tawdriest place—New York's 42nd Street—and nearly bought part of Rockefeller Center. More significantly, Disney's influence is now being felt in almost every downtown as America rushes to build entertainment-based "urban destinations."

Cities are betting that combinations of retail malls, restaurants, cineplexes, interactive museums, and even amusement parks will secure their economic futures. From Disney, they are learning how to attract tourists to lucrative, themed environments that are clean, controlled, and safe from the urban headaches of traffic, pollution, and crime.

Chicago, for example, recently renovated its historic Navy Pier into a tourist attraction with a children's museum, an exhibition hall, shops, restaurants, and a Ferris wheel. Downtown Denver now incorporates 70-acre Elitch Gardens (above), an amusement park relocated from the suburbs. Smaller cities are also considering Disneylike attractions. Silver Spring, Maryland, has proposed a megadevelopment called "The American Dream" to revive its shopping district. Inspired by the Mall of America near Minneapolis, the 2 million-square-foot retail complex would include an ice-skating rink, wave pools, and an indoor roller coaster.

As more of these Disney-inspired developments are built, the challenge for architects will be designing for video and virtual reality while respecting the age-old principles of urbanism. If entertainment-focused projects are to benefit cities, they must not copy inward-looking, suburban-style malls, but be integrated with the sidewalk, the street, and the community. Cities must consider the effect not only on tourism, but on local residents and neighborhoods as well. Too many urban attractions have failed in the past, doomed by disregard for density, parking, design quality, and regional appeal.

Sacramento, for example, built a fortress-like downtown mall 20 years ago, only to spend $107 million two years ago to redevelop a more open complex. Last year, Richmond opened a downtown history park, complete with rides and season passes, only to close it 16 months later owing to lack of visitors. And after the failure of two riverboat operations, New Orleans is now reexamining its recent gamble on casinos. These cities have learned the hard way that entertainment attractions quickly become obsolete if they ignore real life, no matter how skillful the simulation.

Deborah K. Dietsch

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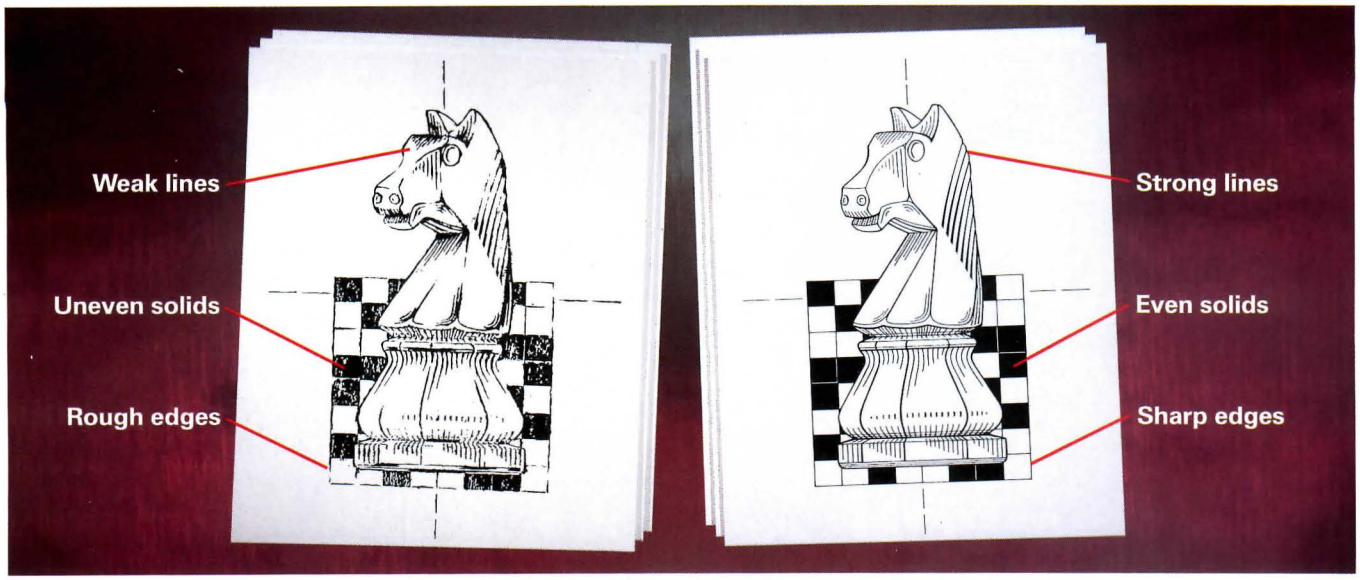

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Letters

Parisian persuasion

I visited the site of the National Library in Paris (October 1995, pages 66-71) in 1993. While I found the building impressive, it was not overwhelming. Architect Dominique Perrault took a program with an incredible floor area and shaped it into a complex that, from a distance, appeared to be rather modest. This serene, inwardly focused sanctuary for reading serves as metaphor for the act of reading itself. In this context, I found the spare minimalism and intellectual rigor of the detailing especially well suited to its purpose.

Your article, however, utterly failed to capture the project as I experienced it. In addition, the cost of the project was misstated. The $7.1 million you listed could not have covered much more than the transplanting costs for the trees in the inner courtyard.

Helen J. Maib, AIA
Kansas City, Missouri

Editor's note: The National Library cost approximately $737 million.

Diversity agenda

I was pleased to read your report on the AIA Diversity Conference in San Francisco (ARCHITECTURE, October 1995, page 27), but I disagree that the proceedings were "long on rhetoric and short on proposals." Specific proposals for AIA and individual action did emerge from the conference sessions, and we should observe a shift from mono- to multiculturalism in AIA membership and leadership in the future.

As a participant in the development of AIA's Diversity Agenda, I take hope from the momentum of this movement—a force for the survival of the profession in a diversifying, global environment.

Marga Rose Hancock, Hon. AIA
Executive Vice President
Seattle AIA Chapter
Seattle, Washington

Smoke screen

I was deeply disappointed by the incompleteness of your October articles on libraries, particularly those in Phoenix and San Antonio. The design freedom of architects Will Bruder and Ricardo Legorreta was seriously constrained by code considerations for fire and smoke safety, but it was released by innovative engineering solutions.

As the engineer who developed the smoke management strategies for both buildings, I was dismayed that you paid no attention to this critically important aspect of the designs. The contributions of Baltes Valentino Associates and Goetting & Associates, mechanical engineers for the facilities, were similarly ignored. Without these unseen contributions, neither of these two outstanding examples of civic presence could have been realized in their current forms.

Michael E. Dillon
President, Dillon Consulting Engineers
Long Beach, California

Correction

Northwest Architectural Company is the architect of record for the Spokane Public Library (October 1995, pages 116-117).

Events

Exhibitions

CHICAGO. "The Prairie School: Design Vision for the Midwest," through January 7, 1996, at the Art Institute of Chicago. Contact: (312) 443-3600.

NEW YORK. "Architecture of Jean Nouvel," through January 15, 1996, at Storefront for Art & Architecture. Contact: (212) 431-5795.

Architects' views on New York City, through March 10, 1996, at the Queens Museum of Art. Contact: (718) 592-9700.

PHILADELPHIA. "Michael Graves: The Architect and the Tea Kettle," through February 24, 1996, at the Philadelphia Museum of Art. Contact: (215) 763-8100.

WASHINGTON, D.C. "The Dome: Symbol of American Democracy," through April 14, 1996, at the National Building Museum. Contact: (202) 272-2448.

Conferences

ALBUQUERQUE. Correctional facility design, February 29 to March 1, 1996, sponsored by AIA. Contact: (202) 626-7300.

BERLIN. Solar energy and architecture, March 26-29, 1996, sponsored by the European Commission. Contact: 011-49-89-720-1232.

CARMEL, CALIFORNIA. "Making Cities Livable," March 12-16, 1996. Contact: (408) 626-9080.

FORT WORTH, TEXAS. Healthcare facility design, March 4-6, 1996, sponsored by American Hospital Association and AIA. Contact: (202) 626-7300.

HOUSTON. "Housing Design '96," January 26-29, 1995, sponsored by AIA. Contact: (202) 626-7300.

WASHINGTON, D.C. Reengineering historic structures, February 9-11, 1996. Contact: (202) 626-7300.

Competitions

Mill Springs Battlefield Visitor Center design competition. Deadline **December 15, 1995.** Contact: (502) 564-7005.

Architectural illustration awards for sketches and presentation drawings, sponsored by the American Society of Architectural Perspectivists. Entries due **January 12, 1996.** Contact: (617) 542-1021.

AIA photography contest for architecture-themed pictures, sponsored by AIA St. Louis. Deadline **March 1, 1996.** Contact: (314) 231-4252.

DuPont Benedictus Awards for outstanding architectural projects using laminated glass. Entries due **March 1, 1996.** Contact: (202) 785-2324.

Photovoltaics competition, sponsored by AIA, ARCHITECTURE, and National Renewable Energy Laboratory. Entries due **March 8, 1996.** Contact: (202) 879-7752.

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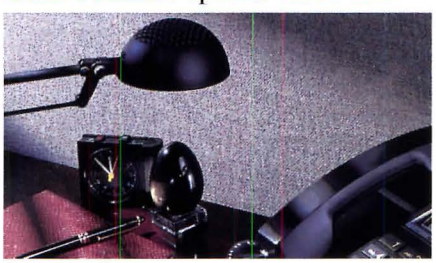

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News

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39 Opinion

Museums Renovate Historic Buildings

RICHARD BARNES

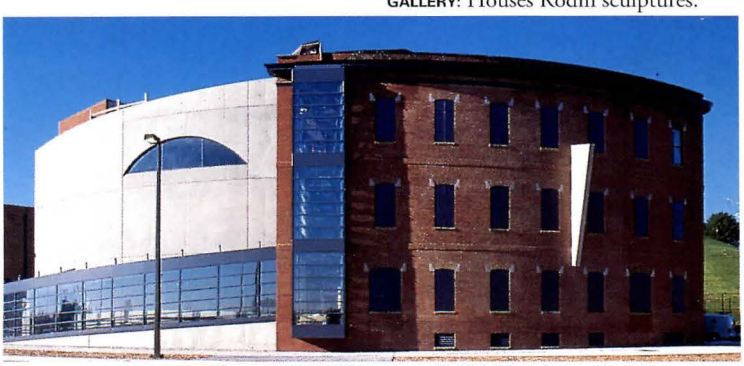
LEGION OF HONOR: Underground galleries added to San Francisco museum.

Legion of Honor

The California Palace of the Legion of Honor, San Francisco's clifftop art museum, reopened in mid-November after a three-year restoration, expansion, and seismic upgrade (pages 100-101, this issue). Begun by Edward Larabee Barnes and completed by Mark Cavagnero, the expansion adds 35,000 square feet to the 1911 building, with two new underground levels of galleries and services. The upper level galleries were cleaned and restored to their original Neoclassical splendor.

RICHARD BARNES

GALLERY: Houses Rodin sculptures.



J. BROUGH SCHAMP

VISIONARY ART MUSEUM: Concrete addition extends 1913 brick warehouse.

Visionary Art Museum

In keeping with its mission of fostering the "outsider" art of self-taught individuals like Howard Finster, Vollis Simpson, and Martin Ramirez, Baltimore's American Visionary Art Museum teamed young local architects Rebecca Swanston and Alex Castro with Project Architect Mike Wigley of Davis, Bowen & Friedel, to design its 35,000-square-foot harborfront building, which opened November 24. The curving concrete addition to the brick Baltimore Paint Company Building, designed by local architect Rufus Bennett in 1913, features galleries surrounding a helical stairwell. Another turn-of-the-century warehouse adjoining the museum has been renovated for the exhibition of large-scale sculpture and to host special events.

The Wolfsonian

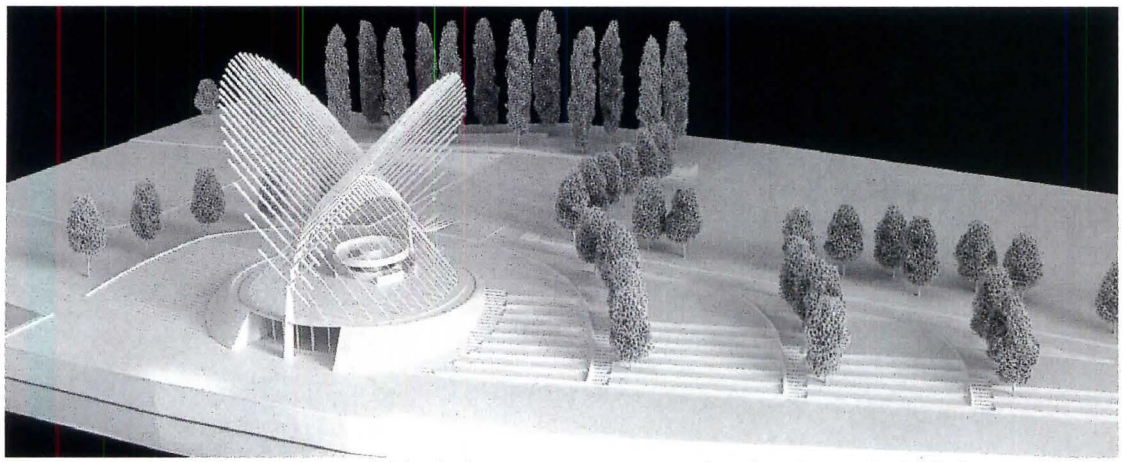
Miami media mogul Mitchell Wolfson, Jr., has spent 30 years amassing an eclectic collection of 70,000 objects, including the furniture of Dutch architect Michel De Klerk, stored in a 1927 South Beach warehouse. Wolfson commissioned local architect Mark Hampton to upgrade the Mediterranean-style warehouse into a museum. The not-for-profit Wolfsonian, with new two stories and a 1929 movie palace's terra-cotta facade, opened last month.

RICHARD SEXTON

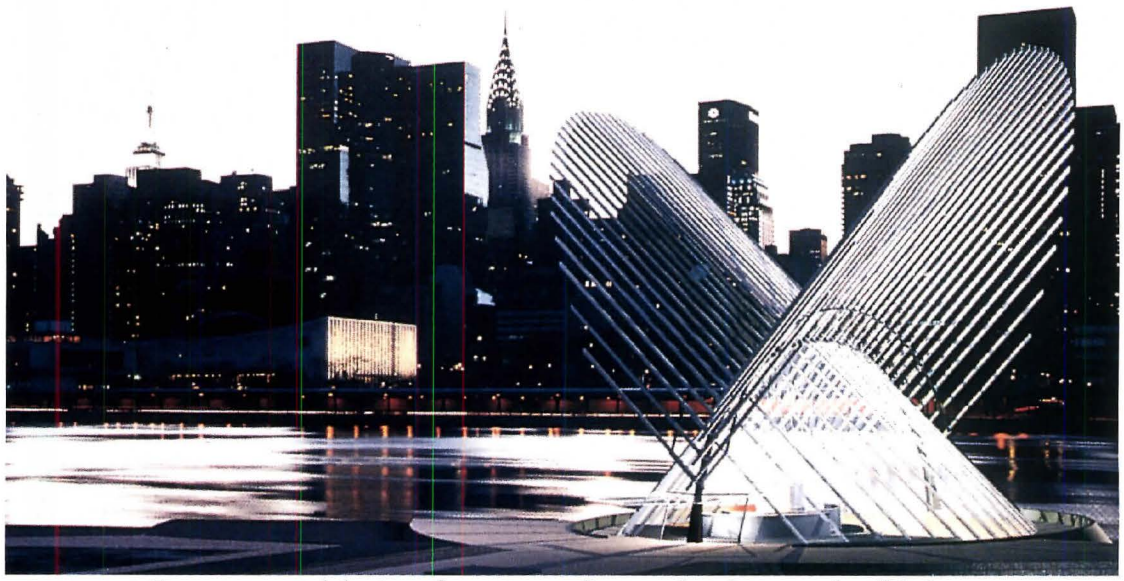
WOLFSONIAN: Former warehouse.

J. BROUGH SCHAMP

BALTIMORE: Museum is near harbor.



SOUTHPOINT PAVILION: Calatrava's Roosevelt Island scheme encompasses terraced gardens that overlook Manhattan.



METALLIC WINGS: Computer-operated aluminum fins rotate according to sun's angle to control sunlight in restaurant.

Calatrava's American Works in Progress

A pavilion on New York City's Roosevelt Island and a museum addition in Milwaukee, Wisconsin, are vying to become Santiago Calatrava's first built project in the U.S. The 44-year-old Spanish architect and engineer's proposed restaurant and visitors' center in New York has been designed, but construction is delayed pending funding. His lakefront addition to the Milwaukee Art Museum is now being designed and should begin construction in 1998.

Calatrava's work is renowned for its expressiveness, such as the 1994 railway station at the Lyon-Satolas Airport in France (ARCHITECTURE, August 1994, pages 72-81). His first U.S. opportunity arose in 1991, with his winning design for a bio-shelter in the unfinished Cathedral of St. John the Divine in Manhattan. Models and drawings of the biosphere proposal, currently on hold, and the pavilion project are part of an exhibition on view at St. John the Divine through January 3, 1996.

Calatrava was commissioned to design the pavilion in 1994 by the Roosevelt Island Operating Corporation, a state-chartered group that manages services and zoning for the 2-mile-long island in the East River. The pavilion is part of a long-term strategy to increase the developing community's tourism and revenue, and to shed its lingering image as "Welfare Island," a repository for city hospitals, asylums, and prisons.

Calatrava's kinetic structure will be constructed on the island's southern tip, adjacent to an as-yet-unbuilt memorial to Franklin Delano Roosevelt designed by Louis Kahn in 1974.

The base of the new pavilion, intended to recall the scale and character of Kahn's granite memorial, will be clad in gneiss remnants from the island's Old City Hospital, demolished last year. It will house a visitors' center and exhibition space. Above the base, a glass-clad metal skeleton will enclose a restaurant on the upper level. Operable aluminum fins projecting beyond the glass roof will rotate to deflect sunlight; when the wings are fully extended, the pavilion measures 40 feet high.

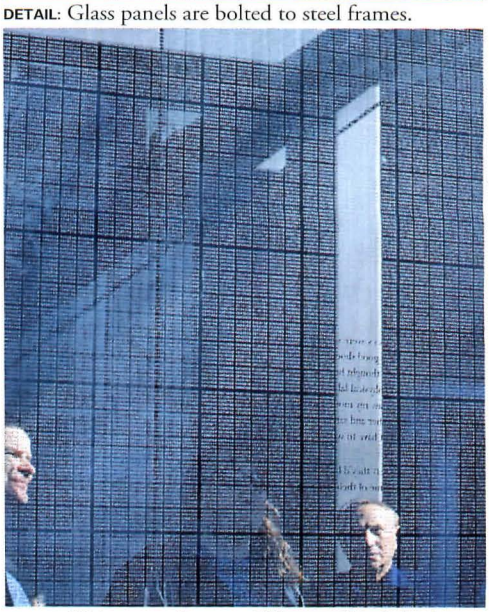
In Wisconsin, Calatrava is designing in the shadow of another Modern master. One year ago, he was selected to design a 40,000-square-foot addition to Eero Saarinen's 1957 Milwaukee County War Memorial, home of the Milwaukee Art Museum. Designs for the $20 million addition will be released next month.—*Ann C. Sullivan*

HOLOCAUST MEMORIAL: Six glass towers on median strip near Faneuil Hall evoke candles or chimneys.

DETAIL: Glass panels are bolted to steel frames.

STEVE ROSENTHAL PHOTOS

ENFILADE: Visitors walk through base of towers on granite path inscribed with Holocaust facts.



DETAIL: Visitors are "tattooed" by numbers' shadows.

New England Holocaust Memorial Opens

Architecture plays a subservient role to words and numbers at the New England Holocaust Memorial, which opened in October. Unlike the pure evocation of grief that is Israel's Yad Vashem, or the simple elegy to the dead that is the Vietnam Memorial, the new Boston memorial is burdened with too much narrative, heavy-handed symbolism, and an inappropriate site.

Designed by San Francisco architect Stanley Saitowitz, the memorial is intended as a heartrending progression through survivors' memories etched into six 54-foot-high glass towers. Visitors follow a granite path inscribed with Holocaust facts—"most infants and children were killed immediately upon arrival at the camps"—and continue through openings in the steel-framed towers. Engraved in the glass are recollections of the slaughter that occurred while much of the world, Americans included, looked away.

Six million numerals, one for each of the Nazis' Jewish victims, completely cover the glass. In sunlight, the numbers create tattoolike shadows on all who pass. At night, however, visitors are merely puzzled by numbers that, viewed from inside, read backwards.

Other symbols are similarly confusing: Under each tower, a floor grate covers a granite pit, where fiber optics and steam make stones look like glowing embers. The "coals" and steam represent both the smoke from the crematoria and, as a visitor walks over the grates, the warm breath of Holocaust victims. This dual symbolism is contradictory and ill-considered, and when the steam is turned off, the fake coals emit light without warmth.

Architecturally, Saitowitz's essential scheme—a progression through towers of numbers—might have been effective were it not so burdened by gimmickry and text. But the painful memories captured in 12 narratives, two for every tower, discourage somber reflection. Rather than pausing to seriously consider the most awful crime of the century, visitors compete, like voyeurs, to read the horrors.

Most importantly, the monument's site trivializes its serious purpose. Saitowitz's progression, with fewer words, would have been more powerful in the empty plaza surrounding city hall or the meadow of Boston Common. Instead, the memorial occupies a median strip next to the city's biggest tourist destination. A travel ad for Boston might now announce: "See Faneuil Hall. Experience the Holocaust. Shop at Quincy Marketplace."

Some 113 Holocaust organizations, most aimed at building memorials, exist in the U.S. today. Their proponents maintain that these monuments must make the world remember. But the New England Holocaust Memorial reminds me of a chilling story told by my father about his own experience at Buchenwald. Guards had captured two escapees and were hanging them publicly as a lesson. What my father recalls is not the Nazis' brutality, but the way other prisoners, Jews like himself, climbed on one another's shoulders to watch.

Sadly, the tragedy of the Holocaust remains relentlessly fascinating. The more graphic and painful the memorial, the bigger the tourist attraction.—*Heidi Landecker*

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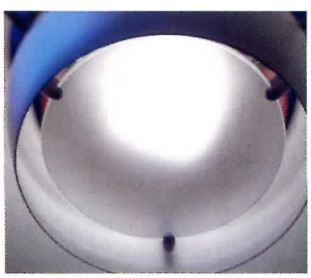

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THEATER DISTRICT: Gensler's design focuses on circular basin.

PETER YENNE

EXHIBITION: Proposals are displayed in downtown lobby.

Urban Visions for Downtown Houston

"Designing for Change," an AIA-sponsored exhibition of proposals by local firms for downtown Houston, responds to the city's recent development plan with formulaic, 1980s-style urbanism. The downtown proper, a cluster of office high-rises surrounded by 600 square miles of sprawling freeway interchanges and strip malls, enjoys relatively stable occupancy rates but is deserted at night. While the 13 proposals on display offer optimistic guidelines for transforming this area into a more vital 24-hour district, they fail to consider the peculiarities of contemporary Houston urbanism.

In a city whose form is dictated almost entirely by the automobile, attempts to generate pedestrian street life are naïve at best. Successful outdoor spaces are few, and office workers prefer the climate-controlled network of tunnels and skywalks to the streets. Instead of creating new alternatives—or improving the clumsy but functional bridges and tunnels—proposals like the Watkins Carter Hamilton-designed civic center, focused on an exterior pedestrian mall, recall the Postmodern projects of Houston's pre-oil-bust glory days. Such knee-jerk solutions prove that flawed urban planning shouldn't always be blamed on developers.—*N.C.*

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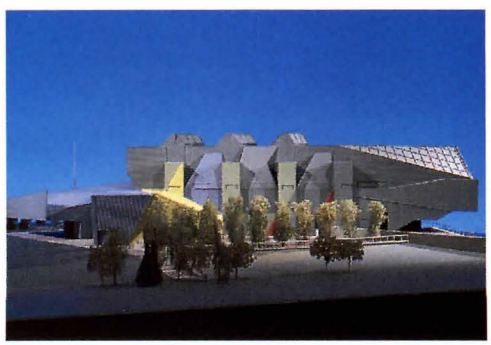
On the Boards

A new aquarium elucidates Lake Superior's fragile freshwater ecology.



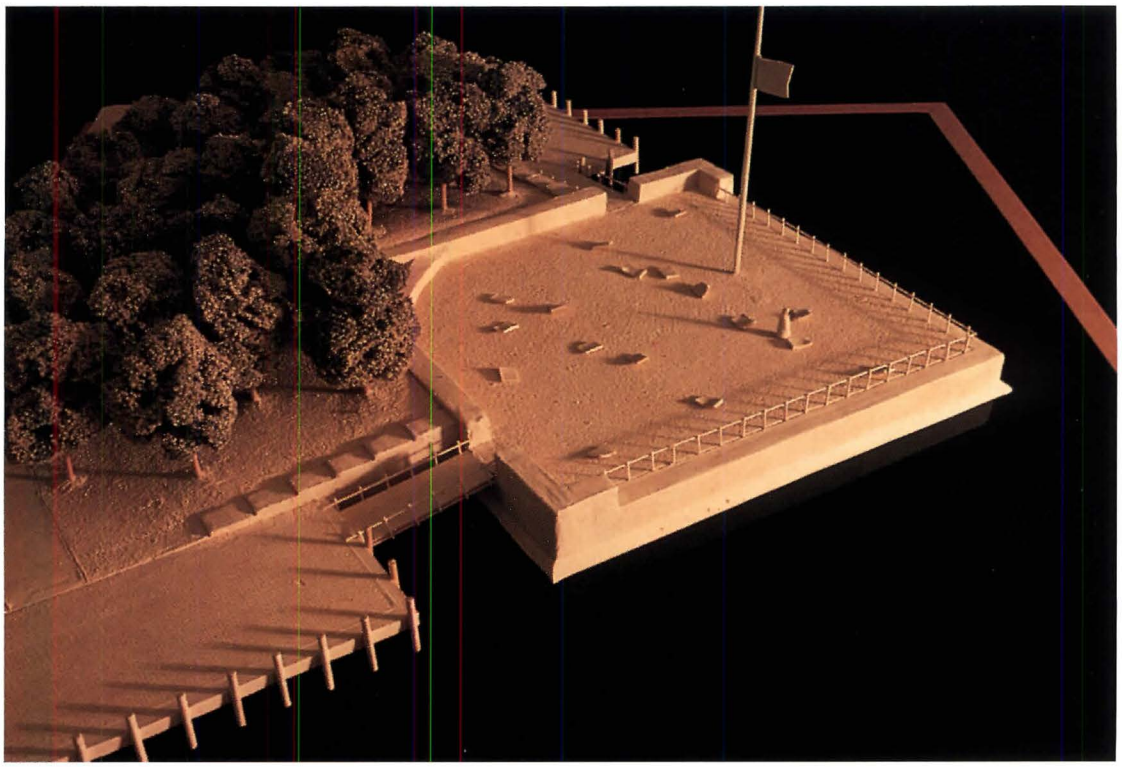
Lake Superior Center
Duluth, Minnesota
Holt Hinshaw Architects

The ecology of the largest of the Great Lakes will be the focus of a new aquarium in Duluth. The 50,000-square-foot building will be sited on four acres extending from Lake Superior to a major interstate and railroad line, between a park and convention center. Designed by Holt Hinshaw, the metal-clad aquarium's industrial form is inspired by the landmark Aerial Lift Bridge at the harbor's mouth.

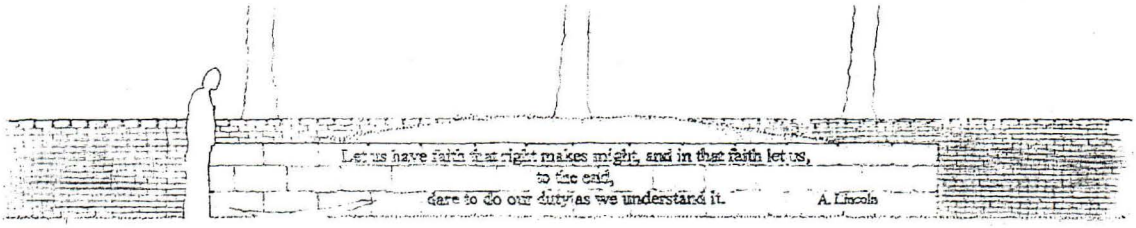
Permanent exhibitions are contained within a linear block topped by light scoops illuminating eight habitats—living core samples cut sectionally through water, land, and air that demonstrate Lake Superior's diverse ecosystems. Wrapped around the habitats is a network of catwalks, lighting bridges, and platforms. A rotated wing south of the main block houses visitor services and administration; a black-box pavilion to the north will host changing exhibitions and theatrical events. The center will be completed in 1998.—*N.C.*

On the Boards

A memorial honors the military with soldiers' letters.

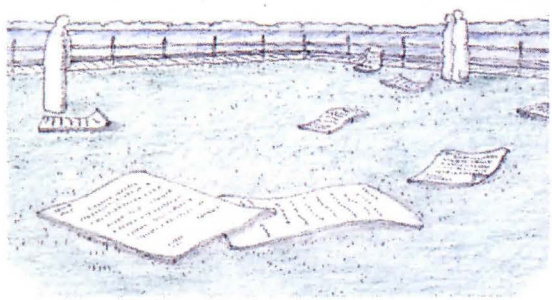


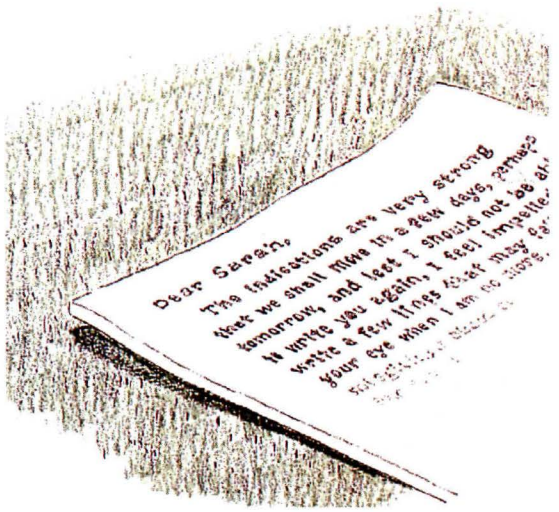
Norfolk Armed Forces Memorial
Norfolk, Virginia
James Cutler Architects
Maggie Smith, Visual Artist



Last letters from soldiers to their families will form part of a proposed Norfolk, Virginia, memorial to the armed forces. Designed by Seattle architect James Cutler and artist Maggie Smith, the project is both a tribute to the military and a poignant reminder of the horrors of war.

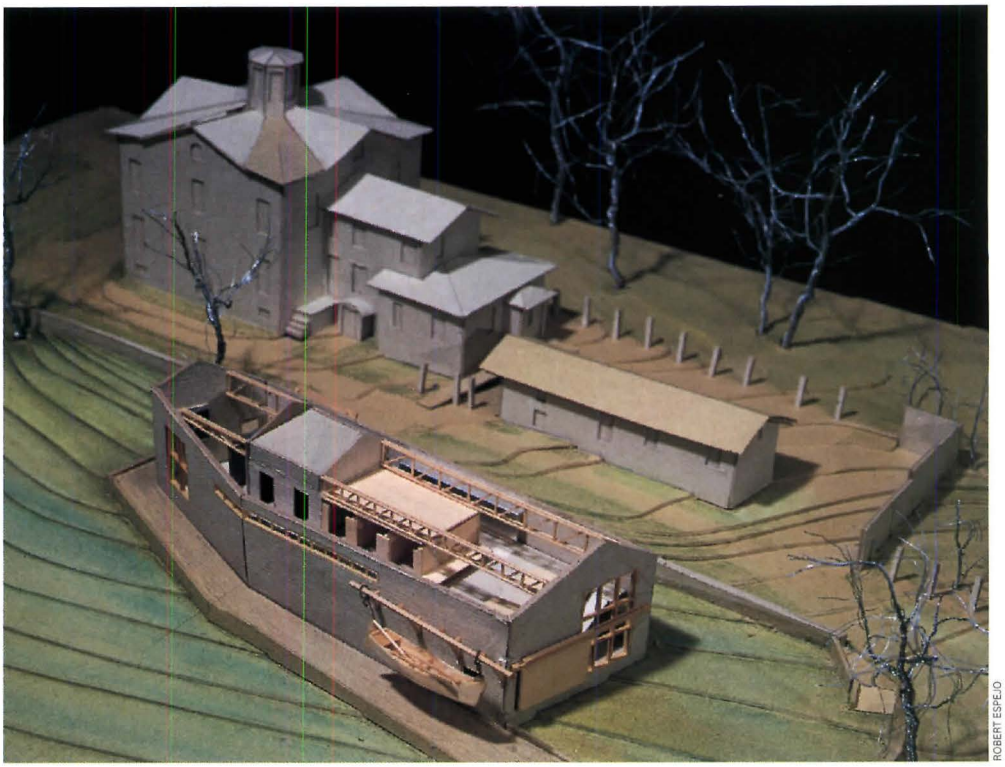
Cutler and Smith's design occupies a 160-foot-square site that projects into the Norfolk harbor from an existing waterfront park. The team will enclose a square lawn with a stone wall bearing a quotation from Abraham Lincoln: "Let us have faith that right makes might, and in that faith let us, to the end, dare do our duty as we understand it." The letters, cast in bronze, will be scattered across the lawn as though blown by the wind. A tree-planted berm and a pair of metal footbridges will link the memorial to the adjacent park.—*N.C.*





On the Boards

An addition to an historic house and museum is inspired by a maritime explorer.



ROBERT ESPEJO

Richard W. Woolworth Library and Archive
Stonington, Connecticut
Brooks and Carey Architects

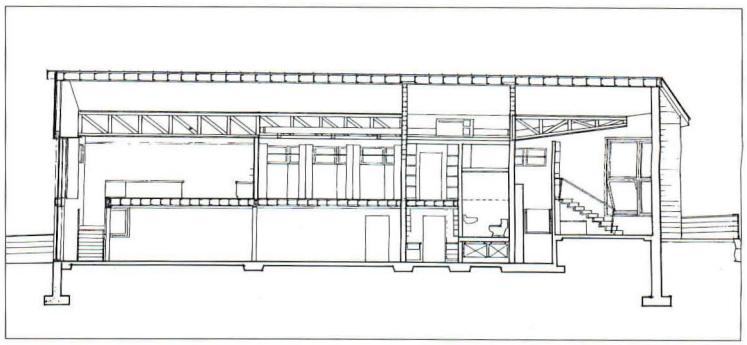
Vermont architect Turner Brooks and his new partner Eeva Pelkonen won a competition in October to design an addition to the Captain Nathaniel Brown Palmer House in Stonington, Connecticut. Palmer, a renowned shipbuilder, explorer of Antarctica, and cofounder of the New York Yacht Club, built the Italianate house in 1853.

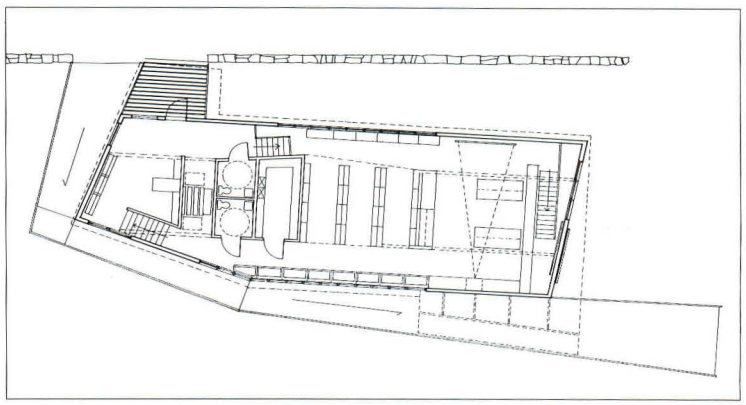
The mansion is currently occupied by a whaling museum and the headquarters of the Stonington Historical Society. The competition, which drew proposals from 35 New England architects, called for a 3,200-square-foot addition to house the society's library and archives.

Brooks and Pelkonen's addition emulates a traditional domestic outbuilding by deferring in scale and placement to the original house. Its tapered volume is distinctly shiplike, and its siting underscores this maritime reference. The architects located the new building next to an existing retaining wall, like a ship moored alongside a quay.

To the south, the library's "prow" is aligned axially with Stonington, and by extension, with Antarctica. Trusses spanning the building lengthwise reinforce this directionality, and a large window in the library's main reading room offers a view of a cove to the north.

A gangwaylike ramp surrounding the building continues internally as stairs and corridors that wrap around the centrally located stacks, storage, and reading room on the second floor. Daylit by baffled windows and entered through a double-height hall, this interior circulation space will double as a gallery. The hallways will be lined with glass vitrines holding the historical society's archives, which will eventually expand to occupy the unfinished area on the ground floor beneath the reading room and stacks. Construction of the addition is scheduled to begin next year.—*N.C.*





Client: Independence Savings Bank Headquarters, 195 Montague St. Brooklyn, N Y 11201. The new 71,000 square foot headquarters occupies the top three floors and the basement of a fifteen-floor office building in downtown Brooklyn.
Architect: R.M. Kliment & Frances Halsband Architects.
Design Team: R.M. Kliment FAIA and Frances Halsband FAIA, Collaborating Partners; Michael A. Nieminen AIA, Associate & Project Mngr.
General Contractor: A.J. Contracting Company, Inc.
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Protest

A new county jail barricades downtown Pittsburgh from its riverfront redevelopment.

RIVERFRONT JAIL: Chunky brick towers of Allegheny County Jail create barrier between waterfront and downtown.

Pittsburgh's New Jail Guilty of Urban Crime

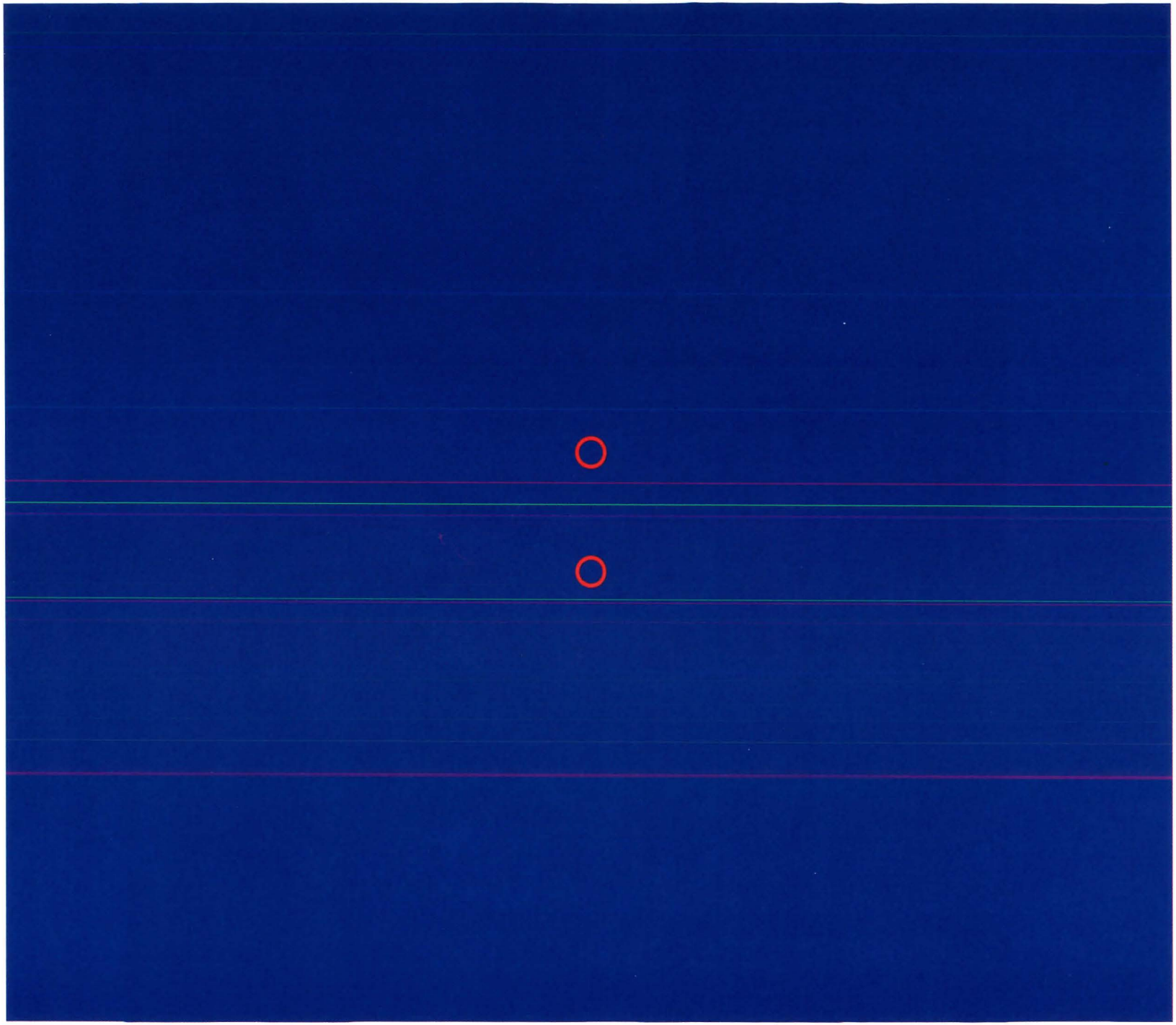
New riverfront towers at the edge of Pittsburgh's Golden Triangle offer the best of city living—units with sweeping views that are within walking distance of downtown amenities. They aren't luxury condos, however, but part of the new $147 million Allegheny County Jail. Located on a former rail yard along the Monongahela River, just east of Pittsburgh's city center, the building is designed by jail expert L. Robert Kimball Associates and architect Tasso Katselas Associates, a local firm that repeatedly secures the biggest county commissions despite a mediocre design portfolio.

Why build a jail on such a prominent riverfront parcel? The county allegedly chose the site because of its proximity to downtown and the existing Allegheny County Courthouse and Jail, a Romanesque landmark designed by Henry Hobson Richardson (1888), which will be renovated into new courtrooms.

A far cry from an architectural landmark, the new jail is a clumsy arrangement of chunky, different-sized brick towers perched on spindly *pilotis*. The towers surround a core of stepped offices sheathed in a black skin that looks more like a suburban spec office building than a public institution. A staggered pattern of tiny windows on each tower destroys any sense of scale: instead, the volumes resemble a series of truncated cheese graters.

Poor detailing aside, the jail perpetrates a more serious crime on the urban fabric of Pittsburgh. Recent attempts by the city to sensitively reuse the industrial remnants of its cityscape have been largely successful. Former steel mill sites have been transformed into high-tech research centers; abandoned warehouses and train sheds revamped into museums and entertainment centers; and waterfront parks planned. Meanwhile, the new 900,000-square-foot jail effectively severs downtown from the river and crowds a prime location with a punitive function.

Last month, things got even worse with the opening of the new $8.7 million municipal courthouse next door. Designed by local architect L.D. Astorino and Associates, the four-story courthouse is clearly meant to function in concert with the jail, but its green, granite-clad form bears no visible resemblance to its larger brick neighbor. Local officials may have intended to create an inspired correctional campus, but instead they have polluted Pittsburgh once again.—*Raul A. Barreneche*



New Museums Stimulate New Art

Architecture can be a catalyst, not just a container, suggests historian Victoria Newhouse.

Should museum architecture be a background or a foreground for its contents? Debate over this issue began as a whisper in the 1930s with noncommittal Modern buildings such as the Museum of Modern Art, and rose to a crescendo with the opening of Frank Lloyd Wright's dramatic Guggenheim Museum in 1959. Today, with museums such as Peter Eisenman's controversial Wexner Center at Ohio State University (below) and the Disney-inspired Groninger in the Netherlands (ARCHITECTURE, September 1995, pages 90-101), the discourse has turned into a pitched battle.

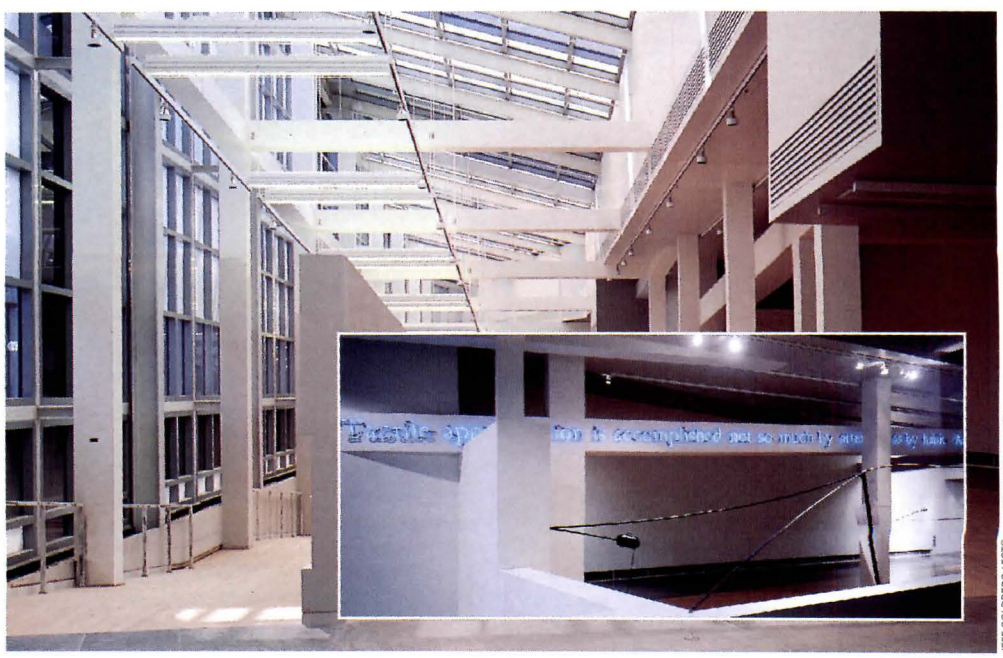
Contemporary museums must no longer be judged strictly as background or foreground architecture, but on the basis of unity with their contents. These new museums appear to follow the definition of environmental art that Germano Celant, curator of contemporary art at the Guggenheim, devised in 1975: "When an artist uses space not as a 'bed' for his work, but as an integral part of it." In other words, the new museums are conceived to show work that can interact dynamically with the architecture, in a relationship that reaches beyond the contextual role of Classical or Postmodern architecture. So intimate is the relationship between container and contained in these museums that the buildings stimulate new art.

This development began in the mid-1970s, when New York City-based artist and critic Brian O'Doherty, among others, started questioning museums' white-walled neutrality, which he called "ghetto space." Architects and museum directors began to feel that art should be seen as part of the world in which it was made, and that a complacent public should be provoked.

Museums' neutrality was first challenged by a Postmodernism based on historical precedents that reached maturity in James Stirling and Michael Wilford's Neue Staatsgalerie in Stuttgart (1984) and Venturi, Scott Brown and Associates' Sainsbury Wing of London's National Gallery (1991). The traditional elements of these Postmodern museums provided a visual context for all kinds of art: in the Sainsbury Wing's permanent galleries, for example, *pietra serena* columns, plinths, and arches create settings appropriate to the Early Renaissance collection on view.

The columns and beams of converted industrial lofts played a role similar to their Postmodern counterparts, but at an enormous scale equal to contemporary art. The interest in industrial adaptations was a response in part to the explosion of size, in part to the changing nature of art. Since the mid-1960s, new art forms have presented a new set of installation and storage requirements. Site-specific installation, performance, conceptual, video, and multimedia works all defy museum norms for dealing with art. Architects who continue to design a variety of traditional fixed, rectilinear galleries for temporary exhibits or collections being formed are not coming to grips with these new requirements.

The first of the unconventional new museums opened in 1989—Frank Gehry's Vitra Design Museum in Weil am Rhein, Germany, and Eisenman's Wexner Center for the Arts in Columbus, Ohio. Although



JEFF GOLDBERG / ESTO INSET: FREDRIK MARSH

RIGHT: Peter Eisenman's Wexner Center is better suited to site-specific art, such as Joseph Kosuth's neon text (inset), than to traditional collections.

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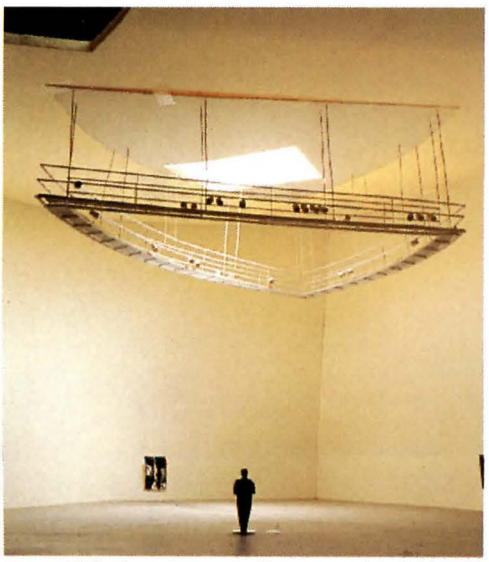
different in purpose and style, both buildings point to a new direction in museum design: highly articulated settings for artifacts with which the architecture interacts.

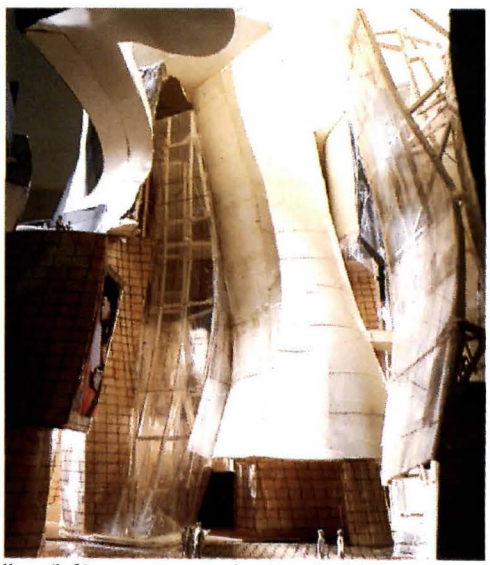
The Deconstructivist Wexner Center is a daring piece of urban design that links campus with city and the museum's architecture with adjacent buildings. Six years of operation have revealed that the Wexner is better suited to artistic experiment than to collecting. Conventional exhibitions are difficult, if not impossible, to show. A large expanse of gridded, glazed wall reduces the surfaces on which art can be hung, and the grid and view through it to the street distract from paintings installed on panels added to this wall. However, the museum has inspired remarkable site-specific works of art which can only be shown at the Wexner, among them Joseph Kosuth's "Ex Libris, Columbus (for W.B.)," a neon text attached to one of several horizontal beams that intersect the galleries. The Wexner works best for strictly environmental art, or when exhibiting artifacts that are custom-made for it.

If Eisenman's architecture is exclusive, Frank Gehry's is inclusive. It is difficult to imagine a work that could not be displayed to maximum advantage in Gehry's sculptural galleries at Vitra. Within each of three spaces—individually distinct yet opening into one another—every object comes alive in play with complex and unexpected forms and light. It is not surprising that traditional design displays seem inanimate when compared with Vitra's: a neutral museum setting can have a deadening effect on objects made for diversified interiors.

Gehry is applying a sculptural esthetic similar to Vitra's—but at a much larger scale—in his 240,000-square-foot Guggenheim Museum for modern and contemporary art in Bilbao, Spain, to be completed in 1997 (below). His plan to combine sculptural, Classical, and loftlike galleries presents a maximum number of possibilities for different types of exhibitions. This plurality of distinctive spaces designed in relation to specific art forms could prove to be the optimum solution for major museums in the future.

The four-part, multipurpose Groninger Museum in the Netherlands was intended by its former director, Frans Haks, and its chief architect, Alessandro Mendini, to provide a





JOSHUA WHITE PHOTOS

BILBAO: Gehry's spaces range from curved, voluminous gallery (left) to monumental atrium (right).

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playful experience. Eschewing what he considers the boring didacticism of most museums, Haks wanted an environment so different from visitors' expectations that they would be compelled to drop all preconceived ideas about what they see. Each of the museum's pavilions is designed by a different architect, but only the space by Coop Himmelb(l)au qualifies as part of the new trend in museum architecture. Like all the new museum buildings, this extraordinarily dynamic gallery requires creative curating. Wolf Prix, principal of Coop Himmelb(l)au, compares the space to an organ, noting, "You can't play it easily." But the extra effort will be well worthwhile.

Rem Koolhaas's Kunsthal in Rotterdam (ARCHITECTURE, September 1993, pages 86-89 and below), an outwardly simple glass-and-steel box, is not a museum, but a place for performances and exhibitions ranging from automobiles to fine art. Much has been written about the Kunsthal's unsettling intricacy, but in fact its unique ramp system is a model of clarity and orientation—Philip Johnson's two prime requisites for museum design. Spiralling up through the building's three levels, the continuous ramp propels the visitor on an unmistakable path. Koolhaas's manipulation of space, change of level, and transparent walls introduce what he refers to as a "culture of congestion."

Where Koolhaas confronts the visitor with the city's complexity, Steven Holl wants to exclude it. Holl describes his project for a contemporary art museum in Helsinki, to be completed in 1998, as a "neutral, serene" space that will unfold to provide "mystery and surprise." In 25 naturally lit galleries, the architect eliminates columns, moldings, window openings, and track lights. While the Helsinki museum's galleries appear close to the neutrality of Modern architecture, Holl insists that his galleries will be "perspectival" and "silent, but not static." Hoping to inspire new art, he is even prepared to see artists drill through his pristine plaster ceilings and concrete floors.

Each of these museums is different from the others, yet all share common elements. With the exception of the Vitra and Helsinki museums, the spaces function more as *Kunsthallen* for temporary exhibitions than as museums for the collection and preservation of art. Storage is minimal, and the perennial problem of expansion is moot: in several cases, the siting of these buildings makes them virtually unexpandable.

With the Neue Staatsgalerie in Stuttgart, Stirling and Wilford provided the model for tying a museum into a community's circulation patterns. The Wexner, the Kunsthal, and the Groninger all follow this model, plugging these museums into the pedestrian life of their cities. In Bilbao, the Guggenheim will be the centerpiece of the city's riverfront redevelopment plan and is expected to become a major tourist attraction,

BOB GOEDEWAAGEN PHOTOS

KUNSTHAL: Movable partitions adapt Koolhaas-designed gallery to old masters (left) or modern art (right).

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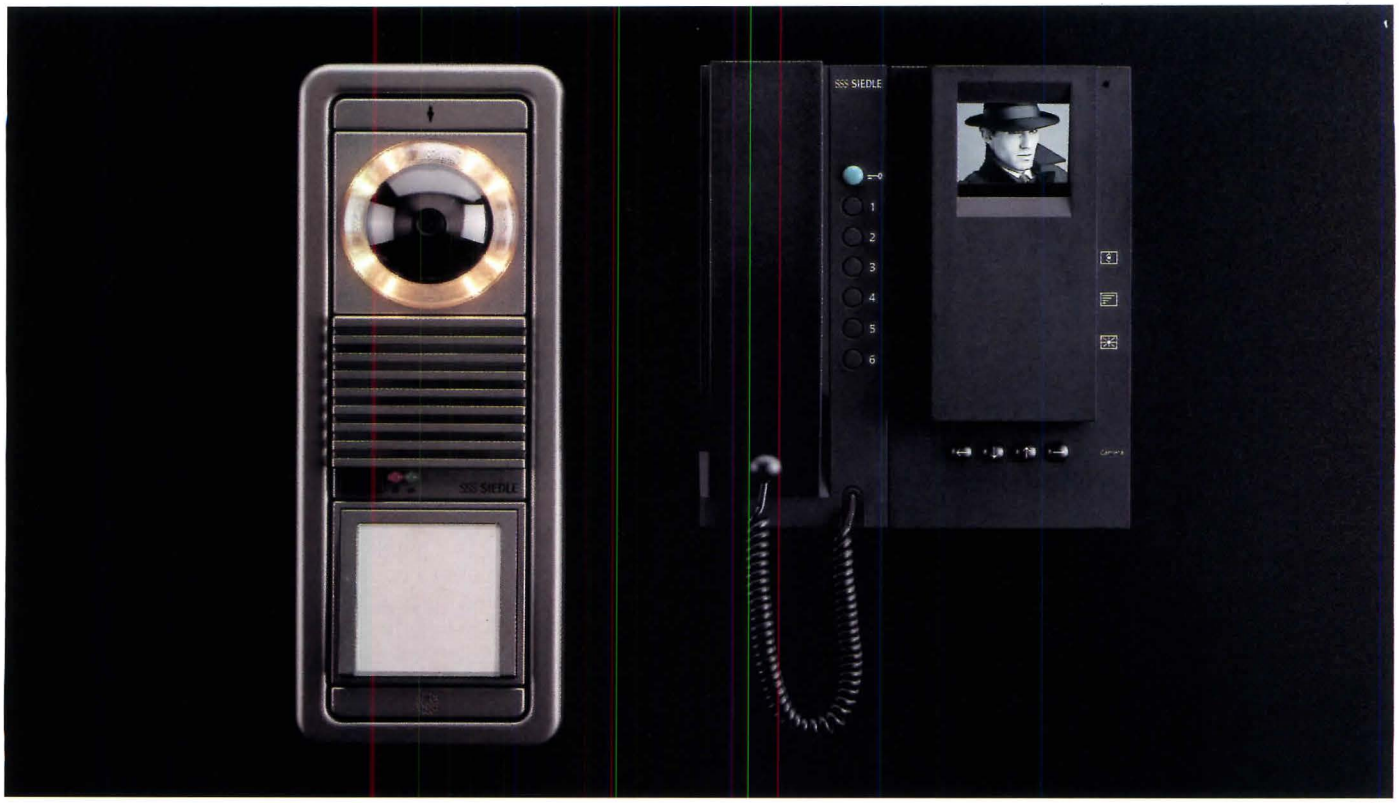

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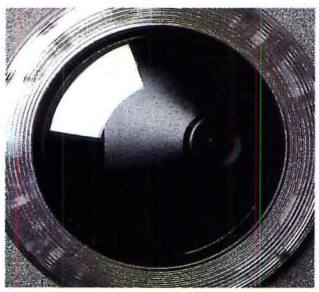

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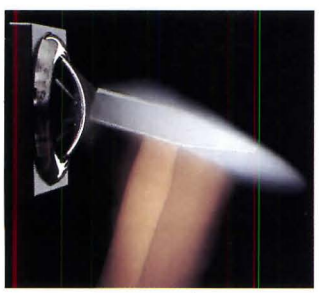

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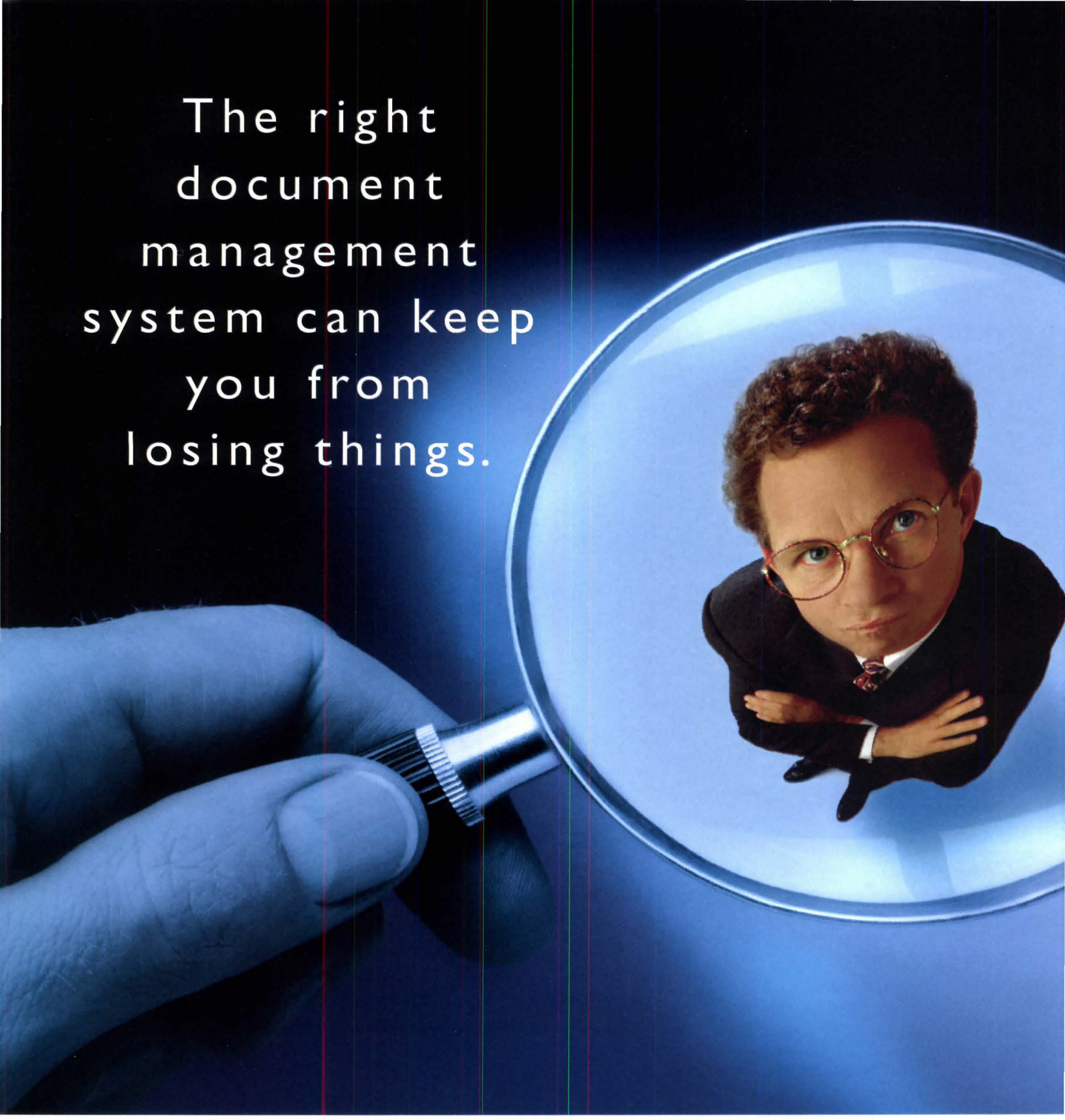
as both the Kunsthal and the Groninger have.

In its relatively short history, the art museum has come a long way, from a palatial institution intended solely for the contemplation of art to a place where educational, social, and commercial activities have become increasingly important. In the course of these changes, museum architecture has often suffered. Some museums, such as New York City's Metropolitan Museum of Art, have been expanded to a point where the original architecture has been obliterated: there is no longer a sense of style, place, or procession. Others, such as the Louvre in Paris, now seem more like shopping malls than museums. The new museums often play roles of tourist attraction, urban renewal anchor, substitute for a collection, and a draw for funding, all of which require high-profile architecture and accessibility. Both are positive attributes, provided they are not so overemphasized as to trivialize the art experience.

But the most significant shared trait of the new museums is the idea that museum design can become a catalyst for new art. For the first time in its 200-year-old existence, this building type is looking back to the kind of intimate relationship between disciplines that flourished in the Baroque period, exemplified by Giovanni Bernini's "The Ecstasy of St. Teresa" in the Coronaro Chapel in Rome, which unifies sculpture, architecture, and painting techniques.

The profoundly serious intention of new museum architecture to provide environments uniquely suited to today's art forms, and its stunning success in achieving that goal, are a powerful safeguard of the museum's future. It is easy to focus on the difficulties presented by designs such as the Wexner or the Groninger, but artistic innovation is always difficult. Often what appear to be the most daunting innovations provide the most rewarding results.—*Victoria Newhouse*

Victoria Newhouse is the author of Wallace K. Harrison, Architect *(Rizzoli, 1989).*



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That's Edutainment

Education and entertainment are drawing closer together in new interactive museums.

Cities seeking secure economic futures are banking on a combination of education and entertainment to attract people back downtown. As shown in this issue, new multisensory, interactive museums are the latest examples of the "edutainment" trend, designed to teach Americans about culture, science, or technology—and, more importantly, entice them to return.

In Cleveland, for example, headphone-wearing visitors to the Rock and Roll Hall of Fame and Museum can listen to more than 500 rock-and-roll classics by merely touching a screen. Museumgoers at Akron's Inventure Place become inventors as they tinker with fiber optics, magnets, and lasers. And at the National Maritime Center in Norfolk, visitors fire digital torpedoes from the bridge of a virtual battleship after learning about the world's oceans.

Television plays an obvious role in these new edutainment facilities. Cable networks today, with more influence on global culture than ever before, are commissioning cutting-edge design to announce their prestige. Nickelodeon's new offices in New York City, for example, recreate the structure of a city with internal "streets" and "piazzas" intended to promote the exchange of creative ideas. And the Televisa network in Mexico City broadcasts entertainment's bold new image with a sophisticated shed attuned to the satellite age.


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Nick at Work

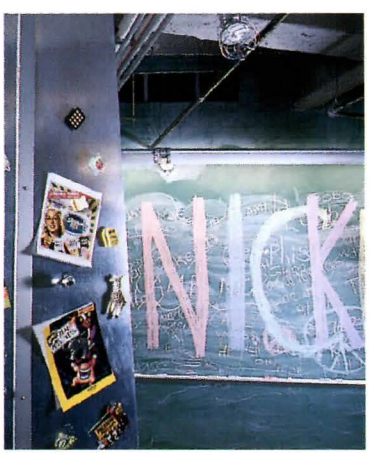
Nickelodeon Headquarters • New York City • Fernau & Hartman Architects

In the early days of Nickelodeon, the children's cable television network, four of the six employees shared an office so tiny that the whole crew had to vacate the room each time anyone needed to step out. Though far from ideal, those makeshift quarters of the early 1980s were a hothouse of creativity in which collaborative thinking thrived. "We had a very close family atmosphere when we were small," recalls Nickelodeon President Geraldine Laybourne, adding, "Our best ideas came out of the hallways and bathrooms; we've always made good use of basketball hoops, Ping-Pong tables, and places to just 'hang.' But the question was, how do you keep those qualities in a big space with over 250 employees?"

Today, Nickelodeon reaches more than 60 million homes, offering sitcom reruns on "Nick at Nite" and such spin-offs as films, toys, a magazine, and theme-park attractions. When the network enlisted Berkeley, California, architects Richard Fernau and Laura Hartman to design the interiors of its 120,000-square-foot New York City headquarters, the last thing the company wanted was a maze of traditional corporate offices.

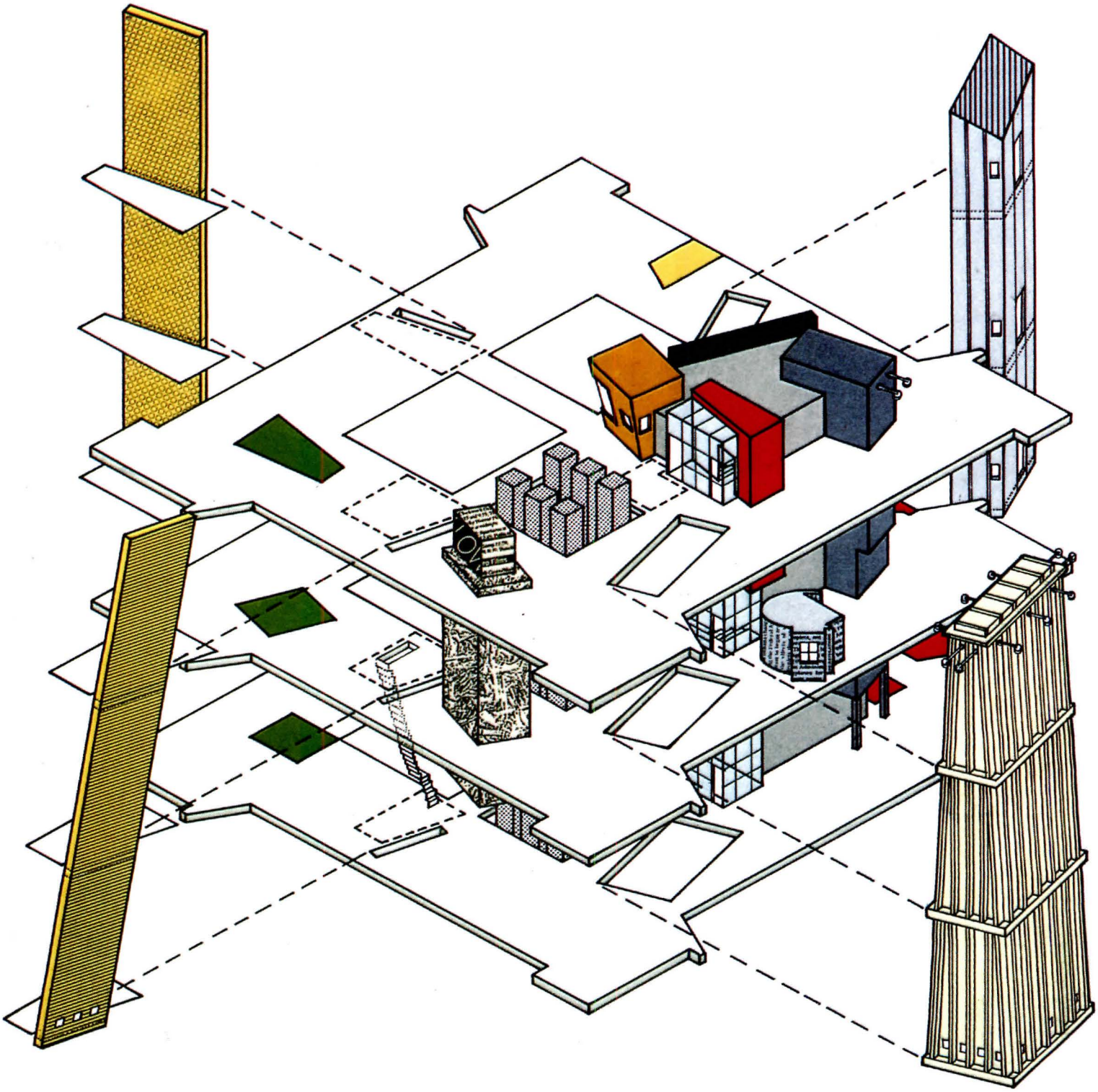
As Fernau & Hartman quickly realized, capturing Nickelodeon's lighthearted spirit was essential, but the greater challenge lay in designing an environment that would inspire spur-of-the-moment brainstorming. "The biggest single issue," says Fernau, "was communication and connection: between people, between departments, and also between spaces."

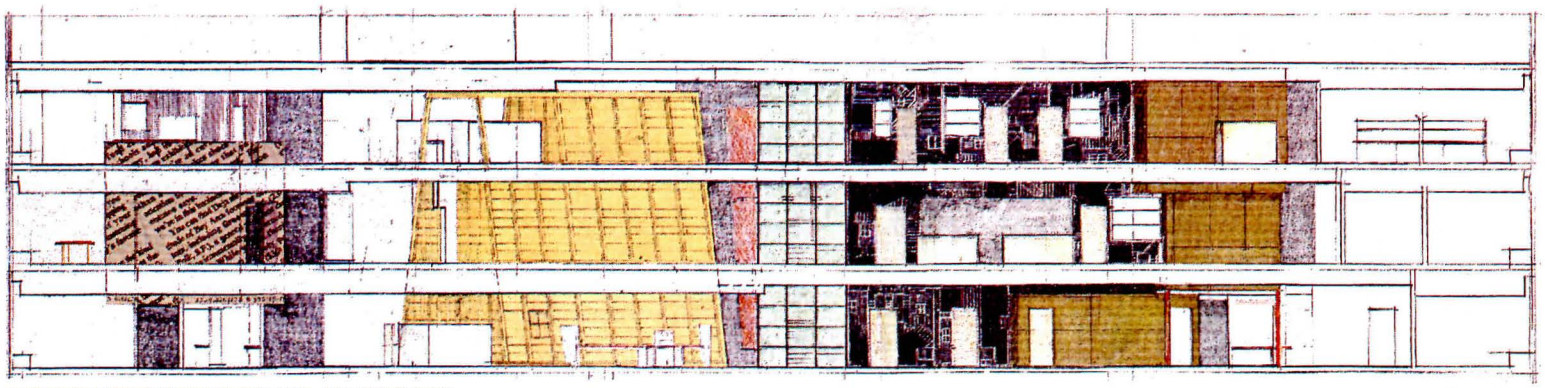
Though Nickelodeon occupies four floors of a 1970s high-rise near Times Square, the new headquarters breaks with conventional office design—or what Fernau dubs "the standard suburban model," in which commuters travel from the lobby to individual offices and rarely use the spaces in between. Instead, the architects favored a more urban approach, emphasizing public spaces where people from all walks of life (or job descriptions) might meet. In this newly democratized setting, the trappings of corporate hierarchy—corner offices for top honchos and windowless bull pens for support staff—are gone. Open work areas allot square footage and daylight by job function, not rank. Even Laybourne traded her 12-window office for a more open space and what she proudly calls "the smallest desk at Nickelodeon."



A collection of whimsical "buildings," containing a dazzling variety of meeting rooms, punctuate the office areas. "We've provided more than 20

FACING PAGE: Nickelodeon's new headquarters is organized around communal spaces such as Mediaplatz, bordered by chalkboard wall (right) and galvanized sheet metal of Refrigerator Tower (left). Multiple monitors play Nickelodeon's television programs; props appear in showcases throughout headquarters. **TOP:** Kids await auditions on wooden bleachers in 38th floor's reception area; reception desk features perforated steel with slate countertop. **ABOVE:** Chalkboard wall is popular message center.



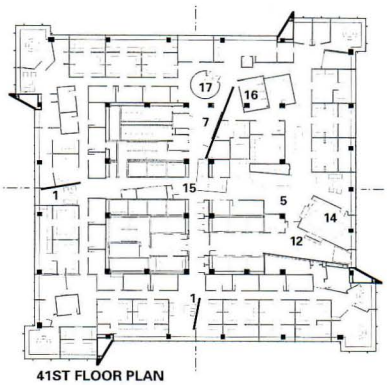


EAST-WEST SECTION THROUGH 37TH, 38TH, AND 39TH FLOORS

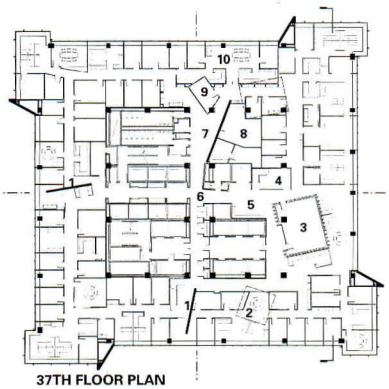
10'/3m

38TH FLOOR PLAN

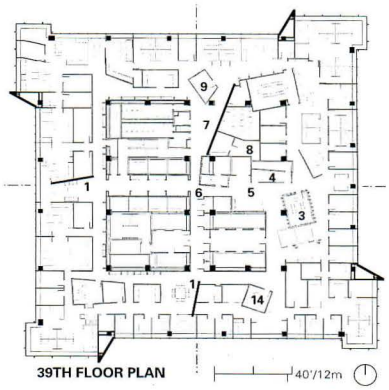
1 PIN-UP FIN WALL
2 NICK JR. LAB
3 CRATE
4 STAIR CORNER
5 PIAZZA DEL POPOLO
6 HISTORY CORNER
7 MEDIAPLATZ
8 NICK BUILDING
9 REFRIGERATOR TOWER
10 NICK AT NITE LIVING ROOM
11 INSERT STAGE
12 RECEPTION AREA
13 LIBRARY
14 CONFERENCE ROOM
15 NICK BILLBOARD
16 CHILLER
17 TANK



41ST FLOOR PLAN



37TH FLOOR PLAN



39TH FLOOR PLAN

40'/12m

conference rooms—all different in size and scale, closed and semi-closed—suited to many kinds of meetings," explains Fernau. "The trade-off for fewer closed offices is more conference rooms."

Frequently washed with bright color, these miniature buildings are clad in such contrasting materials as perforated aluminum, strandboard, papier-mâché, lithography plates, stained plywood, and ribbed steel. The interiors range in character from the tiny Kontatsu room and its Japanese-style table hovering over a carpeted well, to family rooms with slouchy sofas, feet-ready coffee tables, and of course, TV sets. Shared by all employees, these amenities, along with libraries, pantries, and dubbing rooms, are distributed throughout Nickelodeon's four floors to maximize chance encounters.

Organized loosely along cross-axes, or "streets," each floor offers an unobstructed central route from east to west, enlivened by sunlight and views of New York City through windows at either end. In contrast to the disorienting double-loaded corridors of more typical office layouts, these pathways give "pedestrians" a horizontal frame of reference within the entire floor and the city beyond. More than just passageways, the corridors are veritable collages of surfaces primed for messages: cork, chalkboard, and magnetic metal alongside bill-plastered kiosks. Larger play areas, or "parks," christened with such fanciful names as Piazza del Populo (next to the café) and Mediaplatz (bordering the prop storage room and videotape library), further encourage spontaneous gathering and idea sharing.

FACING PAGE: Axonometric shows how architect's buildings-within-building design mimics urban plan. Metal-clad Refrigerator Tower rises to north (top right); wooden Crate stands to east (bottom right). **SECTION:** Floors are visually interconnected by Crate and fins. **PLANS:** Offices are loosely organized around cross-axes that give unobstructed views of city at either end of main east-west pathway.


EXIT
EXIT
EXIT
NICKELODEON
KID WASH

Four "cardinal landmarks" provide additional orientation points and reinforce visual connections vertically. To the east, the Crate, a truncated wooden pyramid visible through the two-story glazed stairway wall, gives the illusion of a single volume, or what Fernau calls "virtual penetration." (The Crate actually houses three stacked conference rooms with no multistory spaces.) At its base, the 644-square-foot Town Hall, with its glazed garage door, is the largest conference room and can flexibly accommodate an overflow audience.

To the west and south rise two distinct four-story pin-up walls, or "fins." The southern fin, intended as a backdrop for "pitch" presentations, literally pitches eastward. To the north, individually stacked dubbing rooms form the Refrigerator Tower: cooled within, clad in metal, and ready for notes and snapshots hung with alphabet magnets. At a more central location, the History Corner comprises a vertical continuum of showcases on every floor, displaying props and other artifacts from Nickelodeon's TV shows, as well as the company's consumer products and staff-concocted playthings.

In departmental work areas, Fernau & Hartman designed for each division's idiosyncrasies. "Nick at Nite," for example, was given a suburban home layout straight from a sitcom, with dining and living areas befitting the staff's collection of 1950s furniture and TV sets. In contrast, "Nick Jr.," the network's preschool programming division, offers a kid-scaled room with crawl-through access for relaxed meetings with the youngest members of Nickelodeon's audience.

While Nickelodeon transformed itself spatially, the company simultaneously restructured itself within a larger strategy to decentralize management. The changes are recent and the paint still fresh, but so far the new arrangement seems to be working. "At first," Fernau ad-

FACING PAGE: Seen from staircase, pyramidal Crate appears to penetrate floor, but actually contains no multistory spaces. **TOP:** To suggest vertical continuity, Crate's 39th floor top is lit by overhanging fixtures, while 37th floor base (facing page) is uplit like monument. **ABOVE:** Curved conference room is clad in lithography plates from *Nickelodeon* magazine.

SCOTT FRANCES / ESTO

mits, "we had to run workshops on how to use the spaces in between, to get people to take ownership of spaces outside of their immediate work areas." As the company settles into its new headquarters, Laybourne already sees widespread signs of acclimation. In-house baseball scores and freeform doodles meander across the chalkboards. Enormous bouncing balls—some exceeding 8 feet in diameter—lie in casual clusters like giant orange, blue, and yellow gumballs. Someone has even painted cartoon ants crawling up an interior windowpane. "And as for myself," says the now more accessible Laybourne, "I feel like I've come out of retirement, like I have a new lease on life....My staff is letting me play with them again."—*Sarah Amelar*

Sarah Amelar is an architect and writer based in New York City.

NICKELODEON HEADQUARTERS
NEW YORK CITY

ARCHITECT: Fernau & Hartman Architects, Berkeley, California—Richard Fernau, Laura Hartman (principals-in-charge); David Kau (project architect); Turk Kauffman, Scott Donahue (design team); Geoff Holton, Sarah Cunniff, Susan Stoltz, Erica von der Heyden, Chat Chuenrudeemol, Keith Dubinsky, Ariel Dunkel, Tania Davidge (project team)
ASSOCIATE ARCHITECT: Kohn Pederson Fox Interior Architects, New York City—Johnny Rodland (project architect)
ENGINEERS: Leichtman and Lincer (structural); Flack + Kurtz (mechanical, electrical, plumbing, and lighting)
CONSULTANTS: Shen Milsom & Wilke (acoustics)
GENERAL CONTRACTOR: Lehr Construction
COST: Withheld at client's request
PHOTOGRAPHER: Jeff Goldberg/Esto, except as noted

SCOTT FRANCES / ESTO

TOP: Metallic paint over wallboard gives conference room a red glow. Ramp-and-stair system with metal grating leads to Nickelodeon On-Line division, raised on access floor for cabling flexibility. **ABOVE:** Library features desks that fold into wall like Murphy beds. **FACING PAGE, TOP:** Dropped ceilings distinguish departments *from public* spaces. **FACING PAGE, BOTTOM:** Mock control booth serves as office for director of On-Line division.


EXIT

Reinventing Akron

Inventure Place • Akron, Ohio • Polshek and Partners Architects

Akron, Ohio, was once the tire capital of the world and a bustling regional center. Today, its massive factories stand like sepulchral sentinels at the edge of downtown. But Akron hasn't yet gone the way of Detroit. Updating its industrial heritage, the city has targeted high technology as the engine to revive its flagging economy, crowning itself the "Polymer Capital of the World." A recent example of this effort is a gleaming new complex built by the University of Akron for the research and development of polymer science. Hoping to entice collateral business into the area, downtown boasts a new convention center, and high-tech corporate tenants are even giving some of the tire halls a retread. Now, on a hilltop site overlooking the railroad and the university, Akron has unveiled the cultural component of its campaign.

Awkwardly billed as Inventure Place, the striking addition to downtown is a 77,000-square-foot museum for the National Inventors Hall of Fame. Akron won the facility in a national search in the 1980s, after the Hall outgrew its Washington, D.C., home. Tax and funding incentives, a grassroots public-relations campaign led by citizenry, and last-minute lobbying by local industry titans convinced the Hall of Fame that Tire Town was the place to be.

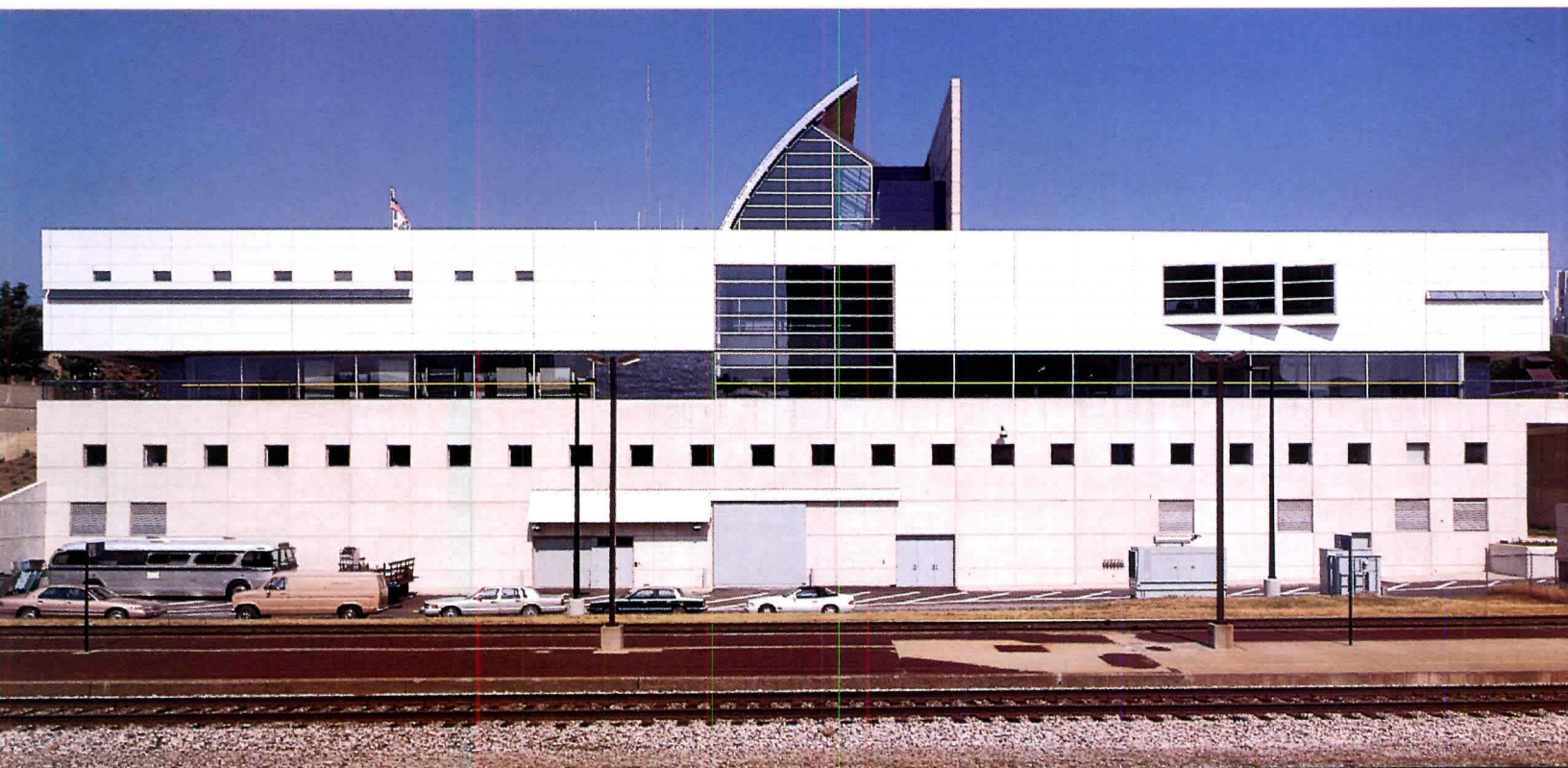
Ohio is fast becoming the Hall of Fame of Halls of Fame: among Cleveland, Canton, and Akron, there are now three such institutions. However, while Cleveland's Rock and Roll Hall (pages 86-91, this issue) and Canton's Football Hall do little more than pander to popular culture, Inventure Place charts a more cerebral course. Akron's new museum seeks to gather the history, spirit, and act of invention into a single facility, and it succeeds by harnessing design, entertainment, and education to the vehicle of exploration.

Designed by Polshek and Partners, Inventure Place looks less like a museum and more like a stainless steel sail billowing gently over a large plaza, with a smooth metal skin that pulls sunlight out of Akron's cloudy skies. It is actually two museums in one: the Inventors Hall of Fame and the Inventors Workshop, described in its literature as "a variety of exhibits where you are the inventor." Design Principal James Polshek, born in Akron and designer of the city's new convention center, turned the bifurcated program into a design conceit, separating the narrative Hall of Fame from the participatory Workshop. The former occupies the sail; the latter slides under the plaza.

The composition is completed by a low-slung, bar-shaped building. Housing the museum's offices, restaurant, and gift shop, it sits perpendicular to the sail along the eastern side of the public plaza. This sleek horizontal block wears a tight white metal skin with rushing horizontal striations that recall the railroad track just behind it. Along with the outsized, Erector-Set-like signage tower that anchors the plaza's leading corner, the metal skin and multimullioned glazing herald a Neo-Constructivist language that Polshek employs to great advantage throughout Inventure Place.

ABOVE: Inventure Place anchors Akron's downtown redevelopment, bridging the city's university and government center. Bar-shaped volume houses restaurant, gift shop, and classrooms. **FACING PAGE:** Dramatic stainless steel sail gives Inventors Hall of Fame a strong presence on Akron skyline. Tower sign introduces Polshek and Partners' motifs of structural expressionism; blue slab contains mechanical and circulation core.


INVENTURE PLACE
University Ave
QUAKER SQUARE

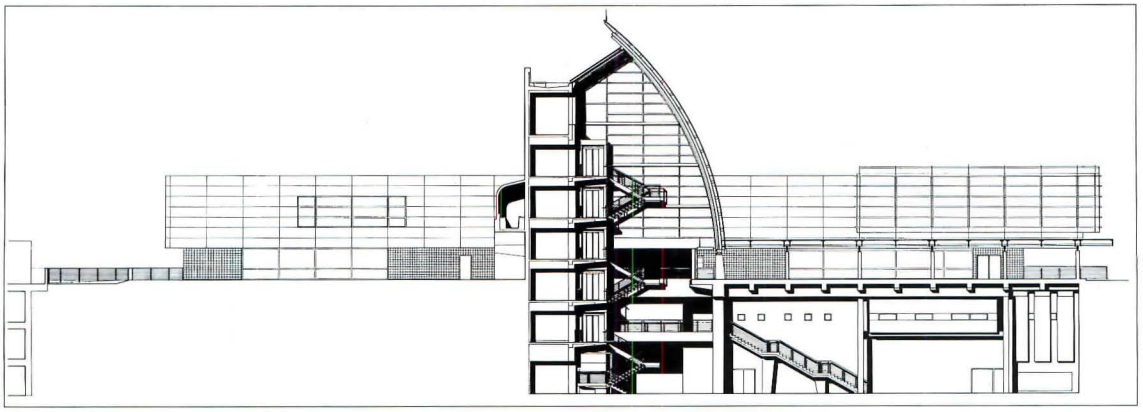


This desire to unwrap the mystery of the structure, to let visitors figure out how the building is made, parallels exactly the mission of the museum itself. "Our focus here is on ingenuity—on getting people to think inventively, understand how things work, and then, we hope, do something wonderful with that," explains Inventure Place's Executive Director Stephen Brand. "The building is part of that process."

The sail sets the stage: a vigorous, sweeping homage to technology, its stainless steel skin lashed in place by external trusses riding down along the facade. The arc rests on beefy, pin-jointed capitals sitting atop truncated columns that disappear into the plaza, only to reappear inside the Workshop below. The columns form an arcade along the glazed lower portion of the sail, which leads to the point where the vaulted form intersects the bar building. The museum's understated entrance lies at that perpendicular connection. No sign directs visitors to the door, and the apparently casual approach is actually deliberate. Throughout the museum, Polshek reinforces program with circulation: the entry is meant to gently suggest discovery.

Once inside, the circulation changes with the character of each part of the building. The Inventors Workshop is loose and unstructured, but in the Hall of Fame, organized as a timeline, circulation is tight and directed. Visitors ascend a single escalator to the top of the sail, then view exhibits lining the stack of five partially cantilevered floors while they descend via dramatically cantilevered stairs. Profiled chronologically along the narrow floor plates are inventors ranging from Elisha Otis and Edwin Land to Charles Goodyear, whose rubber vulcanization process once bounced Akron to the industrial forefront. From the edge of the display, guests can peer into the atrium created by the arcing southern facade of the sail.

FACING PAGE, TOP: Escalator to Hall of Fame from lobby is expressed against shear wall; garden occupies future site of theater. University is visible in background. **FACING PAGE, BOTTOM:** Active railroad tracks to west are echoed in horizontal articulation of building's facade. Concrete base contains Inventors Workshop, storage, offices, and exhibit fabrication area. **TOP:** Glazed dining room projects from service building (right); narrow slot between sail and service building leads to understated main entrance. **ABOVE:** Canopy leading to entry shields gift shop's windows.



NORTH-SOUTH SECTION

20'/6m

That view, and the wall of noise accompanying it—rock music, clanking machines, electronic bleats, and the delighted shrieks of children—produces a vertiginous and giddy pleasure: hanging in space on the beautiful cantilevered staircases, watching people milling and playing 100 feet or more below, feeling as well as hearing the rush of sound. Fingers tingle, the mind works, and it is hard to decide whether to spend more time with the inventors or rush down to the Inventors Workshop to become one.

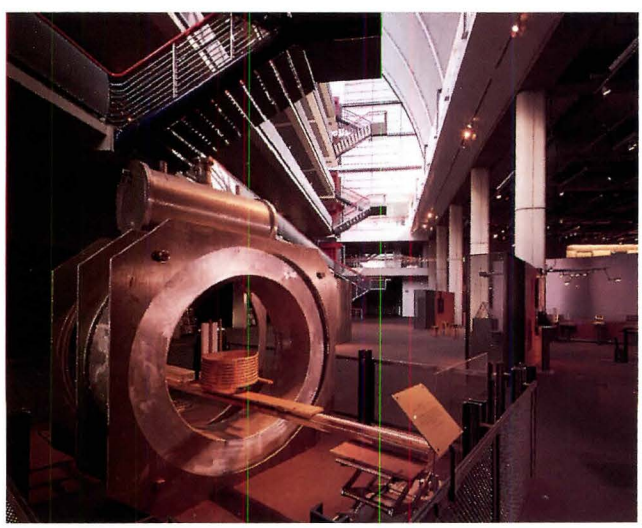
The Workshop is an irresistible 20,000-square-foot playground of interactive toys and gadgets designed by educational exhibit-makers Hands On! to kindle imagination in visitors of all ages. Scattered loosely across the subterranean concrete box, the exhibits resemble unfinished Saturday-afternoon projects in someone's garage. The allusion is purposeful, a fond nod to the history of backyard tinkerers.

The garage is also a Modernist architectural classroom. Rigorously ordered mechanical, electrical, and plumbing systems hang from the ceiling; above, at the sail's east and west ends, fritted glazing demonstrates properties of transparency and translucency. The concrete structural system is expressed. Even the elevator is a teaching tool, with its glass cab, exposed mechanicals, and witty see-through control box which is a wonderful mess of wires, lights, and circuits—a Workshop product that has made its way into immediate service.

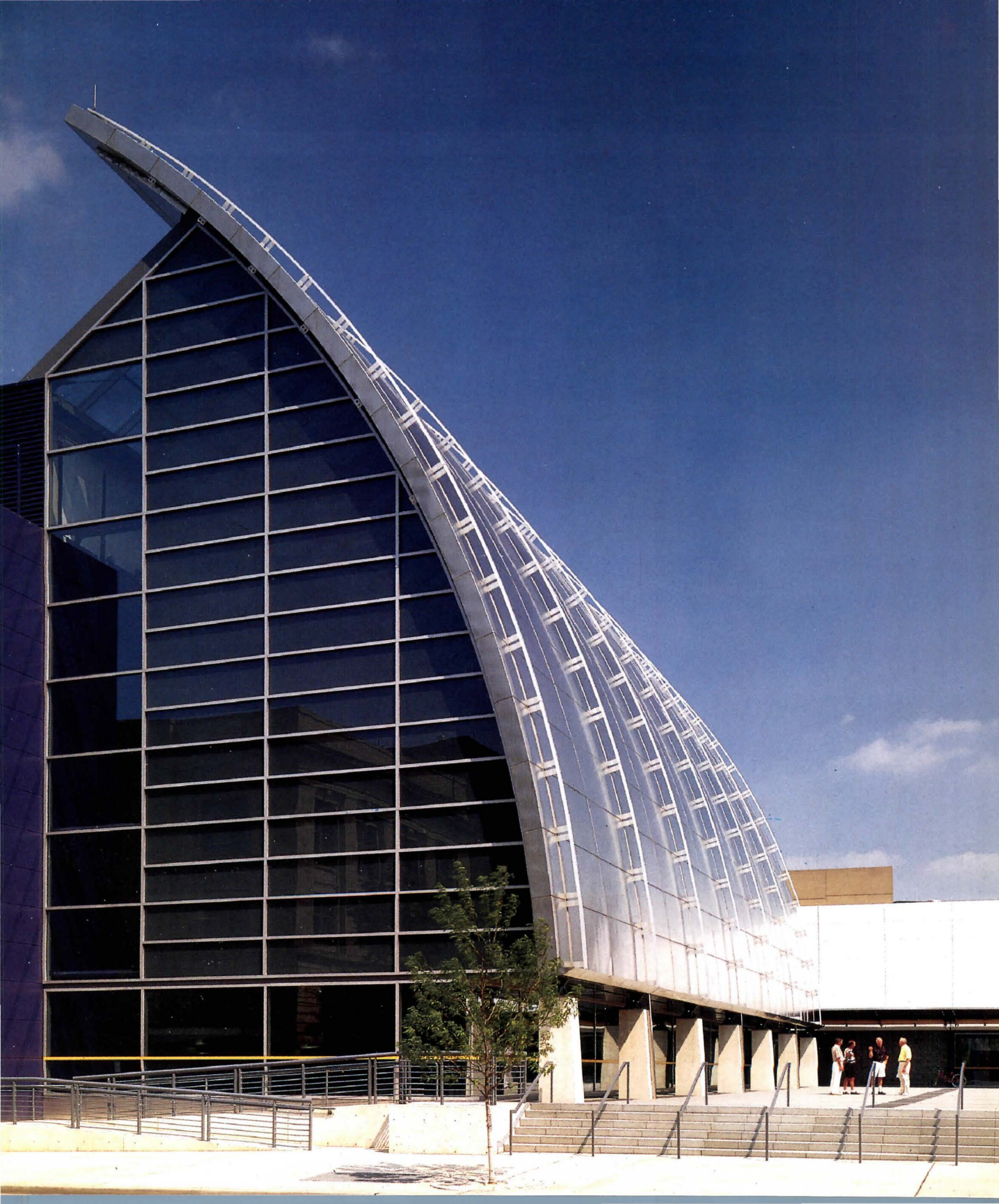
The elevator is one moment of humor among many that keep the educational building program from becoming overly didactic. It is also emblematic of the museum's integrative nature. Due to managerial changes among the project's promoters, Polshek and Hands On! were given extraordinary leeway in developing the building's program. As a result, the transition between exhibits and architecture is all but seamless, assisted by the flexibility of the building's Neo-Constructivist esthetic, which allows Polshek to express programmatic and structural layering through sculptural assembly.

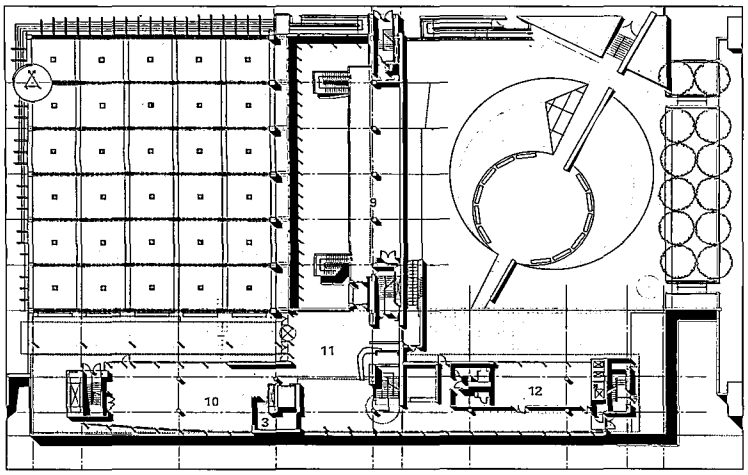
The vaulting, iconographic sail is the symbolic center of the complex; the utilitarian bar, its functional and visual foil. The two slide through each other, locking a blue box of services into an articulated shear wall. Like a brightly colored set of children's building blocks, each of the programmatic elements reads clearly.

Though mannered, the language has a logic. Inventure Place is a museum about mechanical inventions, and thus the building is mechanistic in its materials, in its celebrations of structure and connectivity, and in its program-expressive massing. It extends the agrarian

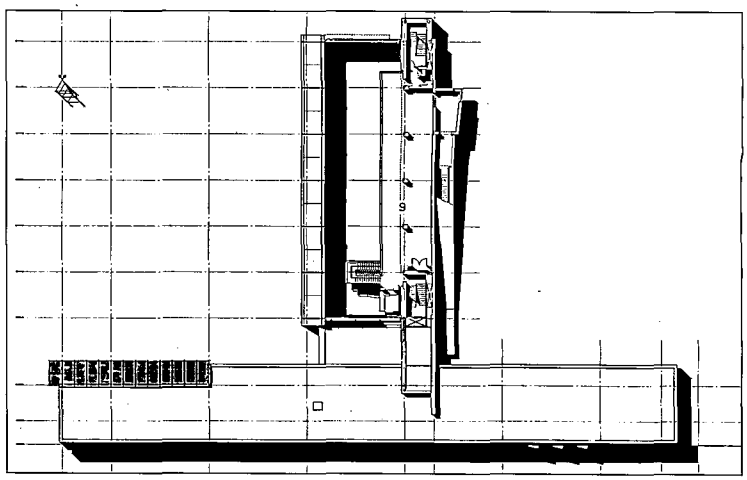


SECTION: Hall of Fame, stacked inside sail (center), projects into atrium rising full height of building; escalator leads to interactive Workshop in basement (lower right). **ABOVE:** Early magnetic resonance imaging (MRI) device is one of many technological innovations displayed in Workshop on atrium floor. **FACING PAGE:** Fritted and transparent glazing at ends of sail illustrate properties of translucence while daylighting atrium space. Inventors Workshop resides beneath public plaza (right).

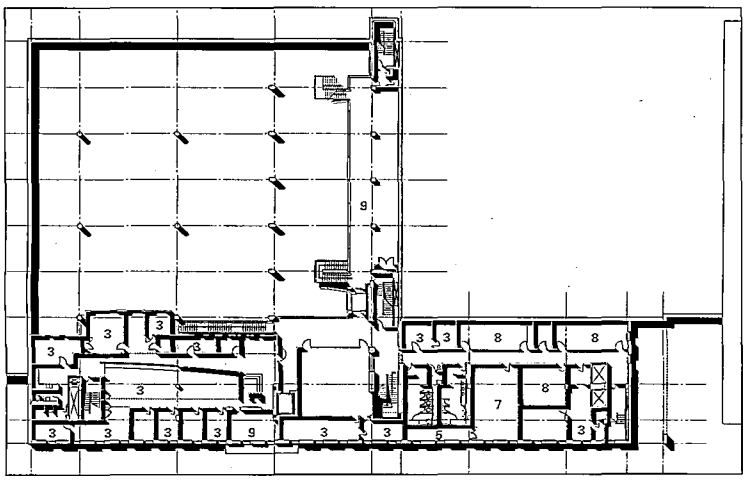




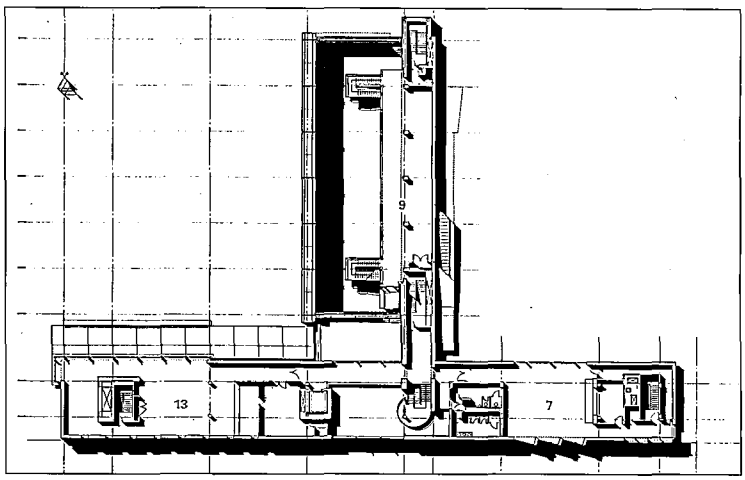
GROUND FLOOR PLAN



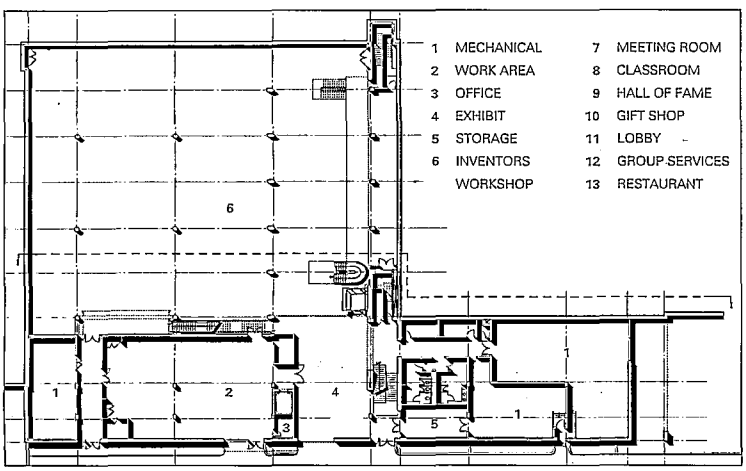
TOP FLOOR PLAN



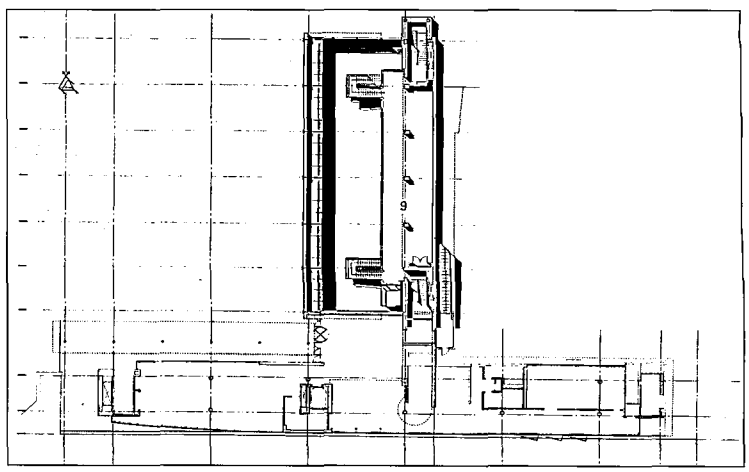
FIRST BASEMENT PLAN



SECOND FLOOR PLAN



SECOND BASEMENT PLAN



THIRD TIER PLAN

40'/12m

FACING PAGE: Floor plates of Hall of Fame are cantilevered and tapered at their edges; staircases are then cantilevered further out into atrium sail (Details, last page of this issue). System of sound-absorbing white panels lining inside of sail can double as projection screen. Atrium is daylit from skylight at top and glazed walls at east and west. PLANS: Exhibit fabrication area and double-height Workshop occupy basement (bottom left) inserted beneath plaza (top left); Hall of Fame is housed on five tiers overlooking atrium. Garden on ground level is future site of theater.

and industrial structures that Polshek labels "folk" architecture: warehouses, hangars, and silos. The timelessness of these American icons inspires Inventure Place and lends it authority.

The project's only clear shortcoming is its public plaza. Although the building defines the space clearly, it then turns inward, offering little more. The plaza becomes a 14,000-square-foot void, a vacant, arid counterpoint to the inventive architecture surrounding it.

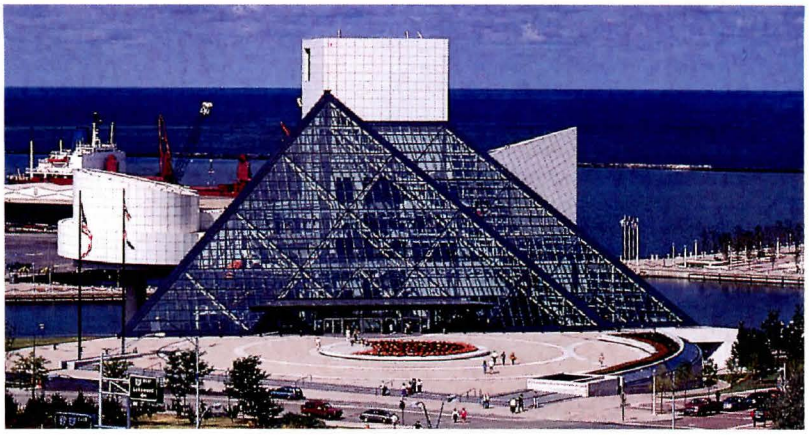
Yet the symbolic value of Polshek's open space is not lost. Akron wants to revive itself, and education, research, and invention are the catalysts by which it intends to ignite the process. The University of Akron and its high-tech polymer research center are located just over a bridge from the museum. Inventure Place is their civic analogue, a place to understand the mysterious processes leading to scientific, economic, and cultural advances. The plaza links the three, creating an important gateway in downtown—one through which Akron views its university and its future.—*Reed Kroloff*

INVENTURE PLACE, HOME OF THE NATIONAL INVENTORS HALL OF FAME
AKRON, OHIO

ARCHITECT: Polshek and Partners Architects, New York City—James Stewart Polshek (design principal); Joseph L. Fleischer (principal-in-charge); James G. Garrison, D.B. Middleton (senior designers); Don Weinreich (project architect); Jihyon Kim (technical coordinator); Joanne Sliker, Gaston Silva (project managers); David Sherman, Charles Wolf (design team); Steven C. Peppas, Denis Dambreville, Mark Lowe Fisher, Jong R. Hahn, Darius Sollohub, Craig Spiegel, Lori Sacco (project team)
ASSOCIATE ARCHITECT: TC Architects, Akron
EXHIBIT DESIGNER: Hands On!
LANDSCAPE ARCHITECT: URS Consultants
ENGINEERS: Ove Arup & Partners (structural); Byers Engineering (mechanical); Kucheman, Peters and Tschantz (electrical); URS Consultants (civil); R+R International (soils)
CONSULTANTS: Calori & Vanden-Eynden (graphics); Synergy Consultants (lighting); Jaffe Holden Scarbrough (acoustics)
GENERAL CONTRACTOR: Welty Building Corporation
PHOTOGRAPHER: Jeff Goldberg/Esto

TOP: Workshop houses interactive displays, machines, and gadgets placed loosely throughout subterranean, garagelike concrete box. **ABOVE:** Hall of Fame features timeline of inventors and U.S. patents (right) with specialized exhibits (center). **FACING PAGE:** Exhibits designed by Hands On! use architectural materials and finishes. Carefully ordered mechanical and structural systems transform building into museum exhibit.


DUKE ELLINGTON



Modern Medley

Rock and Roll Hall of Fame and Museum • Cleveland, Ohio • Pei Cobb Freed & Partners

Rock music fans gained a new pilgrimage site on Labor Day with the opening of the Rock and Roll Hall of Fame and Museum in Cleveland. Designed by I.M. Pei, the $92 million, 150,000-square-foot building has become something of an instant landmark.

Even so, the Rock Hall, as it is known locally, is less than a masterpiece. The building performs well as a photogenic environmental sculpture and a symbol of Cleveland's new image as a Rust Belt city on the rebound. But it looks better in postcards, in magazines, and on television than it functions as a museum. Originally designed for a site overlooking the Cuyahoga River behind the Terminal Tower complex, the project was later moved to the Lake Erie waterfront on the north flank of downtown, where it inspires little sense of a relationship to its surroundings.

The Rock Hall's location at Cleveland's north coast harbor also poses a challenge for visitors. Close-in parking is scarce, and the hike from downtown will be uncomfortable in bad weather and downright harrowing during the notorious midwestern winters.

When attendance is heavy, negotiating the museum itself will be difficult. Pei designed much of the building before the exhibit areas were created, and the exhibits then had to be squeezed inside the areas assigned to them. As a result, the Rock Hall's interior is filled with choke points that make long lines inevitable well before the building reaches its maximum occupancy level of 2,500 visitors. The museum is selling timed tickets to ameliorate the problem.

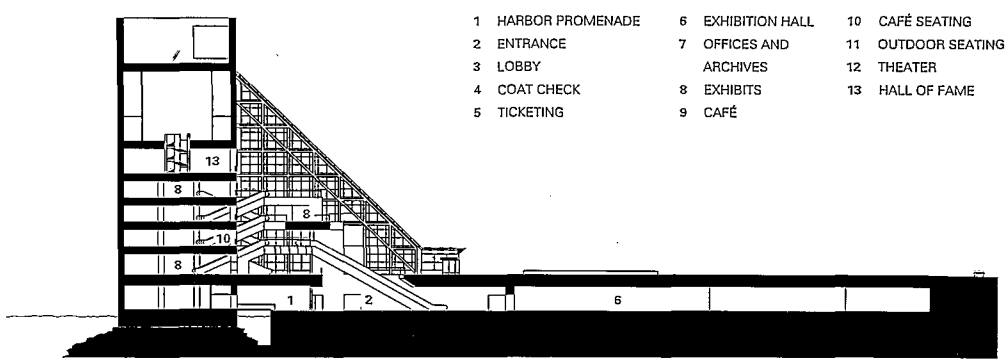
Pei's design centers on a 167-foot-high tower anchored on a concrete foundation at the edge of the lake. The squarish tower is clad in a grid of 4 1/2-by-4 1/2-foot, 5/32-inch-thick aluminum panels. Cantilevered exhibit areas burst from the tower in an attempt to represent rock music's explosive energy: one, a flaring trapezoid, juts over the water like a giant loudspeaker; the other is shaped like a drum on a stand, with its top sliced at a rakish angle.

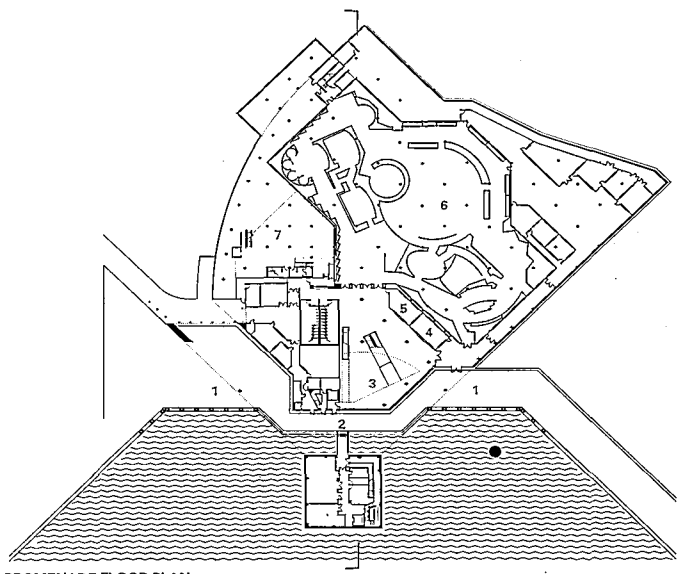
The main entrance and lobby are enclosed within a triangular glass tent, fastened to the tower like a lean-to, which is constructed of steel pipe columns and bow trusses supporting a low-E glass system. The principal museum area lies below the entry-level plaza that functions as a forecourt to Pei's signature triangle.

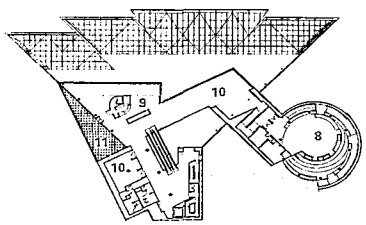
The exhibits, designed by The Burdick Group of San Francisco, are an educational and entertaining nostalgia trip. Display areas are dense with text panels, recorded music, movies, video displays, interactive computer exhibits, and mannequins sporting everything from John Lennon's Sergeant Pepper uniform to a leather jumpsuit worn by Elvis.

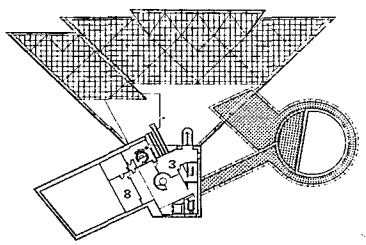
The visitor's path leads from the cavelike main exhibit area at the base of the building, up escalators and stairs to progressively smaller displays on the floors above. As the floors shrink in size, the crowding

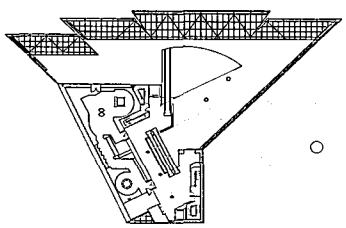
FACING PAGE: Sited on Lake Erie, Rock and Roll Hall of Fame centers on circulation tower from which exhibit areas are cantilevered. Building is clad in painted aluminum panels mounted on steel frame. **INSETS:** Bridges connect drum-shaped exhibit area (left) to tower and glass-enclosed lobby (right). **ABOVE:** Pei's pyramid faces south toward Cleveland.

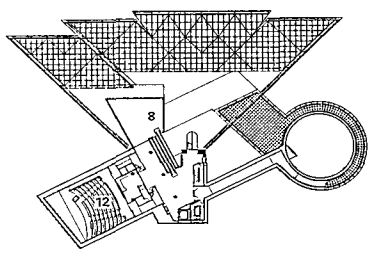












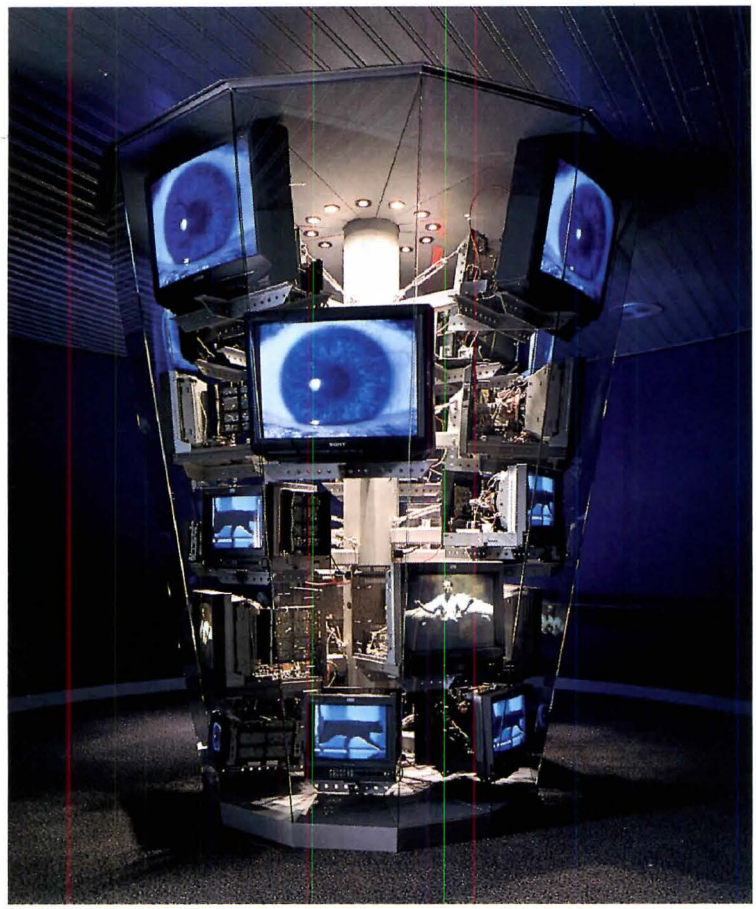
and long lines tend to increase. The actual Hall of Fame occupies a small, dark, cubic room atop the tower, in which inductees' signatures glow like neon in laser-etched glass. The room is heavy-handed and lugubrious compared to the upbeat exhibits below.

The Rock Hall's darkened exhibit spaces contrast sharply with the public spaces, which treat visitors to dramatic views of terraces and overhangs flooded with light from the leaning wall of glass overhead. Pei originally planned for the building's interiors to be clad in painted aluminum panels, but in the end, drywall was substituted to cut costs. The experience of gliding up one of the Rock Hall's nine escalators can be exhilarating. But the heavy tubular steel trusses of the glass tent—engineered to withstand lakefront winds up to 150 miles per hour—weigh down heavily on the interior and create an unpleasant sense of compression, an effect akin to being pressed up under the skylights in Pei's National Gallery East Wing.

Pei claims the building's design represents his response to rock music—an art form that the 78-year-old architect has admitted he knew little about and liked even less before the recording industry executives behind the project persuaded him to take the assignment in 1987. But rather than reflecting a new influence, the Rock Hall recalls several of Pei's past designs. The glass tent and tower configuration resembles an early version of the John F. Kennedy Library; the glass tent echoes the Louvre's glass pyramid; and the jutting exhibit areas recapitulate the blocky cantilevers of the Everson Art Museum. It's a medley of Pei's greatest hits, united in a clunky, awkward mélange. The monolithic, aluminum-clad forms facing north to the lake can be striking from some angles—especially when illuminated at night—but other views are dull and static.

Had it been built as part of the Terminal Tower complex, the Rock Hall would have been steps away from Cleveland's commuter rail hub and a major downtown shopping mall. It also would have acted as a dramatic foil to the Terminal Tower itself, a 1930s vintage Neoclassical skyscraper made famous by Margaret Bourke White's photographs of Cleveland's Depression-era skyline. Pei's building would have played a Modern David to the tower's Goliath—a juxtaposition nicely symbolizing rock music's rebellion against tradition.

FACING PAGE, TOP: Tubular steel trusses supporting glass tent (upper left) press down visually on the interior and obscure views of city. FACING PAGE, BOTTOM LEFT: Interior surfaces are finished in drywall to cut costs. FACING PAGE, BOTTOM RIGHT: Escalator connects entry to Rock Hall's main exhibits. PLANS: Floor levels decrease in size as building rises, causing gridlock in visitor traffic. SECTION: Cumbersome tower is united with entrance triangle.



At the harbor, the Rock Hall is merely an isolated object that stands out starkly against the horizon, turns its back to the lake, and angles away from the downtown skyline. Furthermore, the building's form suffered when Pei had to chop 35 feet from the tower in order to make it fit under the flight path of nearby Burke Lakefront Airport.

Cleveland, which has enthusiastically supported the idea of hosting the Hall of Fame since its inception a decade ago, eventually won the right to be the building's home by raising $66 million in public funds. The city's Regional Transit Authority is spending another $55.25 million to improve access to the Rock Hall's waterfront site with a new rail line that will link it to the Terminal Tower complex.

Those massive expenditures are predicated on the museum's potential to burnish the city's image and boost its economy by helping transform it into a tourism magnet. At a time when 40 percent of Cleveland's population lives in poverty and the city's failing school system has been taken over by the state, such an expense might seem questionable. Despite predictions that Pei's building will attract a million visitors annually, it will be years before it is known whether the Rock Hall was a wise investment.—*Steven Litt*

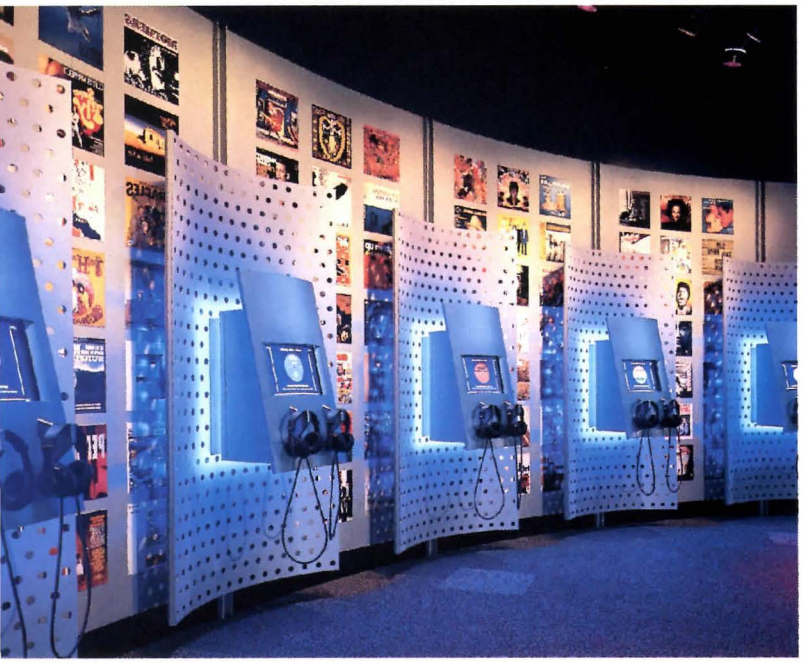
Steven Litt is the architecture critic for the Cleveland Plain Dealer.

ROCK AND ROLL HALL OF FAME AND MUSEUM
CLEVELAND, OHIO

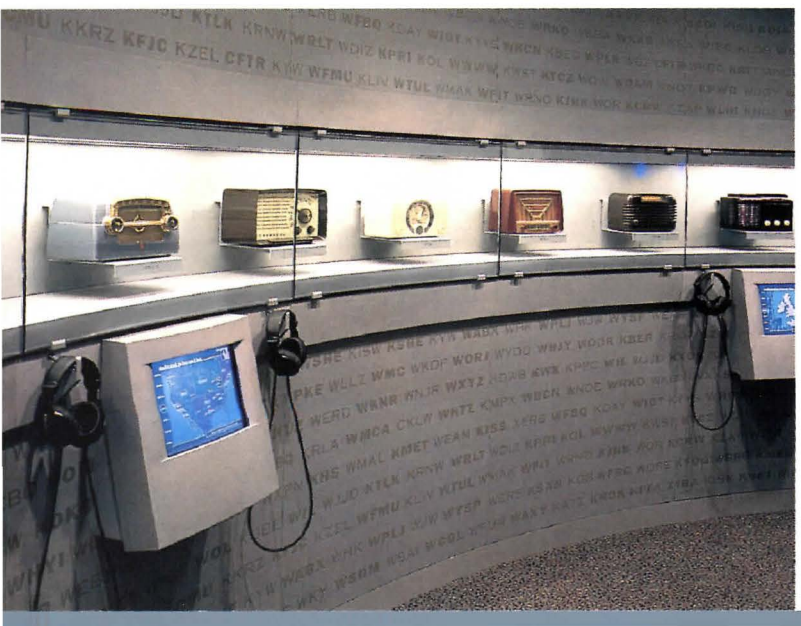
ARCHITECT: Pei Cobb Freed & Partners, New York City—I.M. Pei (designer); Leonard Jacobson, Michael D. Flynn (partners); Charles T. Young (associate partner); Richard Diamond, Jennifer Sage, Winslow Kosior, Richard Gorman, Andrzej Gorczynski, Craig Rhodes (senior associates); Christopher Rand (associate); Marianne Lau, Hope Dana, Steven Derasmo, David Dwight, Mahasti Fakourbayat, Kevin Johns, Sandra Lutes, Christine Mahoney, Gianni Neri, Krista Williams, Jean Christophe DuBois, Sophia Gruzdys (project team)
ASSOCIATE ARCHITECT: Robert P. Madison International, Cleveland, Ohio—Robert P. Madison (principal); Khai H. Lim (project management); Richard Franta (field supervision)
EXHIBIT DESIGNER: The Burdick Group
ENGINEERS: Leslie E. Robertson Associates (structural); Altieri Sebor Wieber Consulting Engineers (mechanical/electrical/plumbing)
CONSULTANTS: Knight & Stolar (landscape); Fisher Marantz Renfro Stone (lighting); Shen Milsom & Wilke (acoustics); Rolf Jensen & Associates (safety); Boyce Nemec Designs (audiovisuals); Alexander Isley Design, Calori & Vanden Eynden (graphics); Calvin Kort Associates (vertical transportation); Martin Helly (specifications); Professional Service Industries (geotechnical)
GENERAL CONTRACTOR: Turner Construction, in association with Colejon Corporation, Choice Construction, Bradley Construction
COST: $92 million, including exhibits
PHOTOGRAPHER: Timothy Hursley

ABOVE: Video monitors mounted on steel frame and other exhibits were designed by The Burdick Group of San Francisco. **FACING PAGE, CLOCKWISE FROM TOP LEFT:** Rock Hall's exhibits include memorabilia display cases, freestanding platforms with costumed mannequins of rock stars and stage props, a collection of vintage radios, and interactive video and audio displays.


1950
1963
1963
1971
dancing in the street




KADELIC


KKRZ KFJC KZEL CFTR


alice cooper
FUNKADELIC

Mex-Tec Transmission

Televisa Headquarters • Mexico City • TEN Architects

With the completion of the Televisa building in the heart of Mexico City, TEN (Taller de Enrique Norton) Architects has resoundingly confirmed a generational position in Mexican architecture that can only be called "Mex-Tec." TEN's mixed-use project for offices and company dining rooms is a confident essay in High Tech details that is absolutely foreign to its surroundings and yet—because of the ease with which it adjusts to the sun, smog, and boisterous street life—it is somehow familiar. Televisa is the architectural equivalent of the *criollo*, or creole: a person of European stock born in the New World who is committed to its syncretic culture.

The great elliptical vault of the new headquarters for Mexico's leading television network carries metallic panels that rest on gracefully bent steel ribs, creating a compact urban figure that defers to the soaring spire of the company's 450-foot-tall transmission tower. The structural lightness and severe palette of gray, black, and silver are closer in spirit to the industrial vernacular seen in thousands of tin-roofed warehouses all over the city than to the monumental tradition of masonry buildings usually reserved for high-profile projects in Mexico.

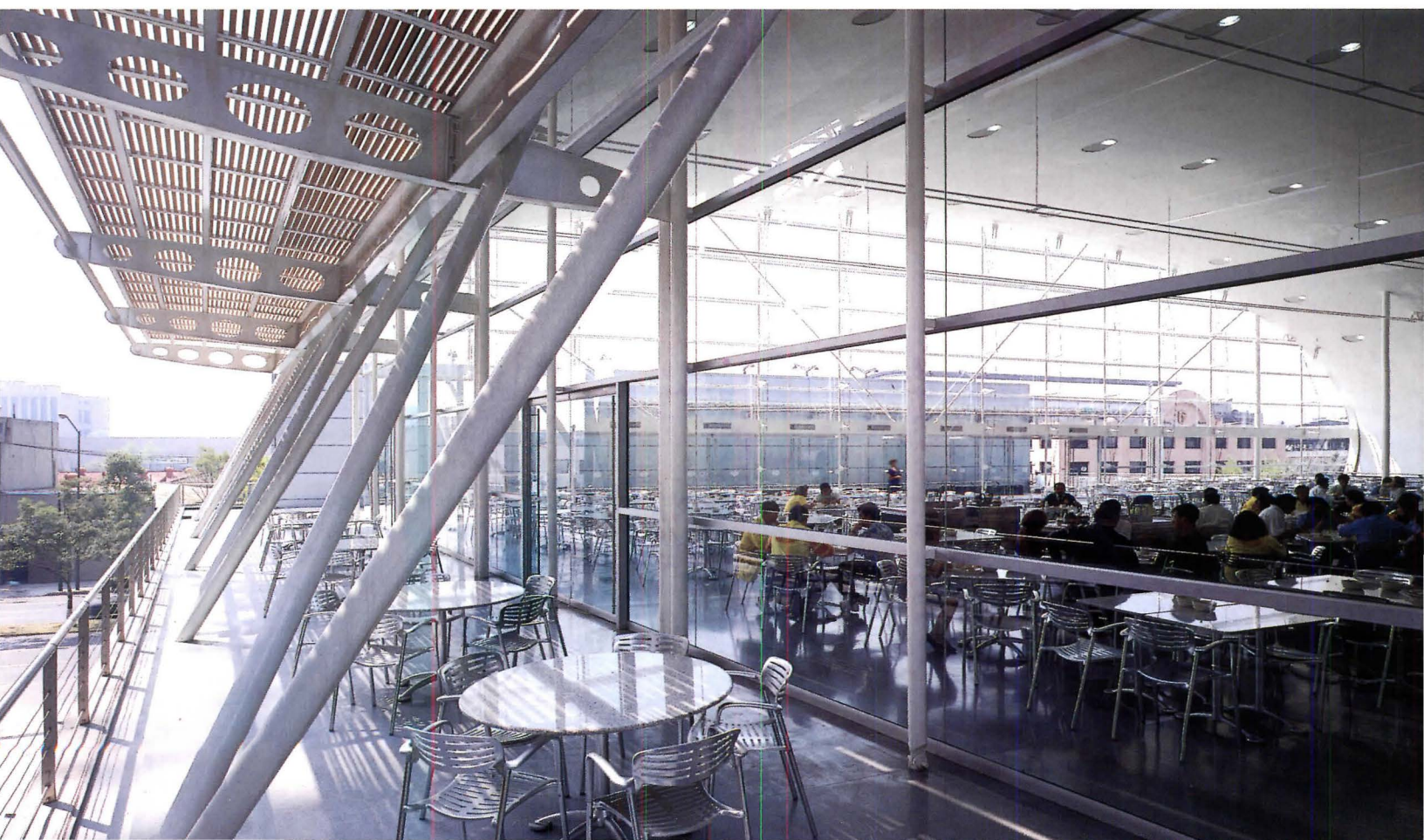
As in all societies affected by the alienating processes of modernity, Mexican architects during the past half-century have undergone a marked identity crisis in response to the perceived threat to their culture by international development. The adamantly anticolonial position of the Modernist generation in its best work, such as that by Teodoro González de León, chose broad, horizontal massing strategies that identified it as Neo-Aztec. Led by Ricardo Legorreta, the Postmodernists have absorbed the vivid colors and decorative genius of indigenous peoples into a kind of Neo-Zapotec esthetic.

Mex-Tec, a trend now apparent in the work of Alberto Kalach, Isaac Broid, Luis Vicente Flores, and several other young architects working in Mexico City, is an attempt to shed these nationalist or folkloric approaches through a more realistic emphasis on technology and typology. What makes this architecture seem Mexican, rather

ABOVE: Televisa's new administrative building is located on busy avenue near historic center of Mexico City. Rectangular elevator tower supports billboard with company logo. **FACING PAGE, TOP**: New elliptical vault occupies trapezoidal site adjacent to Televisa's older production building (background) and transmission tower. Ramp leading to dining level is hung from zinc-clad plane (foreground). **FACING PAGE, BOTTOM**: Services are clustered at vault's shorter north end; ground-floor parking garage is clad in hand-polished cement panels.


televisa


Montana



than mainstream High Tech, is the degree to which external techniques such as steel tensioning have been assimilated into, rather than imposed upon, a complex cultural situation.

The Televisa project is the most visible and fully developed example of Mex-Tec. With its metallic materials, skillful handling of daylight, and sensitive arrangement of views, the building demonstrates a profound understanding of local conditions as well as a typological inventiveness. Bulging seductively like a well-fed parasite at the base of the spindly transmission tower, the new building creates a strong urban identity for Televisa, the leader in Mexico's deregulated media industry. In the tradition of the Crystal Palace, TEN's project upsets the semantic expectations for a large Mexico City building; instead of walls and windows, it offers a single vault and expansive glazed surfaces.

Located on a major traffic artery at the edge of the historic center, just a few blocks away from the new National Library by Abraham Zabludovsky, the Televisa building is the third great shell structure created by TEN Architects in the 1990s. The first contains the cafeteria for Televisa's suburban offices outside of Mexico City; the second shelters the National School of Theater (ARCHITECTURE, September 1995, pages 78-83) at the new City of the Arts campus.

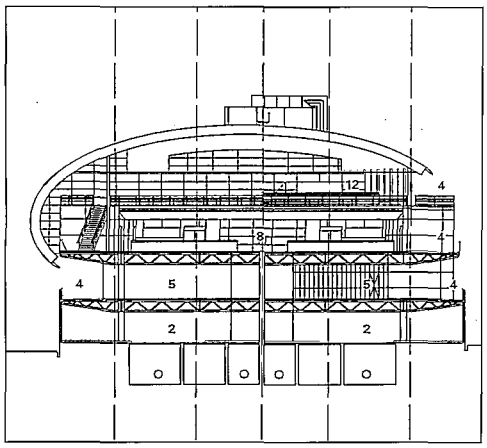
TEN's latest shell is even more complex than earlier projects: not only does it slope 10 degrees, but it follows a radial rather than orthogonal grid. Only Renzo Piano at the Bercy II Center in Paris has recently attempted such geometric complexity, resulting in similar difficulties. Because of the roof's complex curvature, the Televisa building's aluminum-coated roof panels could not be cut to standardized shapes and required individual calibration and sizing.

The vault's tapered form was determined by the long trapezoidal shape of the site, a strip of land next to the company's nondescript, concrete-framed production buildings, which occupy two adjacent city blocks. The shell typology provides a single memorable form into which a variety of volumes and programs can be freely inserted, and to which others can be playfully appended.

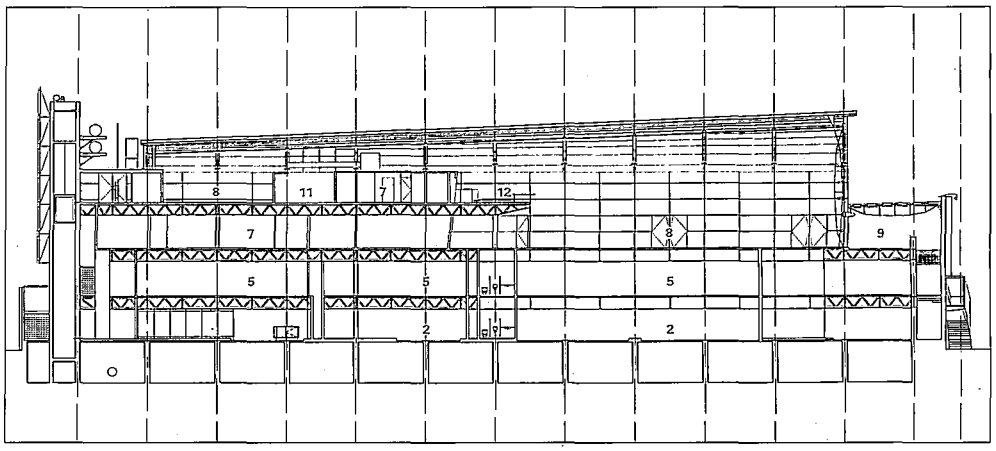
Oozing out of the shorter end of the shell is an inverted conical stair tower, flaring upward to a skylight, which is flanked by a wall of elevator banks brazenly supporting an overscaled, scaffoldlike billboard for the company's logo. At the open south end, a gentle, glass-enclosed ramp hanging from a detached, zinc-clad plane leads more ceremonially to a semiexposed foyer outside the vaulted dining hall. The spacious foyer is covered by a glass canopy that is magically suspended by tension cables. TEN Architects' artful play of simultaneously exposing and enclosing these more public spaces allows for an ingenious mediation of social and atmospheric climates.

Inside the vault, the space of the 30-foot-high dining hall is interrupted by a single row of symmetrically placed columns, adding to the structure's mystery. Clustered behind the ash-paneled bar and

FACING PAGE, TOP: TEN Architects inserted lower patio between new and old buildings; overhang shields second floor offices beneath vault. Long dining terrace adjoins glass-covered foyer protected by zinc-clad wall (left). **FACING PAGE, BOTTOM:** Dining terrace is shaded by sequoia-strip awnings supported by steel flanges and steel tube struts. **ABOVE:** Foyer leading from entry ramp, exposed at east and west ends, is covered by 12-millimeter-thick laminated glass canopy, supported by cable-tensioned steel truss.



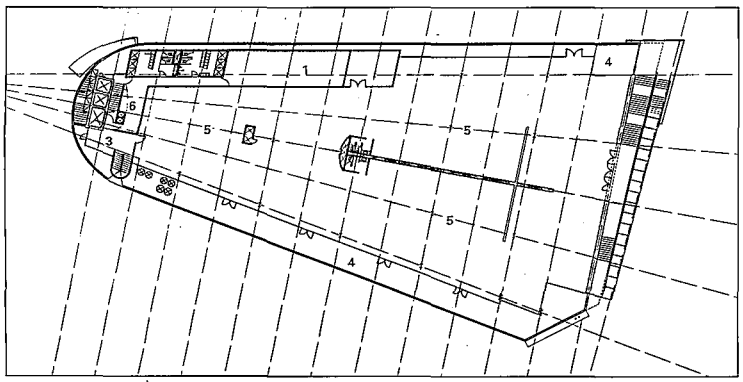
WEST-EAST SECTION



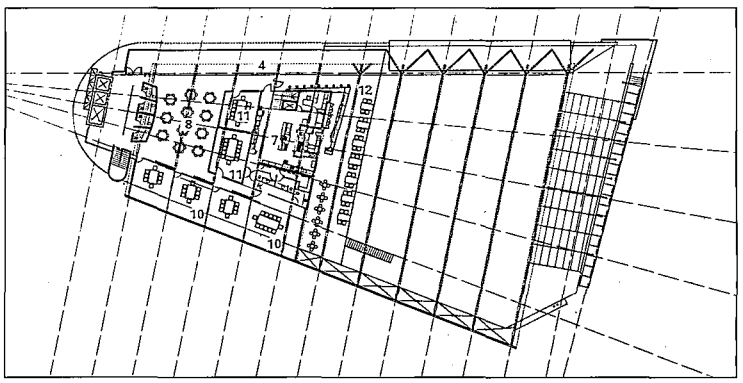
NORTH-SOUTH SECTION

32.8'/10m

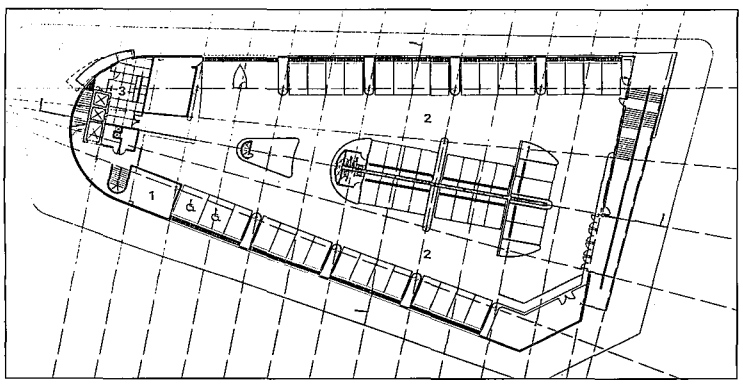
1 MECHANICAL
2 PARKING
3 VESTIBULE
4 TERRACE
5 OFFICE
6 RECEPTION
7 KITCHEN
8 DINING ROOM
9 CANOPIED FOYER
10 PRIVATE DINING ROOM
11 CONFERENCE ROOM
12 BAR



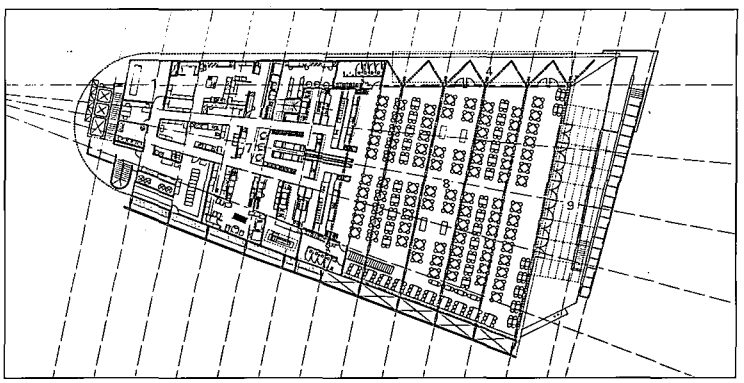
SECOND FLOOR PLAN



THIRD FLOOR MEZZANINE PLAN



GROUND FLOOR PLAN



THIRD FLOOR PLAN

32.8'/10m

SECTIONS AND PLANS: Ground floor is reserved for parking; second floor houses open-plan offices. Dining hall and kitchens occupy third floor; mezzanine above contains bar and private dining rooms. FACING PAGE, TOP: View to south through terrazzo-floored dining hall shows cables tensioning curved roof of vault. FACING PAGE, BOTTOM LEFT: Steel truss wall supports glazed southern facade. Interior is primarily daylit, with additional recessed lighting fixtures. FACING PAGE, BOTTOM RIGHT: Steel columns support ribs of vault.

kitchen on the mezzanine, which forms a promontory under the vault's roof, are a separate dining area for Televisa executives, conference rooms, and private dining rooms enclosed by frosted glass panels.

Both the view out from the main dining hall and the glare of the glazed southern wall are intentionally blocked by the zinc-clad ramp, as is direct light along the western expanse, where a gap at the shell's edge allows daylight to filter up the curved walls from the terrace below. This occlusive strategy gives the dining room not only a glowing quality of diffused light, but a privileged feeling of partial detachment in one of the world's most populous and chaotic cities.

On the east side, facing Televisa's older building, which TEN Architects resurfaced with thin, horizontal aluminum slats, a terrace has been cut into the vault and shaded by wooden *ramadas*, so that the space between new and old buildings resembles a sheltered patio. The company's new offices are surreptitiously tucked into the lower floor between the dining hall and the garage and are accessed and ventilated by a peripheral terrace, artfully shaded by the lip of the great shell. The concrete walls of the lower levels are rendered in panels of black, hand-polished cement—a relatively inexpensive technique in Mexico because of low labor costs—which yields a soft patinated surface as elegant as the native *tezontle* stone, but more smog resistant.

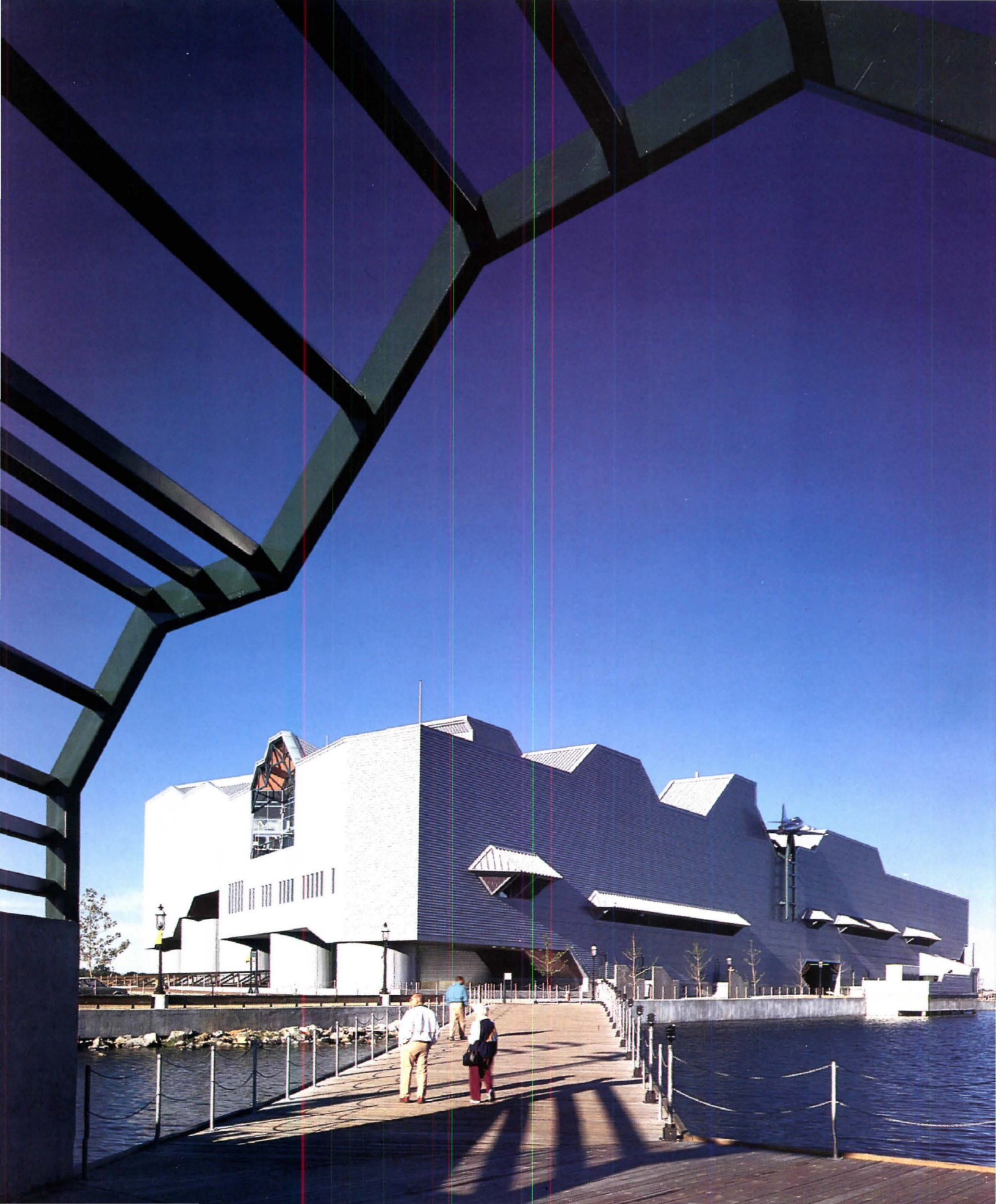
The Televisa's uncanny, bulbous form, with its sophisticated technology and beautiful detailing, seems shocking when seen in the context of the buildings surrounding it. Yet this bold new structure is oddly consistent with the industrial metal shed roofs that have come to dominate the fabric of the city. Like the incongruous television set welcomed into most homes, it has the same ability to ingratiate itself as an agent of well-being. In this way, it mirrors the uprooted *criollo* condition that Italian philosopher Gianni Vattimo attributes to postmodernity—the simultaneous desire for belonging and detachment. As a consummate work of Mex-Tec, TEN's elliptical shell is consciously rooted in its local situation, while aspiring to a technically perfected realm beyond it.—*Richard Ingersoll*

R. Ingersoll teaches at Rice University and edits Design Book Review.

TELEVISA HEADQUARTERS
MEXICO CITY, MEXICO

ARCHITECT: TEN Architects, Mexico City—Enrique Norten, Bernardo Gomez-Pimienta (principals); Blanca Castañeda, Raul Acevedo, Jesus Alfredo Dominguez, Gustavo Espitia, Héctor L. Gámiz, Rebeca Golden, Margarita Goyzueta, Javier Presas, Roberto Sheinberg, Maria Carmen Zeballos (project team)
ENGINEERS: Ove Arup & Partners, Colinas de Buen (structural); AMS Derby (roof)
GENERAL CONTRACTOR: PYC
COST: Withheld at client's request
PHOTOGRAPHER: Timothy Hursley

ABOVE: Steel-framed, frosted glass panels screen private dining room, tucked under arc of vault's west side, from executive dining area; view to north is partially blocked by stair tower. **FACING PAGE, TOP:** Wall behind mezzanine bar is paneled in ash; bar tables shoot playfully through slot below railing. **FACING PAGE, BOTTOM:** Structural steel ribs are seductively exposed at vault's base, above glass-covered opening (left) that allows daylight from sheltered second floor terrace to filter up indirectly.



Harbor Master

Nauticus, The National Maritime Center • Norfolk, Virginia • Centerbrook Architects and Planners

Part battleship, part oil rig, and part whale, Nauticus, the National Maritime Center in Norfolk, Virginia, challenges Jules Verne's fantasy of the sea. The blue-gray leviathan, moored downtown on the Elizabeth River waterfront, is a supersized hybrid of organic and technology-based forms that invites comparison but defies description. "Visually, it refers to all things maritime," asserts Mark Simon, principal of Centerbrook. "Yet they come together to make a very special place that is its own invention. It's science fiction."

The idea for Nauticus grew from a longstanding downtown development plan that called for construction of a regional tourist attraction. Interest quickened in the mid-1980s, when an oceanic center under the auspices of Jacques Cousteau was proposed. Norfolk eventually rejected the idea, but community leaders remained keen to create a building that would symbolize a progressive city ready to shed its image as just another Navy town.

Nonetheless, water remains dear to Norfolk, which has prospered since colonial times because of its deep natural harbor. Maritime technology, shipping, marine science, and the U.S. Navy are so vital to daily life here that together they comprised the ideal subject for a combined educational and entertainment attraction celebrating Norfolk's strengths. Once that idea was agreed upon, the National Maritime Center Authority began a reprogramming effort with exhibit consultants Herb Rosenthal & Associates and Centerbrook, which enlisted the ailing Charles Moore as design consultant.

Several schemes were considered, including a series of ship's profiles sliced like bologna, an amorphous curve hovering above the ground, and a design dominated by a giant portal framing views to the water. Ultimately, the final solution combined aspects of all three. "The building wanted to be a work of art," Simon explains. "But on the other hand, it is sitting on a real working harbor, so we used hard materials, like corrugated metal. It's a maximalist building."

Although it lies at the foot of Main Street, Nauticus is blocked from view by a 6-foot-high flood wall. The building occupies a site along a waterfront promenade extending from Ghent, a residential neighborhood; past the waterside marketplace developed by James Rouse; and concluding at Harbor Park, the city's new baseball stadium. Two public parks flank the Nauticus site; architect James Cutler has just won the competition to design the Norfolk Armed Forces Memorial (pages 28-29, this issue) in the park to the museum's south.

These important site constraints were handled adroitly. Views of the harbor and between the two parks were protected by lifting much of the building into the air, like an upside-down wedding cake. And the promenade remains intact, preserved by the construction of a new pedestrian bridge on the unprotected side of the flood wall.

FACING PAGE: Nauticus looms on horizon like aircraft carrier. Projecting eyebrows on north facade conceal intake and exhaust vents on service side of building. **ABOVE:** Center's conglomeration of aluminum-clad volumes occupies site at edge of downtown Norfolk, along waterfront promenade stretching from residential neighborhood to new baseball stadium. Pier adjacent to Nauticus acts as an auxiliary museum, supplementing exhibits with public tours of working U.S. Coast Guard cutters and Navy cruisers temporarily docked in harbor.

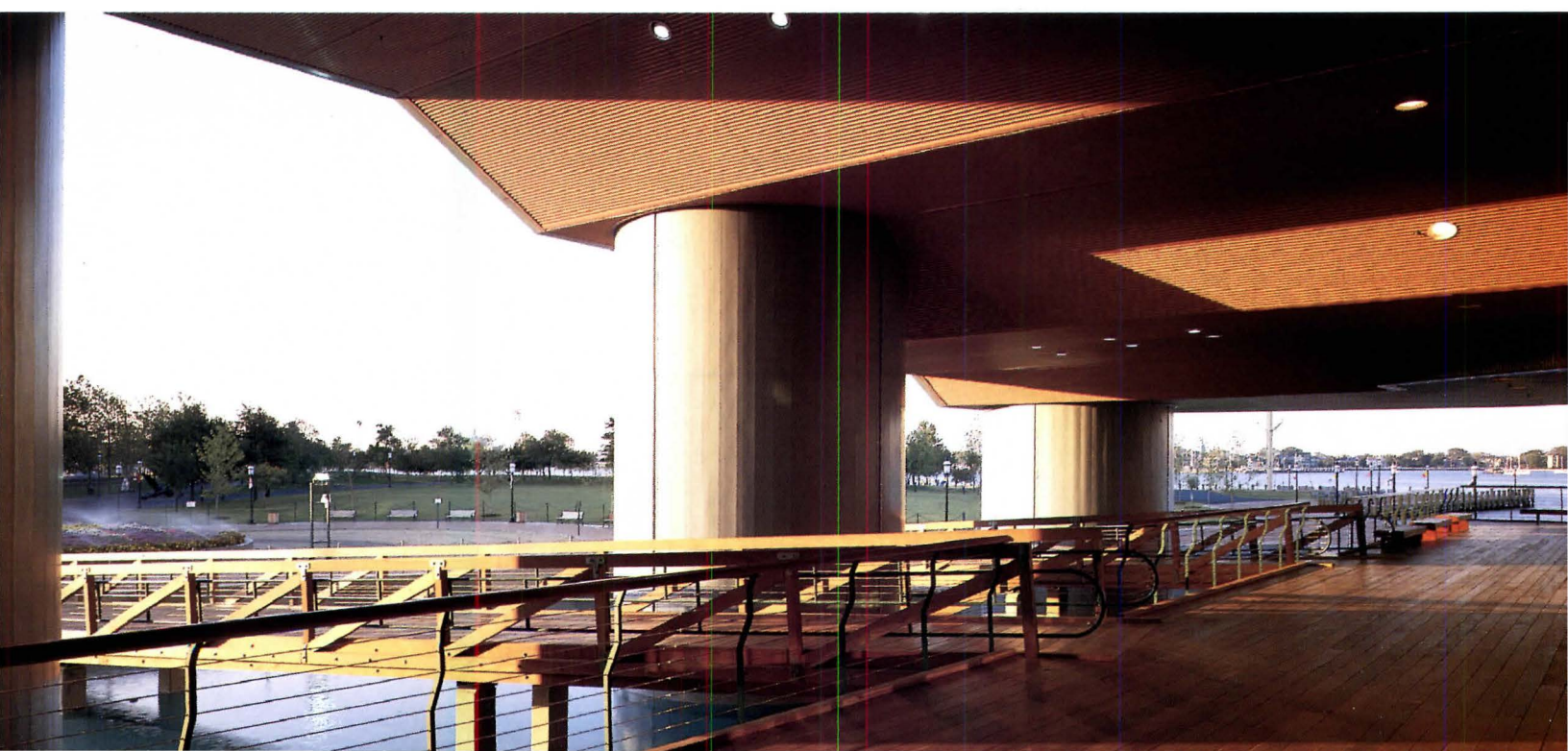
Those walking along the bridge encounter the appropriately rugged volume of Nauticus, an undecorated shed which holds its own alongside the seagoing vessels that dock at its rear door. Yet at close range, the building is surprisingly humanized by the textured surfaces and protruding elements that help diminish its scale.

Hardwood gangplanks lead from the promenade to the ticket windows, passing between oversized columns and above stepped reflecting pools and spillways—an approach meant to suggest boarding a ship or landing on an island. Given the vitality and scale of the building's exterior, one expects an equally dramatic entry. The sense of anticipation created by the exterior is instead rewarded with a bland lobby, where visitors enter abruptly into the 77-foot-high Wonder Hall beneath a towering skylight. Rather than engendering excitement, the structure's open core feels narrow and cluttered.

From the lobby, visitors step onto a 180-foot-long, sloping people mover that shuffles them up to the third floor, on which the exhibits are concentrated. On the way, the ramp passes through sequential layers of asymmetrical portals in various pastel shades of green and blue, while windows in the south wall offer changing views of the river traffic and inner harbor. As first planned, this was the beginning of a single-flow circulation path through the exhibits—a strategy that was abandoned when a new director ordered additional stairs built to encourage greater freedom of movement between floors. While the change dilutes the simplicity of the design and crowds the space, Nauticus staffers say the alteration was a functional success.

The 50,000-square-foot third floor is a loft filled with freestanding multimedia exhibits and hands-on displays. Doors on the west end open to an outside deck resembling a captain's bridge, from which visitors can watch ships moving through the gateway to Chesapeake Bay. Inside, tucked into corners and behind curved walls, are small theaters showing brief educational films and a special theatrical stage set which simulates the experience of naval warfare. As the sequence of exhibits ends, visitors enter the 350-seat Nauticus Theater for a wide-screen presentation on the world's oceans. They then exit to the

FACING PAGE, TOP: Deck on upper level offers commanding views of harbor; Nauticus-in-miniature wing (right) contains service connections for ships that dock at pier for public tours. **FACING PAGE, BOTTOM:** Building shelters plaza for dining, events, and Navy reunions. Curved volume (right) accommodates 350-seat, wide-screen theater. **ABOVE:** South facade reveals stepped form of escalator and staircase leading to exhibits. Exterior is clad entirely in aluminum, including standing-seam roof panels.



second floor, which houses a virtual reality exhibit and the Hampton Roads Naval Museum, relocated from former makeshift quarters on the Norfolk naval base.

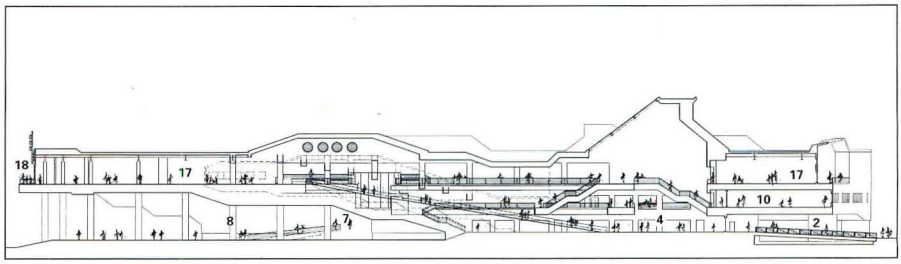
The show continues outside on a 600-foot-long pier, where vessels ranging from square-riggers to Coast Guard cutters dock for public tours. The pier's dimensions and dockside services were specifically planned to accommodate an Aegis-class Navy cruiser, which is a regular attraction on the site. Beneath the west end of the building is the Celebration Pavilion, a brick plaza that offers Nauticus a lucrative rental space for special events and naval crew reunions.

Although shortfalls in attendance have the Norfolk City Council debating an annual subsidy of $1 million to keep the center running, Nauticus has captured the fancy of many. Down to the detailing of the terrazzo in the central hall—whose repetitive oblongs can be imagined as a flotilla of ships or a school of jellyfish—the building repeatedly invites viewers to apply their own imaginations to the mysteries of the sea. As a metaphor, it is a success.—*Vernon Mays*

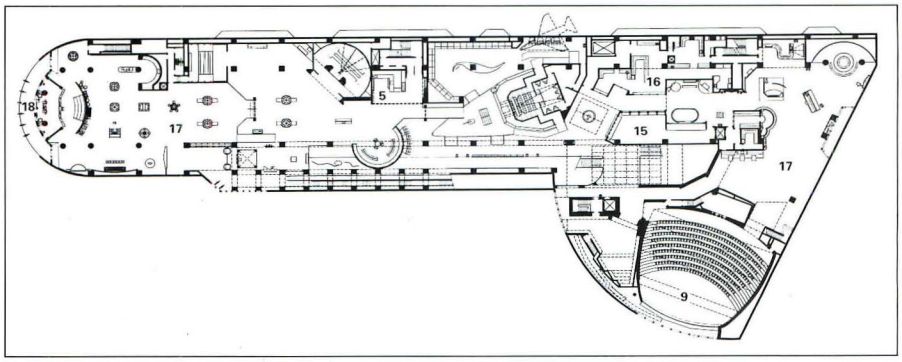
NAUTICUS, THE NATIONAL MARITIME CENTER
NORFOLK, VIRGINIA

ARCHITECT: Centerbrook Architects—Mark Simon (partner-in-charge); James A. Coan (project manager); C. W. Moore, C. Floyd, J. R. Martin, J. Parks, W. Wanradzi, C. T. Delfosse, K. Hauser (project team)
ASSOCIATE ARCHITECT: Shriver & Holland Associates—Henry V. Shriver (partner-in-charge); Aubrey C. Brock, Joseph T. Gaber (project architects); Joseph C. Freeman (construction administrator); Timothy J. Bell (landscape architect); J. W. Myers, R. G. Poole, J. W. Hasten, T. B. White, W. N. Bissell, M. N. Scott, J. P. Kramer, M. L. Treon, F. H. Hitch, K. E. Blankenship (project team)
EXHIBIT DESIGNER: Herb Rosenthal & Associates; Ralph Appelbaum Associates
ENGINEERS: Spiegel, Zamecnik & Shah (structural); Vansant and Gusler, John L. Altieri (mechanical/electrical); Hayes, Seay, Mattern & Mattern (traffic/civil)
CONSULTANTS: Glenn & Sadler Assoc. (sitework and marine); Lester Collins (landscape); White Oak Assoc. (operations); Andrew Chartwell & Co. (cost estimating); Systems Design Assoc. (lighting); Dorfsman-Zelenko Assoc. (graphics); Sigma Design Group, Davy and Assoc. (theater); Mueser Rutledge (soils)
GENERAL CONTRACTOR: W.M. Jordan Company
COST: $22 million
PHOTOGRAPHER: Jeff Goldberg/Esto

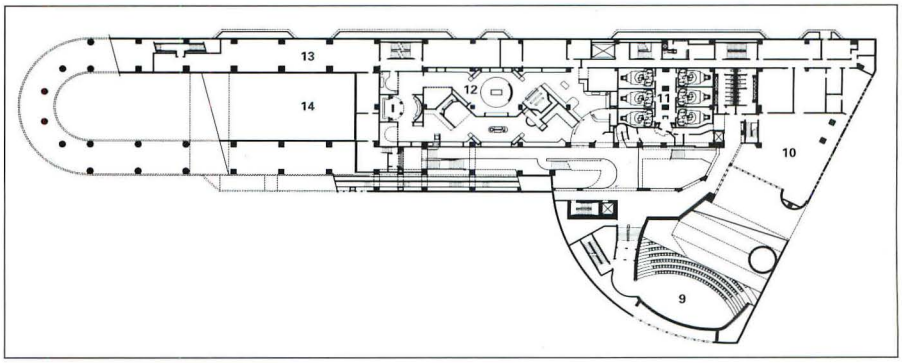
FACING PAGE, TOP: Gangplanks lead from parking to museum entrance over stepped pools of water; playful approach simulates boarding a ship. **FACING PAGE, BOTTOM:** Visitors waiting in line are protected from sun by overhang with views of Elizabeth River and waterfront parks; park to south is future site of Norfolk Armed Forces Memorial. Decking is made of Ipe, a tropical hardwood that withstands heavy traffic. **ABOVE:** Temporary exhibit gallery is visible through fish-shaped windows.



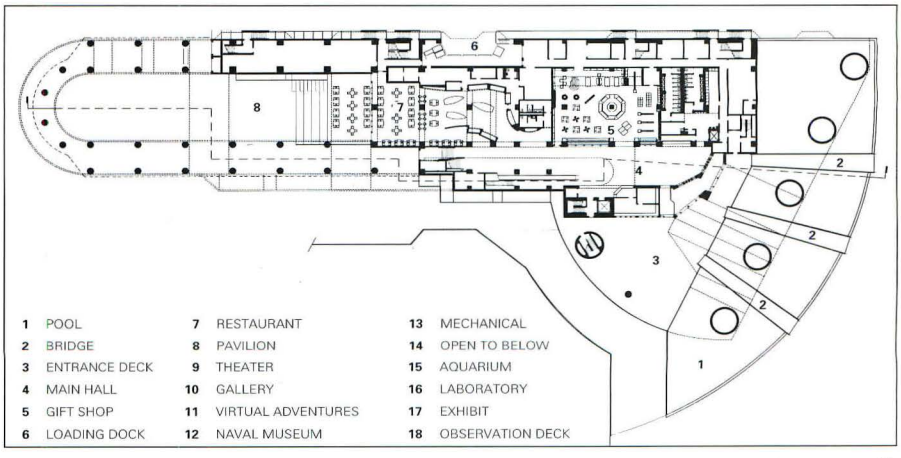
WEST-EAST SECTION



THIRD FLOOR PLAN



SECOND FLOOR PLAN



1	POOL	7	RESTAURANT	13	MECHANICAL
2	BRIDGE	8	PAVILION	14	OPEN TO BELOW
3	ENTRANCE DECK	9	THEATER	15	AQUARIUM
4	MAIN HALL	10	GALLERY	16	LABORATORY
5	GIFT SHOP	11	VIRTUAL ADVENTURES	17	EXHIBIT
6	LOADING DOCK	12	NAVAL MUSEUM	18	OBSERVATION DECK

FIRST FLOOR PLAN

40'/12m

TOP LEFT: Paved in terrazzo, main hall rises full height of building. **ABOVE LEFT**: Flexible loft on third floor is filled with freestanding exhibits. **SECTION**: Long diagonal line follows people mover and modulation of ceiling heights. **PLANS**: First floor contains café, gift shop, and services; exhibits and theater occupy second and third floors. **FACING PAGE**: View from landing shows massive skylight over main hall.

SOMETIMES A CO
CALLS FOR THE U

It's not every day that bridge building techniques are used to expand a convention center. Yet, when the growth of Bartle Hall Convention Center in Kansas City was hemmed in on three sides by buildings and on the fourth by Interstate-670, there was but one way to go: over the highway.

Since this project broke new ground from an engineering standpoint, the designers insisted on tried and true materials they knew they could trust. Like strong, economical Vulcraft steel joists. There's no margin for error when you're spanning six lanes of traffic with 550 tons of 90' steel joists. Only the engineering expertise of the world's largest steel joist company will do.

90' Vulcraft steel joists.

A further challenge of the project was that there was no storage area for materials. Vulcraft easily overcame that obstacle by making 20 separate, on-time deliveries, each containing precisely the correct materials. And, Vulcraft successfully handled the complex detailing required for these joists.

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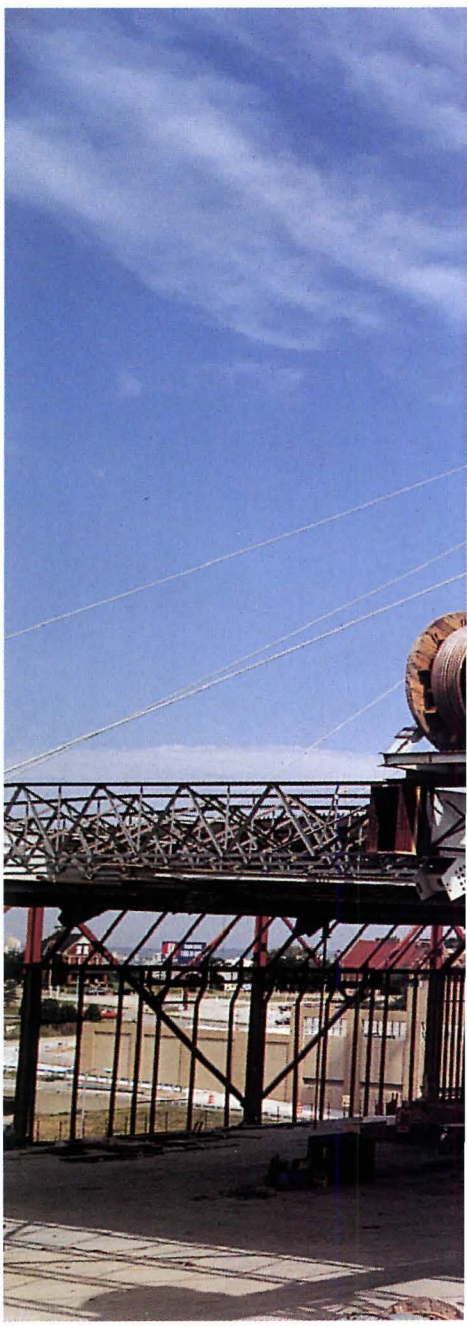
Architect-Engineer: HNTB Corp.; General Contractor: Walton General Contractors, Inc.; Steel Fabricator: Havens Steel Inc.; Steel Erector: Danny's Construction Co., Inc.

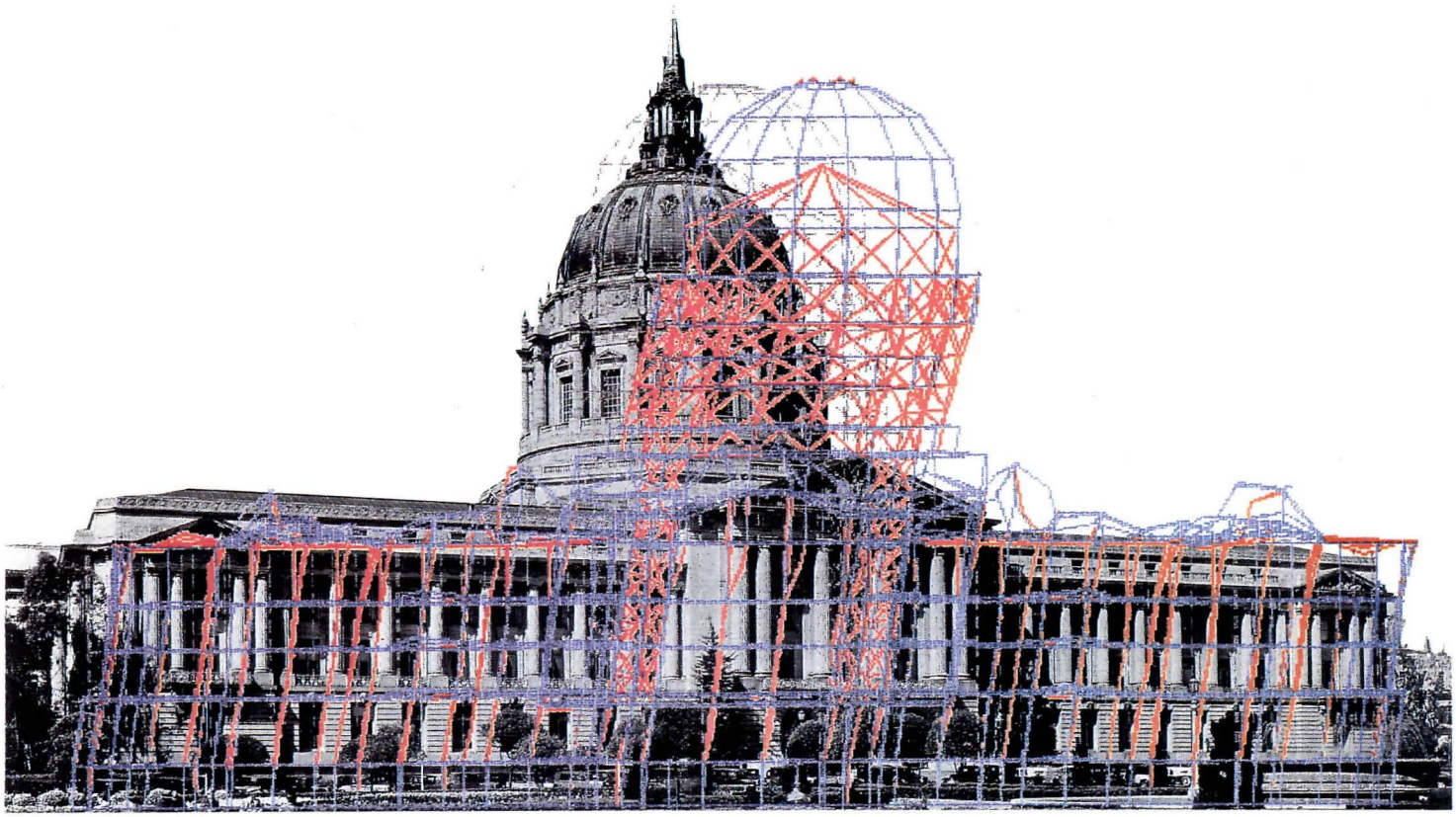
Photographs in this advertisement may not reflect complete or final installation. Consult Steel Joists Institute Technical Digest No. 9 for information concerning safe handling and erection of steel joists and joist girders.



Bartle Hall Convention Center, Kansas

Technology & Practice

99 Technology
111 House
117 Practice
121 Computers
136 Details



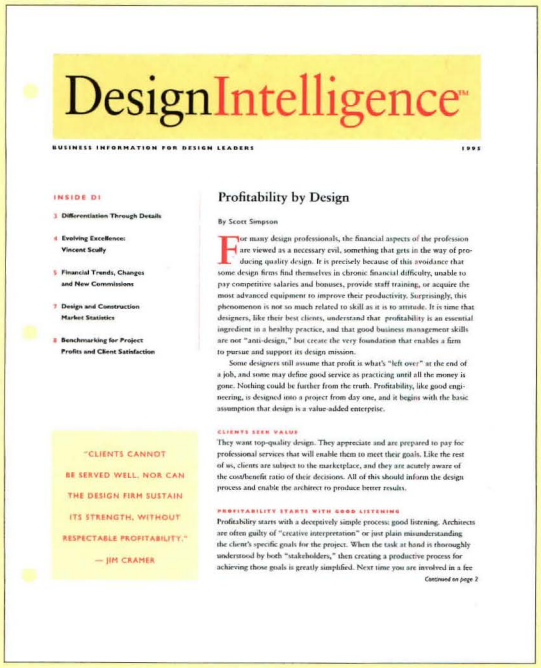
Strategies for resisting earthquakes and other upheavals form the basis of this month's Technology & Practice section. Our technology feature examines seismic upgrades in five California civic landmarks (such as San Francisco's 1916 City Hall, above) and presents the pros and cons of new shear walls, braced frames, and base isolators in historic buildings. Our residential feature extends this coverage with earthquake-proofing measures for two historic houses designed by the turn-of-the-century architect Willis Polk. Sizable wall cavities in these early 20th-century buildings allowed new bracing to be inserted without disturbing the original historic fabric.

The recent demise of The Architects Collaborative (TAC) is the subject of our practice article. TAC failed primarily because it bet too heavily on risky foreign projects. Our report finds that the firm's problems can be traced back to its postwar ideals, which were never revised to respond to changes in the profession.

Groundbreaking new visualization software is surveyed in this month's computer article. Developers of conventional CAD applications are adding new features to their modeling, rendering, and animation packages to make the software easier to navigate, resulting in a more fluid design process.

ADVANCING THE ARCHITECT'S COMPETITIVE EDGE 24 TIMES A YEAR

Design



DesignIntelligence℠

BUSINESS INFORMATION FOR DESIGN LEADERS 1995

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"CLIENTS CANNOT BE SERVED WELL, NOR CAN THE DESIGN FIRM SUSTAIN ITS STRENGTH, WITHOUT RESPECTABLE PROFITABILITY."
— JIM CRAMER

Profitability by Design

By Scott Simpson

For many design professionals, the financial aspects of the profession are viewed as a necessary evil, something that gets in the way of producing quality design. It is precisely because of this avoidance that some design firms find themselves in chronic financial difficulty, unable to pay competitive salaries and bonuses, provide staff training, or acquire the most advanced equipment to improve their productivity. Surprisingly, this phenomenon is not so much related to skill as it is to attitude. It is time that designers, like their best clients, understand that profitability is an essential ingredient in a healthy practice, and that good business management skills are not "anti-design," but create the very foundation that enables a firm to pursue and support its design mission.

Some designers still assume that profit is what's "left over" at the end of a job, and some may define good service as practicing until all the money is gone. Nothing could be further from the truth. Profitability, like good engineering, is designed into a project from day one, and it begins with the basic assumption that design is a value-added enterprise.

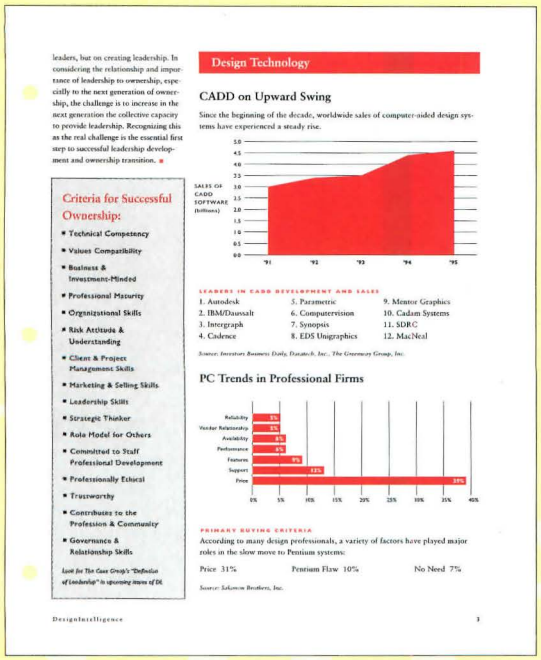
CLIENTS SEEK VALUE

They want top-quality design. They appreciate and are prepared to pay for professional services that will enable them to meet their goals. Like the rest of us, clients are subject to the marketplace, and they are acutely aware of the cost/benefit ratio of their decisions. All of this should inform the design process and enable the architect to produce better results.

PROFITABILITY STARTS WITH GOOD LISTENING

Profitability starts with a deceptively simple process: good listening. Architects are often guilty of "creative interpretation" or just plain misunderstanding the client's specific goals for the project. When the task at hand is thoroughly understood by both "stakeholders," then creating a productive process for achieving those goals is greatly simplified. Next time you are involved in a fee

Continued on page 2



leaders, but on creating leadership. In considering the relationship and importance of leadership to ownership, especially to the next generation of ownership, the challenge is to increase in the next generation the collective capacity to provide leadership. Recognizing this as the real challenge is the essential first step to successful leadership development and ownership transition. ■

Criteria for Successful Ownership:

- Technical Competency
- Values Compatibility
- Business & Investment-Minded
- Professional Maturity
- Organizational Skills
- Risk Attitude & Understanding
- Client & Project Management Skills
- Marketing & Selling Skills
- Leadership Skills
- Strategic Thinker
- Role Model for Others
- Committed to Staff Professional Development
- Professionally Ethical
- Trustworthy
- Contributes to the Profession & Community
- Governance & Relationship Skills

Look for The Coxe Group's "Definition of Leadership" in upcoming issues of DI.

Design Technology

CADD on Upward Swing

Since the beginning of the decade, worldwide sales of computer-aided design systems have experienced a steady rise.

LEADERS IN CADD DEVELOPMENT AND SALES

1. Autodesk
2. IBM/Dassault
3. Intergraph
4. Cadence
5. Parametric
6. Computervision
7. Synopsis
8. EDS Unigraphics
9. Mentor Graphics
10. Cadam Systems
11. SDRC
12. MacNeal

Source: Investors Business Daily, Datatech, Inc., The Greenway Group, Inc.

PC Trends in Professional Firms

PRIMARY BUYING CRITERIA

According to many design professionals, a variety of factors have played major roles in the slow move to Pentium systems:

Price 31% Pentium Flaw 10% No Need 7%

Source: Salomon Brothers, Inc.

DesignIntelligence 3

DesignIntelligence is a newsletter that presents new management ideas and insights that help you grow.

Each issue of *DI* features insights and knowledge on the issues that impact the design business environment, the art of management, effective leadership, economic and political wisdom, and the implications of change.

MORE GROWTH AND CHALLENGING CHANGES AHEAD

Our articles address issues like increasing profitability, effective ownership transitions, million-dollar marketing strategies, successful firm mergers, and secrets of today's most fulfilled design leaders. And there is much more.

Each issue of *DI* will become an indispensable resource for you. Messages are written by leading consultants and design mentors from education, practice, and corporate life. The Coxe Group, Inc., one of the nation's premier management consulting firms, regularly provides features and case studies. The Greenway Group, Inc., strategic and turnaround management consultants, contribute their new research and methods leading the way to profits and growth.

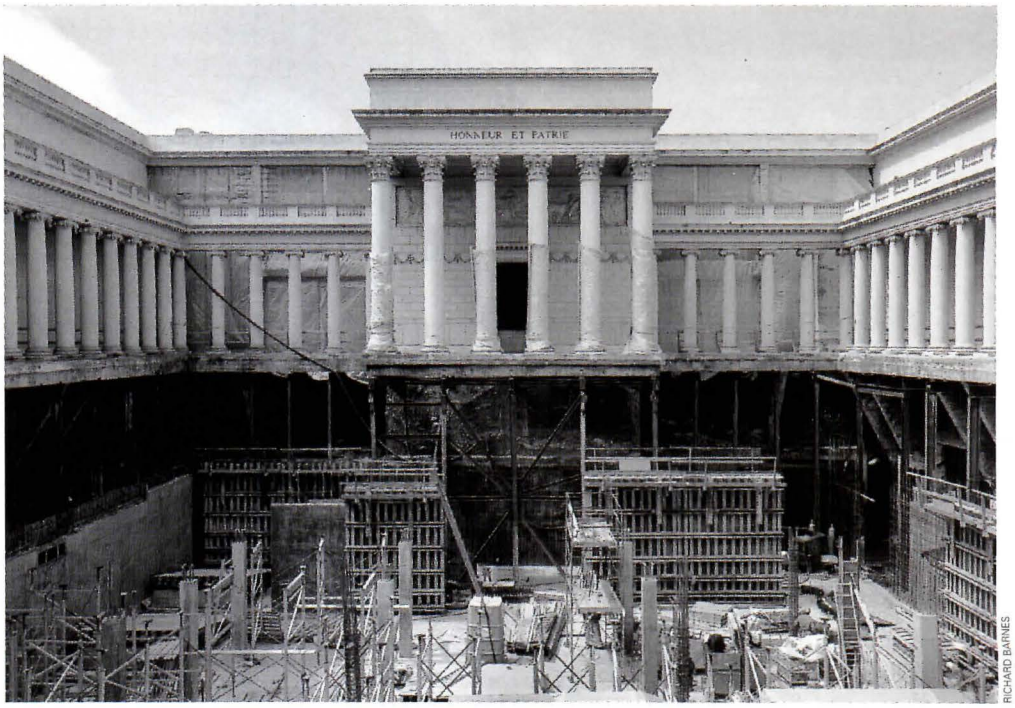
TAKE CONTROL OF DESIGN TECHNOLOGY

There are forces of change rapidly altering professional practice. With *DesignIntelligence* as your partner, you'll profit from our experience and active involvement in the technological revolution. Even the most educated principal is too often uninformed outside a certain (and sometimes narrow) range of design and management subjects. Each issue of *DI* uncovers new and relevant information on technology and its changing implications. If you are seeking facts that will keep you ahead of the times, you will find insightful information in every issue of *DI*.

DI delivers a new kind of information on the evolving role of technology. We report on changes in CADD technical developments, and offer insights on new software programs and wireless technology. All in all, this section of *DI* will help you make decisions on capital expenditures and will help you to understand the winning experience of "best of class firms." In short, *DesignIntelligence* will become a valued strategic partner and talent scout.

Seismic Upgrades for Civic Landmarks

Boosting the earthquake resistance of historic buildings requires structural ingenuity.



RICHARD BARNES

ABOVE RIGHT: Expansion of San Francisco's Palace of the Legion of Honor included seismic strengthening of the foundation with steel braces.

Retrofitting historic structures with earthquake-resistant systems is a preservation nightmare. Boosting the seismic strength of an existing structure, improving the ductility of its connections, or simply joining structural elements for improved performance usually calls for alteration or removal of original elements. The challenge for architects lies in determining how to meet code requirements without violating the integrity of an historic structure.

Adding new shear walls is a cost-effective way to increase stiffness, for example, but massive new walls can obscure historic facades and darken interior spaces. Braced frames can be inserted into a structure without outwardly changing its appearance, yet dismantling walls to insert the frames and then restoring historic finishes can be expensive and difficult. Base isolation—an increasingly popular retrofit measure that consists of large vulcanized-rubber shock absorbers inserted below structural columns—has the least visible impact and doesn't disturb historic materials, but it is very costly and not always feasible for softer soil types.

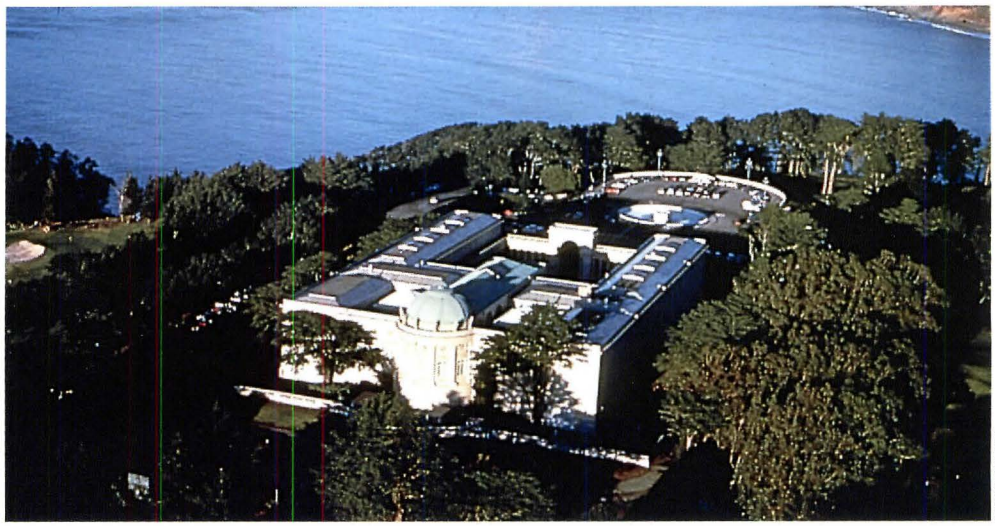
Building codes governing seismic upgrades are based on human safety—ensuring that occupants can survive an earthquake and be evacuated safely afterwards. If the structure is eligible for the National Register of Historic Places, seismic upgrades must protect the building fabric as well as human life.

The specific seismic upgrade method depends on such factors as site conditions and the building's height and geometry. Because ground movement varies in different earthquakes, a previously sound technique may turn out to be unreliable. Most architects and engineers, for example, were surprised at the failure of moment frames in the 1994 Northridge earthquake. The welded beam-column connections in many of these moment frames, the most common seismic system found in newer buildings, fractured during the quake. With a grant from the City of Hope National Medical Center and the Federal Emergency Management Agency (FEMA), the Los Angeles office of Ove Arup & Partners and the American Institute of Steel Construction are researching why existing connections failed, and how to retrofit and repair them. The team is also developing design criteria and guidelines for the construction of new moment frames.

As a result of this research and studies by other groups, such as the Structural Engineers Association of California, Los Angeles has already introduced new interim ordinances to govern moment frames until the Uniform Building Code is revised and released in 1997. The city is currently allowing fractured beam-column connections to be rewelded, without requiring reconfiguration of the joints.

Since the moment-resisting connections in question were installed in post-1960 structures, the code revisions won't affect most historic buildings. But in earthquake-prone areas, the new codes promise big changes in structural design.—*Raul A. Barreneche*

California Palace of the Legion of Honor
San Francisco, California
Mark Cavagnero Associates



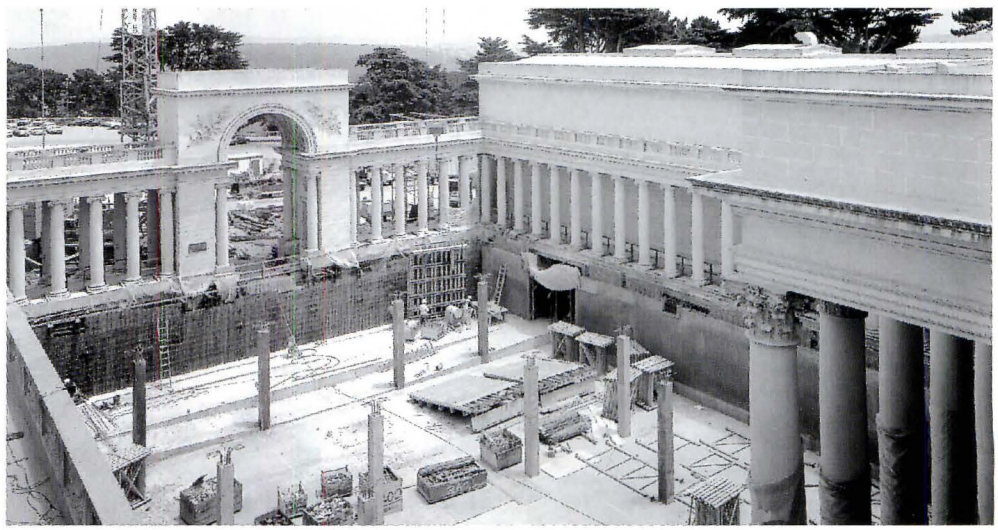
ROBERT CAMERON

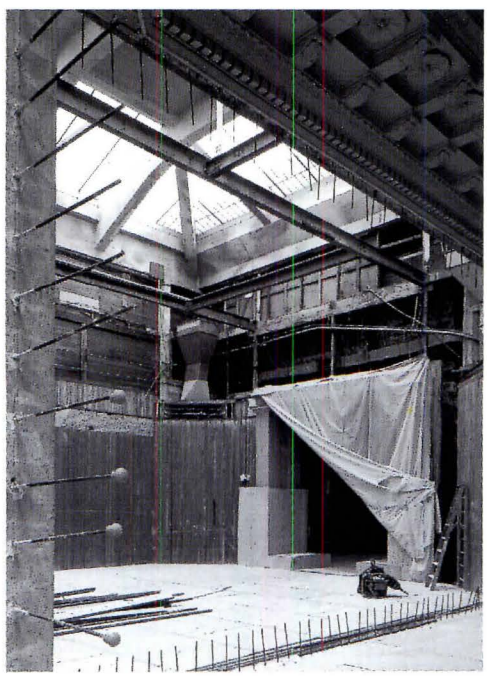
Architects Edward Larabee Barnes and Mark Cavagnero Associates were commissioned in 1991 to renovate and expand the California Palace of the Legion of Honor, an art museum designed by G.A. Applegarth and modeled on the 1784 Hôtel de Salm in Paris. After Barnes's 1992 retirement, the project was taken over by Cavagnero, who seismically upgraded the existing building and added two new levels below a central courtyard.

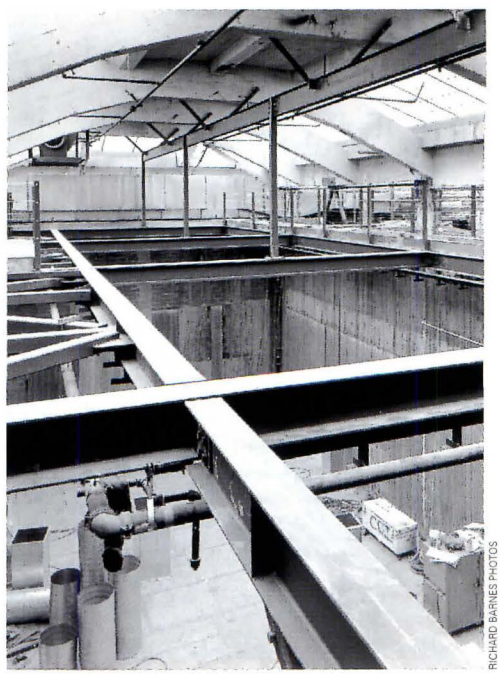
The original museum was constructed of an irregular, discontinuous system of concrete beams and columns with unreinforced hollow clay tile infill. Although its exterior walls—composed of plaster applied directly to the clay tile infill—required strengthening, the museum decided not to alter the Legion of Honor's historic shell, a decision that won support from local landmark authorities. Cavagnero and local firm GFDS Engineers decided against base isolators to strengthen the 1924 building, primarily because of the irregularity of its structure.

Cavagnero instead upgraded the exterior structure from the interior. After several interior clay tile infill walls were removed, a framework of reinforcing bars was inserted in their place and sprayed with concrete to create monolithic shear walls. In other walls, the architect braced the tile infill with vertical concrete stiffeners. "The shear walls had to be the same dimensions as the originals, because we didn't want to lose a single inch of gallery space inside," explains the Legion of Honor's Project Manager Deborah G. Frieden.

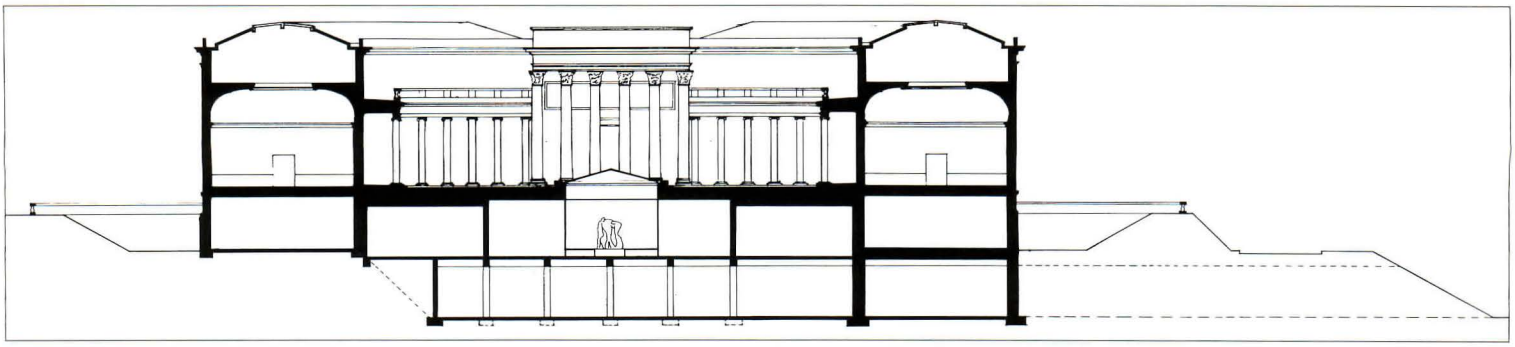
Above the new shear walls, Cavagnero added 2-foot-square concrete ring beams, to which he bolted large steel trusses at the building's attic level. The new trusses help knit the entire building together, adding extra lateral stability and allowing it to move as a single monolithic mass during an earthquake.





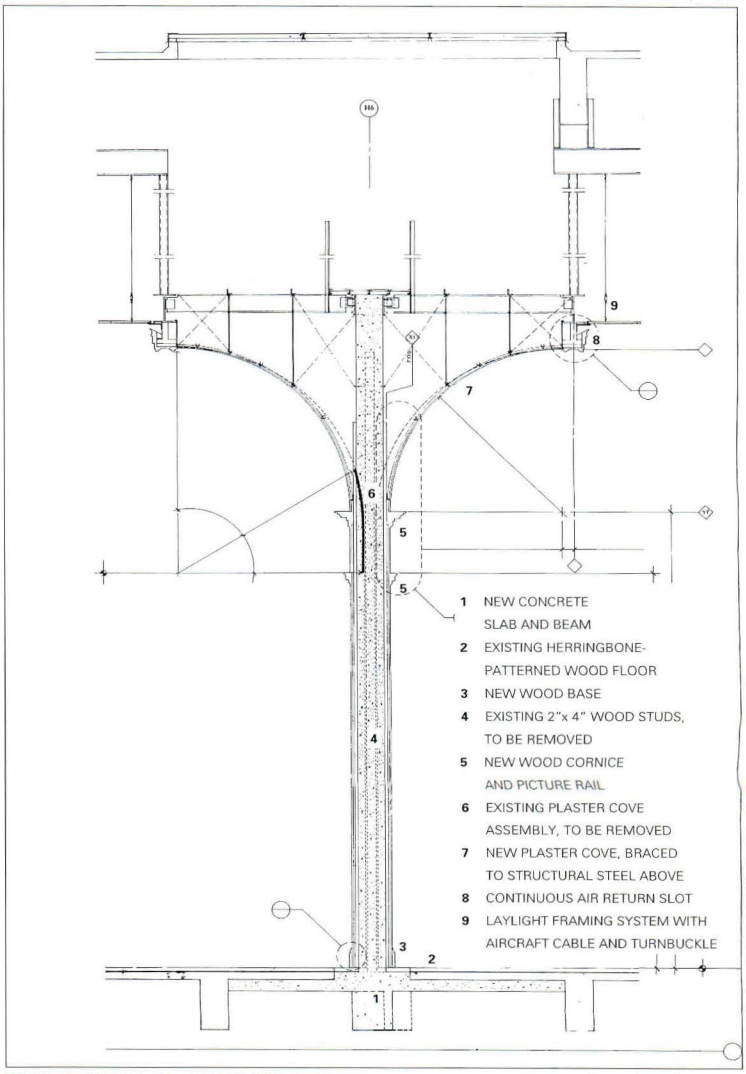


RICHARD BARNES PHOTOS



EAST-WEST SECTION

20'/6m



TRANSVERSE WALL SECTION BETWEEN GALLERIES

3'2"/0.95m

FACING PAGE, TOP: Palace of the Legion of Honor overlooks Pacific Ocean.
FACING PAGE, CENTER: Two new stories of galleries extend below existing colonnaded courtyard.
FACING PAGE, BOTTOM LEFT: Hollow clay tile walls in galleries were removed to insert shear walls.
FACING PAGE, BOTTOM RIGHT: New attic truss is bolted to 2-foot-square concrete ring beam.
SECTION: Two-level addition below courtyard (center) is crowned by pyramidal skylight over galleries.
CENTER: Gallery interiors were reconstructed after insertion of new concrete shear walls.
ABOVE: New steel truss knits together museum structure.
WALL SECTION: Wood partitions were removed and concrete sprayed onto steel reinforcement to form shear walls.

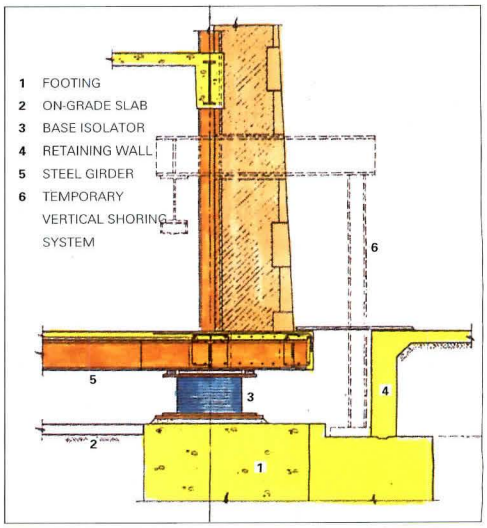
City Hall Restoration
San Francisco, California
City of San Francisco
Bureau of Architecture
with MBT Architecture

Soaring 300 feet high, the ornate dome atop the Beaux-Arts-inspired San Francisco City Hall is the nation's largest, taller than the U.S. Capitol. After the 1989 Loma Prieta earthquake caused significant damage to the building, including cracking of the dome, voters passed a $181 million bond issue to upgrade and repair the deteriorated city hall. The San Francisco Bureau of Architecture joined local firm MBT Architecture and engineer Forell/Elsesser to design the upgrades.

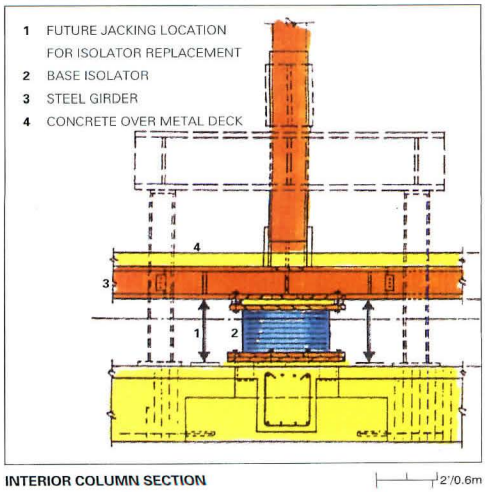
According to Project Manager Tony Irons of the Bureau of Architecture, the building was an ideal candidate for base isolation, which would require little reconstruction of the superstructure and affect the historic interior the least. "Unlike shear walls, the isolators would also prevent the dome from swaying like a huge pendulum," explains Irons.

The vulcanized-rubber-and-steel isolators are being installed below groups of six columns at a time. Supported by temporary jacks, each column is cut roughly 30 inches from the top of the concrete footings, and its base removed. New concrete slabs are poured over the footings, the isolators slid into place and bolted to new concrete pads, and the jacks removed. The isolators must remain clamped together with steel plates until all the columns are isolated, since a quake could destroy a partially isolated building. A 3-foot-wide moat around the perimeter will allow the structure to move 25 inches in either direction, a distance based on a worst-case-scenario of an 8.3 Richter scale quake.

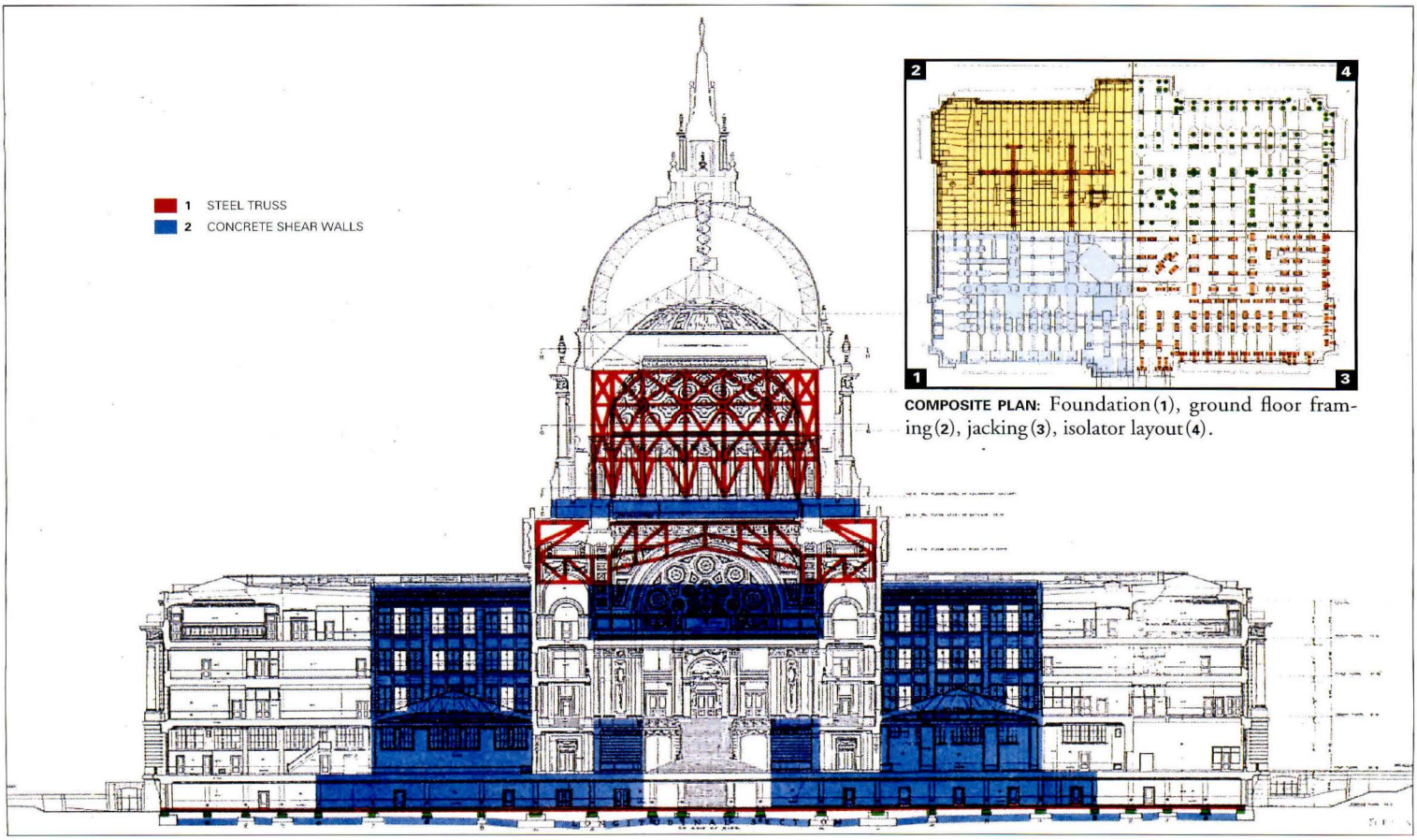
To stiffen the core of the 400,000-square-foot building, the architect will insert concrete shear walls around the interior courtyards. The dome will be stiffened with steel cross-bracing installed in the drum's ceiling. Irons expects construction of the project, which began in May, to be completed in 1998.



EXTERIOR WALL SECTION AT MOAT 1'/0.3m

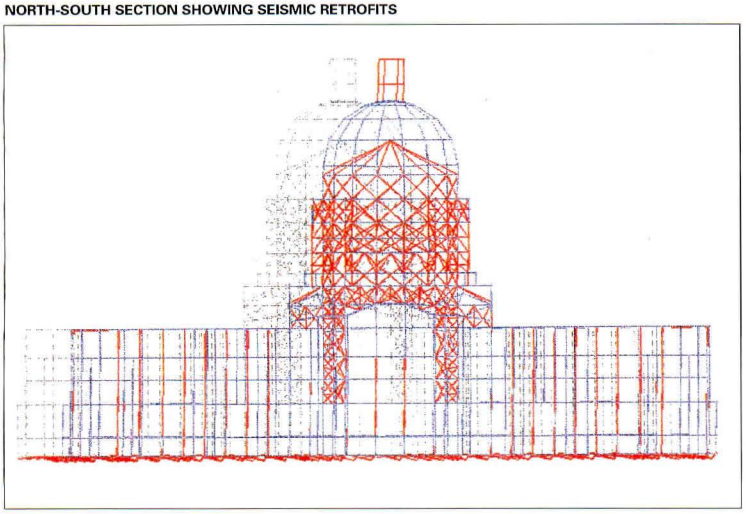


INTERIOR COLUMN SECTION 2'/0.6m

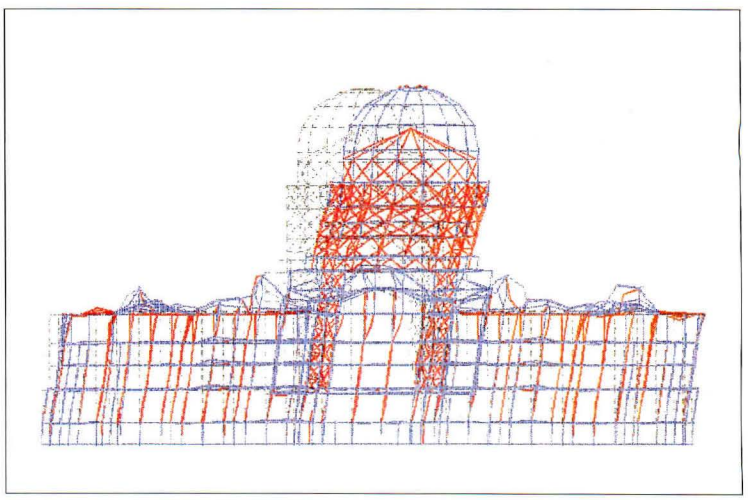


COMPOSITE PLAN: Foundation (1), ground floor framing (2), jacking (3), isolator layout (4).

NORTH-SOUTH SECTION SHOWING SEISMIC RETROFITS



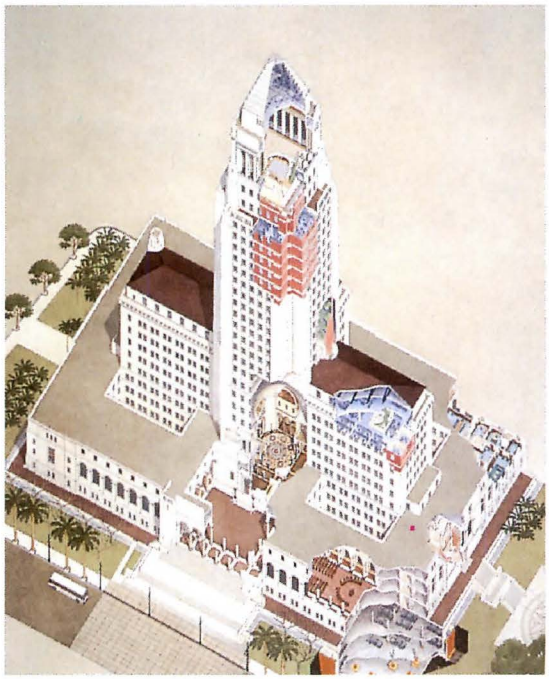
SIMULATED MOTION OF ISOLATED BUILDING

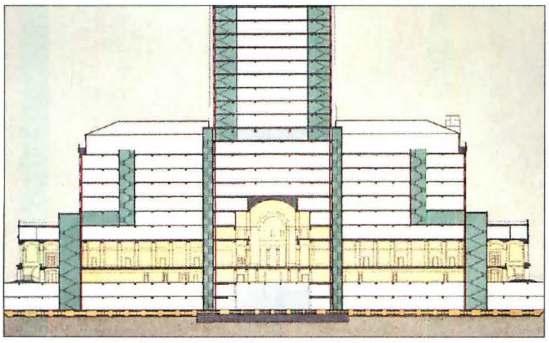


SIMULATED MOTION OF NONISOLATED BUILDING

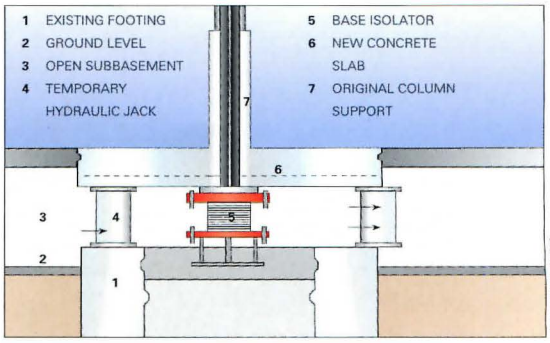
FACING PAGE, TOP: Over 500 base isolators will be installed in San Francisco's Beaux-Arts city hall, designed by Arthur Brown and completed in 1916.
FACING PAGE, CENTER LEFT: New concrete transfer slabs will be poured around columns to evenly distribute loads.
FACING PAGE, CENTER SECTION: Concrete moat around building perimeter (right) accommodates lateral motion of building during quake.
FACING PAGE, BOTTOM LEFT: Column bases will be removed to install new base isolators.
FACING PAGE, BOTTOM SECTION: Rubber-and-steel isolator will act as shock absorber below steel column.
TOP: Seismic upgrade includes adding trusses (red) and shear walls (blue).
PLAN, INSET: Composite drawing shows ground-floor framing plan (top left), isolator layout plan (top right), temporary jacking plan (bottom right), and foundation plan (bottom left).
ABOVE: Computer analysis reveals how base-isolated structure (left) moves as continuous block during an earthquake, while nonisolated structure (right) dramatically deflects.

City Hall Restoration
Los Angeles, California
Albert C. Martin & Associates

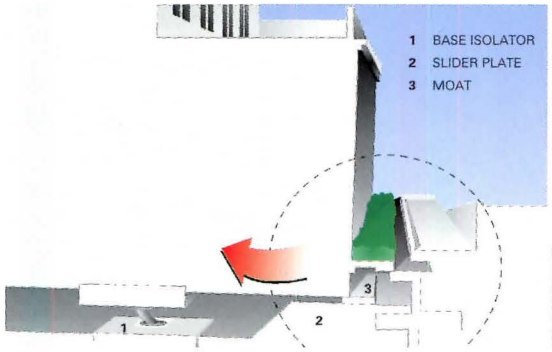




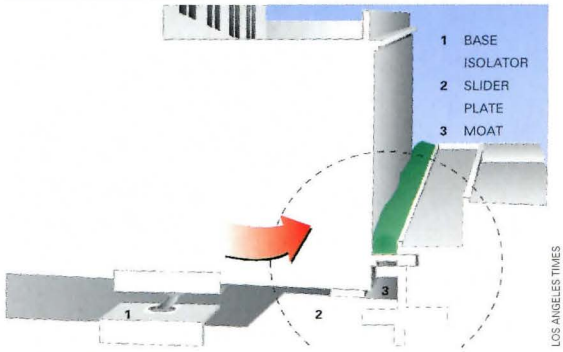
SECTION



SECTION THROUGH COLUMN



SECTION THROUGH MOAT



SECTION THROUGH MOAT

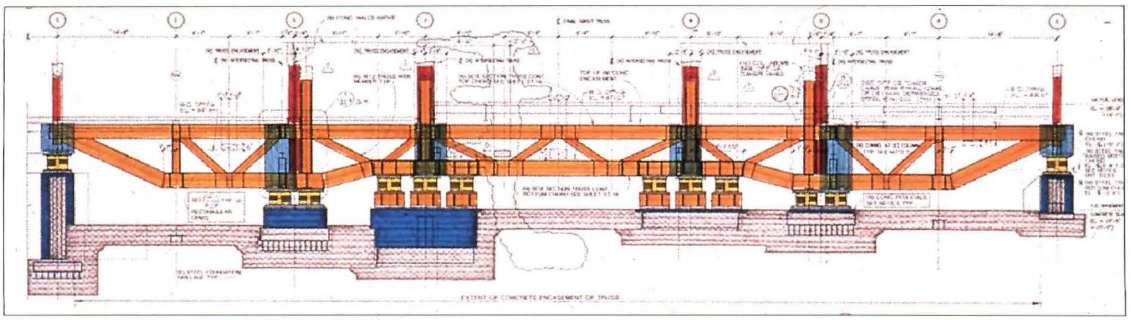
Los Angeles City Hall, made famous by the television show "Dragnet," suffered moderate damage in the 1994 Northridge quake. Nevertheless, local architect Albert C. Martin & Associates is repairing and seismically strengthening the 1929 structure, designed by architects John C. Austin, Albert C. Martin, and John Parkinson. Concrete shear walls will stiffen the 28-story tower, and 430 base isolators will allow steel columns to move independently of ground motion.

The tower's terra-cotta cladding, loosened after a 1971 quake, had been repaired with an epoxy that deteriorated with age and subsequent earthquakes. The tower's unreinforced, hollow clay tile walls were also cracked from past seismic stress. Plans call for removing the tile walls at the tower's perimeter and the edge of the 10-story base, and substituting reinforced concrete shear walls ranging in thickness from $4^1/_2$ inches at the tower's top to 10 inches at its base. Damping devices will also be installed within the tower walls to slow its lateral movement during a quake and minimize damage caused by swaying.

For increased safety, the vulcanized-rubber-and-steel isolators will be installed one at a time at the base of the steel columns. A 5-foot-wide moat around the perimeter of the building will permit the structure to move up to 18 inches laterally. Teflon-coated steel plates—inserted beneath the perimeter foundation walls inside the moat—will act as bearings to help minimize friction as the building slides from side to side during a quake.

Workers have already installed shear walls in the 24th through 26th floors of the tower. The terra-cotta repairs and the $154 million base isolation portion of the project, however, are pending approval from local officials, including the city council and Board of Public Works.

TOP LEFT: Terra-cotta exterior of Los Angeles City Hall was severely damaged in Northridge quake.
TOP RIGHT: Seismic upgrade includes dampers in tower and 430 new base isolators beneath structural columns.
CENTER LEFT: New concrete shear walls enclosing stair towers will increase building's stiffness.
CENTER RIGHT: Base isolators will rest atop upgraded footings.
ABOVE LEFT: Steel sliders inserted between base of building and bottom of moat help structure move with less friction during an earthquake.
ABOVE: Moat inserted around building perimeter will allow structure to move up to 18 inches laterally.



NEW TRUSS ELEVATION

TOP LEFT: Designed by Palmer and Hornbostel, Oakland City Hall is temporarily the world's tallest base-isolated structure, until upgrade is completed of Los Angeles City Hall.
TOP RIGHT: Model shows new concrete shear walls and braced frames.
CENTER LEFT: Larger columns of tower rest on pairs of base isolators.
CENTER RIGHT: Outrigger trusses at basement level evenly transfer building loads and prevent uplift of columns.
SECTION: Base isolators are supported by concrete mat foundation.

City Hall Restoration
Oakland, California
VBN Architects with
Forell/Elsesser Engineers

The Oakland City Hall, a 1914 landmark distinguished by an 18-story tower, was seriously damaged by the 1989 Loma Prieta earthquake. During the quake, the building's hollow clay tile infill walls cracked extensively and the clock tower rocked, causing severe damage to its supporting steel transfer girders. Following the quake, the city determined that the steel-framed structure required an upgrade to meet current seismic codes.

Oakland-based VBN Architects and local engineer Forell/Elsesser determined that a base isolation system was the most cost-effective and the least damaging to the city hall's historic fabric. Before isolating the columns, the team added a supplemental skeleton within the building to increase overall stiffness. "The building lacked a continuous load path," explains Senior Associate Mason Walters of Forell/Elsesser. "Each setback creates a discontinuous point in the lateral system."

Walters added new steel bracing for the top seven stories and within the clock tower structure; at the base of the building, new concrete shear walls were inserted. Huge new outrigger trusses, 8 feet deep and composed of structural steel covered with concrete, were extended in the basement along the entire length of the base. The trusses help tie down the columns carrying the load of the tower, distributing the load evenly to the ends of the base and preventing uplift during a quake.

Base isolators, installed below the trusses, vary in size from 29 inches to 37 inches in diameter. The larger units, called lead-rubber bearing isolators, are fitted with lead cores that provide damping to slow lateral motion in a quake. Until Los Angeles completes the planned upgrade of its own *city hall (facing page)*, Oakland's 325-foot-high civic tower will remain the tallest base-isolated structure in the world.

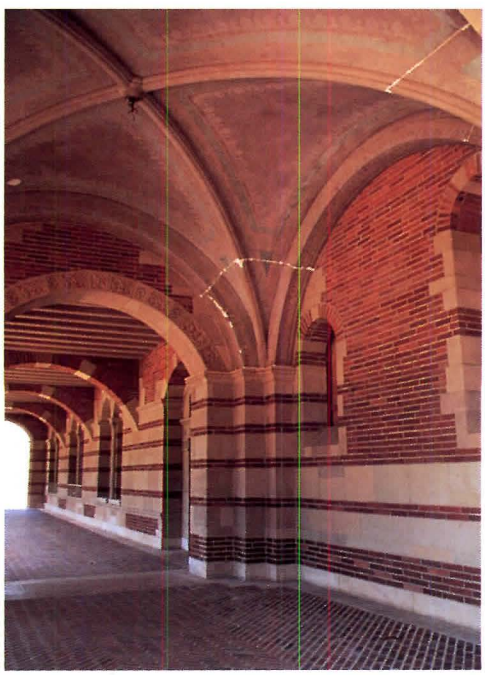
Royce Hall Restoration
University of California, Los Angeles
Barton Phelps & Associates
Anshen + Allen Architects

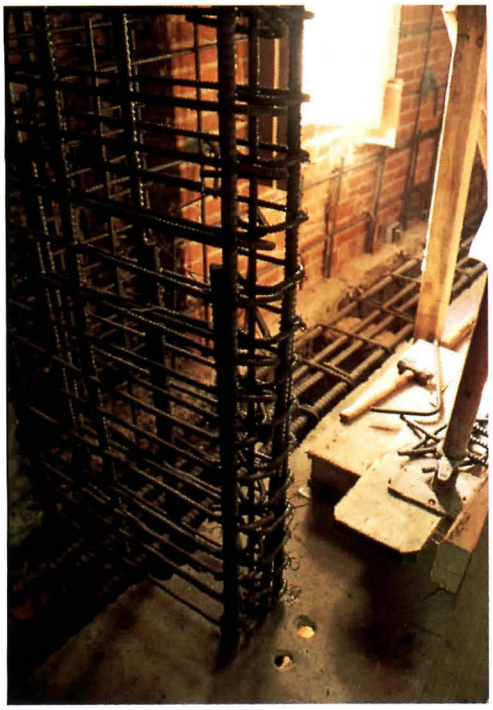
Royce Hall, a 1929 Neo-Romanesque building at the University of California, Los Angeles (UCLA), was severely damaged during the 1994 Northridge quake. Constructed of reinforced concrete, the structure had no seismic supports other than the inherent stiffness of its concrete frame and unreinforced masonry infill and veneer. Architect Barton Phelps suggests that the building should have collapsed during the earthquake, adding, "Nobody knows why it survived as well as it did."

Nearly the entire structure of Royce Hall sustained cracks, as did its hollow clay tile infill walls, brick veneer, and terra-cotta ornament. Inside, the auditorium's east and west walls were cracked from top to bottom. The building's pair of towers were damaged most seriously: both towers cracked at midheight, nearly severing from their bases and collapsing. Phelps estimates that the towers lost 90 percent of their lateral resistance during the quake.

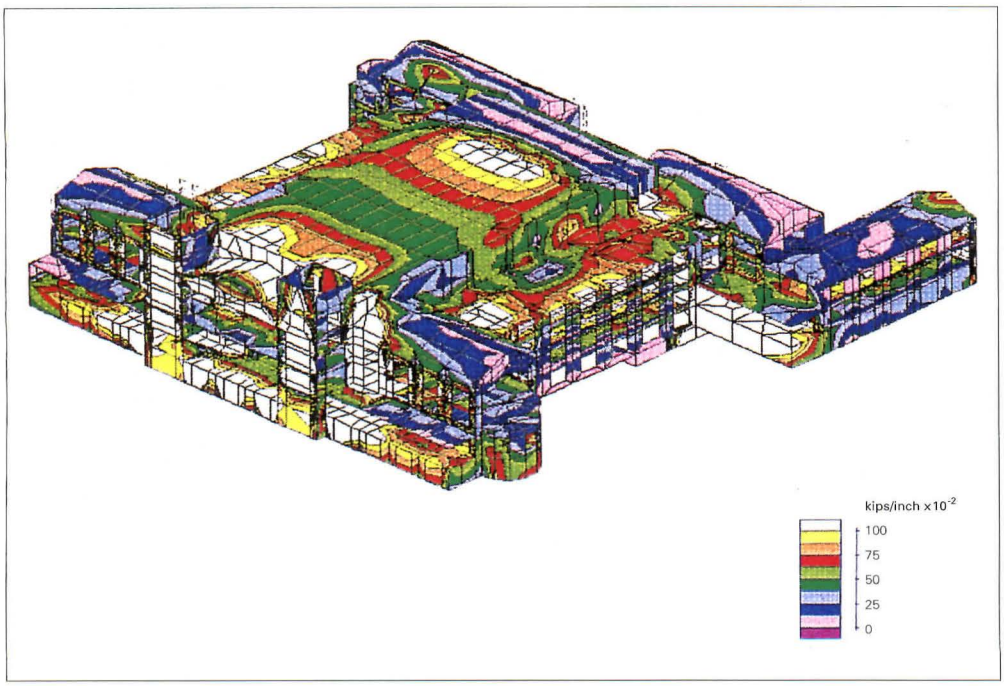
Immediately following the quake, Phelps strengthened the perilously fragile structure. The towers were temporarily stabilized with interior steel shoring, and later with new concrete columns, bond beams, and shear panels around the perimeter. The plaster vaults along two ground-floor arcades were removed to accommodate the new columns, their brick substrate repaired, and the vaults reinstalled.

The second phase of the $38 million project, begun in October, comprises seismically upgrading the overall structure and connecting it to the repaired towers. Working with architect Anshen + Allen, Phelps selected a shear wall system over the more expensive base isolation, because the building's existing structure is too irregular and the site's slope too severe. The existing concrete structure will be repaired and new 12-inch-thick concrete shear walls installed as required.

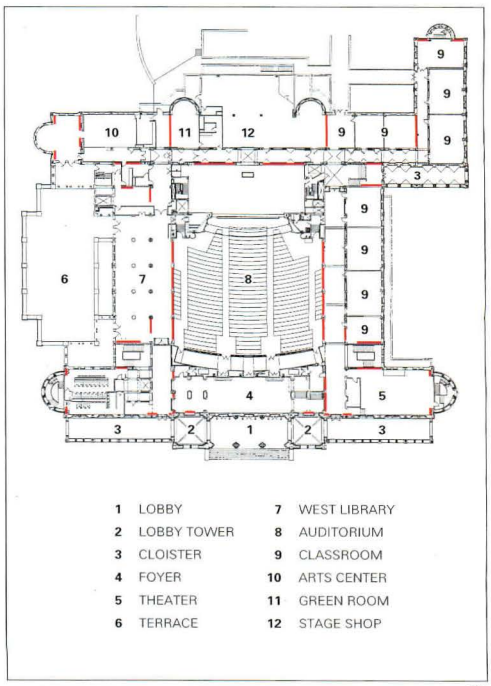




UCLA CAPITAL PROGRAMS

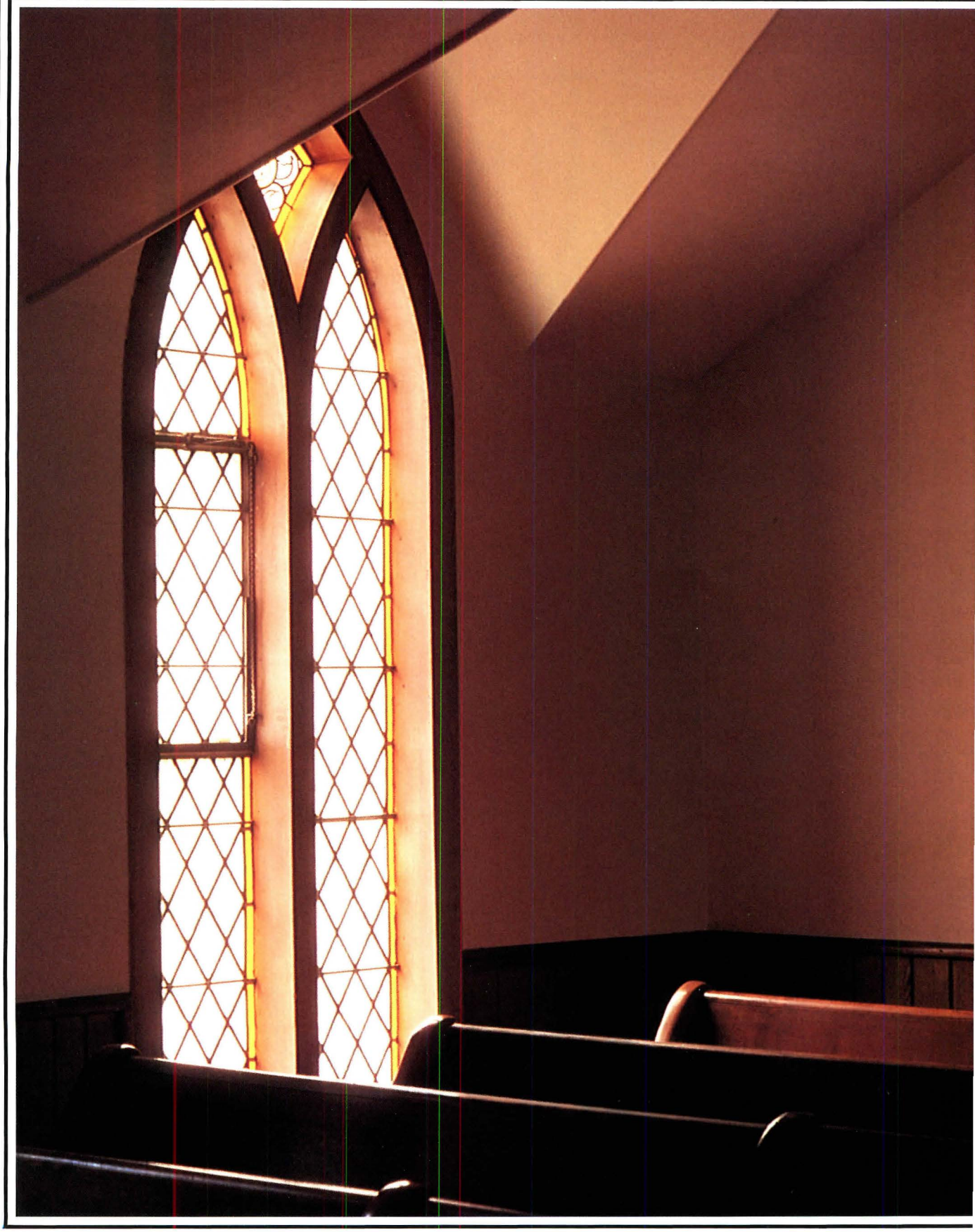


DISTRIBUTION OF SEISMIC STRESSES



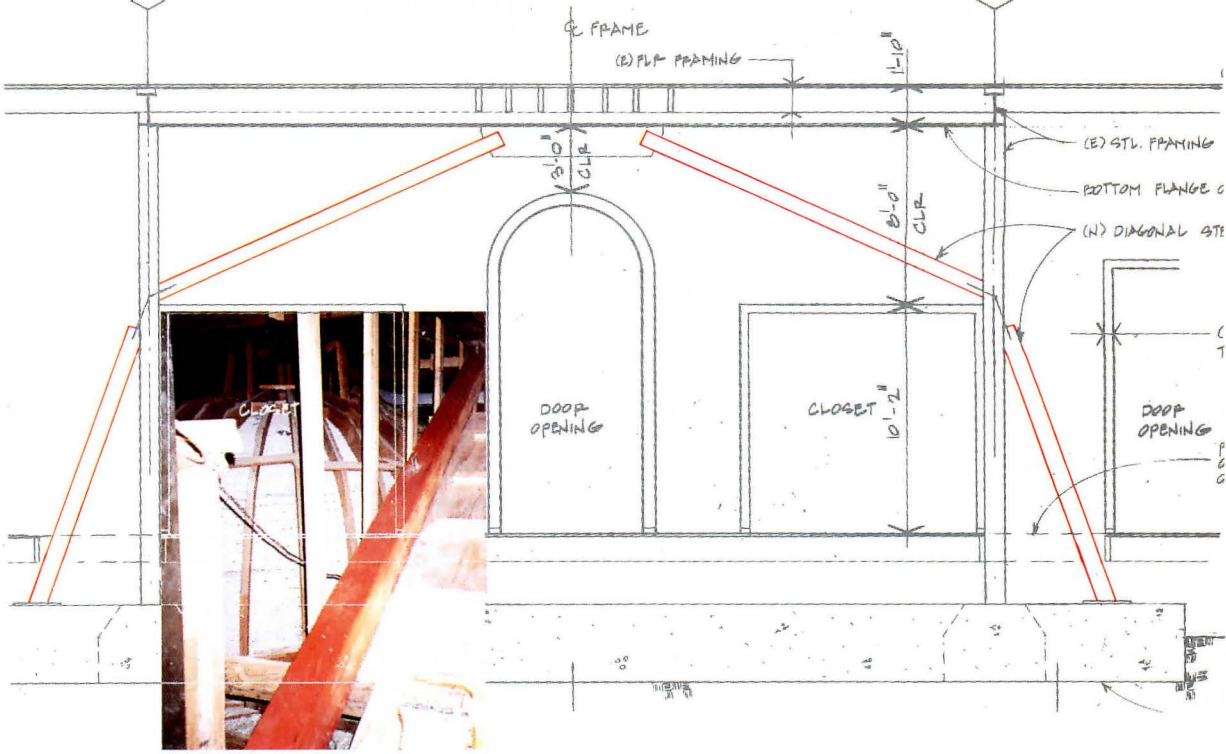
FIRST FLOOR PLAN

FACING PAGE, TOP: Brick towers of Royce Hall, designed by Allison and Allison, nearly collapsed in Northridge quake. Entire structure sustained cracks.
FACING PAGE, CENTER: Plaster groin vaults were removed from ground-floor arcade to accommodate new columns.
FACING PAGE, BOTTOM LEFT: Plaster seals the incisions in reconstructed vaults.
FACING PAGE, BOTTOM RIGHT: Plywood forms, lined with foam padding, temporarily support removed vaults.
TOP LEFT: New steel-reinforced columns inside towers increase stability.
TOP CENTER: Earthquake cracked and displaced brick exterior.
TOP RIGHT: University inventoried damage to historic finishes and reinstalled them after strengthening.
ABOVE LEFT: Computer analysis reveals areas of highest stress on building (red) around auditorium (center).
PLAN: New concrete shear walls (red) will boost lateral stability of building.



Earthquake-Proofing Polk

Two houses by turn-of-the-century architect Willis Polk are seismically strengthened through invisible means.



ABOVE RIGHT: Steel bracing installed in ceiling cavity at Filoli's domed entry increases the house's lateral resistance.

Willis Polk directed one of the most active and influential practices in San Francisco at the turn of the century. His eclectic body of work ranges from the Batten House (1891), a Queen Anne and Colonial Revival amalgam, to the Hallidie Building (1918), the first curtain-walled structure ever built. Two of Polk's last residential projects—Filoli (1917), built for San Francisco entrepreneur William B. Bourne in Woodside, California, and a courtyard house (1913) in San Francisco—were recently seismically upgraded, a task made easier by generous, double-walled construction. Vulnerable structural members were braced with a minimum of disturbance to original finishes.

Architectural Resources Group began seismically strengthening Filoli after San Mateo County identified the property as a potential hazard under the Unreinforced Masonry Law, despite the fact that the brick perimeter walls of the historic property are nonloadbearing. Similarly, local building codes required architect FACE to seismically strengthen the privately owned Polk house in San Francisco because of the large scale of the renovation, which includes the addition of a wine cellar, lap pool, and squash court.

Fortunately, Polk's original structural systems facilitated the unobtrusive insertion of new seismic reinforcements. Constructed with independent exterior and interior framing, they consist of double-walled enclosures with up to 3-foot cavities that are large enough to accommodate new structural members.

Filoli, owned by the National Trust for Historic Preservation and immortalized in the television series "Dynasty," is stiffened by new steel bracing, moment frames, and shear walls installed in existing wall cavities and anchored by new concrete footings—all virtually undetectable. In the San Francisco house, FACE added two steel moment frames, one concealed within an existing wall and the other fastened to the rear facade, and designed a new built-up foundation which acts as a seismic anchor. Preserving as many of the original finishes as possible, the architect reinforced the wood-framed house's structure to prevent future damage to the remaining historic fabric.—*Ann C. Sullivan*

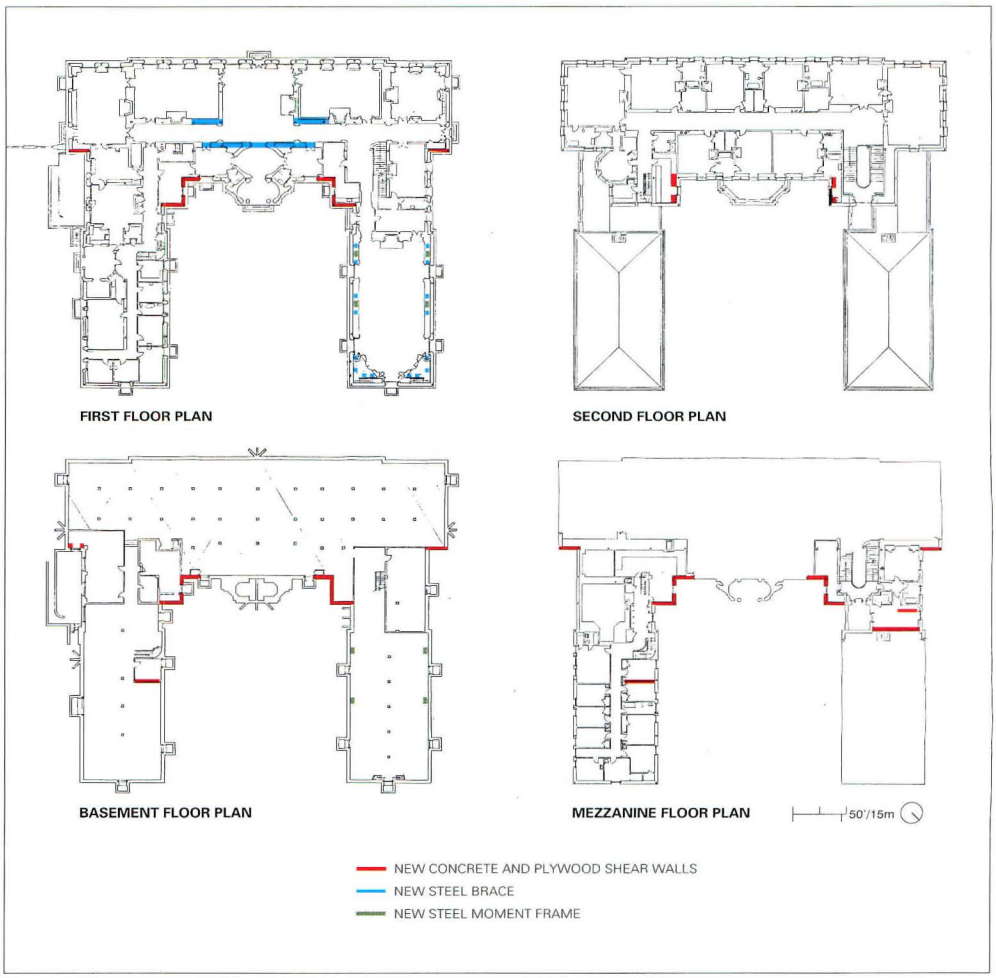
Filoli Restoration
Woodside, California
Architectural Resources Group

Filoli, the Woodside, California, house designed by Willis Polk in 1917, is constructed of nonloadbearing brick perimeter walls and independent steel- and wood-framed interior partitions. It survived the 1989 Loma Prieta earthquake intact, but a subsequent study by Bentley Engineering Company revealed that its unreinforced masonry walls were overstressed, particularly in the north wing. The existing steel frame lacked adequate rigidity, and the original framing connections and floor diaphragms did not conform to current seismic standards.

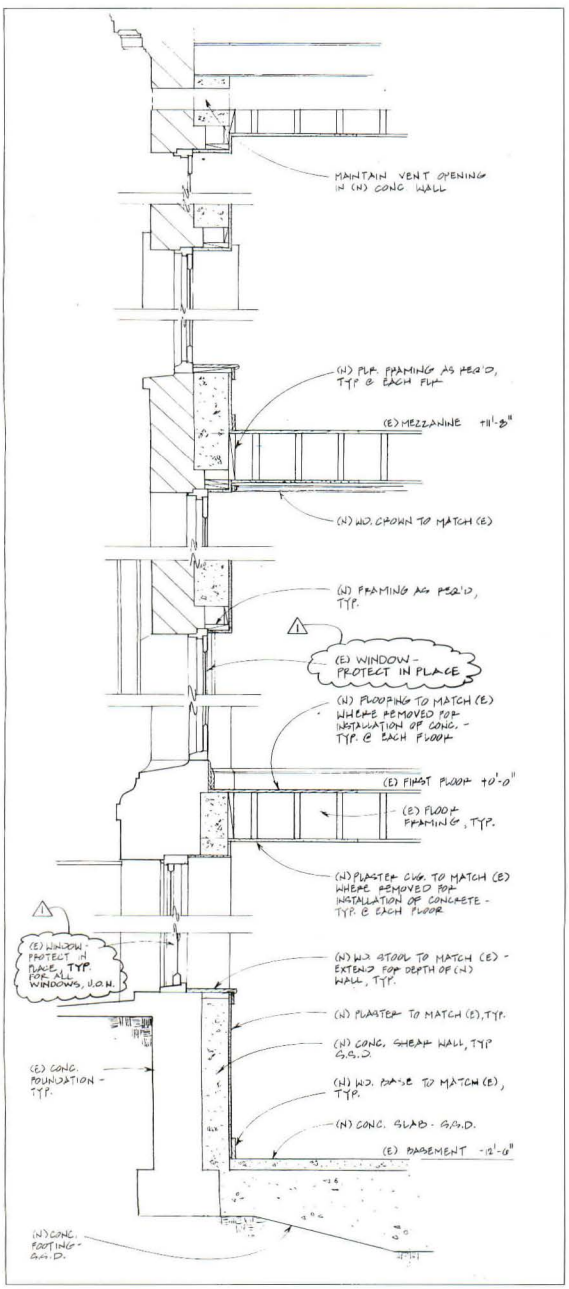
Architectural Resources Group took advantage of the mansion's double-walled construction to conceal new steel and concrete reinforcements. In the north wing's ballroom, eight pairs of tubular steel columns were installed in the 3-foot-wide cavities between the masonry exterior and plaster-finished interior walls to strengthen the brick envelope. In addition, two steel moment frames, fixed to new foundations, were assembled within the walls and roof.

Throughout the main wing of the house, the existing steel framing required stiffening. The architect positioned three diagonal steel braces in the central hallway, added new plywood shear walls to stabilize the second floor framing, and strengthened the floor diaphragm in the attic with 1/2-inch plywood sheathing. Concrete shear walls brace the inside face of brick perimeter walls where the north and south extensions abut the main wing.

Steel members were fed through basement crawl spaces and mezzanine-level closets to preserve the original inlaid floors, wood molding, and murals in the public areas. The second floor required only limited removal and reinstallation of finishes; the exterior remained intact, with the exception of four segments of the ballroom roof that were removed to insert steel columns.

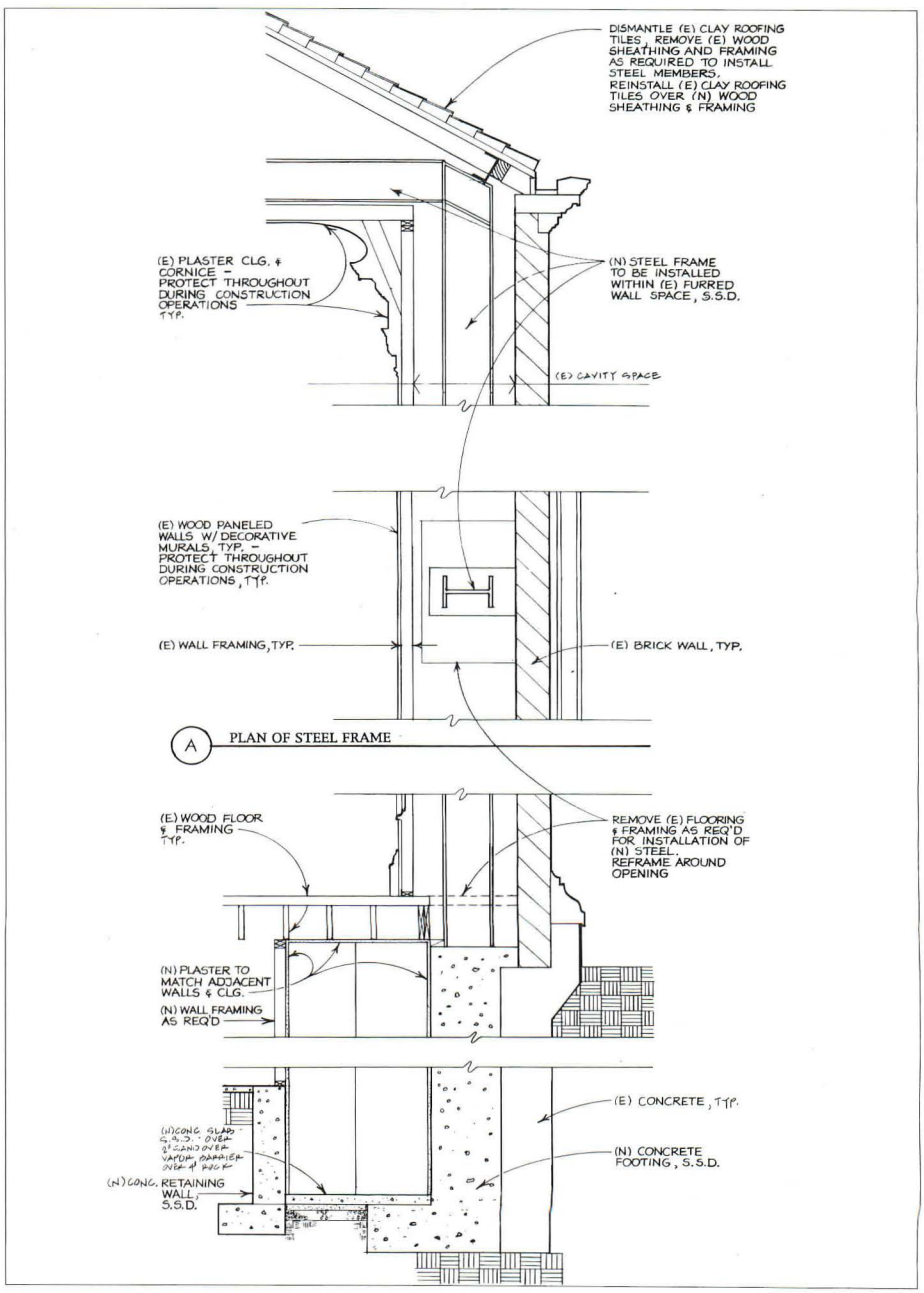


TOP: Originally the country house of San Francisco entrepreneur William B. Bourne, "Filoli" is abbreviated from "fight, love, live." Architectural Resources Group strengthened the 1917 mansion's six chimneys in 1992; phase two was completed this fall.
PLANS: New steel members (blue and green) and shear walls (red) stiffen Filoli's existing steel frame and reinforce perimeter masonry walls.
FACING PAGE, TOP LEFT: Diagonal steel brace installed between hallway and library reinforces original steel frame.
FACING PAGE, TOP RIGHT: Moment frame and tubular steel section were inserted in cavity between exterior brick and interior walls of ballroom.
FACING PAGE, LEFT SECTION: Concrete shear wall braces brick exterior walls.
FACING PAGE, RIGHT SECTION: Steel frame was installed in walls of north wing.



WALL SECTION THROUGH CONCRETE SHEAR WALL

2'/0.6m



WALL SECTION THROUGH STEEL FRAME

2'/0.6m

2960 Broadway
San Francisco, California
FACE, Architect

The first of three courtyard houses designed by Willis Polk on the city's north coast, 2960 Broadway in San Francisco was seismically strengthened as part of an extensive remodeling and expansion. Since its completion in 1913, the rear of the structure had settled 10 inches on its bed of fill and dune sand.

Local firm FACE jacked up the top three floors, removed the original foundation, and extended three hand-dug piers 40 feet to bedrock. Within a new built-up concrete foundation, which serves as a seismic anchor for the house, the architect inserted a garage, wine cellar, and squash court fixed to bedrock with steel tiebacks.

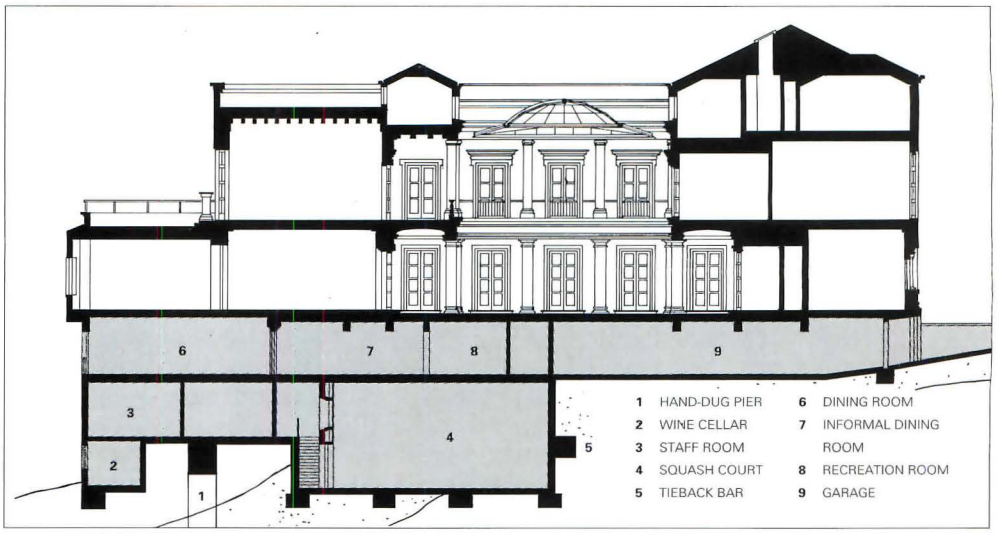
To reinforce the original wood-framed structure, FACE removed the front stucco facade and inserted a steel moment frame in an existing 15-inch cavity between the internal framing and independent stucco-finished enclosure.

The internal cavity within the rear facade, however, was impossible to access without disturbing the interior finishes of the formal living and dining rooms and the master bedroom, stacked in the rear of the house to take advantage of views of San Francisco Bay. To preserve the finishes in these rooms, FACE attached a new steel moment frame, concealed behind new pilasters, directly onto the outside of the facade.

A plywood diaphragm—designed to transmit lateral forces to the perimeter—was installed in the horizontal cavity between the courtyard floor and garage ceiling. To stiffen interior partitions surrounding the entrance, plywood shear walls were added on the ground level.

FACE restored Polk's original finishes on the upper three levels wherever possible, replaced finishes removed in prior renovations, and modified selected areas to accommodate contemporary mechanical and electrical systems.

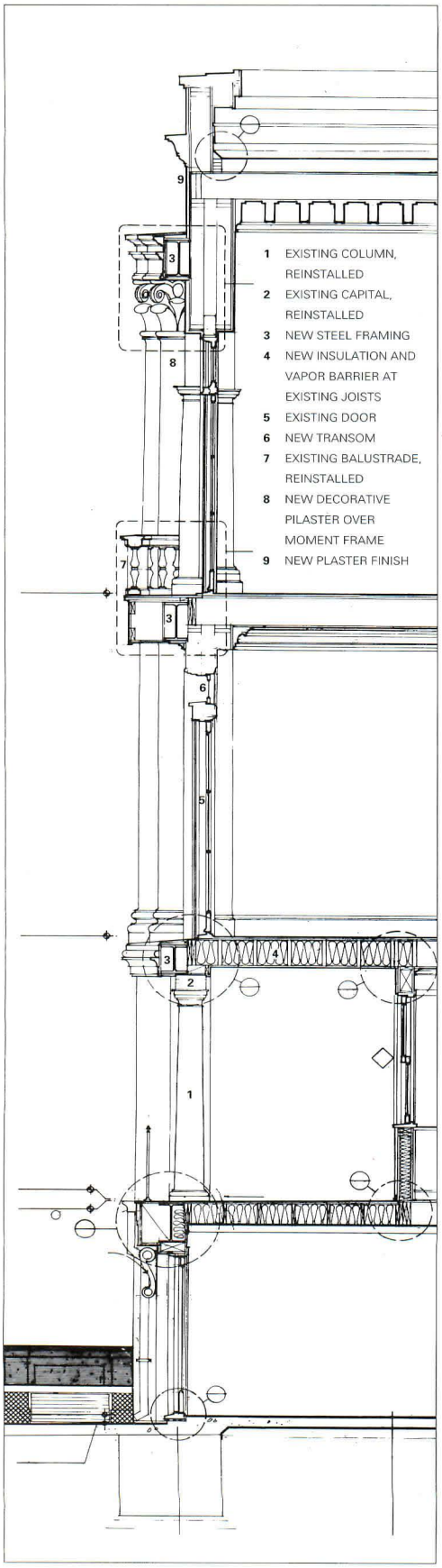
SHARON RISEDORPH



NORTH-SOUTH SECTION

9'/2.7m

TOP: Original facade of 1913 house accommodates a steel moment frame inserted in cavity between internal framing and stucco-finished exterior.
SECTION: FACE added new garage and recreation rooms in built-up foundation and renovated upper levels to respect original design.
FACING PAGE, SECTION: Steel moment frame applied to rear facade is concealed behind new pilasters.
FACING PAGE, TOP: New steel-framed, domed skylight encloses central courtyard; skylight's motorized aperture rotates, opens, and closes.
FACING PAGE, CENTER: Upper floors were temporarily lifted and braced while foundation was replaced.
FACING PAGE, BOTTOM: Decorative trim conceals new moment frame fixed to rear facade in order to avoid disturbing historic interior finishes.



WALL SECTION

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TAC's Demise

The Architects Collaborative closed its doors this spring. What felled this giant? What are the lessons for other firms?

THE ARCHITECTS COLLABORATIVE INC., ARTHUR NIGGLI LTD. 1965

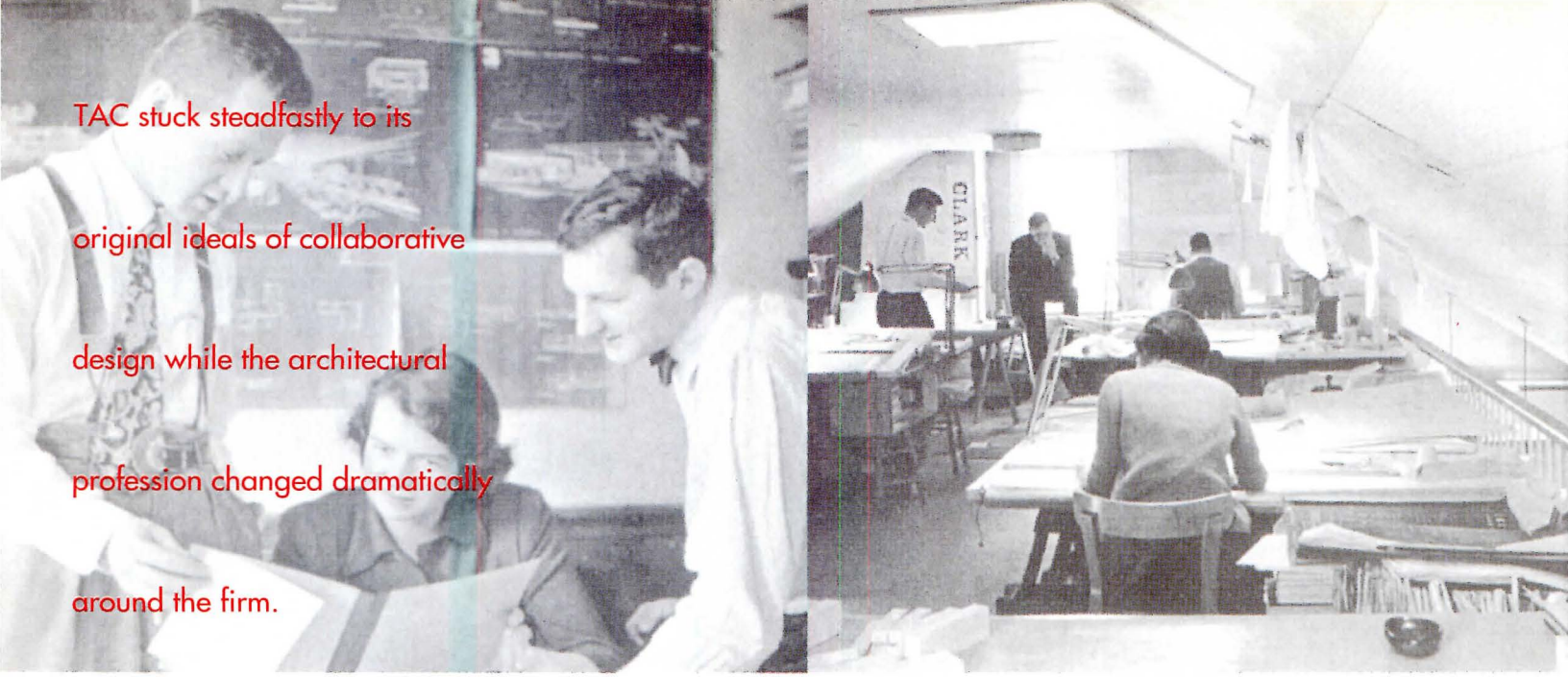
ABOVE RIGHT: TAC was founded in 1945 by (left to right) Sarah Harkness, Jean Fletcher, Robert McMillan, Norman Fletcher, Walter Gropius, John Harkness, Benjamin Thompson, and Louis McMillen.

On the eve of its 50th anniversary in April, The Architects Collaborative (TAC) was far from celebrating—the Cambridge, Massachusetts, firm was on the verge of bankruptcy. Boston's BayBank foreclosed on TAC on April 7, giving the firm's 55 employees one day to remove their belongings from 46 Brattle Street—the building TAC designed for its offices in 1964.

The nation's architectural establishment was shocked as word spread that TAC had closed its doors. After all, TAC was one of the most prestigious firms in the U.S., founded in 1945 by Modern master Walter Gropius. In 1964, TAC won the AIA Firm Award; in 1973, it designed the national AIA headquarters in Washington. By 1980, TAC was among the nation's largest practices, employing 380 people and spawning some of Boston's best firms. Why did it fail?

The simple answer is: Too much foreign work and too much debt. In recent years, more than half of TAC's work was overseas; the firm focused heavily on projects in Iraq and Kuwait, where direct losses from the Persian Gulf War of 1990-1991 ran to about $2 million. At the same time, TAC's U.S. developer clients collapsed, incurring losses of nearly $500,000. (TAC's total billings for this period were in excess of $20 million.) With offices in San Francisco and Rome, the firm had built up tremendous overhead, yet was reluctant to let staff go. Moreover, TAC lost fees for work already performed and thus owed engineers, consultants, and vendors thousands of dollars it couldn't remit. "We weren't generating enough work in the last two years to feed this very large machine," admits 78-year-old TAC principal and cofounder Norman Fletcher.

Once upon a time, TAC's thoroughly Modern outlook set the pace for the postwar era. But the Cambridge firm never made the transition to Postmodern realities—namely, the profession's increasing fragmentation, rampant liability, and breakneck competitiveness. "TAC went out of business because they held



TAC stuck steadfastly to its original ideals of collaborative design while the architectural profession changed dramatically around the firm.

on to their 1960s culture in a 1990s world," maintains Frank Stasiowski, CEO of Practice Management Associates in Newton, Massachusetts. "They chose a path that doomed them to extinction."

Visionary origins

TAC's beginning was idealistic and progressive. In 1945, eight years after leaving Nazi Germany, Bauhaus founder Walter Gropius opened TAC with seven younger colleagues: Robert McMillan, Louis McMillen, Benjamin Thompson, and two husband-and-wife teams—John and Sarah Harkness, and Norman and Jean Fletcher. The firm was founded on values close to the Bauhaus "complete building" ethic; the charter stressed a cooperative, collaborative design process among comprehensive thinkers. Hierarchy was anathema. Projects were executed by teams, each with a group-appointed leader, and design review meetings were held once a week.

The young firm set out from Cambridge after World War II to apply its collaborative methodology to the nation's pent-up demand for housing and schools. With immense optimism in the 1950s, TAC exported its distinctive Yankee Modernism to the Middle East, embarking on a master plan for the University of Baghdad in 1957. Gropius won the AIA Gold Medal in 1959; TAC's AIA Firm Award followed five years later.

Over the years, TAC made organizational changes to adjust to its growth. The firm incorporated in 1964; eventually added departments for graphics, interior design, and landscape architecture; and formed a special strategic planning board in 1977—separate from its board of managing directors—to focus on emerging design concerns such as energy conservation. New approaches served new demands, yet even as a mature organization, the firm was still making decisions based on a team structure.

By the early 1980s, architectural practice grew swiftly more complex and price-competitive, particularly after the Justice Department first prohibited fee fixing by the AIA in 1972. TAC was forced to focus more on clients than on collaboration. Clients were changing in the '80s: they were less likely to be actual users of a building than building committees or speculative developers, and therefore more interested in good returns on investment than in good design.

Project delivery in the 1980s also demanded an ever-widening circle of consultants and construction managers. Lawyers were being asked to write clients' contracts, which "really eroded the base of architects' fees," recalls former TAC principal David Sheffield.

Schedules and budgets tightened markedly. "Clients gave us less time to do the work," Sheffield laments. "We didn't always have a chance to make sure all the bugs were out [of a design], and all the while, litigation was looming."

TAC's risks were rising. Professional liability insurance rates increased 400 percent in the 1980s, but it was foolish to practice without it. TAC was summoned several times as a third-party defendant in litigation between clients and contractors, suits which cost TAC its deductible—anywhere from $50,000 to $200,000—each time its insurers opted to settle with the plaintiffs.

At the same time, clients more often wanted specialty architects for specialized facilities. However, "the collaborative process was not based on the concept of a group of specialists working together," wrote Sarah Harkness in 1989. TAC could take on many types of work, from churches to embassies to corporate headquarters, but its generalist reputation began working against it. In the last decade, "it was getting harder and harder to compete with Kohn Pedersen Fox in high-rises or Ellerbe Becket in healthcare," recalls former principal John Sheehy.

True to its name, TAC always stressed collaboration over individual authorship, a self-effacing philosophy which lost ground to the star designer syndrome. Employees meant everything to the firm. Young architects were given considerable responsibility and frequently rose through the ranks; principals were busy winning new work. The departure of several key principals thus proved untimely losses for TAC—among them John Sheehy, Sherry Caplan, and Howard Elkus, the "supermarketer," who left with fellow principal David Manfredi in 1988 to establish Elkus Manfredi, a Boston firm now with a staff of 90.

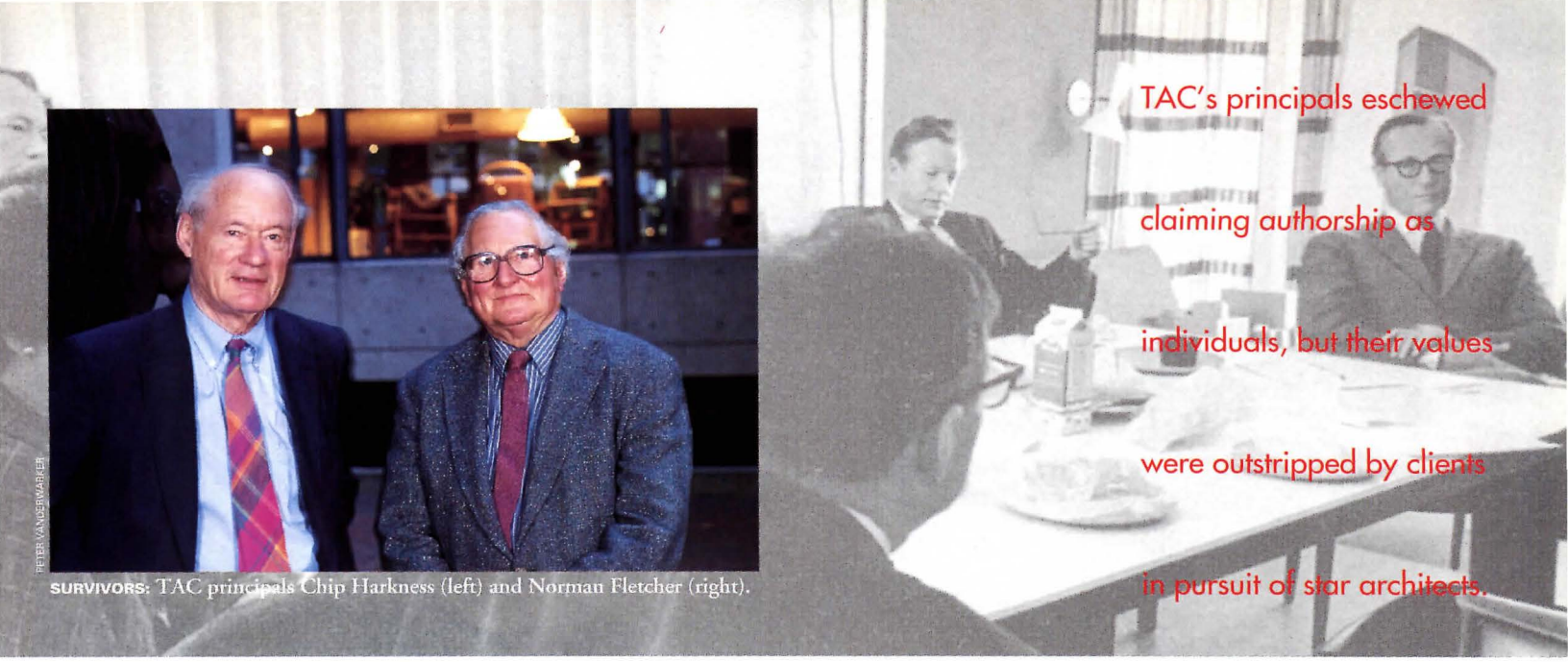
From 1984 on, TAC was appearing on fewer shortlists for major projects. "There was a long time when, if we got to the interview stage, we could get one in four projects," recalls Sheffield. "Then it went to one in six, and then one in eight."

Double debacle

The heaviest blows to the firm were dealt in 1990, when the U.S. office market bottomed out and the Persian Gulf War began. TAC had weathered the political vicissitudes of the Middle East before. Its 30-year engagement with the University of Baghdad would proceed smoothly "and then stop when there was a revolution," recalls TAC's former president John Hayes. Usually TAC's foreign and domestic markets worked cyclically—one flourished as the other flagged—but this time both were in trouble.

Because of the United Nations sanctions against Iraq, $1 million in TAC's fees sat frozen in the Rafidain Bank in Baghdad, where it remains. Owing to the destruction of Kuwait, where TAC had seven projects in progress, another $500,000 or so went uncollected from associated Kuwaiti architects. TAC struggled between 1990 and 1992 to pay its bills while being stiffed on all sides.

By 1992, bankruptcy looked probable: TAC had been missing payments to its 22 stockholders—senior associates, vice presidents,



PETER VANDERMARK ©

SURVIVORS: TAC principals Chip Harkness (left) and Norman Fletcher (right).

TAC's principals eschewed claiming authorship as individuals, but their values were outstripped by clients in pursuit of star architects.

and former principals who took equity buyouts upon leaving the firm. Bankruptcy was averted, however, after the remaining principals worked out a turnaround plan to pay vendors, stockholders, and the landlord by cutting staff—while entirely forgoing their own income.

Mounting arrears

For two years, TAC's relationships with its trade creditors and outside stockholders were nervously overseen by Boston's BayBank, to which TAC owed $380,000 in 1992. (All but $18,000 had been repaid by this year.) The bank, TAC's only secured creditor, was willing to bide its time and hold off foreclosure because, apart from TAC's small outstanding balance, it had issued to TAC several unsecured letters of credit on which creditors could call if they wanted to press the firm into folding.

This delicate balance lasted until early this year. The outside stockholders waited for two years for TAC to dig itself out of debt before one of them broke ranks with the rest and sued TAC for his stock losses.

"It was a lawsuit that had no defense," insists Hayes, who stepped down as TAC's president in 1989, but resumed the post in 1992 when the firm's crisis deepened. "The shareholder was out the money and so were we." Nevertheless, the plaintiff, former principal Peter Morton, won a judgment to collect from TAC in early April.

Morton's suit fatally upset TAC's fragile relations with its landlord, Harvard University. In the early 1980s, TAC sold its Brattle Street building to Harvard and leased it back for $750,000 a year. By this spring, TAC was behind in its rent. In an April 5 meeting, BayBank decided to allow Harvard to call on part of TAC's letter of credit for its overdue sum; TAC would repay the bank in installments.

Then came word of the judgment won by Morton. If TAC settled with Morton, BayBank feared a rush of claims by other stockholders, and a manifold increase in the bank's losses. On April 7, the bank "decided they didn't want to swim with us," Sheffield says. The bank took over TAC's accounts receivable and locked the firm's doors. There was no bankruptcy, only liquidation.

The firm's pension plan plunged in value—payouts were based on people leaving the firm gradually, not all at once. Some of TAC's principals were past retirement age, and others were young enough to start over; some, like Sheffield, 62, and Hayes, 63, were on the cusp, and will receive much less of their retirement funds than expected.

Among the greatest casualties of TAC's demise were the firm's archives, which were stacked 14 feet high in a Cambridge warehouse. BayBank prepared to auction off the historic collection piece by piece to recoup what it could, but a group of architects and academics raised $7,000 to save it. Harvard bought TAC's slides, the Boston Architectural Center purchased its books, and the Massachusetts Institute of Technology took five decades' worth of drawings.

As the bank parceled out TAC's effects, architects nationwide wondered what went wrong—how such a mainstay could fail so dramatically. There were suggestions that the firm lost sight of its ideals.

In fact, TAC's principals hewed too closely to the firm's collaborative credo, when what they needed most was strong executive leadership. TAC's original mission grew obsolescent and ill-informed as the architectural profession changed radically around the firm.

Management vacuum

The chief problem was business judgment, which, because of TAC's collaborative style, was not one person's fault, but everyone's. The firm failed to act like a profit-making enterprise. If it had, it would have balanced its commitments more carefully among markets and tempered its appetite for work with its capacity for debt. When the debt load loomed too large, TAC's principals should have controlled overhead and cut staff—perhaps even before it became critical.

Collaboration obscured individuals' responsibility to acknowledge their own shortcomings and defer to the strengths of a leader. As a result, TAC became a monolithic organization with a leadership vacuum, or at least one with no strong fiduciary sense. The firm lacked the flexibility to respond as quickly as clients demanded, and it also resisted training its project managers in marketing and sales. "When you're entrenched the way TAC was," observes 81-year-old Sarah Harkness, "it's pretty hard to change."

John "Chip" Harkness, 79, contends that TAC fell prey to the architect's curse: "Architects like what they're doing, so they're willing to say, 'Well, you can only pay me half of what I should get.'" But he remains optimistic. This summer, Harkness and Norman Fletcher, who met when working for Eero Saarinen in the 1940s, and two younger partners opened a new firm, Fletcher Harkness Cohen Moneyhun, in Arlington, Massachusetts.

What have they learned? The more you borrow, the more dangerous your life is, Harkness attests. He vows never again to buy anything without "money on the barrelhead." Fletcher cautions younger architects not to accept work without regular payments from clients.

Their warnings are echoed by Hayes, citing a member of the AIA's Large Firm Roundtable who recently stated that 85 percent of his firm's work is overseas. "TAC was in that situation," Hayes notes dryly. Now, the firm is a shell corporation. Its former president bought out the TAC name and inflected it slightly, to the Architects Collaborative International, Inc.—reviving the old TAC spirit, Hayes says, but not its debts or liabilities. The new firm, he is quick to point out, operates in the black.—*Bradford McKee*

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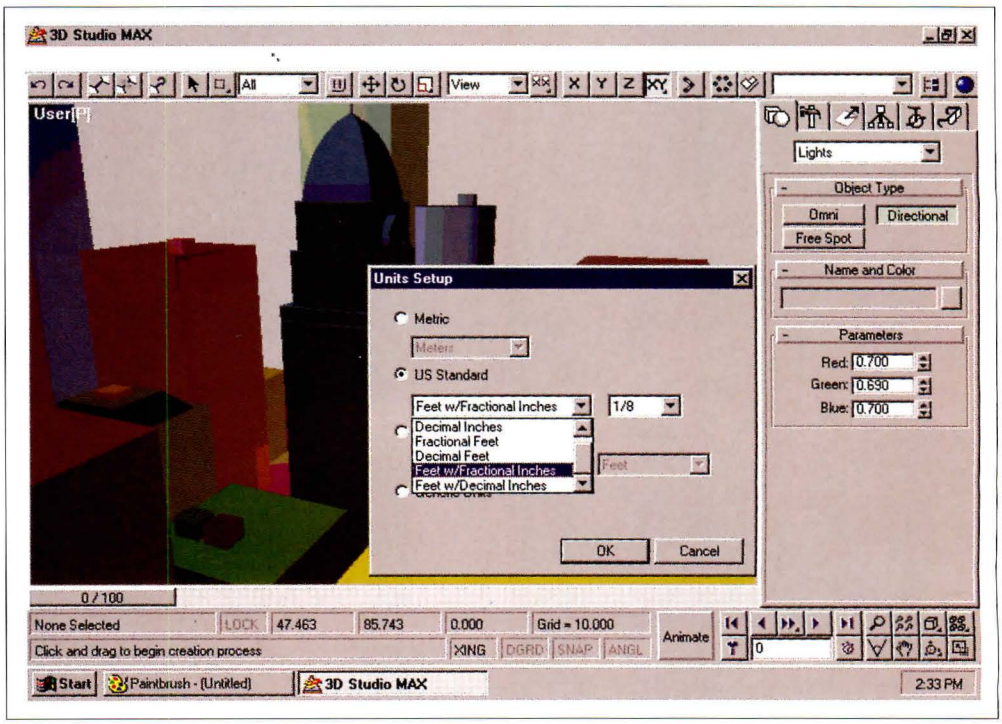
Visualization Frontiers

Rendering, modeling, and animation software is becoming easier to navigate.



ABOVE RIGHT: Autodesk's new 3D Studio MAX, to be released in 1996 on the Windows NT platform, will incorporate previous modules into a seamless, multitasking environment.

Architects have always sought new ways to communicate their design ideas, whether through carefully constructed perspective drawings or impromptu sketches on a napkin. Since even the simplest of designs can be incomprehensible to the average client, the search continues with increasingly sophisticated computer software.

The advent of the Intel-based personal computer in 1980 led a small group of pioneers to develop visualization software—any application that performs a combination of modeling, rendering, or animation tasks. But it was not until 1984, with Apple Computer's introduction of the Macintosh, that such programs became accessible to architects. Apple's graphical user interface (GUI), based on icons, became the foundation for the emergence of true visualization software. As a result, architecture firms that initially purchased Intel-based PCs for CAD production later decided to invest in Macintosh computers for their presentation needs.

The earliest architectural visualization products were developed at schools of architecture, such as ModelShop at Harvard University and form•Z at Ohio State University. Although ModelShop has wavered in its success, form•Z has become the preference of architects and schools of architecture for generating three-dimensional computer models. The application is the most comprehensive and intuitive of the modeling applications available for both the Macintosh and the PC. Once mastered, form•Z's modeling tools can generate virtually any geometric volume.

However, no software currently exists on the market that combines modeling, rendering, and animation at the same level of sophistication within one package. In addition to form•Z, produced by auto•des•sys, modeling software includes MicroStation Modeler and Sculpt 3D from Byte by Byte; other applications, such as Autodesk's 3D Studio, MicroStation Masterpiece, and StrataVision Studio Pro, have modeling modules, but

Solid modeling capabilities called Boolean operations are more intuitive and easier to manipulate than earlier point-based systems. Like a chisel in the hands of a sculptor, the software allows architects to subtract material from a block.

TOP: Sculpt 3D for Macintosh, from Byte by Byte, integrates surface modeling, materials editing, and texture mapping to produce realistic images.
ABOVE LEFT: Eisenman Architects' Banyoles Hotel Lobby, rendered by David Johnson of Arcathexis, was produced on Sculpt 3D's photorealistic rendering package.
FACING PAGE, LEFT AND RIGHT: Landa Residence, designed by Thom Mayne of Morphosis, modeled on auto•des•sys's form•Z, illustrates form•Z's "difference" tool, which creates shapes by subtracting volumes or surfaces.
FACING PAGE, TOP RIGHT: Steed Hammond Paul's Lakota High School amphitheater was modeled and rendered on form•Z to analyze spaces quickly.

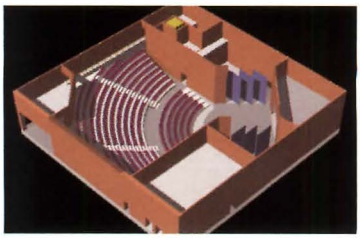
their true proficiency lies in rendering and animation capabilities.

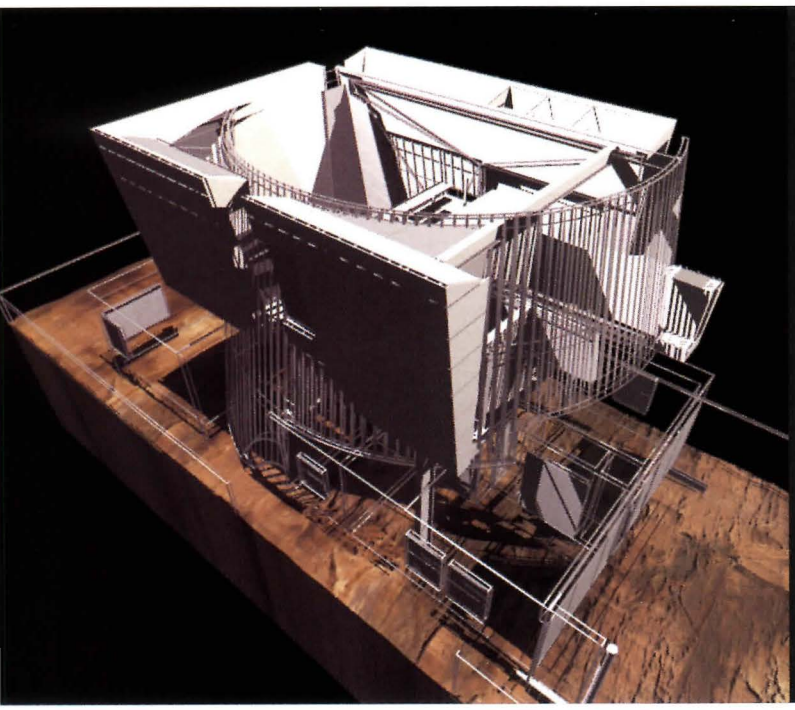
Progress in visualization applications is being made by traditional CAD software developers like Autodesk and Intergraph, which are now bringing new features to their products through Microsoft's Windows and the more recent Windows 95 operating systems. Autodesk's latest version, AutoCAD Release 13, offers a true solid modeler for creating complex architectural forms, while Intergraph/Bentley Systems' MicroStation Release 5 also includes a modeling environment. This shift from computer-aided drafting software to computer-aided visualization applications on the Windows platform is great news for the architecture community.

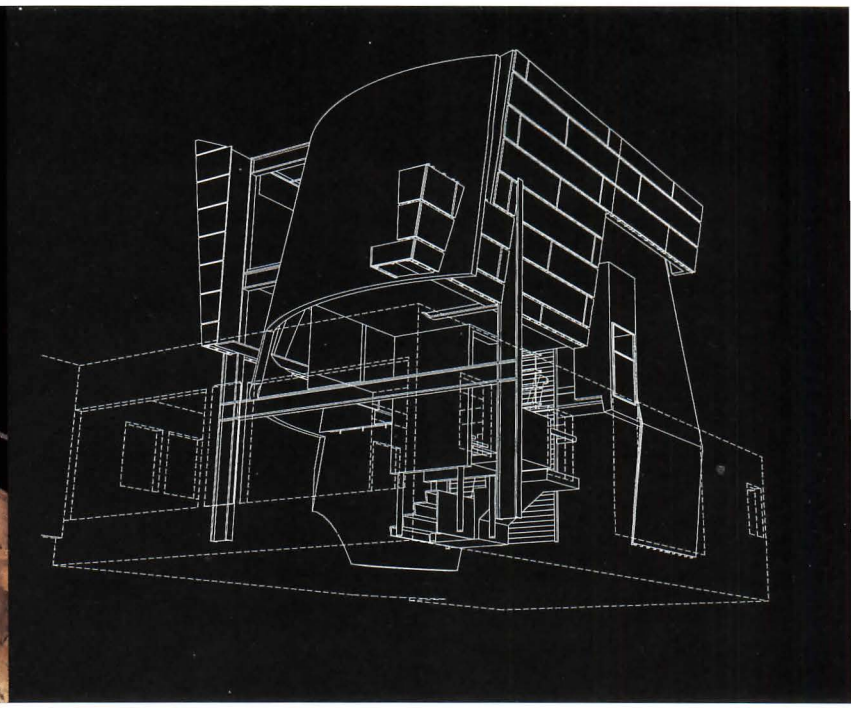
Research shows that most architecture firms have stayed with their original CAD application primarily because they are already familiar with its drafting tools and interface, and thus the learning curve for mastering new software from the same CAD manufacturer, such as a modeling module, is reduced. Many software developers, including auto•des•sys, that have traditionally developed software for the Macintosh, have begun to aggressively develop visualization applications for the PC platform, owing to the similarity of the Macintosh and Windows GUIs. This platform crossover means that architects can stay with their CAD system and yet have access to more powerful tools for enhanced design analysis and communication.

Most of the top visualization applications—including Sculpt 3D, 3D Studio MAX, Studio Pro, form•Z, and Soft FX, as well as AutoCAD Release 13—have solid modeling capabilities called Boolean operations, which are more intuitive and easier to manipulate than earlier point-based systems. They are like a chisel in the hands of a sculptor. From a block, the architect adds or subtracts material in order to achieve the final design; a room can be formed by either subtracting mass from the core or by intersecting

Spline-based and nonuniform rational B-splines (NURBS) modeling tools enable architects to create expressively curved structures. In spline-based modeling, the designer pushes and pulls on vertex points to reshape a three-dimensional form.







six additive surfaces to represent walls, floor, and ceiling. One feature, the "union" tool, produces a single object from the union of two volumes or objects. Another, the "intersection" tool, creates a form from the intersection of two volumes or objects, and the "difference" function derives an object from the difference of two volumes or surfaces.

Other visualization applications, through spline-based and nonuniform rational B-splines (NURBS) modeling tools, enable architects to draw precise curves. Spline-based modeling allows the designer to push and pull on vertex points in order to reshape elements of a three-dimensional model into the form intended. Architectural structures with expressively curved forms are perfect candidates for this visualization technique.

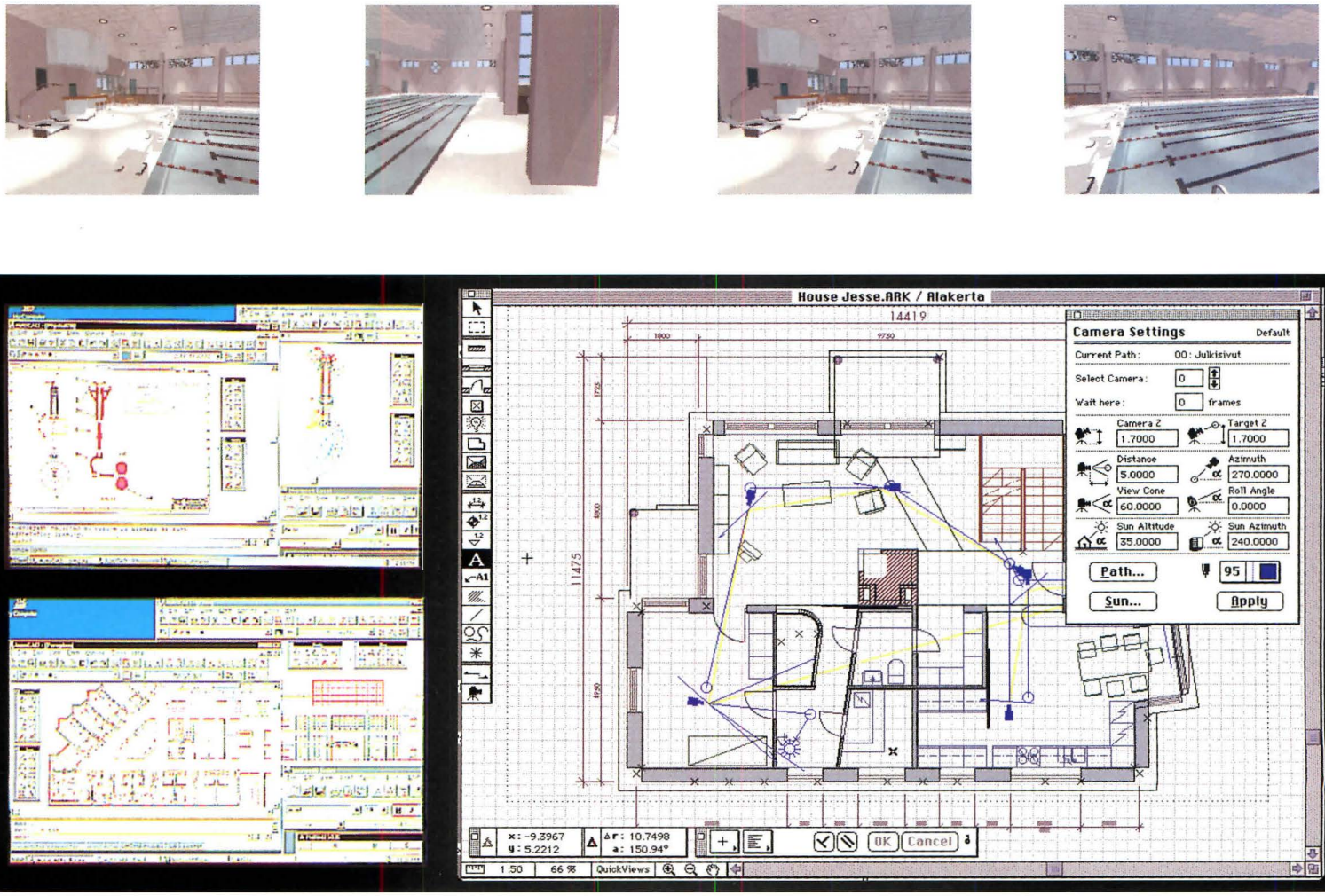
Traditional tools are also becoming more sophisticated. The tool "3D extrusion" gives depth to a two-dimensional shape, as when extruding a floor plan to illustrate volume; "3D sweep" moves a two-dimensional shape along a path to create elements such as a staircase railing. "Lathing" creates three-dimensional volumes of circular symmetry by first drawing two-dimensional profiles, then revolving the profile about the z-axis, which defines the third dimension.

Software developers are also adding more features to model a proposed site. Terrain modeling, for example, allows an architect to show topography in three dimensions and analyze the best location for a building's footprint. Using form•Z, an architect can either draw the site's two-dimensional contours on the computer directly, or digitize the site and then trace the contours. Once the two-dimensional data have been drawn, the height between the contours is entered and a step, mesh, or triangulated contour model can easily be generated.

Architecture has always been influenced by the path of the sun. New visualization software offers ways of analyzing daylight with built-in databases that generate sunlight analyses for any location in the world, at any time of the day, for all 365 days of the year. For example, three-dimensional models generated in 3D Studio from Autodesk, in conjunction with Imagine Sun software by Schreiber Instruments, can be used to create an animation sequence that will illustrate the light's path as it travels across the models, from sunrise to sunset for any given day.

The next generation of Autodesk's application, 3D Studio MAX, scheduled for a March 1996 release, promises to be equally strong in modeling, rendering, and animation, and will operate on the Windows NT platform. Unlike its predecessor, 3D Studio (DOS), and many other visualization applications that assign separate modules for modeling, applying materials, rendering, and animation, the architecture of 3D Studio MAX will be based on a moduleless interface.

Previously, 3D Studio's two-dimensional model was created in 2D Shaper, given a third dimension in 3D Lofter, then exported



TOP, LEFT TO RIGHT: Apple Computer's new QuickTime VR (QTVR) creates virtually real environments with navigable panoramic shots of the site. Natatorium animation sequence was produced using QTVR on ArchiCAD Version 4.55 from Graphisoft.
ABOVE LEFT: Camera settings and walk-through paths in ArchiCAD's QTVR are set up in the animation module; "VR Maker" application creates files for panoramic sequences.
FACING PAGE: Once rendered by VR Maker application, animation is compiled on a frame-by-frame recorder for playback in real time.

into 3D Editor for fine-tuning and application of materials from a different module, Material Editor. Final rendering of still perspectives was completed in 3D Editor and animations scripted in Keyframer. Now, modeling, texture and material application, rendering, and animation can all be done within the same environment, in a seamlessly integrated manner with immediate on-screen results. As has long been requested in previous versions, a ray-tracing renderer will either be included as part of the core 3D Studio MAX product or as a plug-in application.

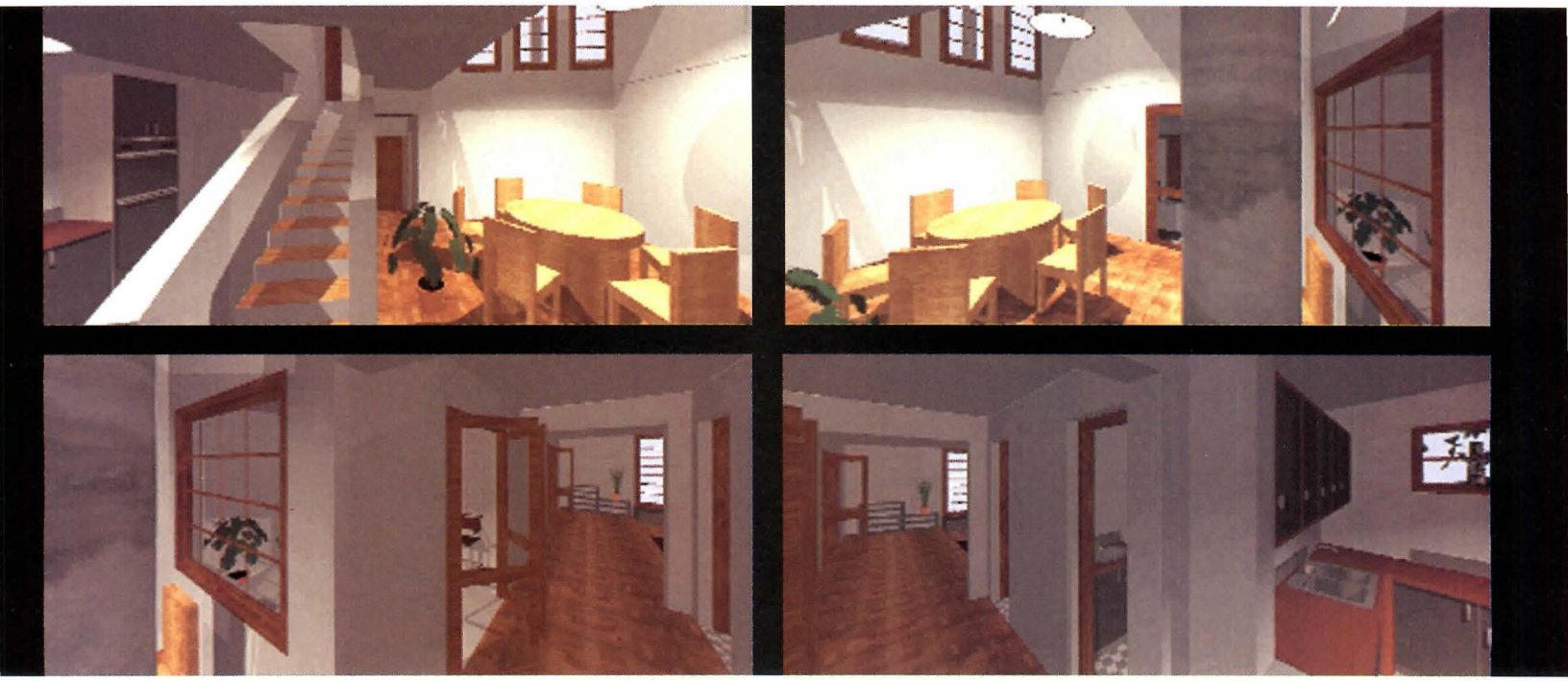
The advanced modeling tools of 3D Studio MAX will include a full set of polygonal and spline-based modeling tools, which will allow architects to select from a series of basic shapes to create three-dimensional forms in a single visualization environment. Since 3D Studio MAX is designed for the Windows NT operating system, multitasking will be possible with this application—for example, while the architect is creating a three-dimensional model, a walk-through can be animated at the same time in the background.

QuickTime VR (QTVR) is another new technological advance in modeling. Developed by Apple Computers, it allows Macintosh and Windows users to experience spatial interactions using only a personal computer with a mouse or trackball and a keyboard. No special hardware or accessories are needed.

QTVR uses an innovative 360-degree panoramic photography technique that enables virtual reality (VR) experiences of real-world spaces. Instead of relying on an artist's rendering of the Sistine Chapel, the user navigates a photographic image of the space with the mouse. Moving through rooms is accomplished by clicking on "hot spots" and zooming in on areas of special interest.

Context can also be represented through QTVR. Traditionally, architects take photographs of a streetscape, then glue them together to create a 180-degree view of the site. These prints can now be scanned into the

QuickTime Virtual Reality (QTVR) uses an innovative 360-degree photography technique to create virtual experiences of real-world spaces. Apple Computers developed QTVR as an extension for both the Macintosh and Windows platforms.



computer and, using QTVR's Authoring Tool, seamlessly stitched together to create a panoramic image. The panoramic file is "diced" to correct distortions and compress the file. Finally, the "MakeSingleNodeMovie" command takes the diced file and creates a movie from the photographs, allowing the architect to "walk" around the site and analyze the surroundings with a 360-degree view.

ArchiCAD Version 4.55 from Graphisoft also enables architects to create movies of a project. Nodes, representing cameras, are placed in the top view of the three-dimensional model and the file saved as a VR data file. By double-clicking on the VR data file, the VR Maker application (an extension of the core ArchiCAD application) is activated, and VR panoramic files are consequently created. The first panoramic file is opened, and once saved, the other panoramic views are compiled into one QTVR navigable movie, which can be played back on any Macintosh or Windows-based computer.

These panoramic movies differ from animated walk-throughs in that for a walk-through, a predefined path is set up in the animation module, and the camera simply follows the path to render the walk-through. Once rendered, the animation is then compiled on a frame-by-frame recorder in order to be played back in real time. A QTVR panoramic movie, on the other hand, needs only a personal computer with a mouse or trackball and a keyboard to experience the proposed space via any path chosen.

Furthermore, Apple's QTVR is an extension of the Macintosh and Windows operating system, a technology developed with an interface inside common visualization software such as ArchiCAD and StrataVision. This tool for generating a virtual reality panoramic movie retails for less than $500.

Several visualization software developers, including Autodesk and Strata, have already begun to incorporate the ability to save files in virtual reality modeling language (VRML) format for transmission across the Internet, which will have a major effect on the way architects share and visualize their designs. Animations, renderings, and three-dimensional architectural models created with a visualization application such as 3D Studio MAX can be saved as a VRML file and uplinked to a home page on the World Wide Web for access by the design team or client.

The new technology is on its way to becoming a mainstay in the same manner that CAD has. Remote designing will become accepted business practice as on-line networks like the Web evolve from text and graphics to full motion-video format and animation with sound. The future promises even more visualization software with architectural implications. Stay tuned.—*Curtis B. Charles and Karen M. Brown*

Curtis B. Charles and Karen M. Brown are principals of Miami-based C4 Studio, a firm specializing in architectural presentations.

photovoltaics Competition

ARCHITECTURE magazine and AIA Research are pleased to announce a competition to explore innovative applications of building-integrated photovoltaic systems, which convert sunlight into electricity by means of solar cells. The competition is funded by the National Renewable Energy Laboratory with support from Cooper-Hewitt, National Design Museum of the Smithsonian Institution.

PROGRAM

Competitors may enter in either of two categories:

- Category One—Design a photovoltaic-powered visitors' pavilion celebrating American sports.
- Category Two—Open submission. Competitors are encouraged to submit research, new ideas, or projects powered by photovoltaics.

JURY

- Peter Bohlin, FAIA, Principal, Bohlin Cywinski Jackson
- Nicholas Grimshaw, RIBA, Hon. FAIA, Principal, Nicholas Grimshaw & Partners
- Donald Prowler, FAIA, Principal, Donald Prowler & Associates
- Steven Strong, President, Solar Design Associates

ELIGIBILITY

This competition is open to practitioners in architecture, building engineering, urban planning, and related fields. Entries may be submitted by individuals or teams. Employees of the National Renewable Energy Laboratory and students are not eligible.

AWARDS

In each category, winners will receive a first place prize of $7,500. A $2,500 citation and a limited number of honorable mentions will also be awarded. Winning entries and other selected entries will be exhibited at the AIA convention in Minneapolis, May 10-12, 1996; at the U.S. Department of Energy's Showcase of Energy Efficiency and Renewable Technologies in Atlanta in July 1996; and at the National Renewable Energy Laboratory Visitors' Center in Golden, Colorado, in 1996. The results of the competition will be published in ARCHITECTURE.

REGISTRATION

The registration fee is $75 for AIA members and $90 for nonmembers. To receive a complete set of competition materials, or for additional information, contact Stephanie Vierra at AIA Research, 1735 New York Avenue, N.W., Washington, D.C., 20006. Phone (202) 879-7752, or fax (202) 626-7425.

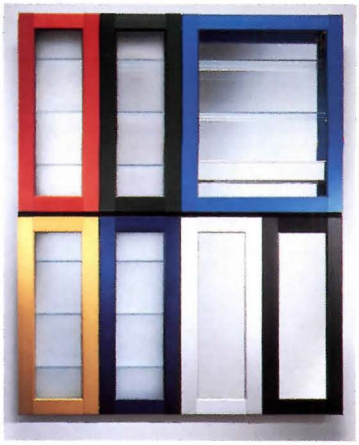
DEADLINE

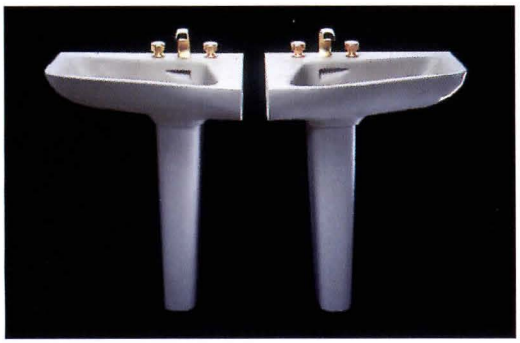
Entries are due on March 18, 1996.

JOE REID AND JOHN PECK PHOTO

Products

Cabinets, sinks, and fixtures update kitchens and bathrooms.





TOP: Sub-Zero's 700 Series of built-in refrigerators are designed in dimensions compatible with standard cabinetry and narrower than conventional units. The line consists of a tall unit and a base unit, both 27 inches wide and 24 inches deep, which can be assembled in several combinations. The 34 1/2-inch-high base unit has two drawers for either refrigerator or freezer space. The tall unit, measuring 80 inches high, contains a cabinet and two drawers and can incorporate refrigerator units, freezer units, or both.
Circle 401 on information card.

ABOVE: Axel Enthoven, a Belgian industrial designer, has created a line of bathroom fittings for Absolute, a division of American Standard. Enthoven's asymmetrical sinks solve the space challenges of older bathrooms. The corner pedestal design offers generous counter and bowl space for small areas: when located in opposite corners of a bathroom, the pedestals consume one-third less space than conventional two-basin countertops. The sink measures 28 1/2 inches wide by 20 1/2 inches deep and is available in two heights, standard and tall, of 31 1/2 inches and 35 1/2 inches. The pedestal is available only in white.
Circle 402 on information card.

TOP RIGHT: The F Series from Robern consists of cabinets with doors framed in colorful anodized aluminum. The simple rectangular frame is available in a number of cabinet sizes with widths from 16 to 24 inches, heights of 30 or 40 inches, and depths from 4 to 8 inches. The modular units are offered in a broad palette of colors, including silver, gold, black, blue, green, turquoise, and red. Inside the cabinet, the back is mirrored and the glass shelves are fully adjustable; an optional interior shelf light is compatible with all cabinet sizes. The glass doors of the cabinet can be specified with clear, double-sided mirror, and lightly or heavily frosted finishes.
Circle 403 on information card.

ABOVE, CENTER: Waterworks represents national and international manufacturers of bathroom fixtures and accessories. The company's Bruges line of sinks are manufactured from hammered weathered copper or hammered satin nickel and are available in round models with 12-inch and 16-inch diameters, as well as ovals measuring 10 by 14 inches. Waterworks also offers ceramic tile, mosaic, and stone surfacing, including antique limestone flooring in a 6-by-6-inch paver.
Circle 404 on information card.

ABOVE: Girotondo is a new collection of faucets and fittings for tubs and basins from Hastings Tile & Il Bagno Collection. The line is available in chrome, satin chrome, gunmetal, or gold finishes. The round knobs serving as decorative handles for the fixture and the ring around the bases can be ordered in white, red, black, yellow, and blue epoxy enamel in addition to the four metallic finishes.
Circle 405 on information card.

Products

Energy-efficient faucets
Presto faucets (above) from Bradley meter water flow automatically for energy conservation but allow users to control water temperature. The faucet has an activation lever that operates with less than five pounds of pressure, supplying water for 15 seconds at .7 gallons per minute, well below government standards. Presto faucets are also vandal-resistant: should a user attempt to trigger continuous water flow, a safety device automatically shuts off the system.
Circle 406 on information card.

Classic faucets
Chicago Faucets is reissuing its 95-year-old commercial faucet design for residential use. The Architectural line (above) is ADA-compliant and available in 15 chrome-plated models. Options include faucets with one or two foot pedals, and gooseneck, 6-inch and 12-inch standard, 13-inch double-jointed, 8-inch single-bend standard, or high-arch spouts. Handles, mounts, and spouts can be interchanged to serve different needs.
Circle 407 on information card.

Granite sinks
Franke's new triple-compartment sink (above), from its Artisan collection of multiple-compartment sinks, is manufactured from granite in a resin composite that purportedly resists cracking, chipping or staining. It is available in four colors: iceberg, sand, boulder, and flint. The new line is compatible with the manufacturer's Completely Franke Sink Systems, which include water-filtration systems, waste disposers, and other products.
Circle 408 on information card.

Quarter-round basins
Kohler's Undertone line of undercounter stainless steel sinks includes the quarter-round basin (above), which measures 16 inches wide and more than 7 inches deep. Used singly or with other models, such as the five-sided basin, 2-inch-deep tray, or 15-inch-diameter circular basin, the quarter-round basin is well suited to corner installations. Also available from Kohler is the Provence faucet with an integral pull-out sprayhead (above).
Circle 409 on information card.

Glass-surfaced cooktop
The Touch Top cooktop from Dacor (above) features fingertip electronic controls. The cooktop is available in 30-inch and 36-inch depths, with a choice of 6-inch, 1,000-watt or 9-inch, 2,400-watt cooking elements. The smaller model has four elements; the 36-inch-deep model (above) has five. Red lights beneath the surface of the cooktop indicate temperature levels. The uninterrupted ceramic-glass surface is available in black or white.
Circle 410 on information card.

Range hood
Abbaka, an importer of European kitchen ranges, hoods, and designer sinks, has introduced a remote ventilator option for its range hoods (above), enabling either external or internal ventilation systems. An adjustable-speed switch controls intake rates, offering uptakes from 1,000 to 2,400 cubic feet per minute. The welded stainless steel hoods incorporate two lighting options: vapor-tight light fixtures (above) or sealed-quartz halogen spots.
Circle 411 on information card.

Kitchen cabinets
The Contralto cabinet series from Snaidero (above), designed by Giovanni Offredi, is distinguished by ergonomic features such as a two-tiered worktop. A drop-away toe kick makes base cabinets appear to float over the floor. The Contralto line has six surfacing options: white, cream, and black laminate colors; lacquer colors in blue and teal; and a wood finish. Snaidero also manufactures sinks, suction hoods, and other kitchen fixtures.
Circle 412 on information card.

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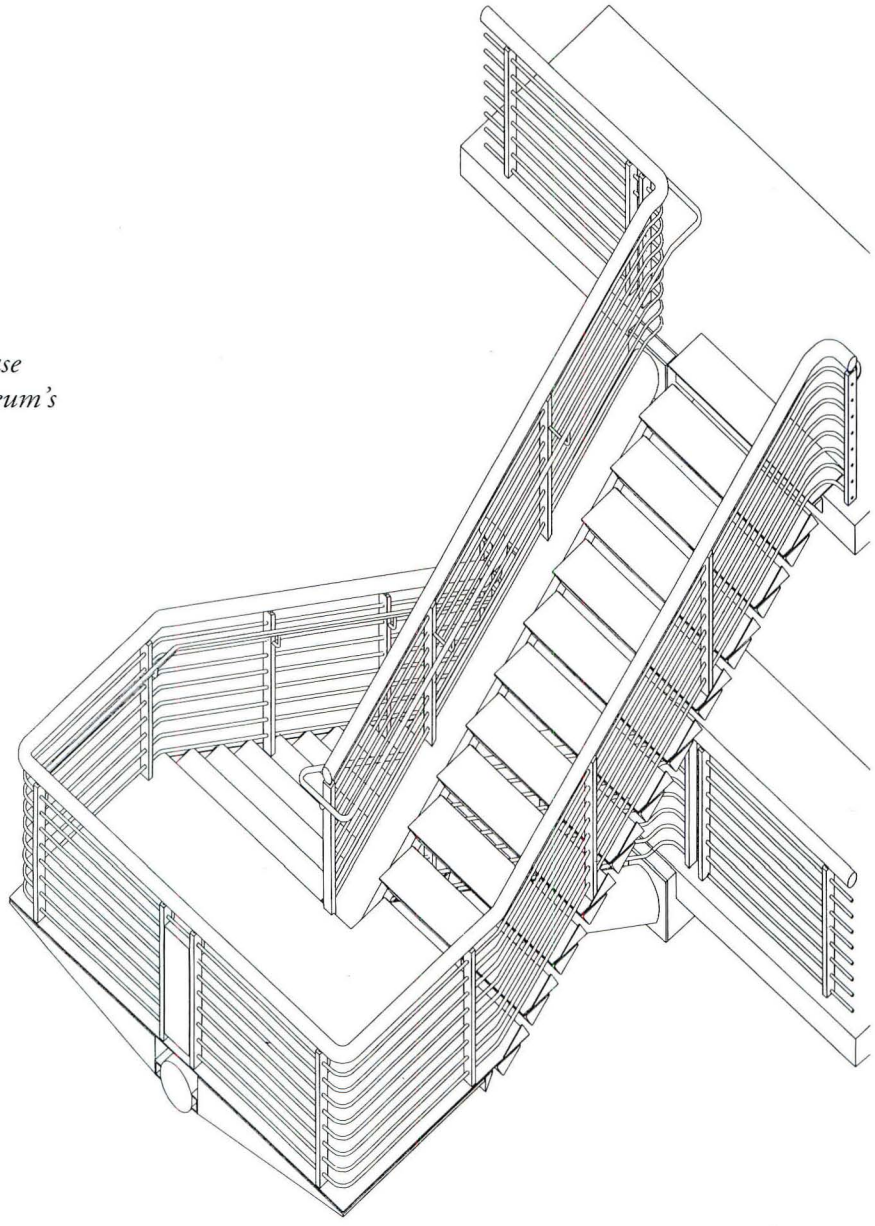
Details

A cantilevered staircase heightens a new museum's spirit of invention.



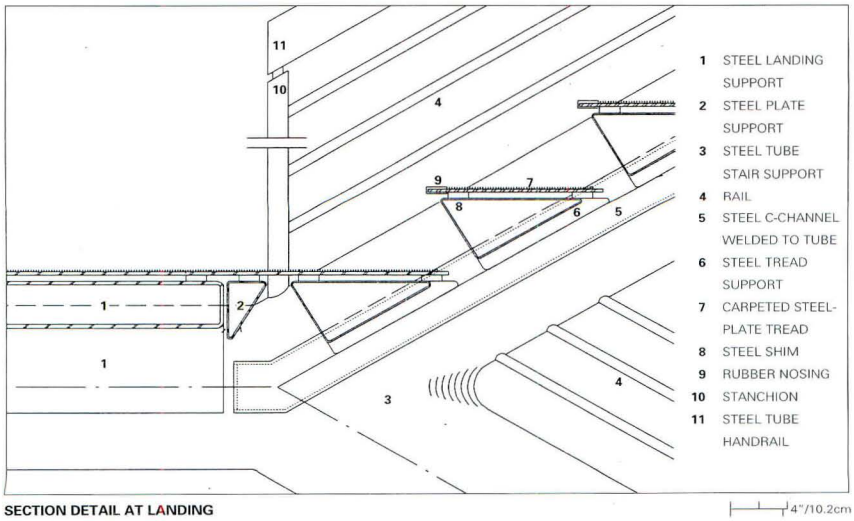
Inventure Place
Akron, Ohio
Polshek and Partners Architects

Collaborating with Ove Arup & Partners, Polshek and Partners designed a triple-cantilevered staircase that appears to defy gravity as it extends over the 97-foot-high atrium of Inventure Place, a new museum in Akron, Ohio (pages 60-69). The flying stair is cantilevered from five narrow floors lined with exhibits. These floor slabs measure 21 feet wide; 9 feet of each floor is cantilevered from a concrete shear wall on the building's north face.

Each flight is supported by a 12-inch-diameter tubular steel spine shaped like a sideways Y. The two extensions of the Y are fastened at the edges of the upper and lower floors to steel angles embedded within concrete beams. These extensions converge midheight at their tubular stem, which supports a steel-plate landing.

The steps are affixed to this structural spine with a 4-by-1 3/4-inch C-channel welded to the outside face of the tube. Hollow, triangular 1/8-inch-thick steel supports are cantilevered from the C-channel, forming the risers and supporting 1/4-inch-thick steel-plate treads. The outside edge of each tread is folded upward to form a triangular end-piece. The treads rest on 1/2-inch-diameter steel shims, creating the illusion that the treads float above their triangular supports.

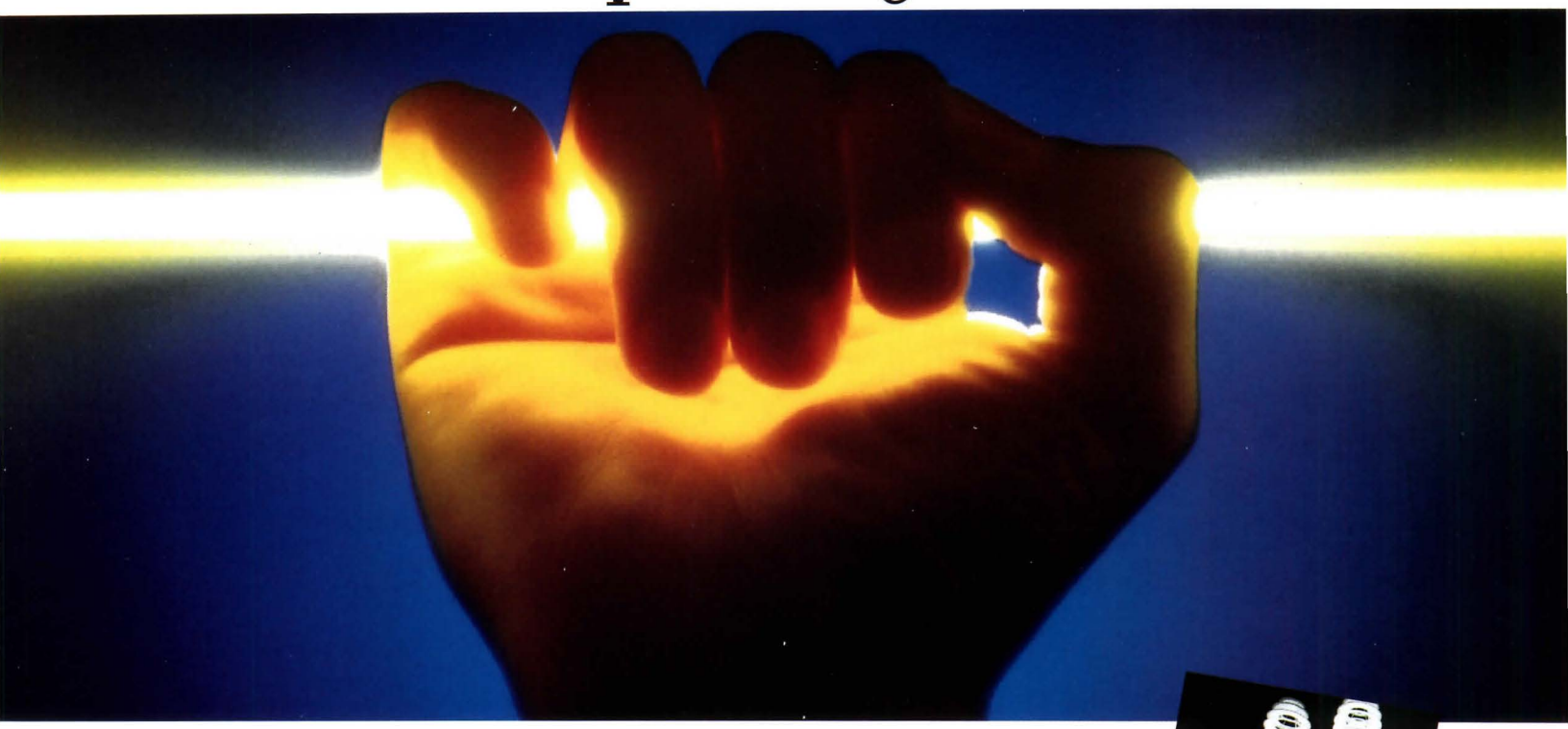
The treads are carpeted and edged with abrasive rubber; 3 1/2-inch-diameter steel tubes form the handrails; and the rails consist of 3/4-inch-diameter steel rods welded to 1 1/2-by-3-inch steel stanchions.—*A.C.S.*



SECTION DETAIL AT LANDING

JEFF GOLDBERG/ESTO

Grip on Light



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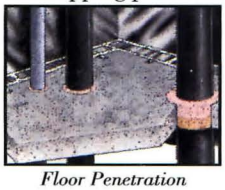

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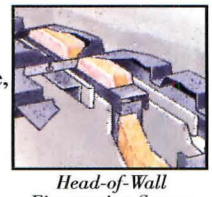

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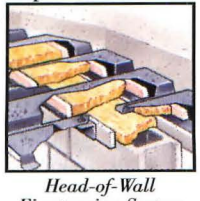

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