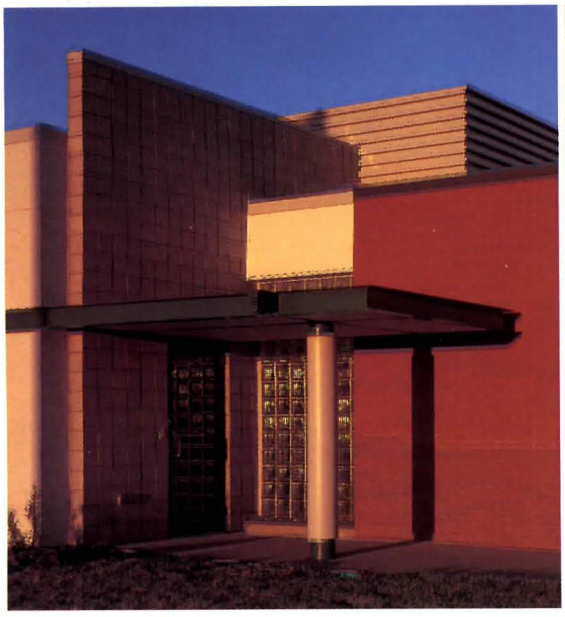
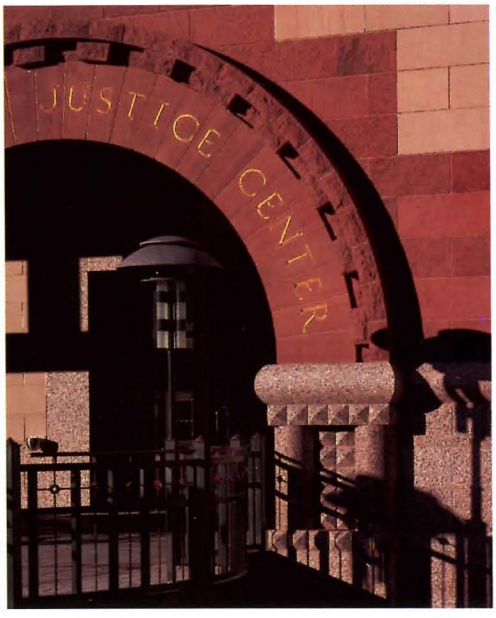
ARCHITECTURE

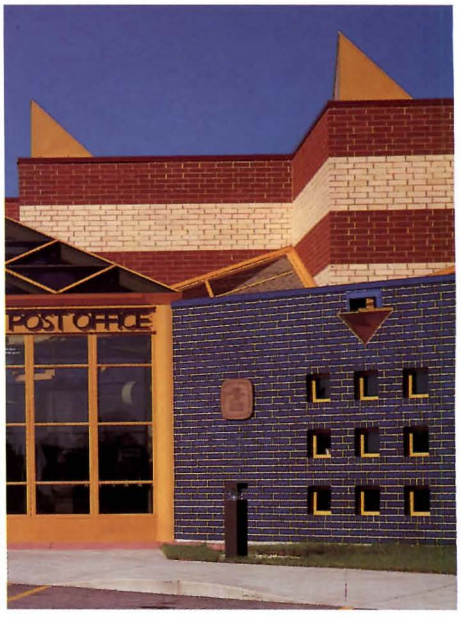
FEBRUARY 1991



PAGE 48

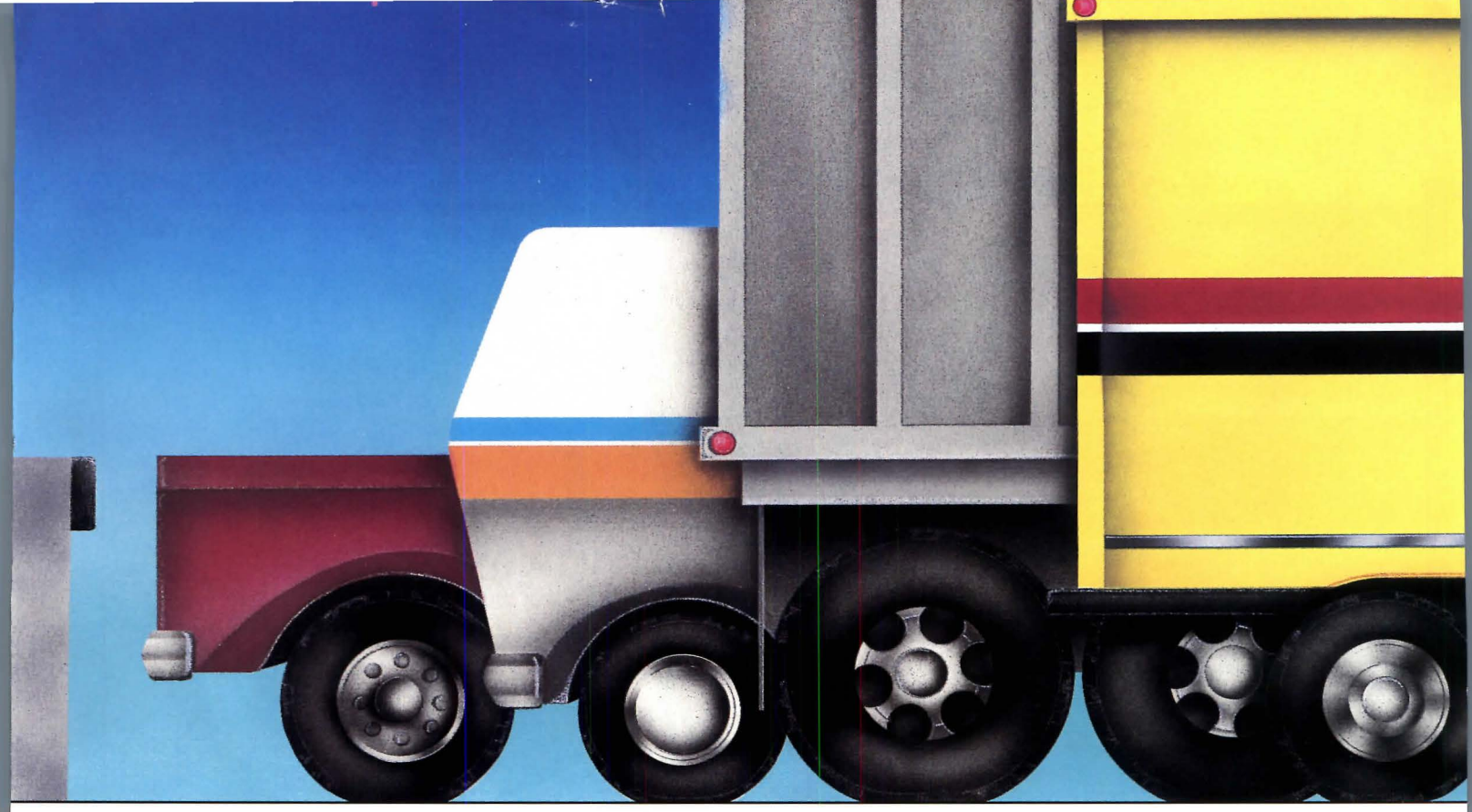


PAGE 64



PAGE 70

DESIGN



Why Every Dock Needs A Lift.

It's simple. Not all truck beds are the same height. Not even a loading dock equipped with a dock leveler can handle the three foot variation in today's truck bed heights.

The solution? Give your dock a lift!

At a raised concrete dock, a dock lift can handle all the trucks that fall outside the limited working range of dock boards or levelers. Plus, dock lifts can provide dock-to-ground access, thereby eliminating the need for dangerous and expensive concrete ramps.

At a ground level building, a dock lift *becomes* the loading dock. Which eliminates the need for costly truck well recesses.

Just as important, dock lifts enhance the safety of your loading dock operation because loads are transferred on a level plane. Runaway loads and the physical pushing and shoving associated with ramps are eliminated.

Why Advance?
Advance is the nation's leading manufacturer of dock lifts. We've specialized in them since 1974. Which means that our equipment design, manufacturing processes and component costs make for the best dock lift value in the industry.

Superdok™ dock lifts from Advance. The most dependable and cost-effective way to "give your dock a lift."

Call **1-800-THE DOCK.**

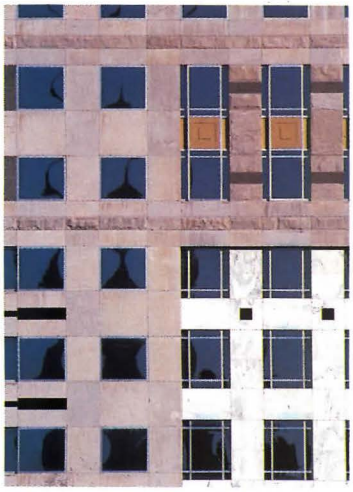
ADVANCE LIFTS

Advance Lifts, Inc. 3575 Stern Ave.
St. Charles, IL 60174 708-584-9881

"Every Dock Needs A Lift."

Circle 31 on information card

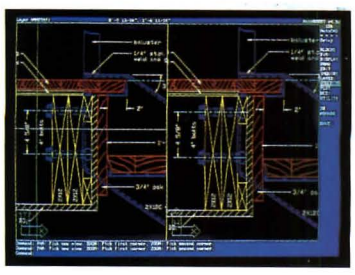
TECHNOLOGY & PRACTICE



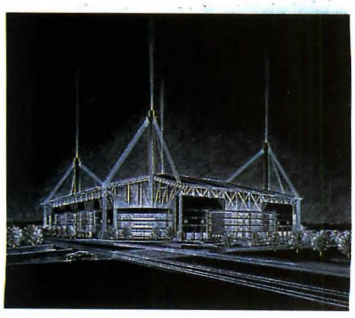
PAGE 79

PAGE 101

DEPARTMENTS



PAGE 109



PAGE 38

COVER:

Aquarium of the Americas, New Orleans, Louisiana, designed by The Bienville Group (page 52). Photograph by Timothy Hursley

NEXT MONTH'S ISSUE:

Annual review of American architecture
AIA awards
Structural steel innovations
Computerized specifications

ENERGY ADVANTAGE™ LOW-E

Combined performance

Environmentally Conscious Architecture: A Call for Entries

OVER THE PAST YEAR, ARCHITECTURE HAS COVERED THE GROWING SENSITIVITY to environmental issues within the architectural profession and building trades. We have reported news of the AIA's Committee on the Environment, its plans for a resource guide to specifying sustainable and nontoxic building materials, and a conference devoted to environmental issues held last November. We have featured editorials, news stories, and technical articles on topics such as energy-efficient glazing, wastewater recycling, solar heating, and photovoltaics. Now it is your turn to help us advocate ecological architecture even further.

This month, we encourage you to enter a competition sponsored by the AIA's Committee on the Environment and the AIA/ACSA Council on Architectural Research that will result in an exhibition and catalog of environmentally conscious architecture. Registered architects are encouraged to submit completed buildings or projects that clearly demonstrate innovative ways of solving environmental problems. Entries will be screened by a jury of architects and environmental scientists, and selected projects will be exhibited at the AIA national convention in Washington, D.C. ARCHITECTURE will also publish the results in our May 1991 issue.

The jury will evaluate an entry in terms of its relationship to site conditions, energy and water conservation, waste management, and building materials and systems. Each submission should indicate clearly how it addresses these critical environmental concerns. Ideally, the buildings and projects should contribute positively to the health of their occupants; not damage their surroundings during construction or use; derive energy from renewable sources; and not incorporate materials obtained from threatened species or environments. To enter the competition, architects must meet the following requirements:

- Projects must be submitted by a registered architect;
- Entries are limited to completed projects or projects completed through design development, with the owner's approval to proceed with construction documents;
- No hypothetical projects are eligible;
- Entries may be new buildings, additions, or renovations of existing facilities; other types of projects will be accepted at the discretion of the jury.

Submission binders must be received at AIA headquarters, 1735 New York Avenue, N.W., Washington, D.C. 20006, no later than February 22, 1991. For more information about submission requirements, contact Stephanie Urban at the AIA/ACSA Council on Architectural Research, (202) 785-2324.

The AIA/ACSA competition and resulting exhibition is called "Making a Difference." With your efforts, it will. ■

—DEBORAH K. DIETSCH

Coke puzzle

Your feature on the World of Coca-Cola building in Atlanta left me full of questions. Where had I seen this building? References to Aldo Rossi and Arata Isozaki were clear, but there was something about that gridded pavilion with the "Coca-Cola" frieze that bothered me. Was it the peculiar way the corner was cut out expressing the non-structural nature of the frame?

A quick look through some old journals helped identify the source of my anxiety. The gridded pavilion is a shameless appropriation of James Stirling's addition to the Tate Gallery in London. Do you think Stirling's barrister would be interested in this coincidence? Keep on supplying us with these interesting puzzles.

Raul A. Rosas, AIA
New York, New York

Questioning logic

Your article on working drawings ("Drawing from Logic," December, 1990) has me both laughing and crying. I am referring specifically to the sample working drawing on pages 108-109. The idea that the worker in the field is going to stop to translate a code number into English—no matter how conveniently located in the legend—is simply laughable, and it would a crying shame if the whole profession converted to such an unworkable system.

Being responsible for getting the contractor to conform with the drawings, I can tell you that it is often a miracle to get the contractor to study the drawings carefully. In many cities, the workers barely speak English, so the artfully worded notes on our drawings barely have effect. The idea of putting yet another layer of effort (and chance for error) into drawings is just wrongheaded.

I realize that the numbering system may have all kinds of advantages for coordination with specs, bidding, etc. But on the job site, this system for working drawings is a detriment, not a help. The system is a tribute to architects striving for order and systemization—and unfortunately, our detachment from reality.

Seth Joseph Weine
Weine Design Consulting
New York, New York

Enjoyable patronage

Just a note to indicate my enjoyment of your "Patrons of Architecture" issue (December 1990). It was interesting to learn that both Monaghan and Wexner had early architectural ambitions. The new format is great; please keep up the strong photo spreads.

Professor Andrew C. Ruppel
University of Virginia
Charlottesville, Virginia

Women's work

A few weeks ago, I learned about your upcoming issue on women in architecture. Your definition of women architects as those who create buildings seems entirely inappropriate.

Does not the making of architecture include research, criticism, activism, professional education of the general public? Why would a publication that includes articles on building evaluation, technological research, education, and the social status of the profession take an exclusionary approach to presenting the work of women architects who build, teach, research, write, and serve as community advocates?

A report entitled "Status of Faculty Women in Architecture Schools" says that the prevalence of traditional values at male-dominated schools serves to marginalize women's work. I suggest that when women fit themselves into an "old boy" elitist concept of the architectural profession, they not only contribute to their own marginalization, they miss an opportunity to create a more expansive, meaningful role in society for an essentially powerless profession.

Dr. Sharon E. Sutton
College of Architecture and Urban Planning
University of Michigan
Ann Arbor, Michigan

Editor's reply

ARCHITECTURE features both men and women architects in such areas as technology, education, and practice every month, but our primary focus is on completed buildings. In our October, 1991, issue devoted to women in architecture, we will also emphasize built work. Women have long been accepted within the profession as teachers, researchers, writers, and community activists, but very few are currently considered important designers.

February 20: John Miles Rowlett lecture series at Texas A&M University featuring E. Fay Jones, FAIA, will focus on design, practice/education, and service. The series will be held on the campus in College Station, Texas. Contact: Melissa Saul, (409) 845-3161.

February 21-23: Meeting of the AIA's Committee on Architecture for Justice, in New Orleans. Contact: Michael Cohn, AIA, (202) 626-7366.

February 22-23: "How We Build: Place, Time, and Architecture," a conference at the University of Virginia in Charlottesville. Contact: UVA School of Architecture, (804) 924-4304.

February 23-26: Meeting of the AIA's Historic Resources Committee, held in Washington, D.C. Contact: Chris Gribbs, AIA, (202) 626-7589.

February 23: Call for entries deadline for "Practice," sponsored by the Architectural League of New York, to feature the work of architects, designers, and planners who have been out of graduate or undergraduate school fot 10 or fewer years. Contact: (212) 753-1722.

March 21-23: Ninth Annual International Energy Efficient Building Conference and Exposition will include presentations of technical papers, case studies, and pre-conference workshops in Indianapolis, Indiana. Contact: (207) 780-5143.

March 27: CSI Products Show sponsored by the Metropolitan New York Chapter of the Construction Specifications Institute (CSI). The show will include more than 100 displays of the latest building products, in Long Island City, New York. Contact: (212) 753-1722.

April 19-21: Emerging Forms of Architectural Practice, a symposium sponsored by the Center for the Study of the Practice of Architecture (CSPA) in Cincinnati, Ohio. Contact: (513) 556-3415.

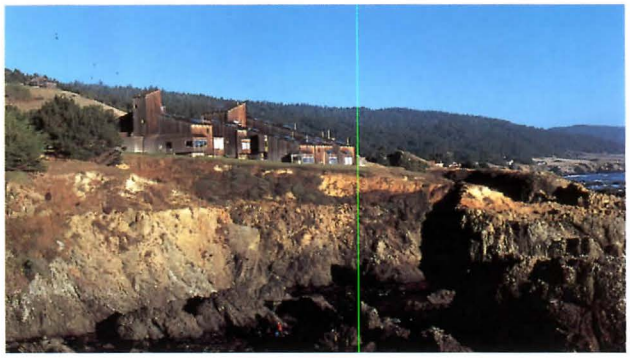
April 23: Lighting Day. A series of seminars and workshops that will explore the latest trends in lighting solutions, design, and products. Cosponsored by the Lighting World Trade organization in Long Island City, New York. Contact: (212) 753-1722.

NEWS

Global Architecture ▪ New L.A. and Cincinnati Museums ▪ Memorial Turmoil ▪ Alabama Civic Improvements

Sea Ranch Wins 25-Year Award

SEA RANCH CONDOMINIUM, A PARADIGM OF SENSITIVE ECOLOGICAL PLANNING AND ARCHITECTURE, was named the recipient of the American Institute of Architects' 25-Year Award. Designed by Moore/Lyndon/Turnbull/Whitaker and completed in 1965, Sea Ranch Condominium and Joseph Esherick's hedgerow houses were the prototypes for the famed development's subsequent additions along the Pacific Coast approximately 100 miles north of San Francisco.



CHRISTOPHER NOLL

With the resurgent interest in the environment, MLTW's Sea Ranch (above) offers a model of design sensitivity.

The environment of this 5,000-acre former sheep ranch on Highway 1 is rugged and uncompromising. Hills to the east of the highway are covered with redwood and Bishop pine, while moorlike meadows to the west slope down to rocky shoreline cliffs. The weather is cool, often foggy, and almost always windy. In describing Sea Ranch in *The Place of Houses*, Charles Moore and William Turnbull wrote that "houses which merged politely into the land would seem to provide little sense of security on this wild coast. Houses which stood out too strongly would emasculate those very astringencies which made the land special."

For this somber site, MLTW gathered 10 apartments, each basically a 24-foot, cedar-clad cube, around a courtyard and modified the complex by varying the condominium's shed roofs. Some units incorporate private gardens or greenhouses, and all face outward toward the rugged coastline or a pocket bay to the west. The residences are tightly clustered to create a cohesive entity rather than a series of disparate components.

Inspired by regional precedents, the Sea Ranch Condominium ignored many of the dictates of Modern architecture to became one of the most published, debated, and copied buildings of the 1960s. Although the condominium's idiom has been imitated in suburbs around the country, its essential integration of building and nature has been largely ignored. Even at Sea Ranch, some of the more recent additions have compromised the architects' original goals. Last year, however, William Turnbull won an AIA honor award for his employee housing at Sea Ranch, which exhibits the same sensitivity for the landscape, vernacular building forms, materials, and siting as the original condominium built more than two decades earlier. —L.N.

AIA BRIEFS

C. James Lawler, FAIA (bottom right, with his predecessor, Sylvester Damianos, FAIA) was inducted on December 7 as the new president of the AIA in Washington, D.C. Outlining his plans, Lawler stated, "Architecture is the most public of arts, but it cannot be accomplished by architects alone. It takes public appreciation and understanding to make it work. Our responsibility is to inspire the public to demand design excellence."

The 47-year-old architect from West Hartford, Connecticut, emphasizes the public's role in architecture, underscoring his objectives for the AIA as practitioners face a recession. Lawler, who has held many state and national positions over the last 10 years, is well equipped to establish continuity within the AIA and to improve communication within the organization and with its allied professions and the public.

As the head of a six-person practice, Lawler is often involved in his firm's projects from beginning to end. This hands-on approach to architecture, he maintains, gives him a better understanding of the typical AIA firm, and he intends to encourage the organization to focus more on the individual needs of its members. "Through better communication, the AIA can build on its success and learn from its failures," he said.

LYNNE LEWICKI

TOM BONNER

Armand Hammer Museum Opens in Los Angeles

Tucked behind the Occidental Petroleum Corporate headquarters in Westwood, California, Edward Larrabee Barnes's new 79,000-square-foot museum (left) displays the works of art collected by the late entrepreneur and oil magnate. The building presents a somber face to the street, while its intimate interiors are an appropriate setting for the collection. *Page 23*

DETAILS

Legorreta Arquitectos and landscape architect Laurie Olin are finalizing the design for Pershing Square, a 5-acre site in downtown Los Angeles. The project resulted from a 1985 design competition, won by SITE, but public controversy and bankruptcy of the Pershing Square Management Association in 1987 tabled the plans. The re-formed Pershing Square Property Owners Association, led by developers Maguire Thomas, commissioned Legorreta for a more conventional design.

D.J. DePree, founder of the Herman Miller furniture company, died on December 10. Under his direction, the company fostered such designers as Charles Eames, George Nelson, and Gilbert Rohde.

Former *New York Times* architecture critic and author Ada Louise Huxtable was elected to the American Academy of Arts and Letters on December 7.

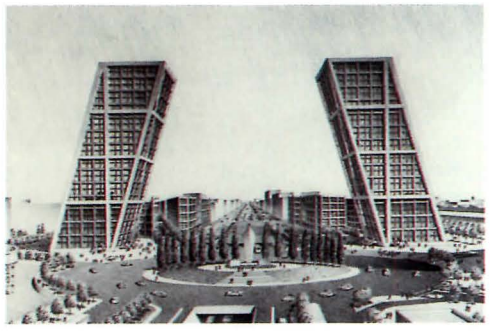
The first project designed by Keating Mann Jernigan Rottet of Los Angeles is BP Plaza, a 20-story, 555,000-square-foot office tower in Houston which features a facade of ribboned and gridded stone, aluminum, and glass. Construction is scheduled to begin this April.

Frank O. Gehry has been commissioned to design a $10 million art building at the University of Toledo (below), adjacent to the city's art museum. The sculptural building will form a courtyard with the existing museum and will be clad in lead-coated copper and glass. The first phase of construction is scheduled to begin late this year.

Global Architecture Examined in New York

ARCHITECTS, BE THEY AMERICAN, EUROPEAN, or Japanese, are designing more and more buildings far from home. The impact of this internationalization will drastically alter what is left of the world's regional and vernacular architecture, if it does not completely destroy it. The Architectural League of New York, aware that many of its architect members who are busy at all are busy abroad, and alarmed by the number of foreign architects hard at work in the region, decided it was time to study this phenomenon as it affects everyday architectural practice and the quality of world culture. Recently, the League's president, Paul Byard, and its executive director, Rosalie Genevro, organized three consecutive symposia to explore what they called "Architecture and the Global Culture."

CERVIN ROBINSON



The League's first panel included (above, left to right): Robert A.M. Stern, David Stewart, Mildred Friedman, and Kenneth Frampton. The Puerta de Europa in Madrid (right), designed by the American firm John Burgee Architects, was only one source of controversy during the symposium.

Participants on the first panel, which focused on Japan, were critic Kenneth Frampton, curator Mildred Friedman, architects Robert A.M. Stern and Rafael Vinoly, and architectural historian David Stewart. The subject of the second symposium was Spain, and the assembled authorities were the architect and critic Ignasi de Sola-Morales, deputy director of *Architectural Review* Peter Buchanan, and architects John Burgee and Rafael Moneo. The final panel offered a summation and critique of the previous sessions by Mary McLeod, associate professor of architecture at Columbia University; Saskia Sassen, professor of urban planning at Columbia; and sociologist Robert Gutman, who teaches at Princeton and Rutgers. Architect James Stewart Polshek provided additional discussion.

Professor McLeod's commentary was of particular interest, noting that the internationalization of architecture has continued for more than a decade. Not only have large, medium, and small American firms been working in Europe and Asia, but European and Asian firms of all sizes have been working in the United States for a number of years. Indeed, these firms' designs have addressed a broad range of building types and scales. Other aspects of architectural practice have been intrinsically internationalized for some time. McLeod presented a roster of names—leading architects transplanted from Britain, Turkey, Iran, China, and Argentina—who head prominent firms or serve as deans or distinguished faculty in American architecture schools. Added to her list were British historians and critics who have contributed significantly to the intellectual life of architecture in the U.S.

McLeod also noted the extent to which the construction industry has become internationalized. She offered the example of I.M. Pei's Bank of China in Hong Kong, which was designed by U.S. architects and engineers, built by a Japanese construction company, framed in Japanese steel, skinned with a German curtain wall with Canadian win-

Continued on page 20

Global Architecture *from page 18*

dow-washing equipment, veneered by French stone from Lyons, and planted on a base covered by Belgian pavers cut by Italians.

Addressing internationalism's effect on indigenous culture, McLeod took issue with the beliefs strongly held by several of the speakers at the earlier symposia, and most vehemently by Peter Buchanan, that the best buildings in any culture are designed by local architects. According to Buchanan, major clients all over the world invariably select the same designers from a fixed set of international architectural stars, "stretched artists producing far too much, very often glib works, not anywhere near as good as a second-string local architect would do."

"This is a naive, romantic assumption," countered McLeod. "The better architecture is actually being done by architects working in locales that are not their own: James Stirling's Neue Staatsgalerie in Stuttgart, for example, "is one of the best buildings of the past decade—better than his design for the Clore Gallery in London," she maintained. Citing the impact of foreign architects on the local construction industry, McLeod also claimed that their presence "usually affects for the better the quality of construction. I.M. Pei's extension of the Louvre set an example in France that has raised the consciousness of construction in that country," she asserted.

CERVIN ROBINSON

The League's final panel included James Stewart Polshek (left) and Mary McLeod (right), who argued in favor of architects working in foreign locales.

So what is to become of the world's regional and vernacular building cultures? McLeod argued that it is not always so easy to find a local context that an architect can respond to, particularly when introducing new building types of a scale never encountered before. Appropriate gestures are difficult to find. "The only kind of regionalism that makes any sense," asserted McLeod, "is the regionalism that comes down to historic preservation." Time may prove her right.

—MILDRED F. SCHMERTZ, FAIA

Mildred Schmertz is a New York-based journalist and member of the New York City Landmarks Preservation Commission.

Armand Hammer Museum Opens in Los Angeles

IN AN AGE WHEN ART MUSEUMS ARE ALL too often designed by architects as ego statements, the institutions created by Edward Larrabee Barnes are a refreshing counterpoint. Barnes's museums are noted for their architectural reticence—their scrupulousness in serving the presentation of the works they house. The Walker Art Center in Minneapolis, for example, designed by the architect in 1979, has been praised by many curators as a perfect showcase for Modern art that does not intrude upon the relationship between the visitor and the display.

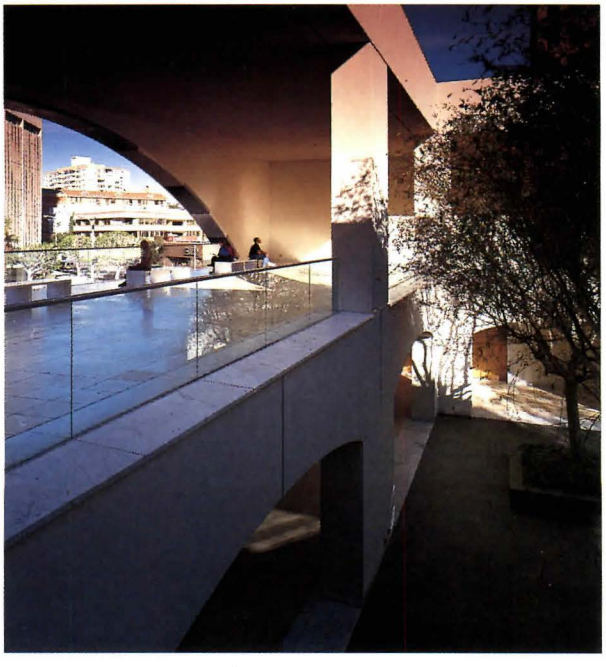
The new $60-million Armand Hammer Museum of Art in Los Angeles is an extreme instance of Barnes's architectural reticence. Tucked behind a bland 1960s office building housing the late entrepreneur's Occidental Petroleum Corporation headquarters in Westwood, the Hammer museum's personality is anonymous to the point of invisibility. The decision to turn a blank face to the street creates an intimidating, almost prisonlike facade. This penitentiary aspect is unfortunately reinforced by horizontal stripes of grey and white Carrara marble, suggesting images of prison garb.

More successful on the interior, the architecture is all background. Organized on two levels around a large courtyard, the galleries and their support areas are marked by modest doorways. The courtyard, whose volume seems almost as great as the combined interior spaces of the 79,000-square-foot building, is the museum's heart. "In turning the building inward, I followed the model of the Renaissance palazzo," Barnes explains. "This was my basic design decision, to present a blank face to the street and shield the interior from its noisy urban environment, creating an arena of tranquillity."

Barnes faced several obstacles to achieving such tranquillity. One was confronting the complexity of many vehicular and pedestrian entrances to the museum and its underground garages. The main lobby off Wilshire Boulevard, reached from the sidewalk or up a ramp from the parking garage, turns out to be merely an antechamber. After mounting a wide stairway to the courtyard, the visitor is deposited outside again, with another stair to climb to reach the upper gallery level. The entrance off Lindbrook Drive at the courtyard's rear, while more direct, has the aspect of a back door despite the wide semicircular "eyebrow" opening above it that seems to proclaim its importance.

Another problem was replacing a three-level subgrade garage with five-and-a-half stories of new parking below the building—a structure that consumed half the budget.

TOM BONNER



TIM STREET-PORTER

Like a Renaissance palazzo, the prison-like street facade of the Armand Hammer Museum (above) shields a tranquil courtyard (below) from noisy Westwood.

The budget itself was challenged by a suit brought by Occidental Petroleum shareholders who questioned the appropriateness of using corporate cash to finance the chairman's private museum. After protracted litigation, a court settlement last fall limited the construction and endowment funds the oil company could spend on housing Armand Hammer's $400-million art collection. Another pending lawsuit, initiated by the heir of Hammer's late wife, claims ownership of half the collection.

The effects of the court-mandated cost cutting appear in the poverty of some of the finishes, and in the lack of funds to complete a library and auditorium. In the courtyard, marble is replaced by cheap stucco. In this minimal context, the stairway leading to the second-floor galleries seems too grand, and the upper-level terraces appear overscaled for an otherwise simple design.

Barnes' reticence, however, really scores in the galleries. The modest spaces, well-proportioned and pleasantly lit, make the experience of viewing art almost painless. "Overall, I wanted to achieve a simple sense of flow and order," Barnes maintains. "Despite the corporate setting, I aimed to create a feeling of intimacy appropriate to the scale and personality of a private collection." The architecture never intrudes, and the screens that divide the larger galleries are no more than backdrops for the works on display.

To maintain steady illumination, track lighting supplements skylights controlled by photoelectric sensors. Because the museum's office tower blocks out the sun for most of the day, the sensors must cope with a wide range of lighting conditions.

While the Armand Hammer Museum does not quite live up to its grand Renaissance ambitions, it does create a thoroughly pleasant environment for the collection it houses, and for the many visitors who will enjoy a quiet moment in the midst of busy Los Angeles. —LEON WHITESON

Leon Whiteson is the architecture critic of The Los Angeles Times.

1991 National AIA Architectural Photography Competition

PROSPECTUS

The 1991 National AIA Photography Competition is being organized by the St. Louis Chapter AIA. The top 54 entries will be exhibited at the 1991 AIA National Convention in Washington, DC. Images for the 1993 AIA Engagement Calendar will be selected from all submitted entries.

ELIGIBILITY

This competition is open only to individual AIA members, Associate members of AIA, members of AIAS and Professional and Student Affiliate members of AIA components, in good standing. Professional photographers, who are members of the AIA and/or any of its components, are not eligible. Slides submitted by ineligible individuals will be returned.

AWARDS

Two Thousand Five Hundred Dollars ($2500) in cash prizes will be awarded at the AIA National Convention by the President of the Institute as follows:

First Place	**$1000**
Second Place	**$ 700**
Third Place	**$ 300**
Louise Bethune Award	**$ 500**

(The subject of the Louise Bethune Award must be located in the United States. No image will receive more than one cash award.)

1. Only 2" × 2" 35mm color slides may be entered.
2. Entries must have been exposed by and be owned by the entrant.
3. Images previously published and/or pending publication or cash-winning images in previous National AIA Photography Competitions are not eligible.
4. Entry fee is $15.00. Entrant may submit up to five (5) slides for each $15.00 entry fee. Entrants may enter as many times as desired.
5. The entry fee is non-refundable and must accompany the slides entered.
6. The subject matter must have an Architectural theme or must contain some element of the man-built environment. Photographic interpretation of the subject matter is the issue, not the architecture.
7. Slides that do not fit in a standard slide carousel will not be judged.
8. Entrants grant permission to the AIA to reproduce slides for exhibitions, AIA publications, and for promotional purposes. All reproductions will become the property of the AIA.
9. The decision of the judges is final on all matters relating to the Competition.
10. Great care will be taken with all slides submitted, but no responsibility for loss or damage during transit or any phase of the Competition will be assumed by the St. Louis Chapter AIA or the National AIA.
11. Clearly mark each slide with the following:
    a. Entrant's name
    b. Slide title
    c. Slide identification (A, B, C, D, E) as listed on entry form.
12. Entries must be postmarked by **March 1** and include:
    a. Completed entry form
    b. Entry Fee (check or money order) made payable to: St. Louis Chapter AIA Photography Competition
    c. Adequately sized self-addressed envelope with proper postage for return of slides
13. Entries shall be mailed to: St. Louis Chapter AIA 911 Washington Ave., #225 St. Louis, MO 63101-1203
14. Submission of slides implies entrant's acceptance of all the above conditions.
15. Void where prohibited by law.

For Additional Information, call SL/AIA (314) 621-3484.

ENTRY FORM
(Please print or type all information)

AIA Membership Number _____

Check One:
☐Member ☐Associate ☐Student ☐Professional Affiliate

_____
Chapter Affiliation Chapter Phone

Name _____
Address _____
City _____ State _____ Zip _____

_____
Firm Phone (Include Area Code)

_____
Home Phone (include Area Code)

If Student:

_____
Architectural School

_____
Name of Dean School Phone

Enclosed is $ _____ for _____ slides
and return envelope.

Mail entries to: **St. Louis Chapter AIA, 911 Washington Ave., #225 St. Louis, Missouri 63101-1203**

SLIDES

A: _____
Title
_____
City and State or Country

B: _____
Title
_____
City and State or Country

C: _____
Title
_____
City and State or Country

D: _____
Title
_____
City and State or Country

E: _____
Title
_____
City and State or Country

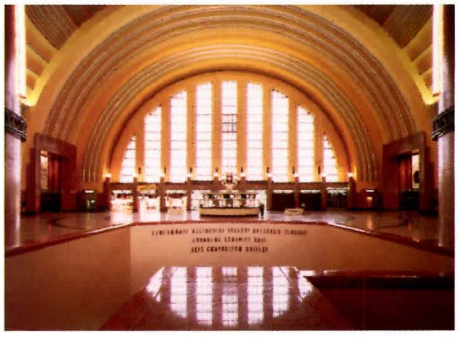
Cincinnati Museums Gain New Life

TWO PROMINENT CINCINNATI LANDMARKS are regaining civic grandeur due to the efforts of Glaser Associates. The local firm is transforming Paul Cret's Art Deco Union Terminal into a center for two of the city's most important cultural institutions, and is renovating the Cincinnati art museum.

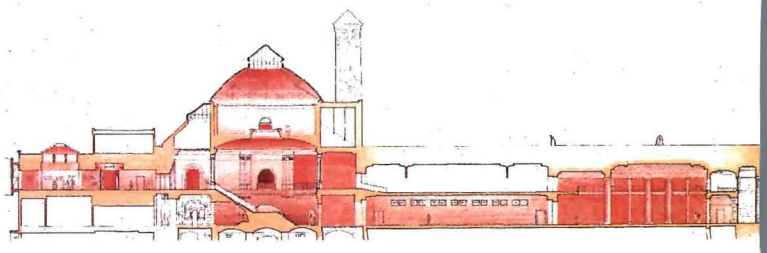
Begun in 1989, the 500,000-square-foot converted train station is one of the most comprehensive museum projects currently under way in the United States. Closed as a train depot since 1972, the 1929 structure was adapted as a short-lived shopping mall in 1980. By the mid-1980s, the building faced an uncertain fate, but with financial help from the state, the city agreed to renovate the vast structure as new quarters for the Natural History Museum and new Historical Museum. The former terminal now houses the Historical Society library, a children's discovery exhibit area, Omnimax theater, museum shops, and ice cream parlor, which opened to the public on November 10.

The Art Deco style of Paul Cret's original terminal is most evident in the restored rotunda (below) on the concourse of Museum Center.

Glaser Associates is also renovating the city's art museum with assistance in lighting and exhibition design from George Sexton Associates of Washington, D.C. Designed by architect James McLaughlin, the Romanesque Revival structure has been continuously altered since it was completed in 1886. The architects plan to restore the two-story Great Hall that was sealed off during renovations in 1950, and create a new grand staircase. Existing galleries will be rearranged, square footage for temporary exhibits increased, and climate control enhanced. Construction began in January and is scheduled to be completed in 1992. —A.G.L.



The Great Hall of Cincinnati's art museum (below), sealed off and hidden since 1950, emerges as the central focus in the renovation.



TCS

creative response in beauty and durability

Surrounded by cropland on the outskirts of a farming community, this private residence is, as stated by the architect, "a response to the historical and physical characteristics of its site. Its sloped roof areas are covered with silver gray TCS (terne-coated stainless steel), suggesting the color and form of traditional rural architecture."

In addition, TCS satisfied the owner's stated need for, "a maintenance-free roofing material that will last several lifetimes."

Architects everywhere are finding that TCS is singularly adaptive to all types of structures, superbly functional as a design component—important advantages which provide maximum creative latitude at relatively modest cost.

We will be happy to send you more detailed information about TCS.

Call us toll-free, 800-624-6906.

TCS is available in Europe and in the Pacific Rim.
For more information, see our catalog in Sweets

Lee Residence, Northeast Arkansas
Architect: Polk, Stanley, Gray, Architects, Ltd.
Little Rock, Arkansas
Roofer: Gerald Rooks Contractor
McCrory, Arkansas
Photographer: Hursley & Lark

FOLLANSBEE
FOLLANSBEE STEEL • FOLLANSBEE, WV 26037
FAX 304-527-1269

Circle 47 on information card

Architects File Suit over Changes in Korean War Memorial Design

CONTENDING THAT A REPLACEMENT DESIGN has been substituted for their own, the architects who won the competition two years ago for a Korean War Veterans Memorial have filed suit in federal court to stop construction of the monument. Burns Lucas, Leon, Lucas Architects of State College, Pennsylvania, has filed the complaint against Cooper Lecky Architects, the Army Corps of Engineers, the Korean War Veterans Memorial Advisory Board, and the American Battle Monuments Commission, charging that the concept, artistic expression, and architectural principles of the firm's design have been changed.

WASHINGTON WATCH

The State College team's design, which was selected from 540 entries, focuses on a column of 38 impressionistic soldiers marching toward an American flag. The procession of figures is intended to occupy a vast landscaped plaza, engraved with quotations about peace. The underlying concept of the scheme was to move a visitor metaphorically from peace, to war, to peace again, entering from a granite plaza to a white marble square. From there, visitors ascend among the line of combat figures in war-torn terrain, to a still pool, an American flag, and a ceremonial plaza symbolic of home and peace.

Cooper Lecky Architects of Washington, D.C., was commissioned by the Army Corps of Engineers in April, 1990, to implement the design, with Burns Lucas, Leon, Lucas retained as consultants, according to the award contract. The claimants charge, however, that beginning in June, 1990, they were eliminated from the design development process, and that a new design has been circulated to the several commissions that must approve projects on the mall.

Much of the architects' complaint focuses on the statues of the soldiers. Vermont sculptor Frank Gaylord, commissioned last June to create the 38 pieces, has positioned the infantrymen in realistic poses such as those that might be assumed on the battlefield. Indeed, Kent Cooper, principal of Cooper Lecky, believes that the figures now afford "the feeling of what its like to be under combat, with people dying around you, and the courage that it takes to be in that situation." While the peace-invoking symbolism and imagery envisioned by the original designers may have been somewhat obtuse, a battalion of fighting soldiers is clearly not what they had in mind.

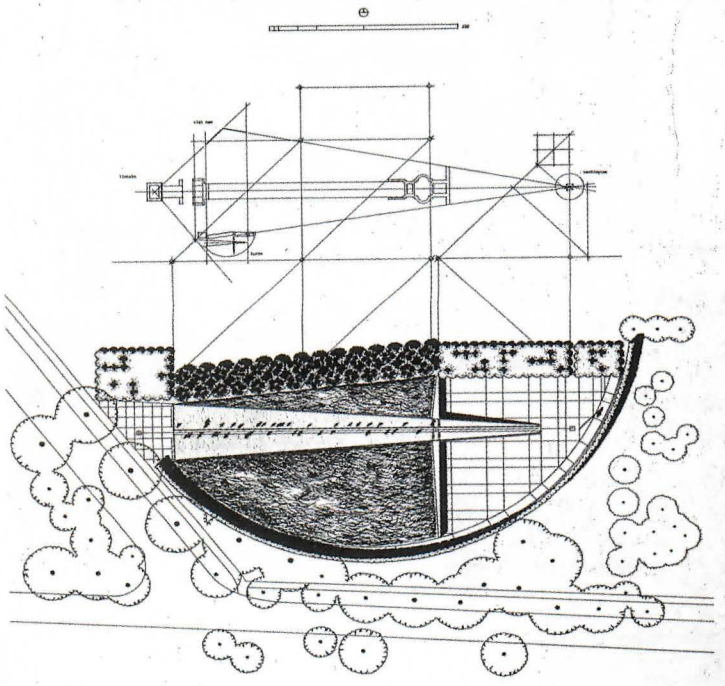
Cooper Lecky has experience in the execution of controversial memorials; the firm oversaw the construction of several heroic figures near Maya Lin's Vietnam Memorial, which ultimately caused Lin to disassociate herself from the scheme. Whether those realistic figures satisfy those who want to remember the glory of war remains questionable. Cooper Lecky at least was successful in placing them far enough away that they barely detract from Lin's powerful scheme.

Ironically, the Vietnam Memorial controversy may have been a catalyst for the selection of the State College team's design. The competition's advisory board, made up of combat veterans, indicated that it was unnecessary to include names, but that designs should incorporate an American flag. Retired Army General Richard Stilwell, chairman of the Korean War Veterans Memorial Advisory Board, concedes that "the original design was chosen exclusively because...that column of ground troopers seemed to capture the essence of a war fought on foot." He adds, "the statues convinced us that this was a good starting point for the evolution of a great memorial."

But Don Alvaro Leon, principal of the winning firm, contends that there was "never any indication that the competition was merely to seek...a starting point for design." Robert Sokolove, attorney for the original designers, says the court must ultimately decide whether federal agencies have the legal right to change a competition-winning design. "What's at stake here," Sokolove maintains, "is the integrity of the design competition process."

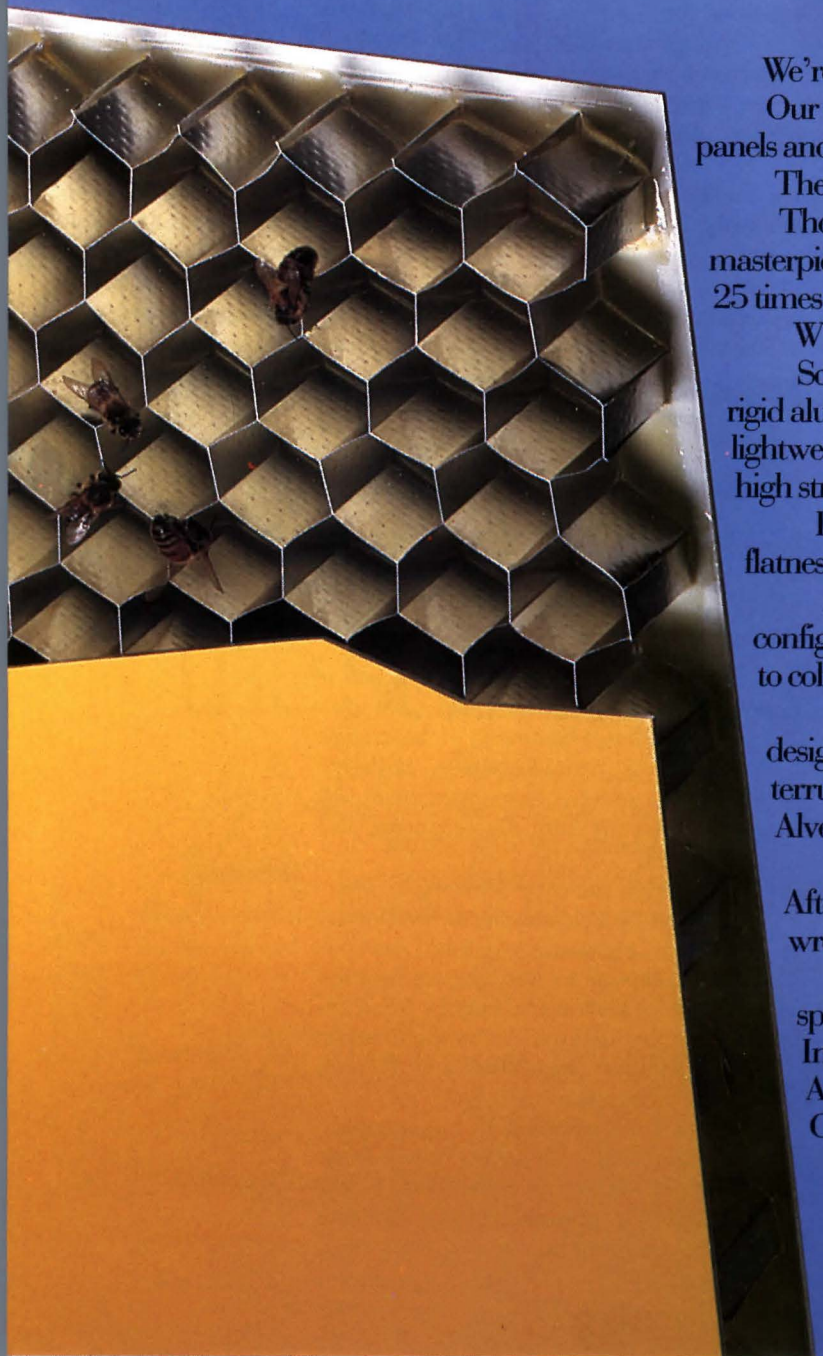
—H.L.

The architects of the competition-winning design (bottom) for the Korean War Veterans Memorial are charging that a replacement scheme (below) has been substituted for their own concept.



We borrowed one of
from some very

our best panel ideas good designers.



We're not ashamed to admit it.

Our engineers got the idea for our Alveus™ panels and curtain walls from somewhere else.

They took it from nature.

The honeycomb core in a beehive is a masterpiece of engineering and art. It can support 25 times its weight in spite of its ultra thin shell.

Which is just what we were looking for.

So inside Alveus panel products you'll find a rigid aluminum honeycomb core. Making them lightweight, yet still able to maintain exceptionally high strength-to-weight ratios.

It also gives you surfaces with absolute flatness.

And lets you curve them into almost any configuration you want. From rounded corners to column covers.

So when you need a smooth surface design that blends with glass to create an uninterrupted flush, monolithic surface, look for Alveus panel and curtain wall.

The ones with the honeycomb core.

After all, four-hundred million bees can't be wrong.

For complete architectural design specifications, contact Kawneer Company, Inc., Department C, Technology Park-Atlanta, 555 Guthridge Court, Norcross, GA 30092.

Kawneer
Panel Products

Circle 49 on information card

Circle 15 on information card

AMERICA'S FIRST CHOICE IN MOBILE FILING AND STORAGE SYSTEMS.

SPACESAVER

Double filing/storage capacity—or handle client needs in half the space.

Spacesaver systems can give you room for more offices, terraces, atriums—whatever.

And give your clients more efficiency, accuracy, security... with fewer steps and faster file retrieval.

From archives to active filing, the ideal choice.

You can customize systems to store virtually any type of material, and for the full range of business needs: massive records retention, central filing areas—or compact modules, handy for each department.

Exclusive Nationwide Local Area-Contractor Network.

And only Spacesaver brings you a coast-to-coast Area Contractor network.

Local installation.

Local service.

Two more reasons why we're America's first choice in Mobile storage systems. And why you can specify Spacesaver with *confidence.*

Spacesaver®

The Spacesaver Group, 1450 Janesville Ave., Ft. Atkinson, WI 53538
1-800-492-3434. In Wisconsin, call 414-563-5546

For more information, circle these Inquiry Card numbers:

Free Spacesaver Design Library Subscription 51	
Spacesaver Systems for...	
Business Offices 53	*Libraries* 55
Law Firms 57	*Museums* 59
Health Care Facilities 61	
Government Facilities 63	
Floor Loading Solutions 65	

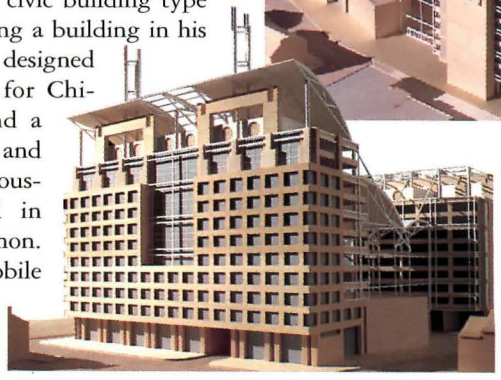
Mobile County Competition Winner Announced

AN AIA-SPONSORED COMPETITION HELD IN September for a county and city government building for Mobile, Alabama, attracted 195 entries from firms throughout the country. First prize was awarded to Harry Golemon, FAIA, and Mario Bolullo, AIA, of Houston, in association with Frederick C. Woods of Mobile. Rather than echoing traditional 19th-century civic buildings, the architects felt it important to emphasize a facility that befits the 21st century, and the winning design has aroused comment among Mobile's citizens for its innovative form.

The $45 million building will occupy a 2½-acre site on the southern edge of the city, bordered by a primary cross-town boulevard, and three blocks from the banks of the Mobile River. A pair of equal-size, rectangular volumes will occupy 550,000-square-feet; one will house courtrooms, the other administrative offices. They will be joined by a cascading atrium in which scissored bow trusses support vaulted roofs. The buildings are animated by bold geometric forms, including an entrance rotunda, a cubic jury assembly room, and an arching, wedge-shaped public meeting chamber. The architects accentuated outdoor pathways and exposed structural and mechanical systems to enliven the exterior.

Golemon, has previously avoided design competitions, was attracted to the Mobile program because of its civic building type and the idea of designing a building in his hometown. Bolullo has designed mixed-use complexes for Chicago and Toronto, and a new convention center and airlines terminal for Houston, both completed in partnership with Golemon. Construction of the Mobile project is scheduled to begin by year's end. ■

—RAY DON TILLEY

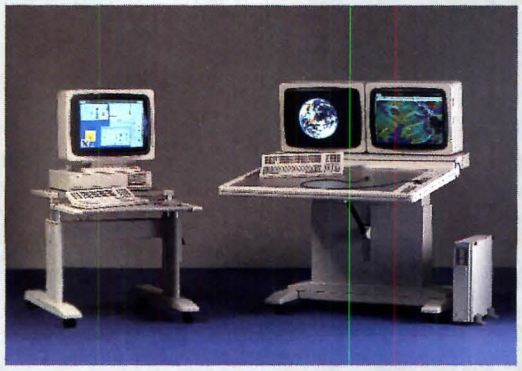


Golemon and Bolullo's design (above and left) blends traditional civic architecture with eclectic structural expressions adopted from the city's shipping industry.

Enter A World Of Integrated AEC Applications On The Affordable Series 2000.

Introducing the Intergraph Series 2000. A superior value in a desktop workstation. And it's production-ready to run AEC applications. Series 2000 features high-resolution color graphics. An easy-to-learn, icon-based user interface. And multi-vendor connectivity for network computing.

Series 2000 – ideal for AEC applications. Use its 3D power to design the site. Create architectural drawings. Add structural and building services designs to the model. View and present the project using photo-realistic renderings and animations. Produce construction documents. Manage facilities using as-built information.



An affordable workstation with integrated applications. Series 2000 runs a full suite of integrated AEC applications working together to give you increased performance and greater capabilities.

This total solutions philosophy has made Intergraph the #1 supplier of AEC CAD systems worldwide.

Series 2000. Available now. For free literature and a demonstration, call 800-826-3515.

INTERGRAPH

Everywhere you look.

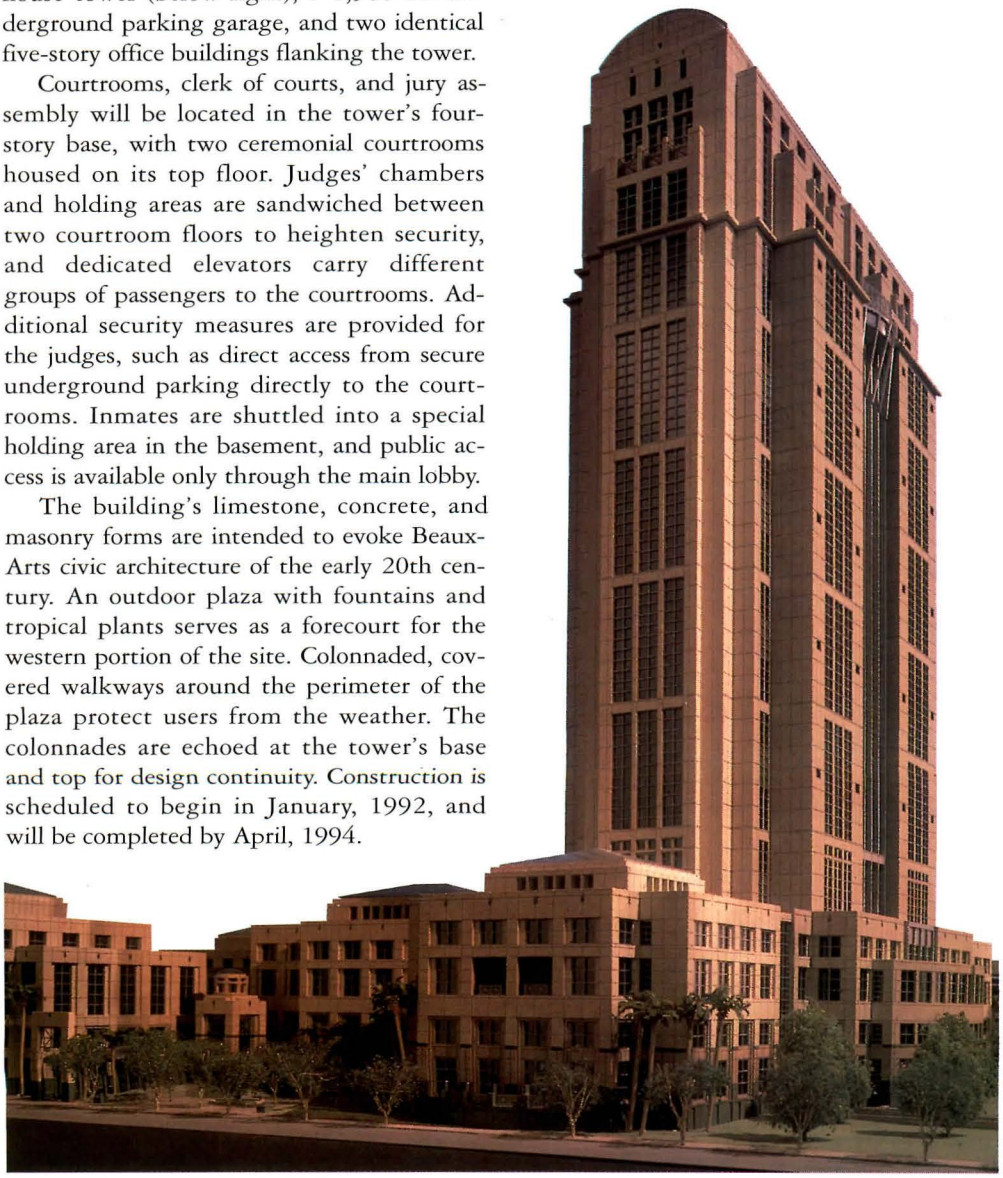
Towers of Justice

Orange County Courthouse
Orlando, Florida
Hansen Lind Meyer, Architects

THE PROPOSED ORANGE COUNTY COURT FACILITY (top right) is designed to accommodate current and future judicial services in a rapidly growing region where overcrowded government buildings are hindering the efficiency and integrity of the courts. In an attempt to address those concerns, Hansen Lind Meyer designed a 790,000-square-foot complex that incorporates a 23-level courthouse tower (below right), a 1,500-car underground parking garage, and two identical five-story office buildings flanking the tower.

Courtrooms, clerk of courts, and jury assembly will be located in the tower's four-story base, with two ceremonial courtrooms housed on its top floor. Judges' chambers and holding areas are sandwiched between two courtroom floors to heighten security, and dedicated elevators carry different groups of passengers to the courtrooms. Additional security measures are provided for the judges, such as direct access from secure underground parking directly to the courtrooms. Inmates are shuttled into a special holding area in the basement, and public access is available only through the main lobby.

The building's limestone, concrete, and masonry forms are intended to evoke Beaux-Arts civic architecture of the early 20th century. An outdoor plaza with fountains and tropical plants serves as a forecourt for the western portion of the site. Colonnaded, covered walkways around the perimeter of the plaza protect users from the weather. The colonnades are echoed at the tower's base and top for design continuity. Construction is scheduled to begin in January, 1992, and will be completed by April, 1994.

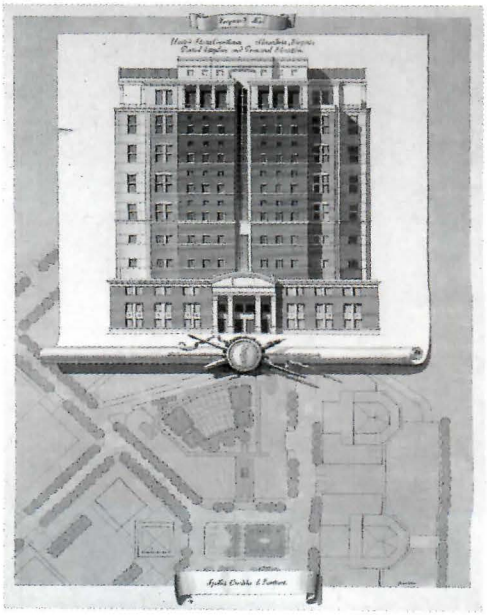


United States Courthouse
Alexandria, Virginia
Spillis Candela/Warnecke, Architects

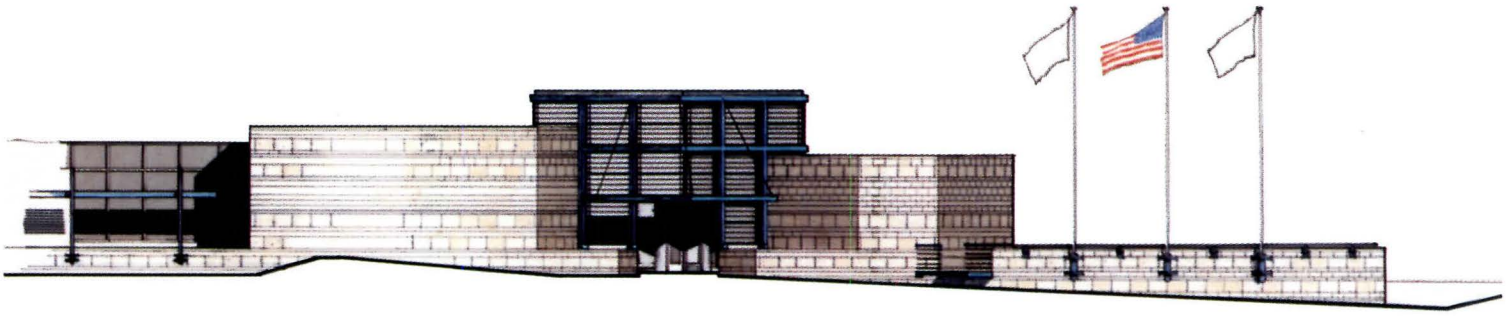
THE FEDERAL COURTHOUSE CURRENTLY being designed for the General Services Administration (bottom) is the first structure scheduled to be built in a proposed 80-acre office and residential development on the fringe of downtown Alexandria. The 315,000-square-foot building, and 500-car underground parking structure, is designed to sympathize with Alexandria's 18th-century rowhouses and low-rise commercial structures.

The architects reduced the mass with a Federal-style, 10-story, brick-clad tower and two wings of five and three stories each, fronted by an outdoor plaza that faces a park. The tower houses 15 courtrooms designed to meet present and projected court-support functions, judges' chambers, and related user-agency groups, such as clerk's offices and offices for the U.S. Marshall and U.S. Attorney. The five-story wing to the west of the tower houses attorneys' offices. A three-story wing to the east, positioned at a 45 degree angle from the tower, houses more court-support and administrative offices.

Both GSA and city officials view the building as a catalyst for development of an abandoned railroad yard. Construction of the project is scheduled for completion in 1994.



Civic Improvements

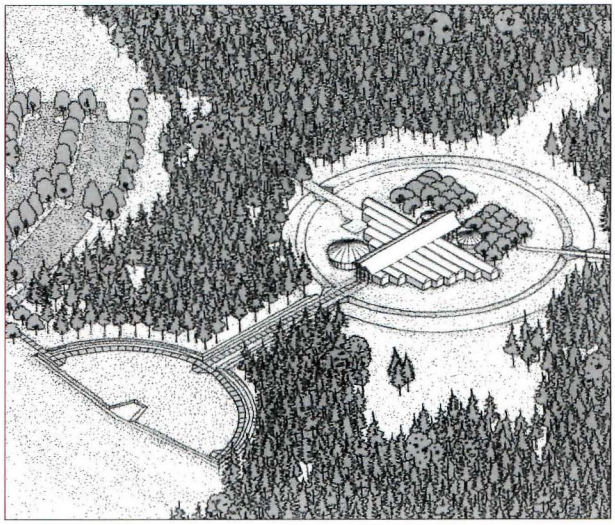


Vernon Hills Police Department
Vernon Hills, Illinois
OWP&P Architects

BY STUDYING ZONING CLASSIFICATIONS AND EXPANSION PROJECTIONS through the year 2005, the Deerfield, Illinois-based architects determined present and future programmatic requirements for the local police department. The resulting 20,000-square-foot station (above) echoes the tight, right triangle of its site in form. Administrative, support, and detention areas are entered at each point, and public access is restricted through a steel- and glass-covered cube at one angle of the triangle. Support areas for the officers, including locker rooms, a fitness area, and a firing range, will be located along the northern boundary, and administrative and other staff functions will be housed along the hypotenuse. High-security areas are appropriately clad in opaque concrete masonry block with a face finish of brick, and administrative areas are sheathed in glass curtain wall. Glass-walled offices border the masonry elements at several locations. The project is expected to be completed by January, 1992.

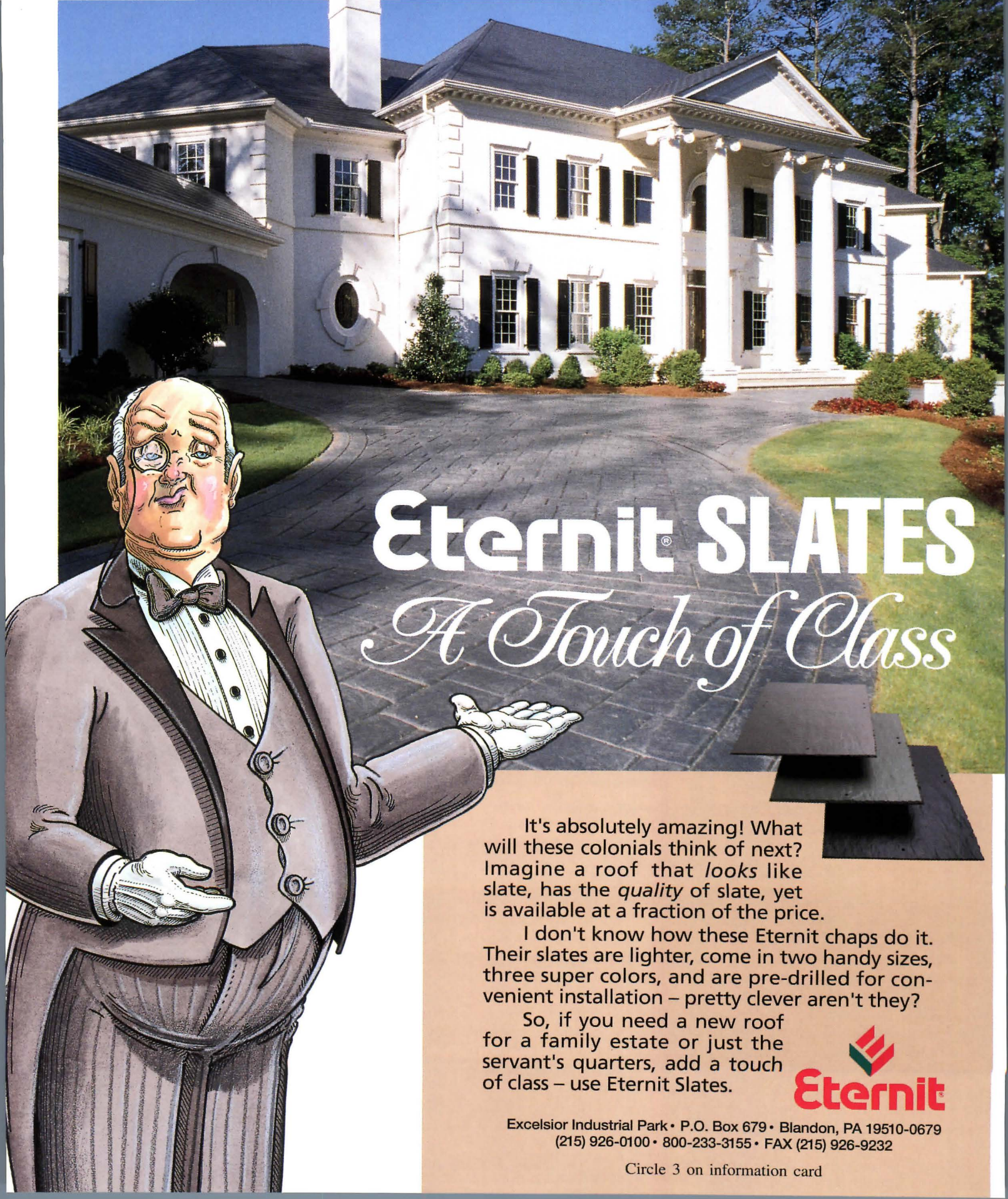
New Jersey Fire Engine and Equipment Museum
Wall Township, New Jersey
Kehrt Shatken Sharon, Architects

A MUSEUM IN CENTRAL NEW JERSEY DEVOTED TO THE HISTORY OF FIREfighting (below) is the first of its kind in the country financed exclusively with public funds. Located on a 10-acre site adjacent to Allaire State Park, the museum will exhibit fire engines, equipment, and related displays within 14,000 square feet. An additional 2,400 square feet is allotted for outdoor exhibits, and 3,500 square feet will contain storage. The building, including a rusticated base of glazed brick, is intended to evoke images of Victorian-era firehouses through brick and masonry block. Signage, windows, and custom light fixtures will be finished in polished brass and chrome, or painted fire-engine red. Completion is scheduled for 1992.



Visitors Center, Indian Cultural Center
Pembroke, North Carolina
NBBJ Architects

WINNER OF A 1990 NORTH CAROLINA AIA REGIONAL Isosceles award for unbuilt projects, the 23,000-square-foot North Carolina Indian Cultural Center (above) will present Native American culture as both history and living tradition, through interpretive galleries, ceremonial chamber, and teaching and storytelling areas. The center will also house support and curatorial offices. Its form combines images of a bird and a serpent—shapes commonly applied to sacred artifacts and crafts of Indians throughout the Southeast. Located on a heavily wooded, 500-acre site adjacent to a lake, the building is organized with two large wings extending from either side of a long hypostyle grand hall of heavy timbered columns. One wing will house exhibit spaces; the other will contain administrative and educational functions. Distinctive colors and rugged materials, such as wood siding and rough shingles, will suggest native American construction. The cultural center, scheduled to be completed in 1992, will be the first phase of an educational park to be developed on the site.



It's absolutely amazing! What will these colonials think of next? Imagine a roof that *looks* like slate, has the *quality* of slate, yet is available at a fraction of the price.

I don't know how these Eternit chaps do it. Their slates are lighter, come in two handy sizes, three super colors, and are pre-drilled for convenient installation – pretty clever aren't they?

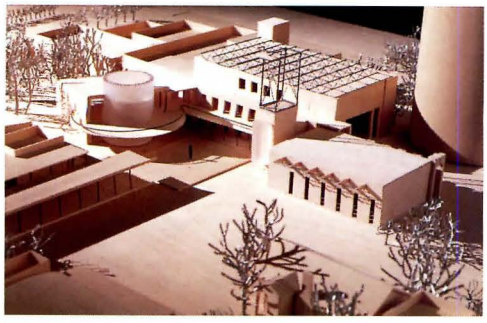
So, if you need a new roof for a family estate or just the servant's quarters, add a touch of class – use Eternit Slates.

Eternit

Excelsior Industrial Park • P.O. Box 679 • Blandon, PA 19510-0679
(215) 926-0100 • 800-233-3155 • FAX (215) 926-9232

Circle 3 on information card

Rebuilding Texas



Addison Conference and Theater Center
Addison, Texas
Cunningham Architects

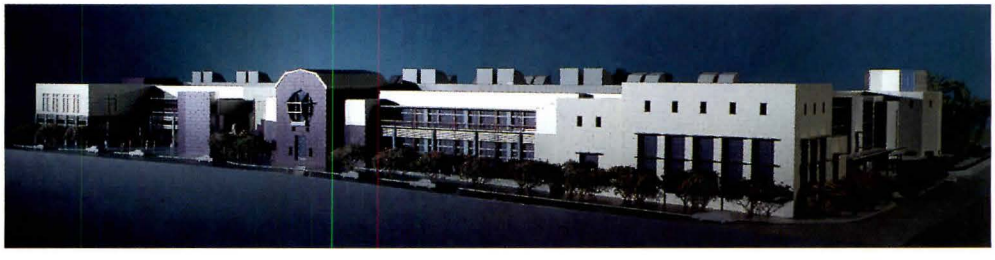
KNOWN INFORMALLY AS "THE BUILDING under the water tower," the Addison Conference and Theater Center embraces the 3-million-gallon-capacity mushroom-shaped suburban icon on its site (above). The center, designed by Cunningham Architects of Dallas, is planned as a community meeting space and permanent performance structure for the nationally known experimental Theater Performing Arts Group. More importantly, the building will create a town center for a city that has none—Addison has grown up in the North Dallas Business Corridor, a town of 3,000 hotel beds and 2,500 businesses, but only 9,000 homes.

Site organization responds to existing features: one primary axis extends northward from the main vehicular approach; a cross axis adopts the slight skew of a windmill on the edge of the property to frame the approach from visitor parking. The entry sequence carries pedestrians past a small wall opening, through an existing black locust grove, into the wedge-shaped theater lobby. The lobby engages a mystical cylinder of frosted glass interrupted by a thin disk of concrete that has a diameter matching the water tower.

The 31,000-square-foot theater is a workhorse, engineered to support the troupe's desire to run galloping horses on stage, cover the floor with 8 feet of dirt, or send cars racing through on cue. To the right of the theater lobby is a 16,000-square-foot conference center. Materials are brick, concrete block, and fieldstone, drawn from an existing 1938 WPA building. Construction of the center is expected to be completed late this year.

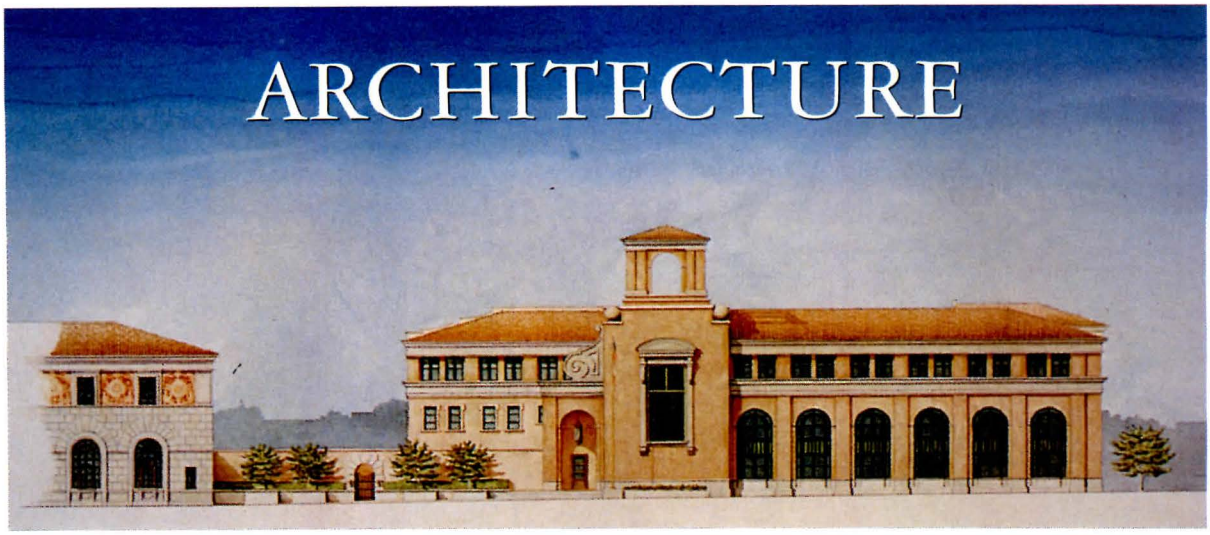
Alamodome
San Antonio, Texas
Marmon Barclay Souter Foster Hays, Architects

THE ALAMODOME WAS THE LAST LARGE-SCALE DEVELOPMENT SECURED BY FORMER SAN Antonio Mayor Henry Cisneros during an eight-year tenure that witnessed Sea World of Texas, the downtown Rivercenter mall, and numerous corporate facilities. Designed by the local firm Marmon Barclay Souter Foster Hays, with primary consultants W.E. Simpson Company (engineering) and the HOK Sports Facilities Group in Kansas City, the stadium (below) will accommodate all sports except baseball. It is envisioned as a lure for a National Football League team and a convention facility to complement the nearby Gonzales Convention Center. Key to this flexibility is a column-free interior provided by a suspended fabric roof. Four reinforced concrete "masts," from which cables are strung, anchor the building's corners and will become signature elements on the city's skyline. Taking advantage of the building's height, the architects have provided arching concession promenades that overlook the city from each facade. Located across a freeway are HemisFair Plaza and the Tower of the Americas, and historic and cultural attractions including the Alamo and Rivercenter. The $174-million project is being funded by a ½-cent sales tax begun in June, 1989. Construction is expected to be completed in 1993.



Austin Convention Center
Austin, Texas
The Austin Collaborative Venture

THE AUSTIN CONVENTION CENTER (ABOVE) is being promoted as a catalyst for economic and cultural development by a city council that quashed plans for a downtown art museum (designed by Venturi Rauch and Scott Brown) and stalled the progress of a new regional airport. Born of such unpredictable politics, the center may help return a measure of stability to downtown Austin's economy and urban development. Furthermore, the Austin Collaborative Venture (a consortium of lead architect Page Southerland Page, design architect Lawrence W. Speck, architect Villalva Cotera Kolar, and engineers Johnson, Johnson & Roy and Wilbur Smith Associates) has authored *District Design Guidelines*, a study that examines the convention center within its downtown context. The building itself is the first large-scale project designed by Speck, who has built a portfolio of small-scale regionalist structures. With a palette of limestone, brick, and metal panels, the architects wrapped the perimeter of a "box" containing 125,000 square feet of exhibition space and additional ballrooms with an assortment of projecting volumes and facade treatments that respond to distinct adjacent areas: the parklike shores of Town Lake to the south, the business district to the west, and the Sixth Street entertainment strip to the north. Construction is expected to be completed in mid-1992. ■



Civic Architecture

ENTERING WHAT THE BUSH ADMINISTRATION'S ECONOMISTS ARE FINALLY CALLING a recession, architects are turning from the private sector to the public sector in hopes of securing future projects. In pursuing public commissions, they might well study this issue to learn from practitioners already experienced in designing civic architecture. Although the projects in this issue represent a diversity of forms and functions, they share a common purpose in creating public amenities that extend beyond the building envelope, such as courtyards, plazas, and parks.

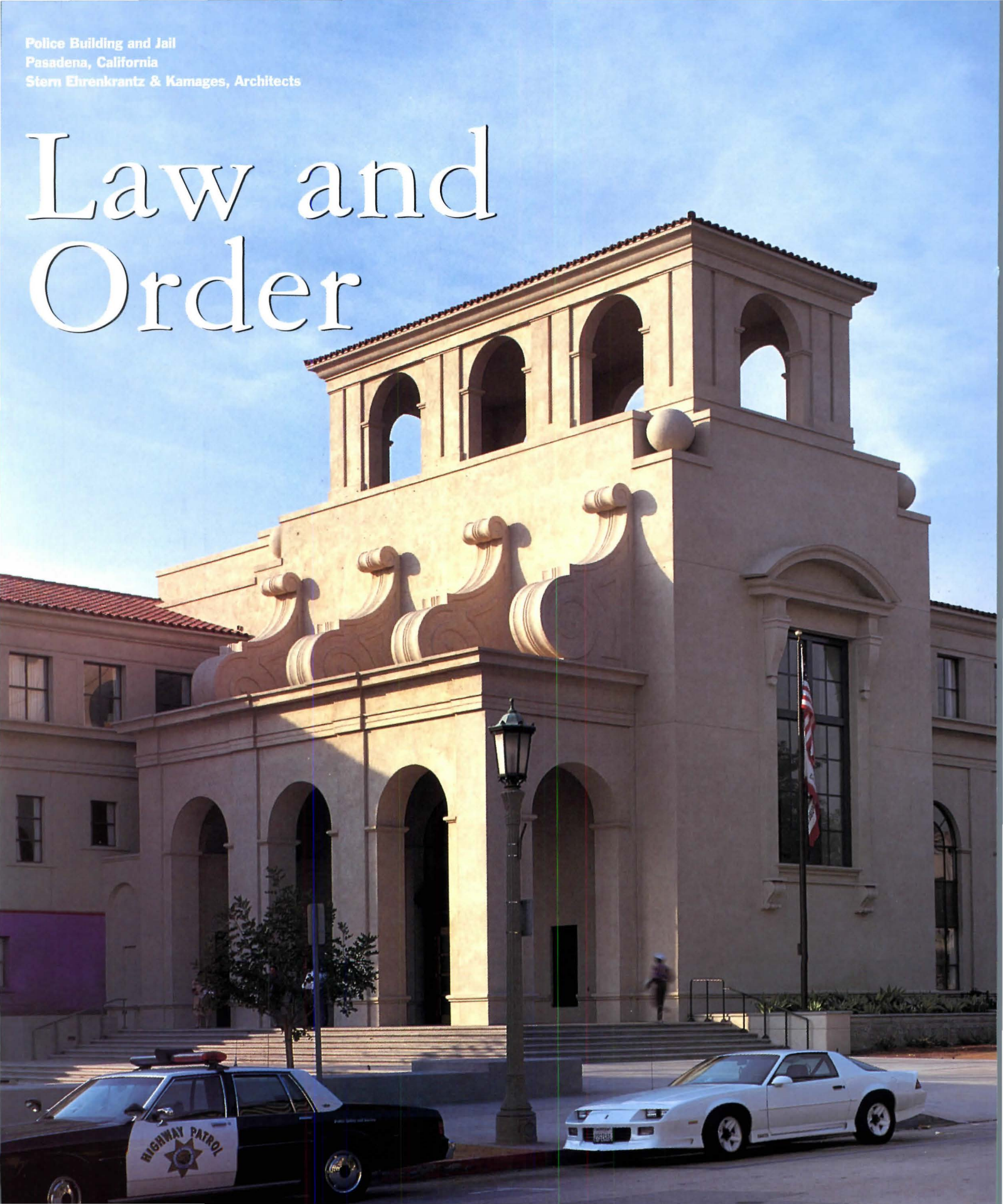
In Pasadena, for example, Stern Ehrenkrantz & Kamages echoed the Mediterranean Classical vocabulary of adjacent historic structures in designing the city's police department building and jail (above), which is sited to form a walled enclave containing public art and a desert park. In San Antonio, a local joint venture of architects sunk a courtyard and excavated a section of the region's ancient *acequia*, or irrigation canal, to tie a new courthouse to the history of its site. By including a waterfront park in its scheme for a new aquarium, a New Orleans consortium of architects opened up precious public space along the Mississippi River.

Civic buildings in more suburban locations, such as a post office near Chicago and a fire station outside Kansas City, must accommodate the culture of the car. The striped brick facade of the Glendale Heights Post Office salutes passing motorists like a big American flag, and even integrates an existing water tower as a "flagpole." Big glass doors for Fire Station No. 4 in Lenexa, Kansas, allow the public a view of the shiny fire engines within, and, in this industrial park in the rolling Kansas plains, even the signage is designed as an architectural element. To accentuate an approach by car, architects for the New Hanover International Airport in Wilmington, North Carolina, created a formal procession with an axial view of the terminal, adding a parking area that serves as a forecourt to the building.

Public access takes on added meaning as the recently passed Americans with Disabilities Act takes effect. Our portfolio of barrier-free projects examines how architects for three public spaces—a park, a health and recreation facility, and a concert hall—accomplished "universal" design. Advice on how to tailor architectural practices for the looming slowdown follows, with all indicators pointing toward the fact that, even in a recession, there's plenty of room for architects with talent. ■

Police Building and Jail
Pasadena, California
Stern Ehrenkrantz & Kamages, Architects

Law and Order



ROOTED IN THE GRANDEST OF ARCHITECTural aspirations, the Pasadena Civic Center is one of the more enduring statements of the City Beautiful movement. The Chicago firm of Bennett, Parsons, Frost and Thompson designed the 1923 plan of the four-block complex, which focuses on Bakewell and Brown's city hall as its centerpiece, and is terminated by Myron Hunt's public library to the north and Edwin Bergstrom's auditorium to the south. Not surprisingly, postwar development has compromised this original plan. Pasadena Place, an enclosed shopping mall completed in 1980, interrupts the southern terminus, and a hulking federal courts building towers over Hunt's library.

Four years ago, the voters of Pasadena approved a $13.3 million bond to fund a new police station that would be the first major public addition to the Civic Center in 20 years. To ensure a building with a strong presence suitable to the grandeur of the original plan, the referendum required community groups and a police advisory committee to participate in the design process. Meeting the challenge, Robert A.M. Stern Architects teamed up with the San Francisco firm EKONA Ehrenkrantz/Kamages to create a new 86,000-square-foot building that successfully integrates appropriate architectural imagery with programmatic sensitivity.

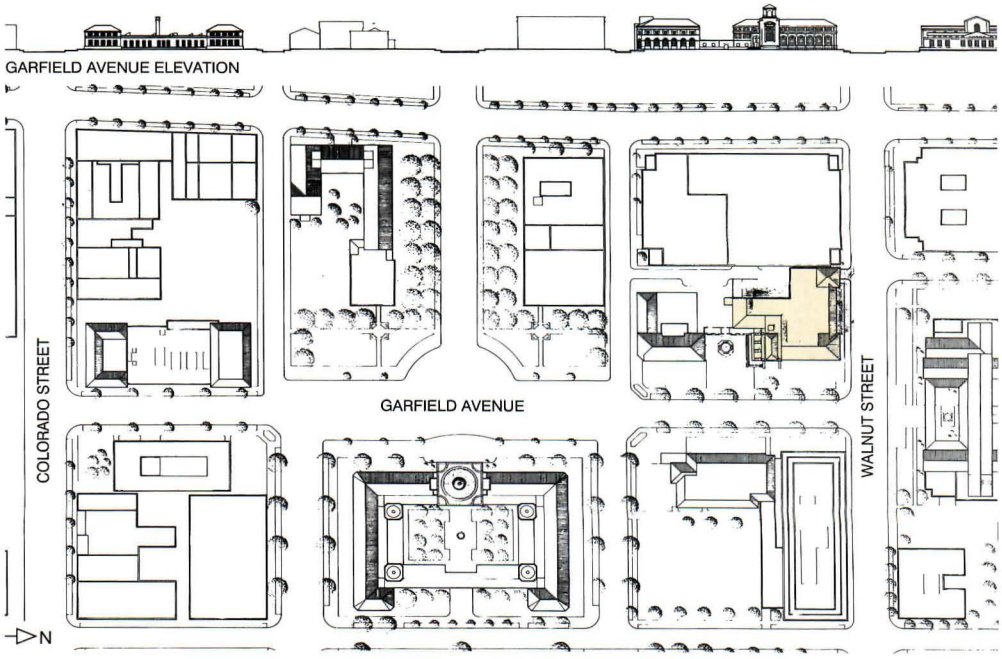
Stern drew from the vocabulary of Mediterranean Classicism, articulated so successfully by the original Civic Center architects. Echoing the massing and materials of the adjacent historic landmarks, Stern's building for the Pasadena Police Department is constructed of stucco with a roof of variegated terra-cotta tile. "The project was under close scrutiny every step of the way," explains Stern, "even to the point where we discussed the appropriateness of the Doric or Ionic orders during public debates televised from the city council chamber."

Diagonally aligned with city hall, the police building is sited to create a walled courtyard that serves as a forecourt for the main public entrance. The desert garden within the courtyard, accented by a purple wall and columnar sculpture designed by Robert Irwin, was developed under the state's art-in-architecture program. This carved-out space serves as an effective transition between the police building and the 1929 Gas Company building directly to the south, an elegant, Renaissance Revival-style structure currently being renovated for city use.

To enliven the east elevation fronting Garfield Avenue, the architect punctuated the long expanse with metal-framed, arched windows and a double-height pilaster that wraps the structure. The cornice line and the eaves relate to the adjacent Gas Company building, and paired, attic-floor windows add to the rhythmic fenestration pattern.

As the building turns the corner to Walnut Street, the composition becomes more clearly articulated, with two linked pavilions and a pergola on the third floor that serves as an outdoor lounge with views of the San Gabriel Mountains to the north. The pavilion anchoring the northwest corner of the structure is actually a sally port that provides a secure compound for police vehicles and the transfer of prisoners.

The building's focal point is an open-air tower rising above the Civic Center Historic District's 50-foot height limit but falling short of its grand precursor set atop city hall. Deferential yet self-assured, the police building tower serves as the principal organization element for both the exterior and interior. The tower is buttressed by four scrolled volutes resting atop a two-story entrance portico. Although it is intended as a visual transition from



Located within Pasadena's Civic Center on the corner of Garfield Avenue and Walnut Street (site plan), the police headquarters respects the materials and forms of its neighbors—the Gas Company building (left in photo above) and Public Library (right in photo above). Its tower (facing page) defers to Bakewell and Brown's city hall (right).

the loggia to the tower, this row of heavy-handed brackets distracts from the exterior's otherwise appropriately scaled proportions.

In addition to functioning as the dominant organizational element, the tower announces the main public entrance. Located within this two-story loggia, the building's front door opens onto a three-story lobby housed within the tower's volume. A grand stairway rises up through the space to connect all the floors and departments that require the most public access. For a building in which issues of security are paramount, the architects successfully avoided the image of an armed fortress. In fact, one police officer brags that visitors to the station often remark that the reception area looks more like a hotel lobby than a police headquarters.

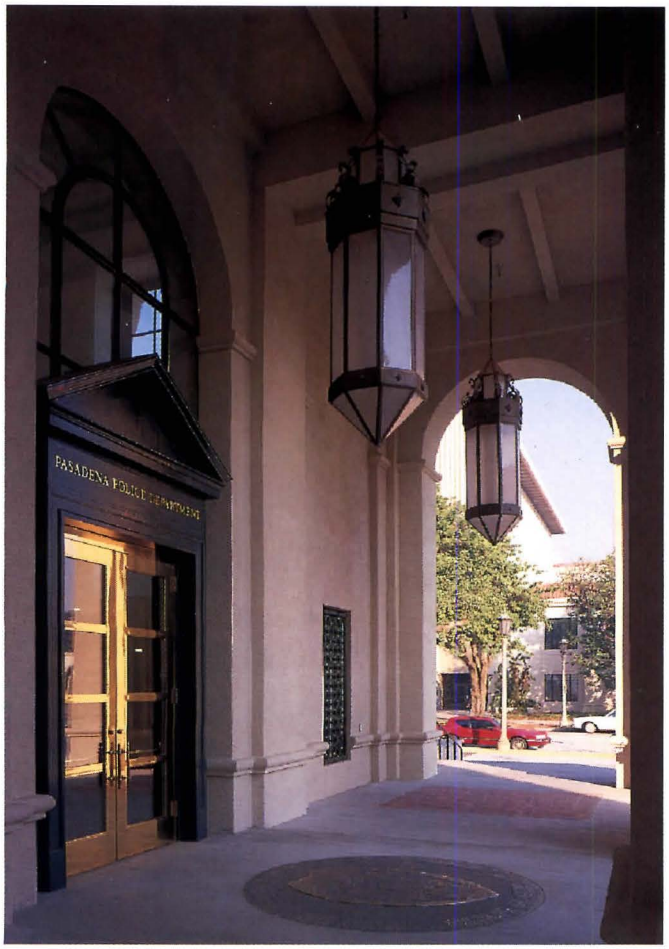
Housing flexible office space, a state-of-the-art communications and dispatch center, crime laboratory, and accommodations for other administrative functions, the facility also contains a 70-bed, single-cell jail for short-term detention on two floors below grade. Cells of the jail are divided into modular units of two 16-cell clusters, two 12-cell clusters, a 4-cell cluster, and a 10-bed dorm. Each cluster focuses on a central, communal dayroom with cells stacked along the perimeter.

The Pasadena police headquarters is representative of both the strengths and weaknesses of Stern's work. As a contextual solution, the building extends and enhances the city's rich architectural traditions, but some of its elements, with their simplified recall of Classical forms, lack detailed authenticity. In spite of these minor shortcomings, the building creates a welcoming, public presence for the city's police force through intelligent planning, strong massing, human scale, and appropriate iconography. ■

—Lynn Nesmith

On Walnut Street, the architects reduced the building's mass (top left) with changes in the fenestration, setbacks, and a third-floor loggia. The desert courtyard (bottom left) features a sculpture and painted wall by artist Robert Irwin. Reinforcing a diagonal axis with city hall, the double-height entry loggia (center left) contains a secondary entrance to the records office on axis with Garfield Street, while a large window and articulated base reinforce the tower at street level (facing page). Window surrounds, volutes, and lanterns (facing page) are inspired by the Mediterranean Revivalism of the original Civic Center structures.

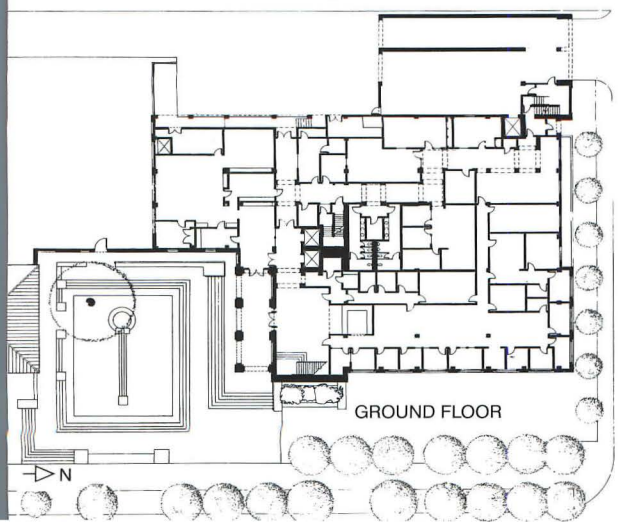

PASADENA POLICE DEPA

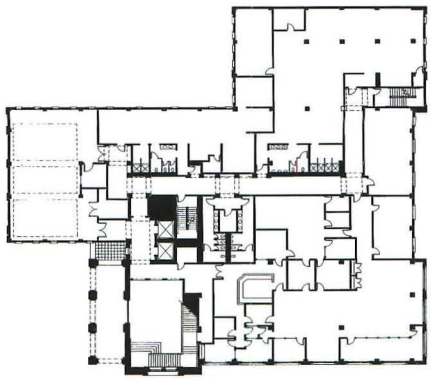


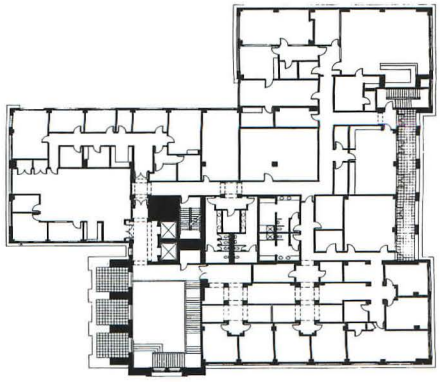
The main entrance to the police station is located within a two-story loggia (above left). In the three-story lobby (above right and facing page), a monumental stairway connects all upper floors (plans below) and serves as the organizing element and vertical circulation path. In designing the public spaces, the architects drew upon Mediterranean-inspired elements—tile flooring, colored tile stair risers, and elegantly crafted railings (facing page). Stern also designed light fixtures and a console for a computer directory located in the lobby (above right). Reinforcing the police department's desire to create a non-threatening environment, the reception desk is staffed by nonuniformed personnel from the Community Services Division.

POLICE BUILDING AND JAIL
PASADENA, CALIFORNIA

ARCHITECTS: Stern Ehrenkrantz & Kamages—a joint venture of Robert A.M. Stern Architects, New York City, and EKONA Ehrenkrantz/Kamages, Architects and Planners, San Francisco, California—Robert A.M. Stern and Christ J. Kamages (principals-in-charge); Timothy L. Craig (project manager); Karen Gibb, John Ike, Barry Rice (project architects); Carlos Abruzzese, Augusta Barone, Austin Brown, Robin Burr, Timothy E. Lenahan, Jane Marshall, Fakoor Popal, Michael Radcliffe, Jeff Schofield, Scott Shin (project team)
ENGINEERS: Forell/Elsesser (structural); Marion Cerbatos, Tomasi (mechanical and electrical); Rogoway & Borkovetz (civil)
CONSULTANTS: Cline, Bettridge, Bernstein Lighting Design (lighting)
CONTRACTORS: Super Mex; M. H. Golden Co.; Continental Heller
PHOTOGRAPHER: Peter Aaron / Esto



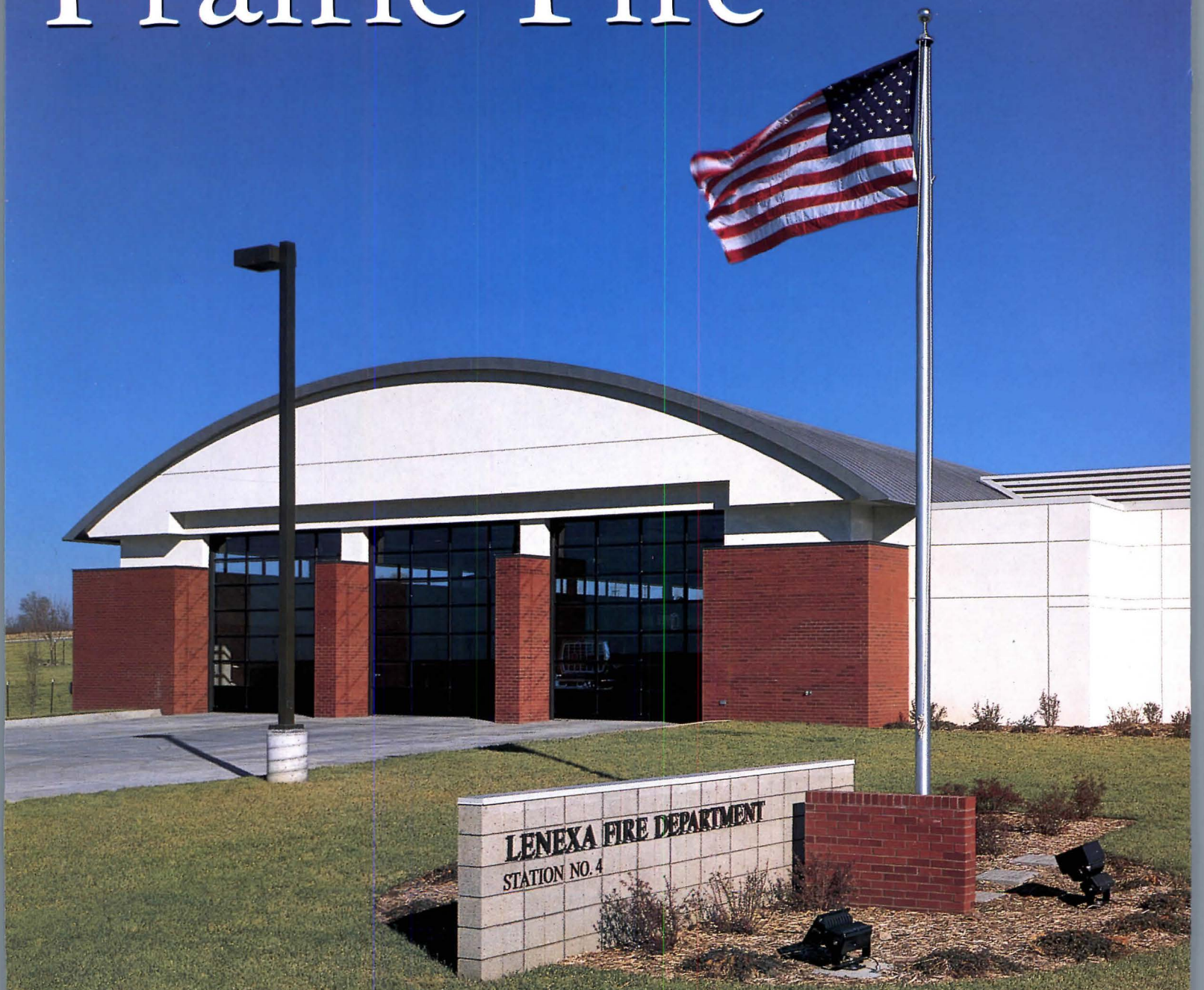

SECOND FLOOR


THIRD FLOOR PLAN


EXIT

Lenexa Fire Station No. 4
Lenexa, Kansas
Shaughnessy Fickel and Scott Architects

Prairie Fire



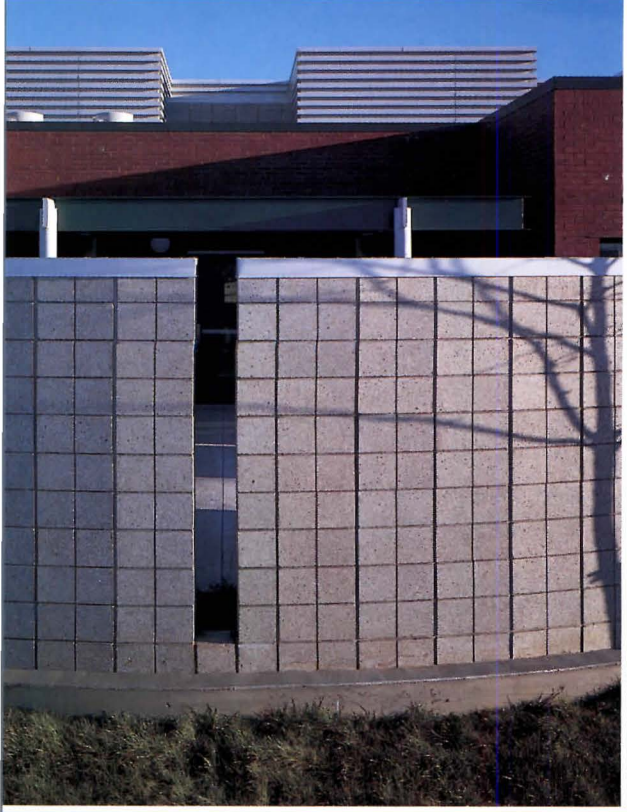
Station No. 4's concrete sign is depicted as an extension of the building's extruded east-west wall (these pages). Apparatus bay is lighted at night so the public can view the *fire engines (facing page, inset).*

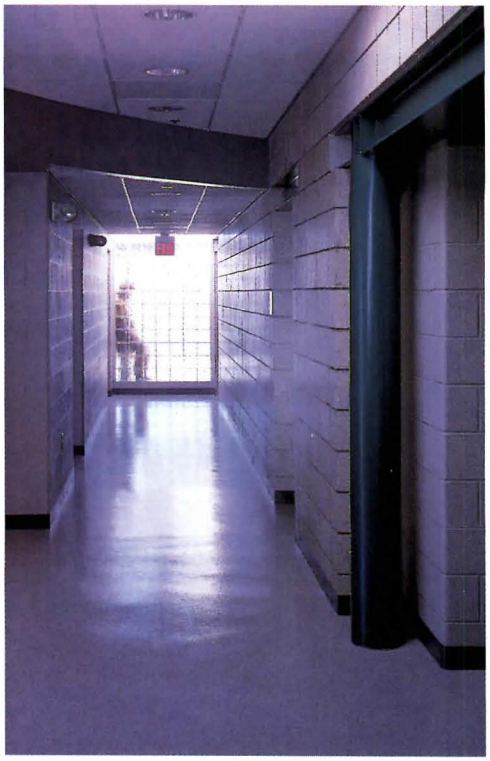
OLDER AMERICAN FIRE DEPARTMENTS OFTEN occupy two-story buildings, in which a clanging alarm sends firemen sliding down brass poles to reach their trucks. But today's fire chiefs eschew the poles—too many firefighters got injured making the slide—so modern fire stations are housed on one level, with several access points linking residential quarters to fire engine bays. And, since women began fighting fires alongside men in the mid-70s, living arrangements and support areas have also changed. Michael Shaughnessy, whose firm recently completed a new station for the Lenexa, Kansas, Fire Department (and is designing two more for neighboring towns), claims the most difficult task in designing the building type is to "integrate the large mass of the apparatus bay with the rest of the building."

Lenexa's Station No. 4 accomplishes the feat with three parallel volumes—a 24-foot-high vaulted apparatus bay, a support area, and residential quarters—situated atop a hill in a new industrial park. The structure's low entrance canopy, a jutting concrete spine above it, and three louvred rectangular volumes housing mechanical equipment on the roof accomplish a skillful layering of forms and materials that breaks up the building's mass and redirects attention away from the vast apparatus bay.

The canopy, built of steel trusses and supported by a steel column, marks the public entrance, bordered by a glass block wall. A skylit corridor, terminated by the wall at one end, separates brick-clad living quarters from a white-stucco-clad volume containing support facilities (a shop, auxiliary generator, men's and women's locker rooms, and laundry). Here, the playful hand of the architects reveals itself: the northern wall of the corridor, in burnished concrete block, pops out of the building at its eastern and western facades, a spine along which the rest of the building falls into formation. Out front, the plane of the wall is further extended by the station sign, in matching block.

Three doors along the corridor provide direct access from Spartan living quarters—dubbed "fireman proof" by Lenexa Fire Chief Kenneth Hobbs—to the apparatus bay, where bowstring steel trusses span three bays. Fourteen-foot-high insulated glass doors give the public a view of the shiny red fire engines inside, and at night the lighted





building glows like a Japanese lantern. Clerestory windows along the bays' north facade heighten this effect, and increase the daylight for firefighters working within, maintaining the trucks in a constant state of readiness. A large round exhaust fan, which removes carbon dioxide from the building and also provides the exhaust outlet for the hose-drying closets, occupies the center of the north facade. The incorporation of this circular element into the building's design adds to its rather Eastern, Japanese effect, a startling but not unwelcome image on the Kansas prairie.

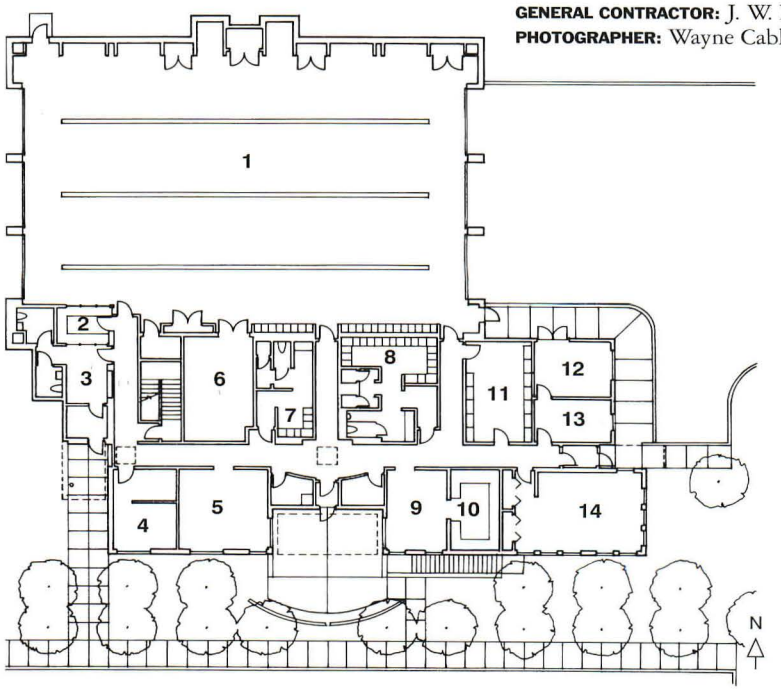
Principals of Shaughnessy Fickel and Scott, founded in 1973, claim the 13-person firm assiduously tries to avoid trends, instead considering each project as a unique circumstance, with forms determined by time and place. "If we did the same building two years later," says Shaughnessy, "it would come out differently." Although the layering of materials and the extruding corridor wall may hint of recent architectural styles, this structure nonetheless awakens a nostalgia for the postwar industrial forms common to such exurban landscapes all across America. Among the curved-roof metal warehouses and rudimentary factories that constitute Lenexa, Station No. 4's functional, hangarlike profile stands like a beacon for good design above the rolling Kansas plains. ■

—HEIDI LANDECKER

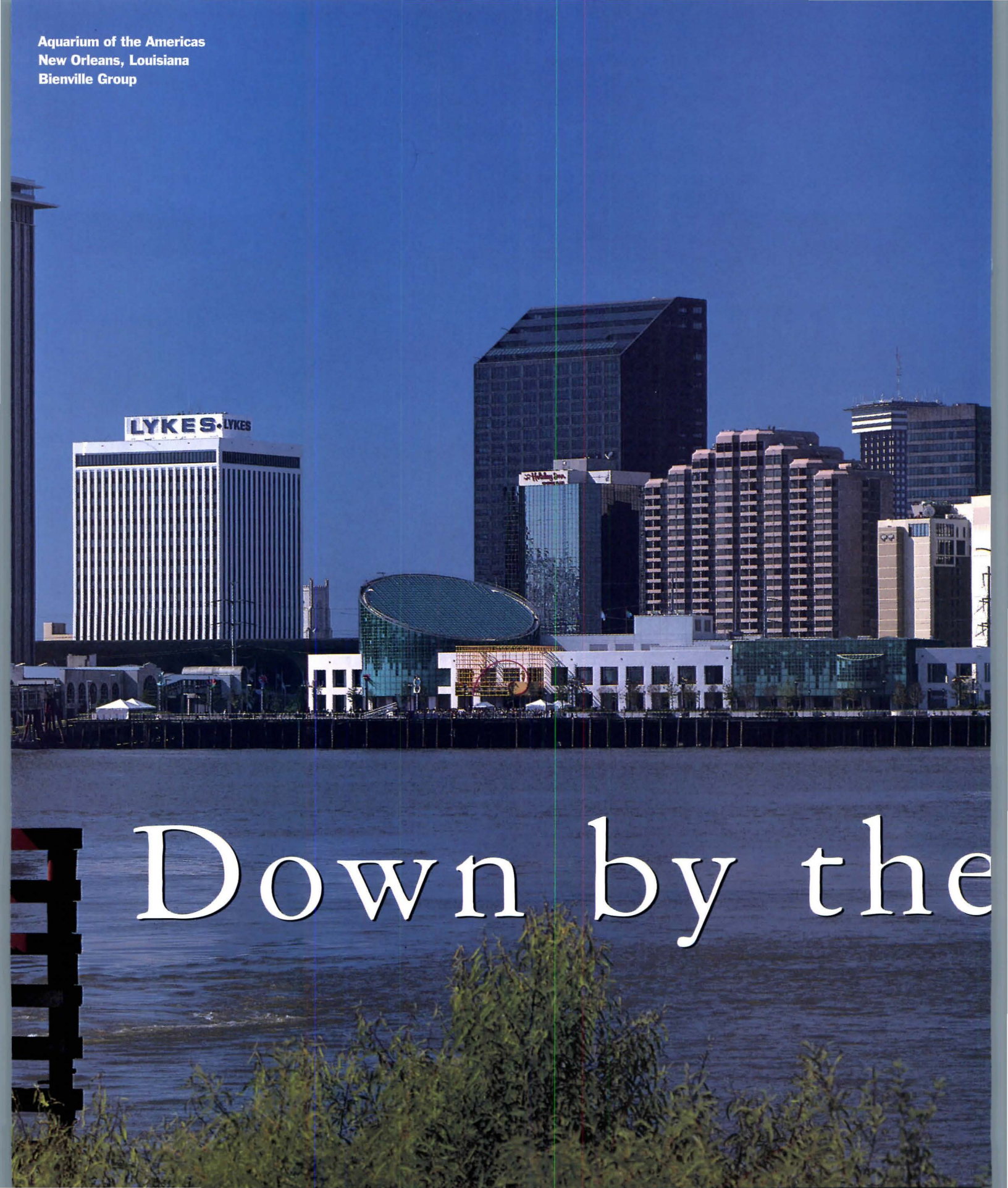
Curved, concrete block wall (facing page, top left) screens south-facing patio from parking area. Clerestories and exhaust fan enliven the north facade (facing page, top right). Apparatus bays are spanned by a 5-inch metal deck with a standing seam metal roof (facing page, bottom), supported by painted steel bowstring trusses (above left). Off-center corridor separates living quarters from support area and bays (above right and plan).

LENEXA FIRE DEPARTMENT STATION NO. 4
LENEXA, KANSAS

ARCHITECTS: Shaughnessy Fickel and Scott Architects, Inc., Kansas City, Missouri—C. Michael Shaughnessy (director of design); J. William Scott (principal-in-charge); Michael Christianer (project designer); Dale Duncan, Greg Hanks, Joel Jacobsen, Keith Mueller (project team)
LANDSCAPE ARCHITECTS: J. L. Bruce and Company
ENGINEERS: Turner Consultants (mechanical/electrical); Kerr Conrad Graham Associates (civil/structural)
GENERAL CONTRACTOR: J. W. Putnam
PHOTOGRAPHER: Wayne Cable/Cable Studios

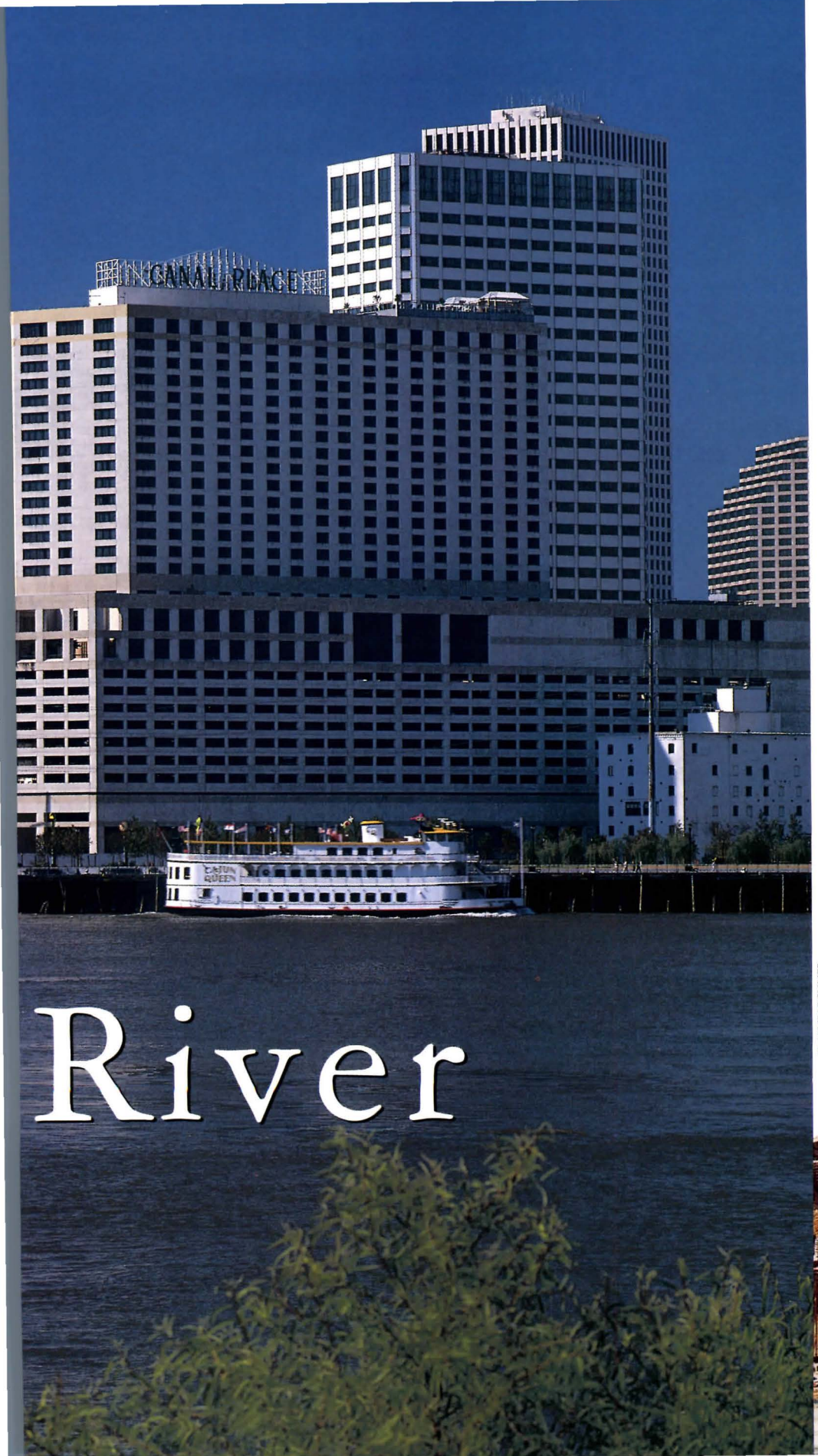


1 APPARATUS BAY
2 WATCH
3 LOBBY
4 OFFICE
5 DAYROOM
6 SHOP
7 WOMEN'S LOCKERS
8 MEN'S LOCKERS
9 DINING
10 KITCHEN
11 STORAGE
12 EMERGENCY GEN.
13 LAUNDRY
14 SLEEPING



Aquarium of the Americas
New Orleans, Louisiana
Bienville Group

Down by the



River

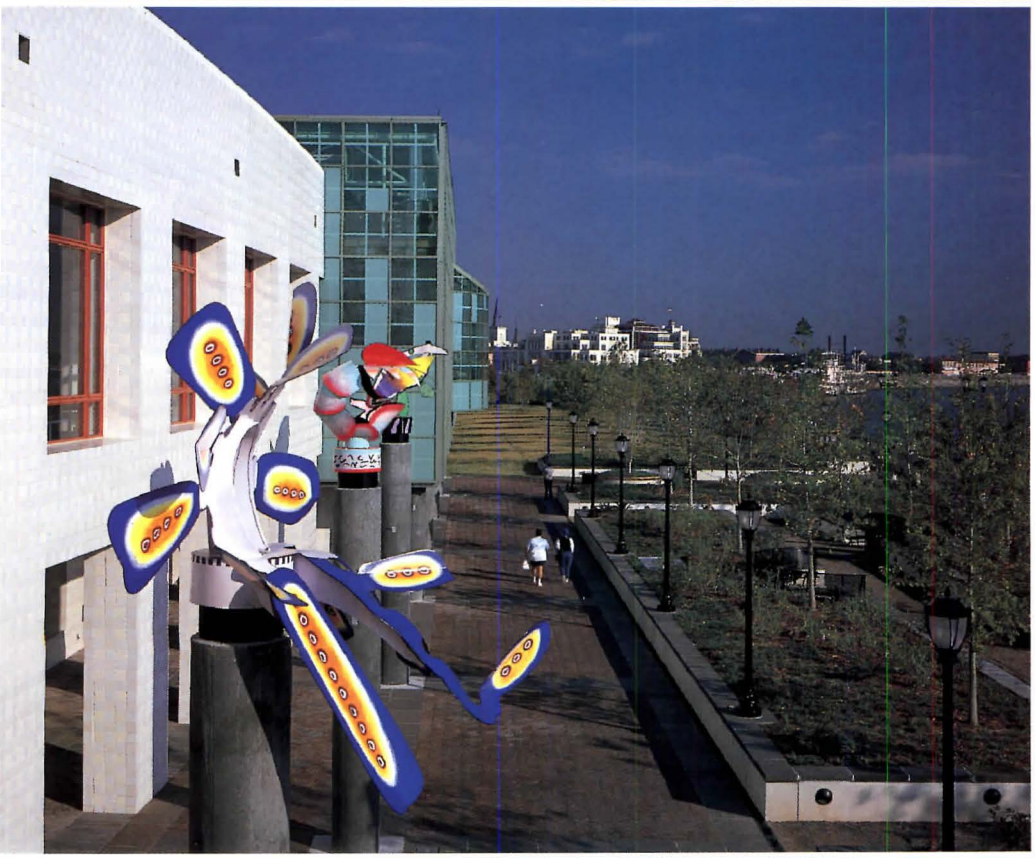
NOSE TO NOSE WITH A BROWN SHARK, A white-haired man and a small boy stand gaping. Grandfather and grandson lock hands before an immense, glowing aquamarine wall teeming with flesh eaters, but their apprehension softens to delight. Each new visitor appears overwhelmed at this concluding exhibit, a calculated grand finale to New Orleans' latest family attraction—the Aquarium of the Americas.

Completed in September, 1990, the 120,000-square-foot structure joins successful aquariums playing to sell-out crowds from Monterey to Baltimore. Aquariums have been so effective at drawing the public that 70 are currently being planned around the globe. Intimacy with live animals, appeal to all ages, and palpable excitement combine to produce "a predictable satisfaction of every visit," according to the Bienville Group, a consortium of five local architectural firms that produced the New Orleans aquarium.

Visitor satisfaction also produces revenues. In the case of New Orleans, local leadership sought a new attraction for a city that increasingly relies on tourist dollars. The mayor and a majority of citizens concurred by giving overwhelming support to a local bond issue to develop the aquarium in 1986. Ron Forman, director of the financially successful local zoo, agreed to undertake the project: since both aquarium and zoo feature native habitats, integration into a single organization called the Audubon Institute seemed logical. Citing a feasibility study of six alternatives, Forman and his organization had one stipulation: that the site be positioned at the foot of Canal Street, easily reached by French Quarter tourists.

ALAN KARCHMER

New Orleans' new aquarium occupies a critical riverfront site at the foot of Canal Street and is bordered by 12-acre Woldenberg park (below). Its linear arcade and glass drum relate to neighboring high rises (facing page).



ALAN KARCHMER

ALAN KARCHMER

Despite preservationists' objections to further crowding the French Quarter's architectural treasury, the Canal Street site was finally selected. Forman and his organization agreed to raise $15 million to match $25 million in city revenues, and contractors broke ground for a $40-million aquarium in 1987.

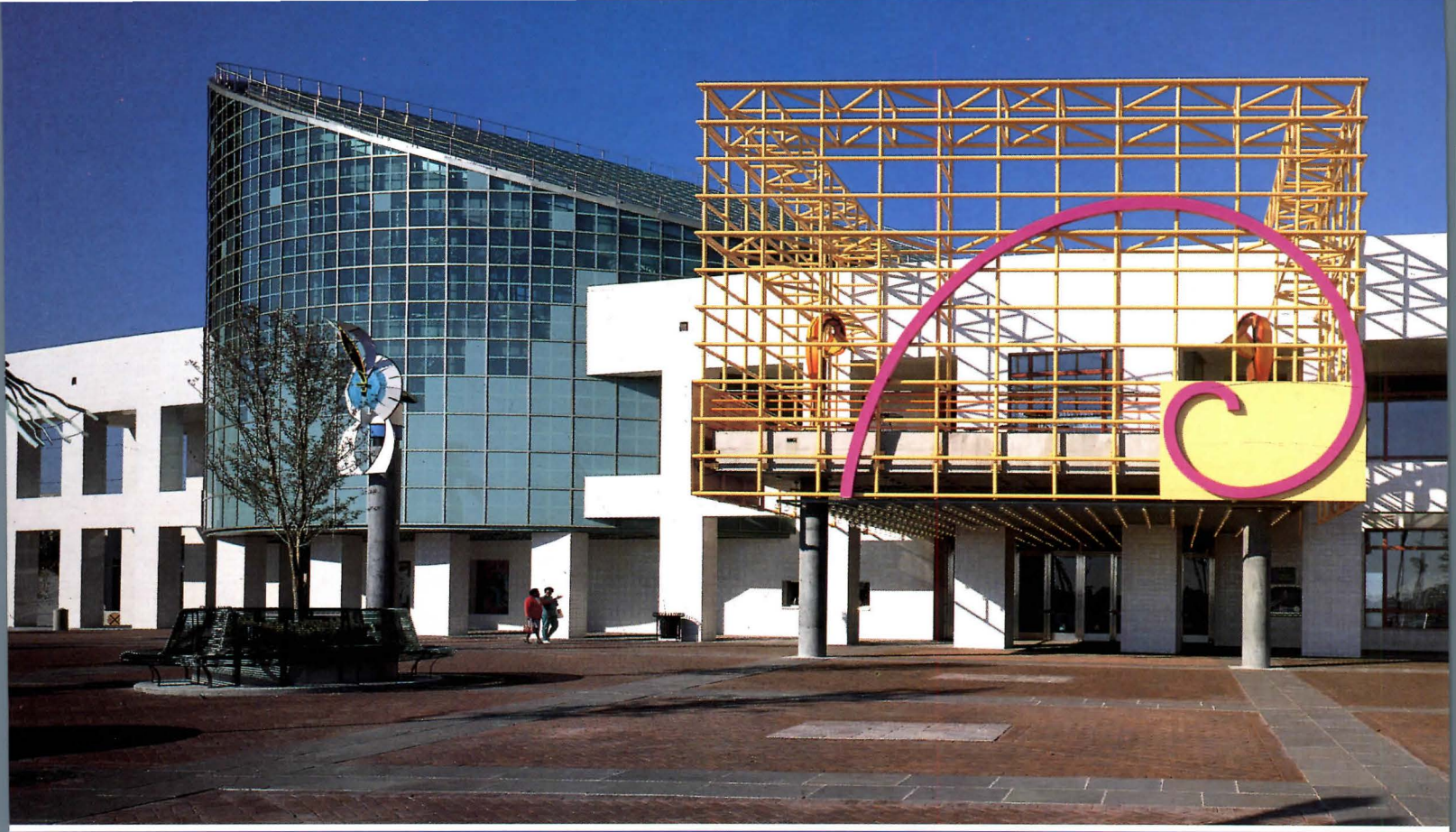
Strategically situated where Canal Street meets the river—and where the old city meets modern New Orleans—the aquarium straddles a line bisected by the Vieux Carre. Primarily low-scaled to accommodate the historic district's 50-foot height limitations, the aquarium blissfully avoids the neo-Quarter pastiche of stucco and ironwork. The structure converses with its contemporary neighbors: adjacent Canal Place, a collection of 1970s-era high rises; Riverwalk, the Rouse-inspired riverfront marketplace; and Edward Stone's ITM tower.

As befits its purpose, the aquarium's massing is lively, not monolithic, and the building responds to its surroundings in three dimensions. A sliced, 145-foot-tall glass drum adds a twist to the local skyline, echoing and updating the ITM building's humdrum circular penthouse; the elegant white facades gently curve in an arc that parallels the river's, replacing an impenetrable wall of rusting docks that blocked access to the "Big Muddy."

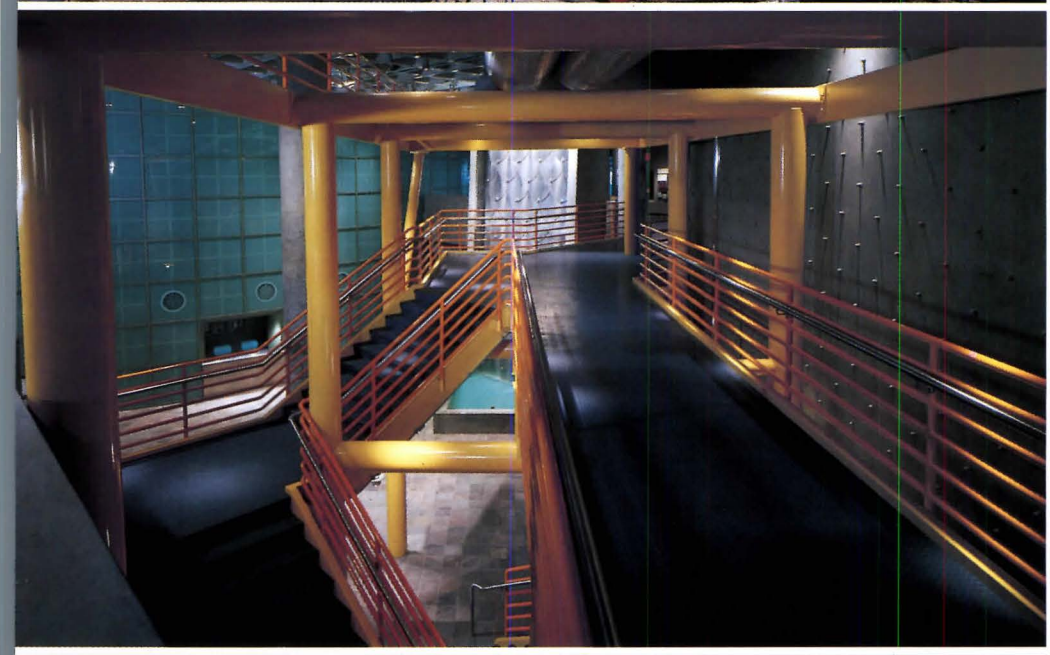
In its planners' most generous stroke, the aquarium sits in a handsome 12-acre park that runs beside the Mississippi River, giving the crowded Quarter breathing room along the majestic waterway. Essentially a long, broad walkway, Woldenberg Park expands from hard brick pavers to soft green space and trees as it widens, framing downtown skyscrapers and the lighted twin arches of the river bridges. Designed with breadth, scale, and permanence, this landscape fits into the city fabric like a prodigal child—immediately familiar and welcome.

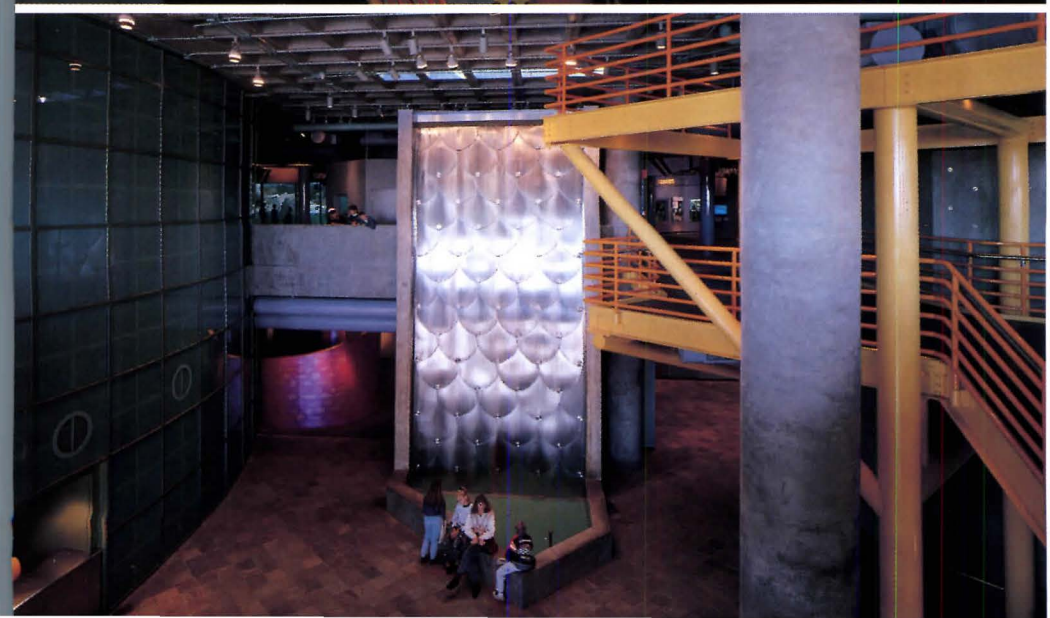
Hidden behind trolley tracks and the floodwall, the building plays peek-a-boo with the city, sharing its personality in bits and pieces as it is approached on foot. At the pedestrian scale, the structure is a contrapuntal essay in texture—difficult to grasp as an entity, but engaging at each encounter.

A simple stucco facade (top left) sits behind floodwall and trolley tracks, while the landscaped plaza features ceramic-tile walls (center left) and whimsical fish sculptures (bottom left). The riverfront entrance features a wave logo on the gridded marquee (facing page, top). Glass drum peeks out from city elevation near park (facing page, bottom).




R R
3
TRACKS





Up close, the apparently all-white ceramic tile cladding blossoms into subtle shades of pinkish beige, creamy yellow, and greyish white.

In a plaza near the entry, a procession of whimsical Ida Kohlmeyer sculptures recalls the carnival spirit of the 1984 New Orlean's World's Fair, setting the tone for the aquarium's interior. The building entrance is unabashedly theatrical, a good idea perhaps pushed beyond its limit to carry the conceit. A gridded yellow metal entrance canopy like a Broadway marquee extends out into the riverfront plaza, its underbelly lighted by myriad incandescent bulbs, its face ornamented with a magenta rendition of the museum's signature wavelike logo.

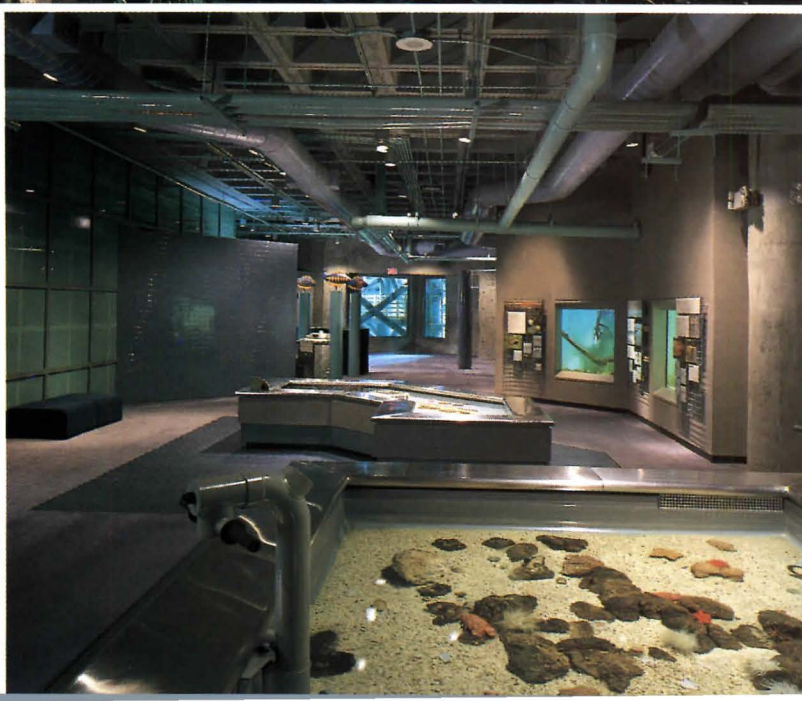
The active street mood and exterior glitter change dramatically to compact strength inside. On entering the two-story lobby, New Age music beckons, pulling the visitor along and setting the scene. Directly ahead, water splashes down the face of a tall fountain, its face sculpted into a fish-scale pattern; to the left, the curve of the glass rotunda meets the ground. Lighting is bright at entry, subdued ahead, but focused on a three-dimensional wave signalling the first exhibit.

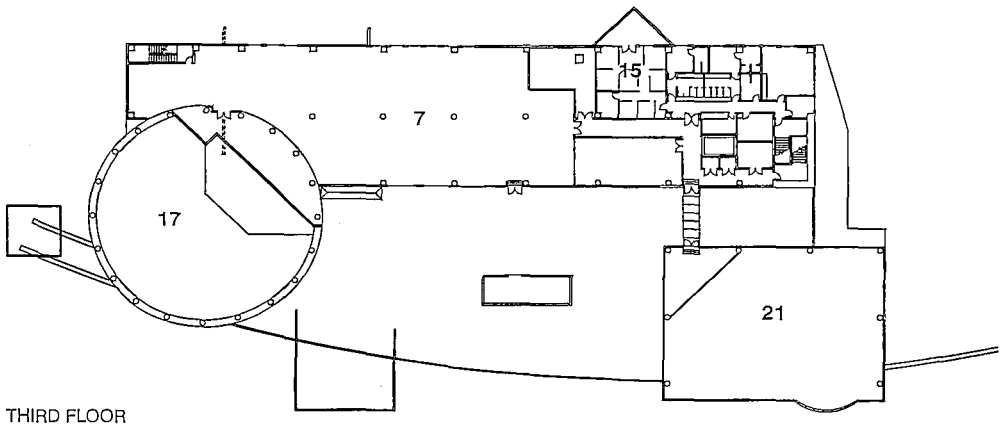
After acclimating to a darkened chamber, the visitor makes a hard turn and walks into a clear acrylic tunnel surrounded by a Caribbean coral reef habitat. Overhead are 132,000 gallons in 17½ feet of water. Beyond the reef, the effective aquarium interiors serve as neutral backgrounds for the intensely engaging habitats strung out along the building's length.

Orchestration of the plan came from several sources. The architects consulted Esherick, Homsey, Dodge & Davis for design advice. The San Francisco architectural firm and local design principals banished dusty seriousness in favor of a true New Orleans spirit: a handsome bar and restaurant occupy a "court of honor" on the second floor.

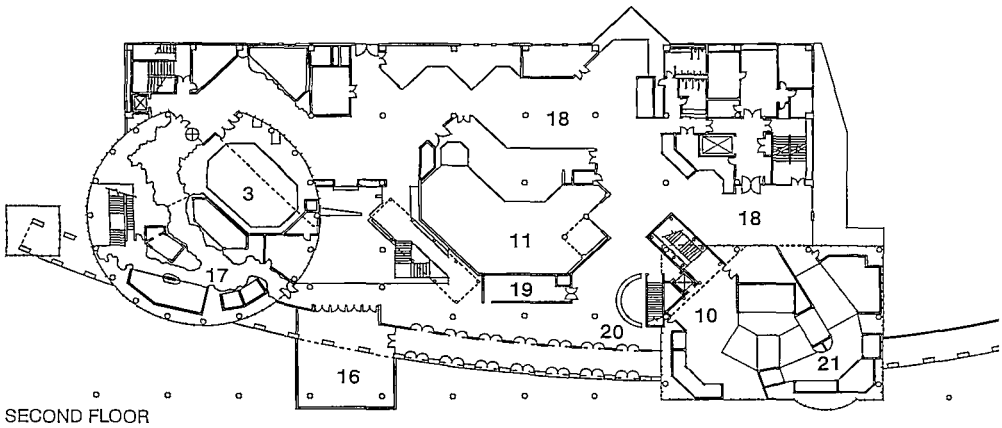
Most exhibits, planned by the Seattle-based firm Bios, include some participatory elements—interactive videos, buttons to push, levers to lift, cameras to focus—in a non-demanding melange that, like the numerous "discovery place" museums of the

Visitors enjoy river views from terrace above entrance (top left). In the lobby, an oil platform sports a yellow handrail (center left) and a grand fountain is clad in fish scales (bottom left). Exhibits include touching pools (facing page, bottom right), the Mississippi River habitat (facing page, bottom left), and the Amazon rainforest (facing page, top).

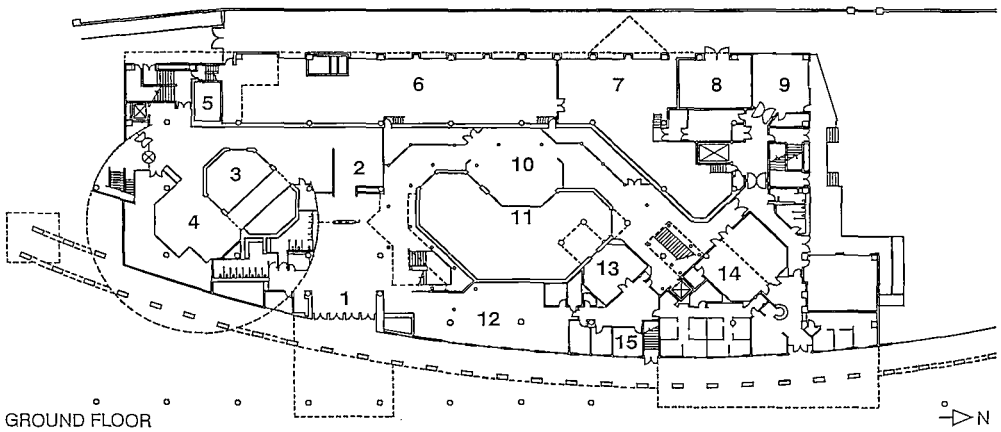




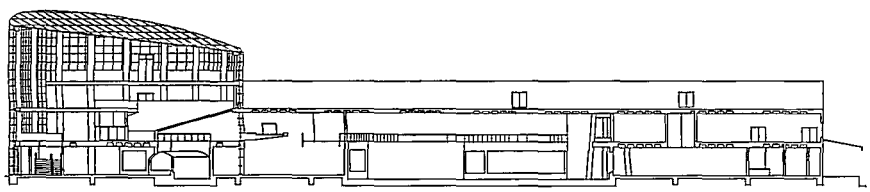
THIRD FLOOR



SECOND FLOOR



GROUND FLOOR



NORTH-SOUTH SECTION

1	ENTRANCE	8	VAULT	15	OFFICE
2	INTRODUCTORY EXHIBIT	9	RECEIVING	16	TERRACE
3	CARIBBEAN TANK	10	GULF EXHIBIT	17	AMAZON EXHIBIT
4	CARIBBEAN EXHIBIT	11	GULF TANK	18	EXHIBIT
5	BRINE TANK	12	GIFT SHOP	19	KITCHEN
6	LIFE SUPPORT	13	CONFERENCE ROOM	20	GRILL/BAR
7	*MECHANICAL*	*14*	*CLASSROOM*	21	MISSISSIPPI RIVER EXHIBIT

Acrylic technology permits walking under a barrel-vaulted passageway through a Caribbean reef (right). Captain Nemo could have designed the oculus for the first-floor conference room (facing page, bottom left). Schools of sharks swim past awed patrons in the aquarium's final exhibit (facing page, bottom right).

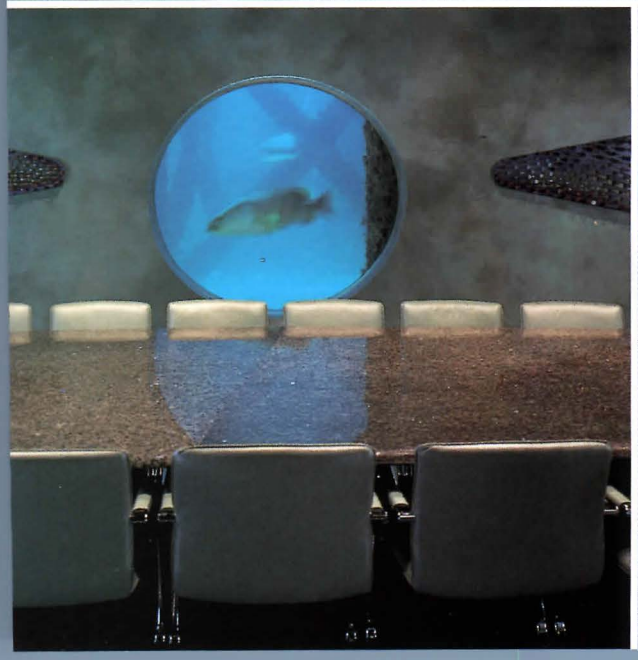
1970s, invites poking around at your own pace. Recent acrylic technology permits the delight and surprise offered by the final big window on the Gulf—a 16-foot-high, 18-foot-long, 11½-inch-thick wall, brilliantly clear—that brings generations in communion with the deep.

Imaginatively conceived and well executed, the aquarium is a show-stopper, predictably drawing crowds from the Vieux Carre and Canal Street into into its air-conditioned depths. Comfortably sited where old meets new New Orleans, the entire project succeeds in conquering a difficult program—opening the riverfront, educating visitors, entertaining with a joyous dignity. And the public seems to agree. In the first month it was open, the aquarium drew 250,000 visitors, a lesson that has not been lost on the administration. Plans are under way for the aquarium's second phase, a 60,000-square-foot addition focused on emerging environmental issues. ■

—ROBERT A. IVY, JR.

AQUARIUM OF THE AMERICAS
WOLDENBERG PARK
NEW ORLEANS, LOUISIANA

ARCHITECTS: The Bienville Group, A Joint Venture, New Orleans, Louisiansa—Concordia Architects (Steven Bingler); The Mathes Group (Creed Brierre); Billes/Manning Architects (Wm. Raymond Manning); Hewitt-Washington & Associates (Lonnie Hewitt); Eskew Vogt Salvato & Filson Architects (R. Allen Eskew, Leonard Salvato)
DESIGN CONSULTANTS: Esherick, Homsey, Dodge & Davis
ENGINEERS: Morphy, Makofsky, Mumphrey, Masson (structural); Warren G. Moses and Company (electrical); Engineering Planning Group (civil/electrical); Go-Tech (civil); Dunn-Lee-Smith-Klein and Associates (mechanical); James M. Montgomery, Consulting Engineers (life support); Boner Associates (acoustical)
LIGHTING DESIGN: Cline, Bettridge, Bernstein
EXHIBIT DESIGN: Bios, Inc.
LANDSCAPE ARCHITECT: Cashio, Cochran, Torre/Design Consortium
CONSTRUCTION MANAGMENT: Walk, Haydel & Associates
CONTRACTOR: Woodrow Wilson Construction (aquarium); Gibbs Construction (park)
PHOTOGRAPHER: Timothy Hursley, except as noted



New Hanover International Airport
Wilmington, North Carolina
Howard Needles Tammen & Bergendoff, Architects

TRANSPORTATION HAS ALWAYS BEEN A major determinant in the physical and economic development of cities. Wilmington, North Carolina, a historic community of 56,000 residents on the Cape Fear River, has experienced financial booms and busts intricately linked with changing modes of transit. An active port from the mid-18th century and the last major Southern port to fall during the Civil War, Wilmington later became a major junction on the Atlantic Coast Line Railroad. But in 1961, rail consolidation along the East Coast bypassed the city for more direct north-south routes.

Today, Wilmington is commonly approached by air. And although airport terminals rarely match the grandeur of the railroad sheds built at the turn of the century, cities like Wilmington are realizing that airports are civic gateways and should attempt to capture elements of local culture. As a result, the region's new 94,000-square-foot airport terminal establishes a commanding presence amid its flat, open terrain by projecting an image of flight.

To enliven what is basically a brick box, HNTB Architects wrapped the front of the building with an aerodynamic entrance canopy that reinforces the terminal's internal linear organization. Four heavy, masonry columns announce the terminal's three separate entrances to the central lobby, ticketing, and baggage-claim areas. Complementing the curved form of the canopy, the architects crowned the three-story central volume with a gently sloping roof; they topped the single-story arrival and departure wings and the concourse connector with barrel vaults. Illuminated at night, these curved forms are like a 20th-century version of the lighthouses that once stood along the North Carolina coast, transforming the terminal into a symbolic beacon for weary travelers arriving by plane.

To reinforce procession by car, the architects created a formal approach with an axial view of the terminal, and carved out a new circular parking lot that functions as a forecourt to the facility. The terminal is set atop an artificially created hill, and a slightly elevated roadway system follows the bermed site to allow passengers to be dropped off and picked up on the same level as the airplane gates. A sloping grade to the south provides a full basement for mechanical systems and supplies the necessary building height to accommodate jetways on the main concourse level. This arrangement eliminates the need for vertical circulation for passengers, except those boarding commuter airplanes too small to accommodate a jetway.

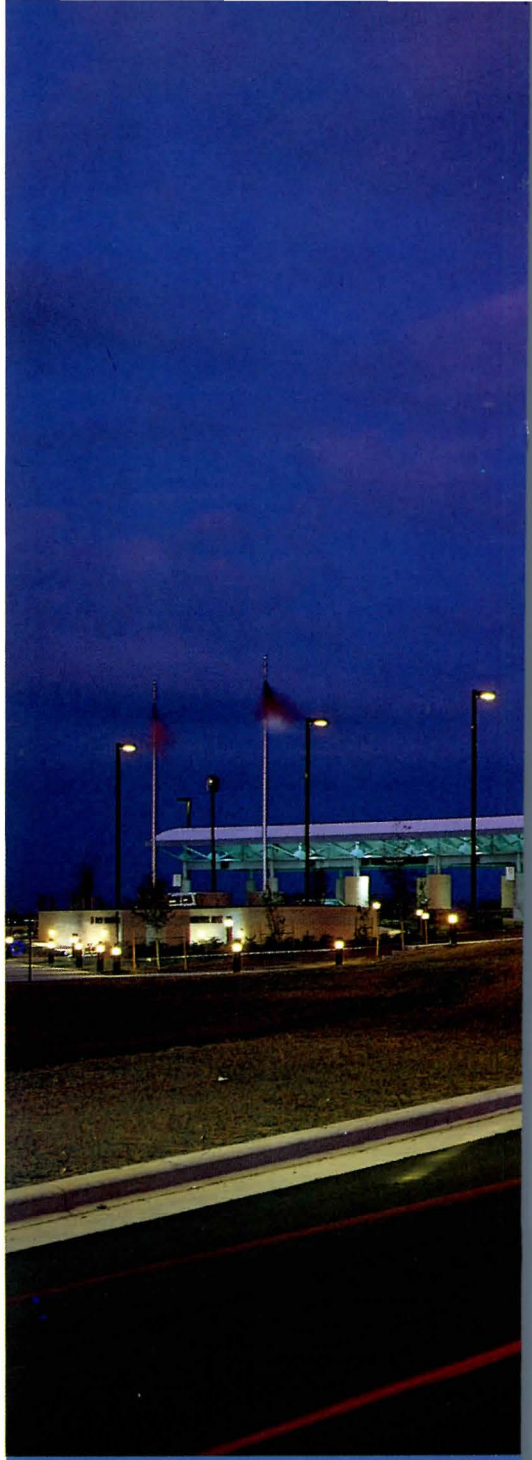
The main internal organizing element of the terminal is a double-height central atrium. Ticketing is housed in a wing that extends to the west, while baggage-claim facilities are located at the opposite end of the building's long axis. From this central space, an angled concourse extends southeast from the main terminal to a freestanding passenger-holding facility accommodating six gates. To accentuate the element as the connection between the holding room and terminal, the architects clad the elevated concourse in white metal panels.

With an eye to the future, HNTB designed the terminal to accommodate expansion in almost any direction. Both wings can be extended to the east and west, and a second dogleg concourse is proposed to the southwest, expanding the airport's capacity up to 22 gates.

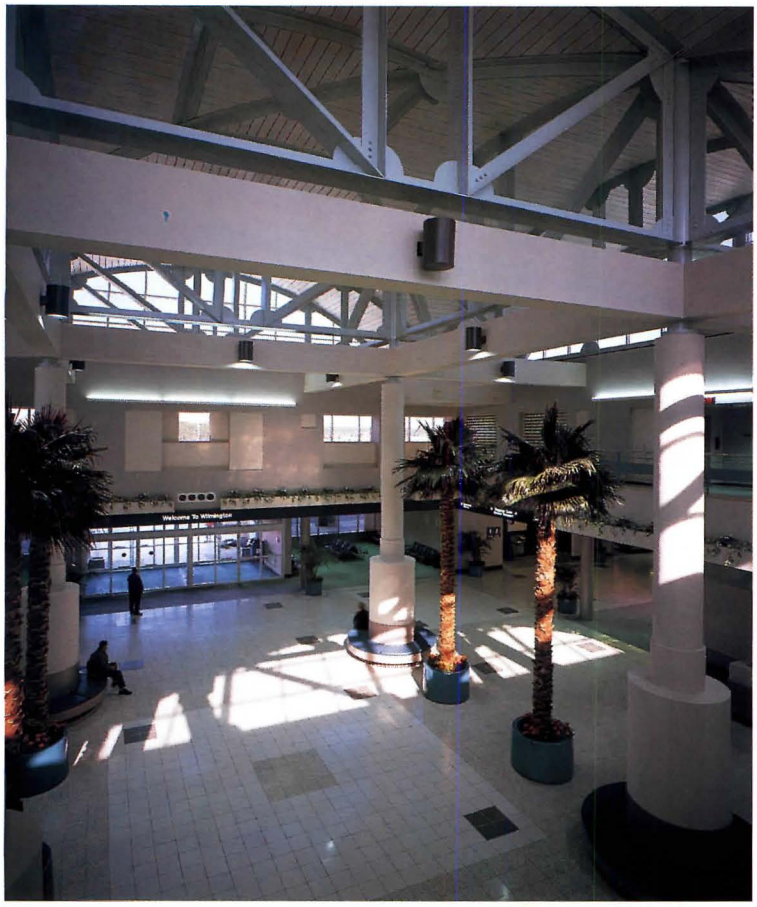
In North Carolina, automobile license plates read "First in Flight" in honor of the Wright Brothers' historic take-off from Kitty Hawk. The city of Wilmington now has a terminal that lives up to the state's slogan. ■

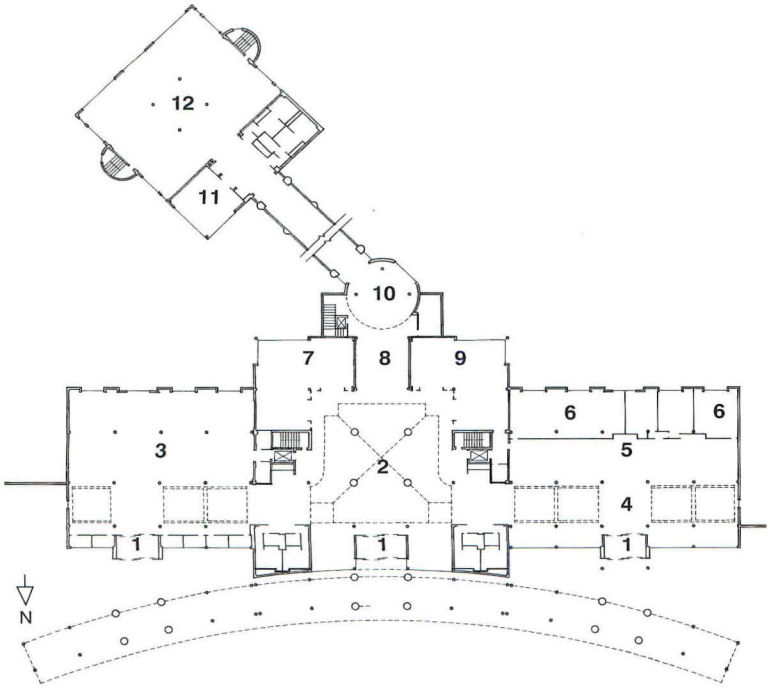
—LYNN NESMITH

The terminal's exterior is articulated with a dark base and graduated bands of lighter bricks (facing page, bottom). Windows facing the airfield are recessed and detailed with aluminum framing (below). Gently sloping roof forms and aerodynamic entry canopy provide a metaphor appropriate for a gateway to the skies (facing page, top).



Civic Gateway





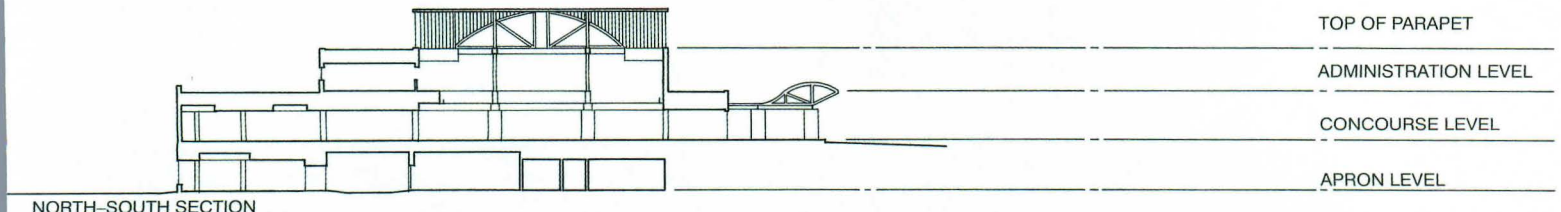
CONCOURSE LEVEL

1	VESTIBULE	5	TICKET COUNTERS	9	RESTAURANT
2	MAIN LOBBY	6	OFFICES	10	ROTUNDA
3	BAGGAGE CLAIM	7	CONCESSION	11	VIP LOUNGE
4	*CIRCULATION*	8	*SECURITY*	12	HOLDING AREA

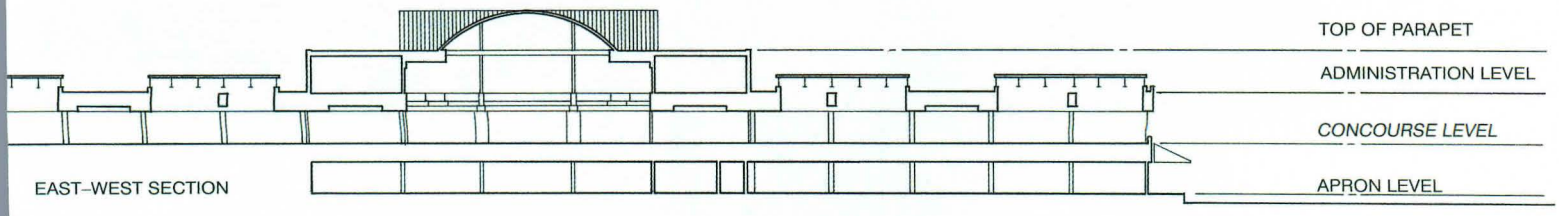
Central atrium features massive columns and exposed structural members (top left). To enliven the lobby, the architects added four 24-foot-high palms—real trees treated with a process similar to embalming to maintain their size and appearance. Airline staff areas and administrative offices are located on the upper floor, off a corridor that wraps around the atrium (above). Building sections (facing page) illustrate the simple, horizontal circulation through the terminal. Ticketing and baggage claim are located on either side of a central lobby (section, facing page, bottom), an arrangement that works well for smaller, regional airports. Passenger waiting rooms are clustered in a freestanding wing connected by a linear concourse (plan, left). Supported by 16 pairs of columns, the painted entry canopy curves around the front of the building and defines the terminal's three entrances (facing page, top).

NEW HANOVER INTERNATIONAL AIRPORT
WILMINGTON, NORTH CAROLINA

ARCHITECTS: Howard Needles Tammen & Bergendoff (HNTB), Alexandria, Virginia—Steven Reiss (principal-in-charge); Cary Goodman (design principal); Joe Grogan (project architect); Kevin McDonald, Reeve Wiederman, Greg Green, Gay Miller, Dave Contag (project team)
LANDSCAPE ARCHITECT: HNTB
ENGINEERS: HNTB (structural/mechanical/electrical); Talbert, Cox & Associates (airfield)
CONSULTANTS: Apple Graphics, Inc. (signage)
GENERAL CONTRACTOR: Miller Building Corporation (phase I); Leader Construction (phase II)
COST: $11.5 million—$122/square foot (building)
PHOTOGRAPHER: Alan Karchmer



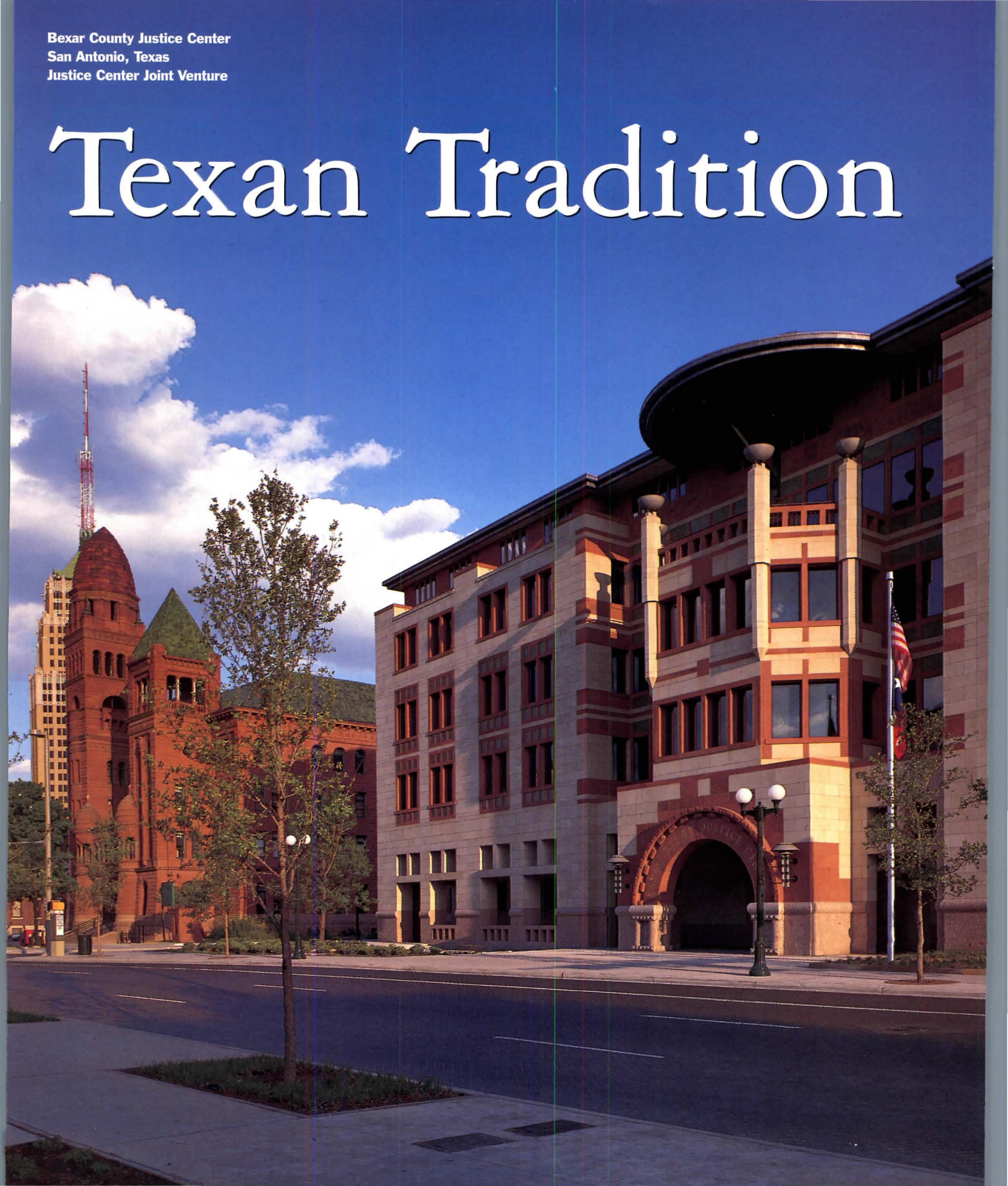
NORTH–SOUTH SECTION



EAST–WEST SECTION

Bexar County Justice Center
San Antonio, Texas
Justice Center Joint Venture

Texan Tradition



NO TEXAS CITY IS MORE HISTORIC THAN SAN Antonio, and no site more evocative than its Main Plaza, Plaza de Las Yslas, which marked the center of the original town. With 18th-century San Fernando Cathedral on one side, and J. Riely Gordon's 1896 Bexar County Courthouse on the other, the plaza epitomizes the city's civic and religious aspirations. It is also a "put-up-or-shut-up" public space where only rugged, assertive buildings can hold their own.

The new Bexar County Justice Center fits right into this context. It is a massive structure that fills an entire block between Main Plaza and Military Plaza, the site of city hall and Palace of the Governors. With its granite base and husky sandstone arches, it is old-fashioned civic architecture that expresses community values and taps the collective memory of its inhabitants. And, despite lapses on the interior, it is also civic architecture that San Antonio can be proud of.

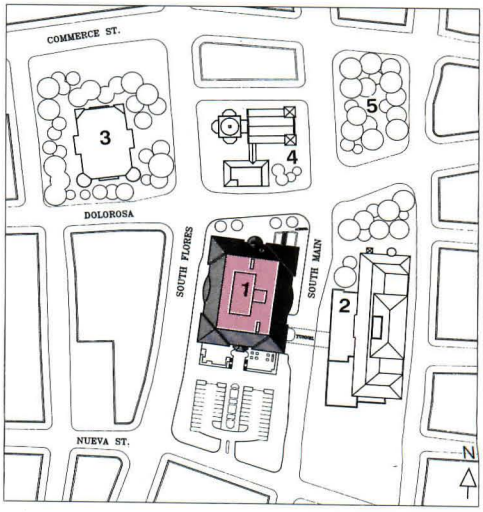
The $24-million complex is a joint venture of three San Antonio firms: JonesKell Architects; Ford, Powell & Carson; and Humberto Saldana & Associates. Although John Kell took the design lead, the project was a genuine collaboration, with the three offices pooling resources for four years.

The architects' immediate task was to relieve the chronic overcrowding in the old courthouse. After considering a proposal for a 20-story tower to be built and leased by a private developer, the county opted for a traditional courthouse for its burgeoning criminal courts. The architectural and urban design challenge then became to plug the new building into a gap between the historic plazas, created years earlier by the demolition of a block of commercial buildings. The architects pushed the new building tight to the street to close the square, yet not so close that it would block views of Gordon's Romanesque wedding cake from the west, along Dolorosa Street. The justice center's cornice is the same height as its predecessor's, but the new structure does not feature competing towers or cupolas. To break up potentially oppressive expanses of wall on the east and west, the architects introduced large, arching bays that gently undulate across the facades. They also added an arcade on three sides, and swelling porches over the north and south entrances.

The exterior finishes are a collage of appropriate materials: pink Texas granite and Pecos red sandstone; a Texas limestone similar to San Fernando's; and a soft Pennsylvania greenstone. The result is a strong yet surprisingly harmonious building that belongs to the same family as its neighbors, while expressing an identity of its own.

One of the building's best touches is also one of the simplest—the excavation of a

The justice center stands between two historic plazas (site plan and bottom photo), but is sited to allow views of J. Riely Gordon's 1896 Bexar County Courthouse from city hall. Materials, colors, and massing are compatible with the towers of the historic courthouse (facing page). A second courts building may eventually be built on the back portion of the site (bottom), across from the original courthouse.



1 JUSTICE CENTER
2 BEXAR COUNTY COURTHOUSE
3 MILITARY PLAZA / CITY HALL
4 SAN FERNANDO CATHEDRAL
5 MAIN PLAZA

small section of the ancient *acequia*, or irrigation canal, that once flowed through the entire city. It is a small cut, only a few feet long on the north side of the building, yet it helps to preserve the history of the site.

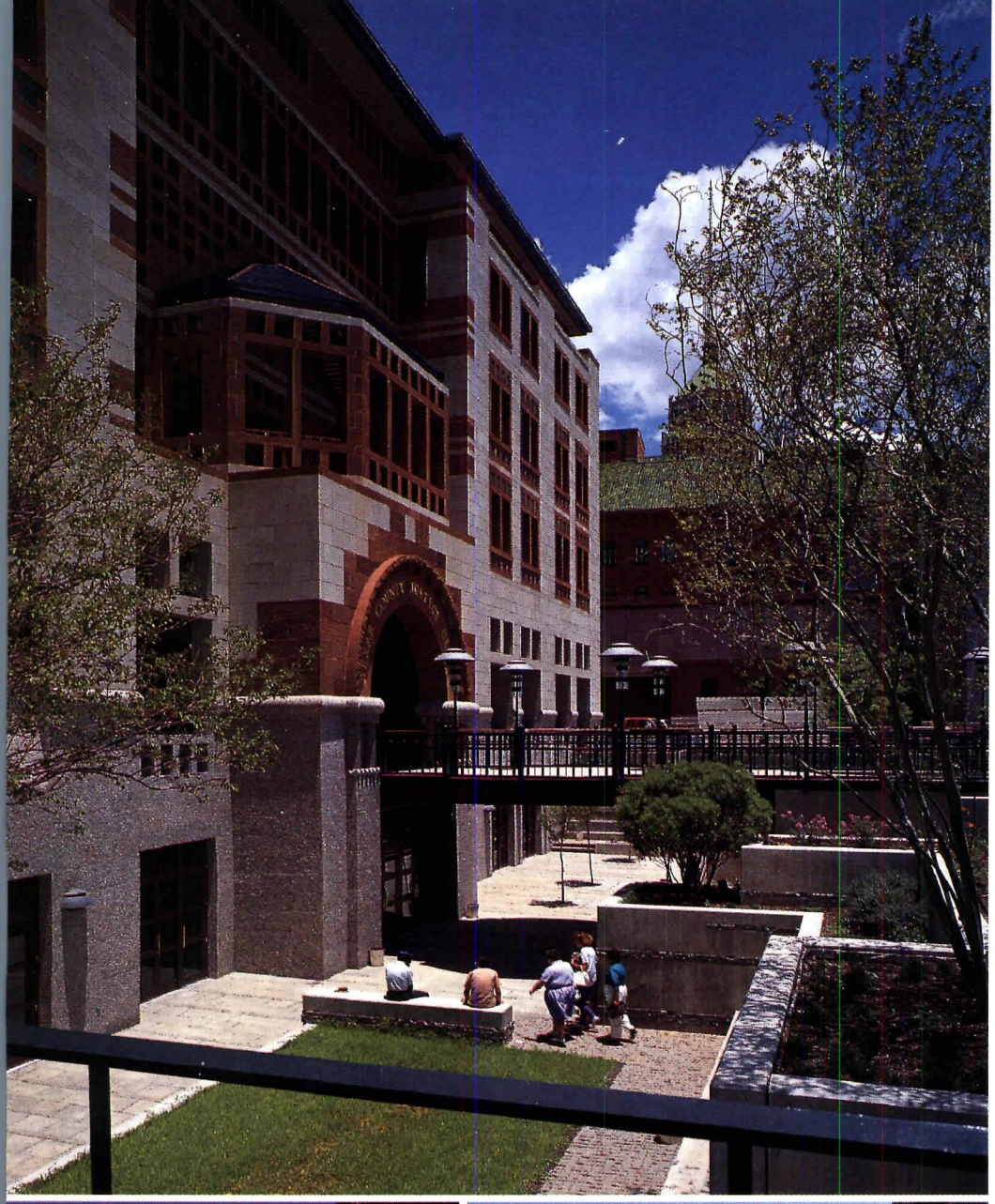
The archaeological theme reappears in a sunken courtyard on the south side of the building. Four carved limestone columns by Dallas sculptor Sandy Stein imply that the architects uncovered the ruins of an earlier culture while excavating for the new building. The artist also decorated the walls with horizontal bands of greenstone that simulate strata in the earth. The sunken courtyard extends along the full width of the building, admitting natural light to the cafeteria and central jury room on the ground floor, and giving jurors and visitors a place to relax.

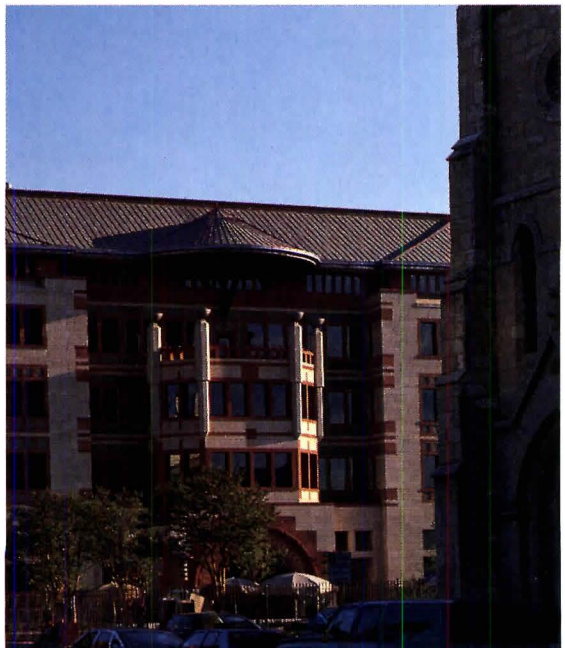
The natural light is welcome because most of the justice center's interiors are dark and cramped. No dramatic rotundas, grand staircases, or spatial flourishes announce that this is an important public building. Except for the first floor, the finishes are pedestrian and detailing is fat-fingered.

The basic organization, on the other hand, is thoroughly pragmatic. Sixteen courtrooms are located on the first three floors, with offices for the district attorney, county clerk, and grand jury housed on the fourth and fifth. Each floor is bisected by a public corridor, while judge and jurors traverse a controlled corridor between courtrooms and judges' chambers. The courtrooms themselves feature coffered, Richardsonian ceilings, and are finished in the sturdy, Spartan style of traditional Texas courthouses—including wooden swivel chairs for jurors.

Confronted with a tight budget, the architects chose to spend most of it where it really shows—on the facade and around the plaza. Even with compromises on the interior, the Bexar County Justice Center is several jumps ahead of its anonymous brethren around the country, many of which are indistinguishable from hospitals and office buildings. In San Antonio, older civic architecture has not only been recalled but emulated. ■

—David Dillon



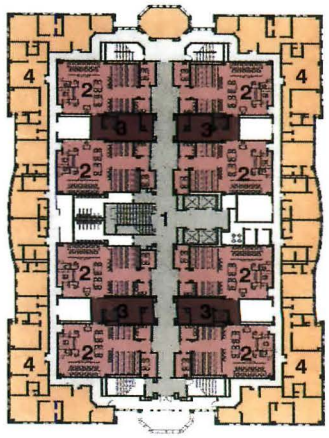


A sunken courtyard on the south side of the justice center (top), suggests an archaeological dig and admits light into the central jury room. To relieve potentially oppressive massing, the architects introduced gently arching bays (bottom left) and dramatic porches (bottom right). The south entrance (facing page) proclaims unequivocally that the center is a civic building of importance.

The south porch (facing page) is a popular spot, offering sweeping views of downtown San Antonio. Individual courtrooms (top right) are updated versions of traditional Texas courtrooms, detailed with coffered ceilings, mahogany furniture, and custom light fixtures referencing the scales of justice. Though the overall plan is pragmatic (right), with courts on the first three floors and offices on the top two (section below), detailing in some of the interior spaces is heavy-handed and lugubrious (top left). Public corridors bisect each floor, with controlled corridors accessible to judges. The prisoners enter a sally port on the east side of the building and are confined to an interstitial floor until their court appearance (section).

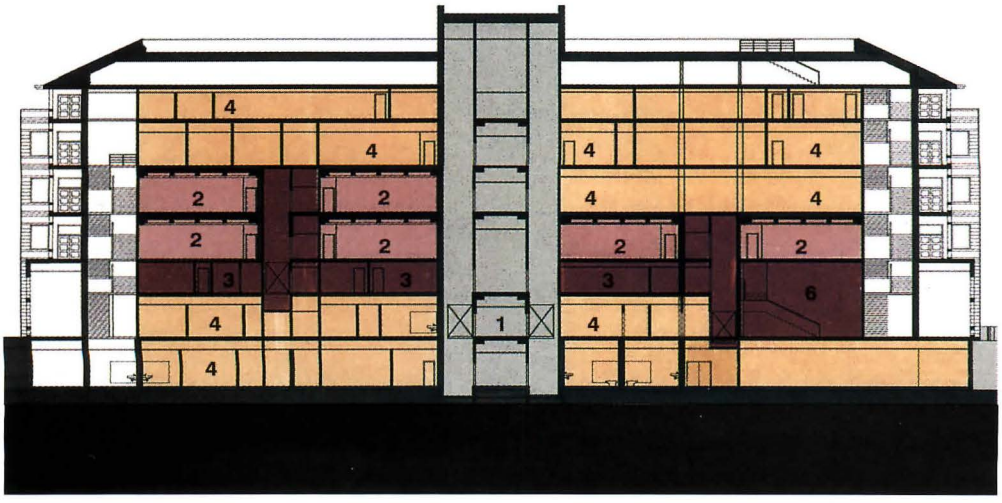
BEXAR COUNTY JUSTICE CENTER
SAN ANTONIO, TEXAS

ARCHITECTS: Justice Center Joint Venture: Jones & Kell Architects; Humberto Saldana & Associates, Inc.; Ford, Powell & Carson, Inc.—Boone Powell (principal-in-charge); John Kell (design principal); Humberto Saldana (design associate); Bruce Sasse (project manager); Roy Lowey-Ball (programming); Jerry Sparks (design); Bob Wise (job captain); Oscar Saldana (production); Randy Hohlaus (construction administrator)
LANDSCAPE ARCHITECT: Ford, Powell & Carson, Inc.
ENGINEERS: W.E. Simpson Company (structural); Goetting & Associates (mechanical, electrical); Curtis Neal & Associates (civil)
COST: $24 million—$85 per square foot
PHOTOGRAPHER: R. Greg Hursley

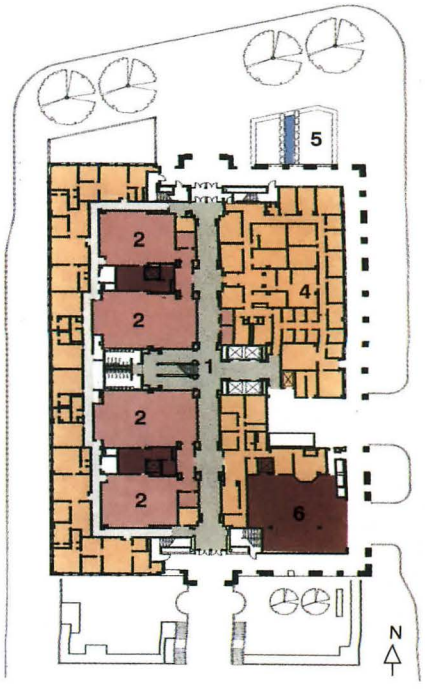


TYPICAL FLOOR

1 MAIN CIRCULATION
2 COURTROOMS
3 PRISONER HOLDING CELLS
4 OFFICES AND JURY ROOMS
5 ACEQUIA
6 SALLYPORT



SECTION LOOKING EAST



FIRST FLOOR

Glendale Heights Post Office
Glendale Heights, Illinois
Ross Barney + Jankowski, Architects

Special Delivery

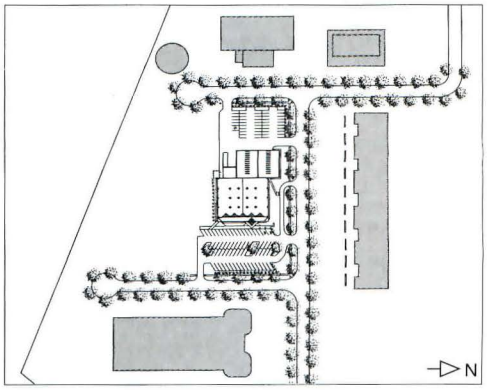
CREATING A BUILDING OF CIVIC IMPORTANCE on the suburban strip presents architects with a seemingly insurmountable challenge. For a new post office just outside Chicago in Glendale Heights, Ross Barney + Jankowski Architects accepted the car-oriented character of the strip and deflated the high-minded seriousness associated with civic buildings in traditional urban contexts. In this case, the site offers an off-beat locale for a public building: an industrial park of one- and two-story red- and buff-colored brick boxes set back from the main thoroughfare.

According to principal Carol Ross Barney, the particular challenge of the Glendale site was to establish a building that would be memorable to drivers cruising past Pizza Hut and Toys R Us. This demand for visibility perfectly complemented the nature of the contemporary post office, which is essentially a decorated shed in the true Venturian sense—a big warehouse for sorting mail, with a small public area for postal services. In patriotic splendor, Ross Barney designed a post office that waves a big flag at passing motorists, wrapping the warehouse with Old Glory rendered in brick, glass, and steel.

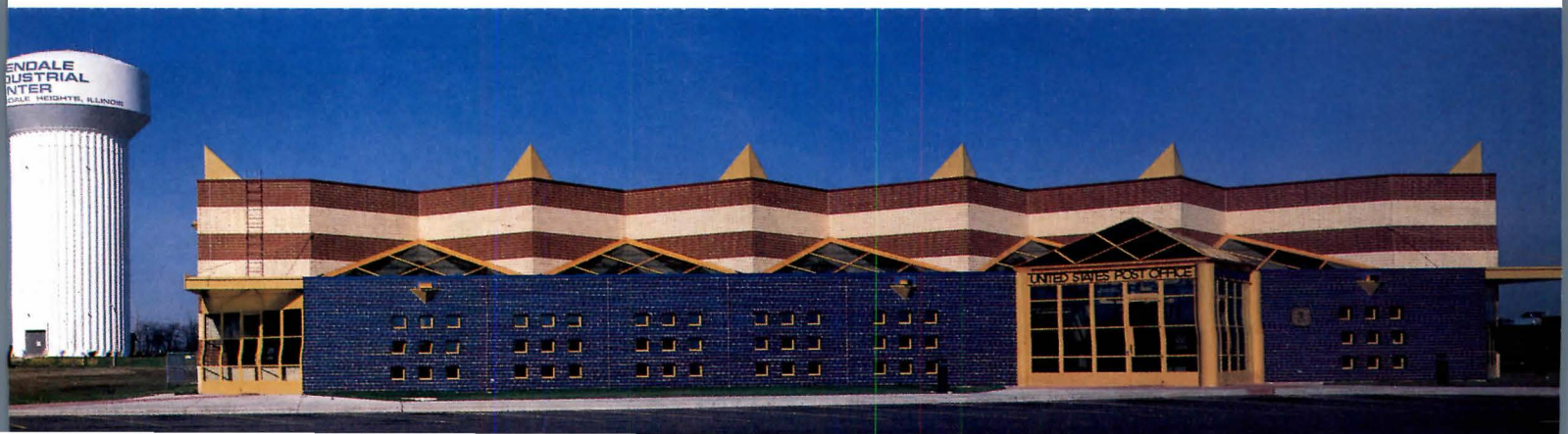
How did Ross Barney get away with a razzle-dazzle post office for a client known for its conservatism? "We presented three very different schematic designs, all of which met the program and could be built within budget," explains Ross Barney. "We were also very lucky to have Fred Gleave as the post office's project manager, who got behind our design and toughed it out. He took it all the way through the approval process." Gleave, an architect with the post office who acted as client representative, claims he encouraged Ross Barney to pursue her most radical idea, given the building's location off the strip. "I wanted it to stand out in its context," says Gleave, "so it would be easy to find. This isn't a design that could be built anywhere, but it's very appropriate for this site." After Ross Barney's presentation, Gleave switched from client rep to design advocate, making sure that Ross Barney's ideas didn't get watered down in the approval process.

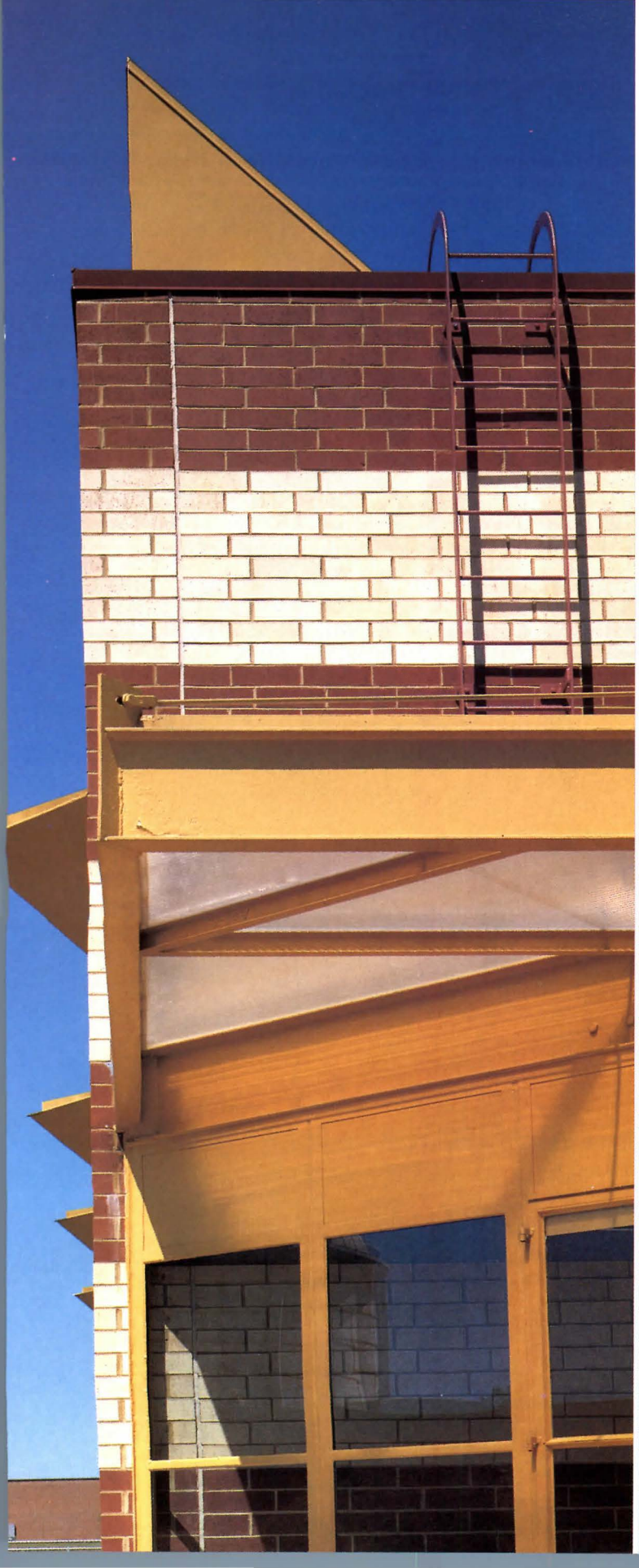
From the highway, the post office presents an arresting facade of red and white brick, topped with gold-colored triangular light scoops that appear as points of ascending stars. The resulting angular, patterned forms of the wall achieve the effect of a flag rippling in the breeze. As the striped walls wrap around the sorting areas, the pointed projections are reinvented as rain scuppers. At the back of the building, this striped brick opens to form a perforated screen providing shelter for postal vehicles. At the base of the building, a field of blue glazed brick is punctured by little square windows that appear like stars. This wall, scaled for the pedestrian with its small penetrations and gaps filled with gold-painted steel and glass enclosures that mark the building's entrances, is best appreciated as a visitor parks in front of the building. A south entry leads directly to the lockboxes, and a north portal connects customer service counters and a small alcove of stamp machines, scales, and wrapping areas for self-service after business hours.

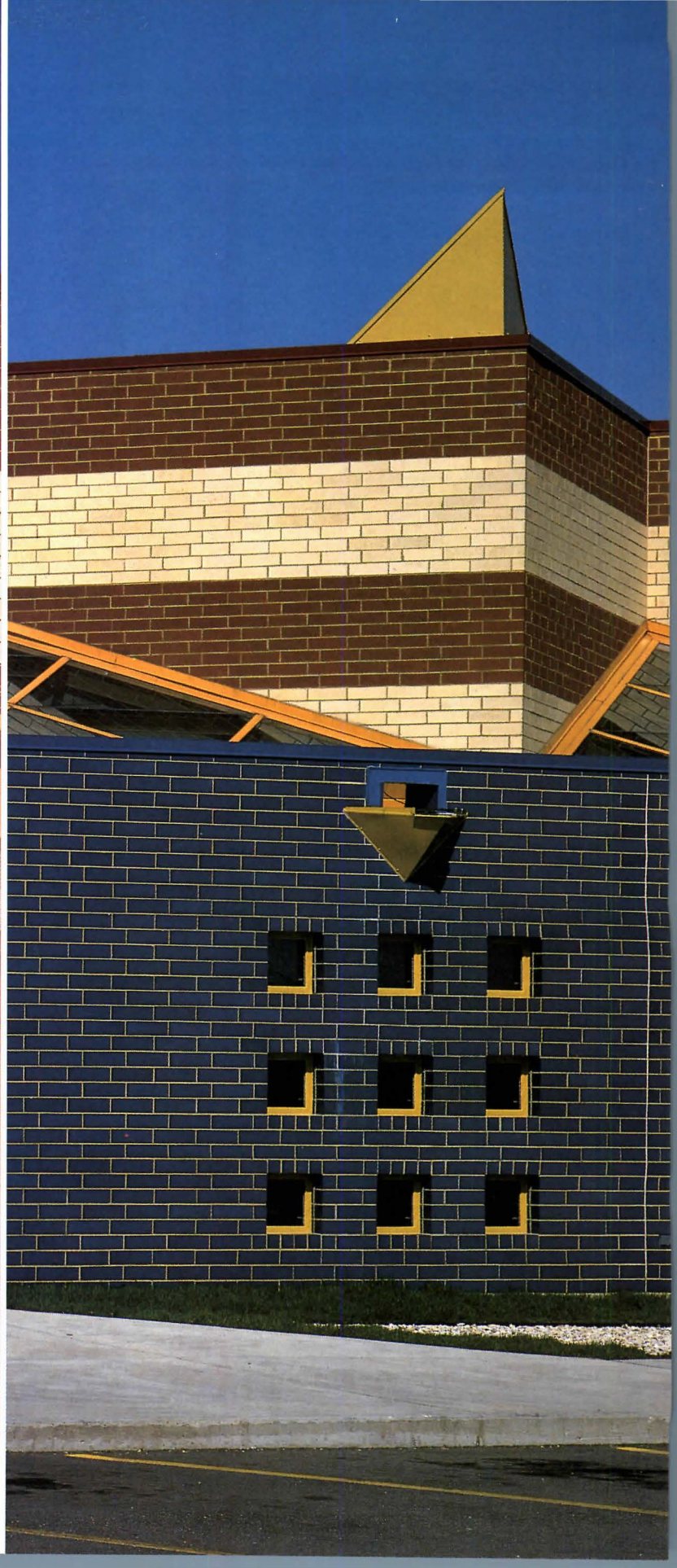
Inside the public lobby, one is immediately struck not only by the decorative features, but by the architectonic nature of the striped zigzag wall as it counters the straight



Surrounded by lackluster brick boxes (site plan, right), Glendale Heights' new post office is constructed of materials similar to its neighbors, but makes a bold impression with patriotic imagery (below); a distant water tower appears as a pole for the facade's "flag." At the building's southeast corner (facing page, left) gutsy detailing in steel, brick, and glass announces the entrance below. Blue glazed brick base, punctuated by small windows, (facing page, right) is scaled to the pedestrian and surmounted by triangular, sloped skylights and a striped wall.







blue surfaces and forms an enclosure for lockboxes, its surfaces bathed in natural light. Upon entering, the skylights that fill the void between the striped wall and a low blue ceiling offer a worm's-eye view of the wall's exterior and the pointed scuppers. To avoid the seemingly endless rows of lockboxes one finds in most post offices, Ross Barney divided them into three "fingers" that reach into the mail-sorting area behind the public spaces. These alcoves, with walls of vibrant red, offer privacy for customers sorting through daily mail on granite-topped tables. The long fluorescent fixtures above continue the American flag metaphor, outlining white stripes of light against a red field.

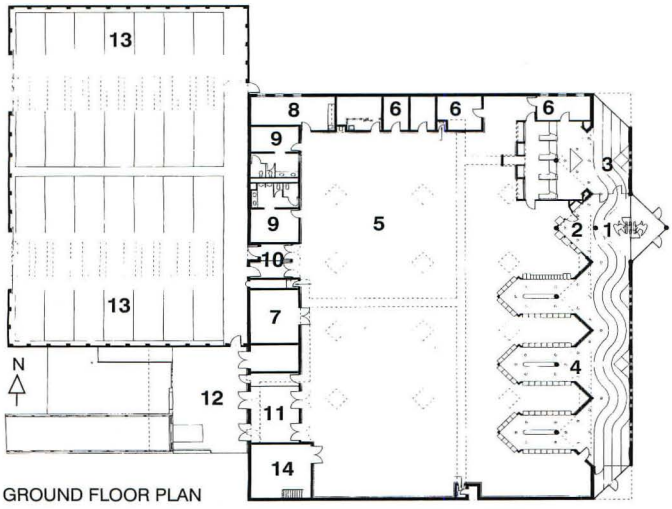
The area just behind the frontal blue wall is primarily devoted to circulation and provides a space for opening or wrapping packages and addressing parcels. The blue wall is glazed brick inside, too, and its small windows appropriately limit views to the outside, "screening an uninspiring view of the parking lot," as Ross Barney notes. Overhead, a low ceiling is punctuated with rows of square fluorescent fixtures that mimic the layout of the windows and allude to a field of stars.

In public areas, a linoleum floor, chosen for its durability and low maintenance, is enlivened by wavy stripes of red and white, extending along the blue wall. In the lockbox alcoves, a blue floor with gold stars contrasts with the red walls. The sorting areas, closed to the public, are another world altogether—very little color, but lots of natural lighting to keep down energy consumption.

Glendale Heights' post office represents an unusual collaboration between a talented architect and an enlightened client representative. But it's a mixture that should be pursued by the postal service in every zip code. ■

—MICHAEL J. CROSBIE

Only a small portion of the 24,000-square-foot post office's interior is devoted to public use (plan and section); warehousing and mail-sorting spaces predominate. Vehicular parking is protected by a perforated masonry wall (bottom) to provide security for postal vehicles and completely screen the loading dock at the southwest corner from passing motorists. Within the unheated enclosure, rows of skylights illuminate trucks and workers. View from glassy north entrance (facing page, top) reveals interplay between zigzag and blue walls, with lockbox alcoves (facing page, bottom left) located at the "folds" in striped wall (facing page, bottom right). Red wall near door contains self-service postal machines, scales, and areas for wrapping packages. Stars and stripes in the floor of the lobby are rendered in linoleum, while postal eagle is specially designed as a vinyl link mat.

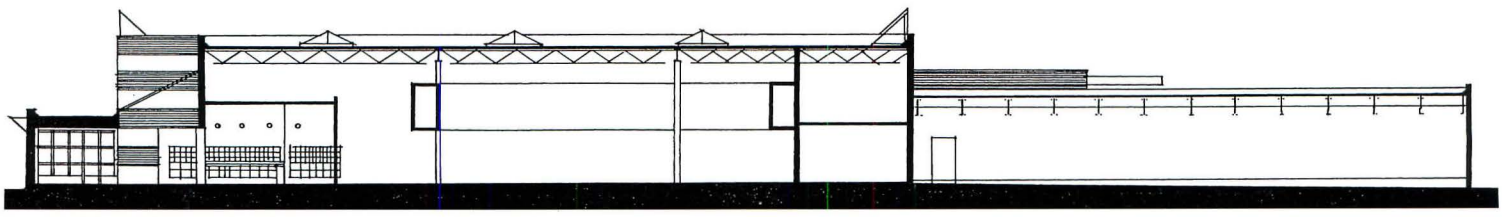


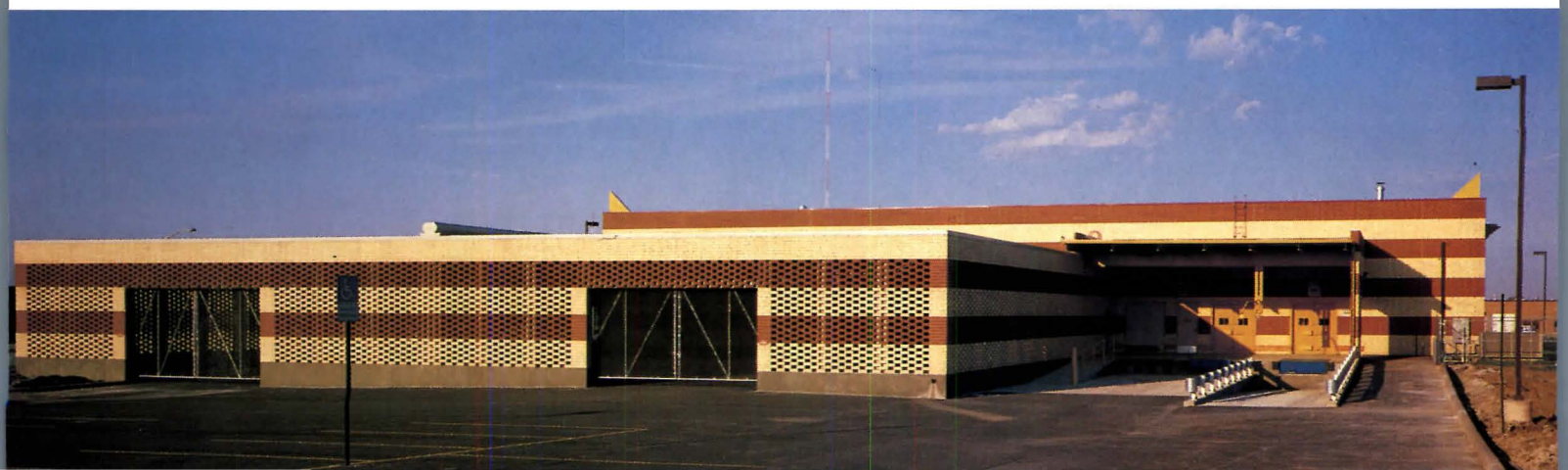
GROUND FLOOR PLAN

1 PUBLIC VESTIBULE
2 SELF-SERVICE LOBBY
3 SERVICE LOBBY
4 LOCKBOX LOBBY
5 WORKROOM
6 STAFF OFFICES
7 EQUIPMENT ROOM
8 LUNCH ROOM
9 LOCKERS
10 CARRIER VESTBULE
11 DOCK VESTIBULE
12 DOCK
13 CARRIER PARKING
14 MECHANICAL

GLENDALE HEIGHTS POST OFFICE
GLENDALE HEIGHTS, ILLINOIS

ARCHITECTS: Ross Barney + Jankowski, Inc., Chicago, Illinois—Carol Ross Barney and James C. Jankowski
ENGINEERS: Beling Consultants, (mechanical/electrical); Martin/Martin, Inc. (structural)
GENERAL CONTRACTOR: Delko Construction Co.
COST: $1.9 million—$83/square foot
PHOTOGRAPHY: Barry Rustin Photography





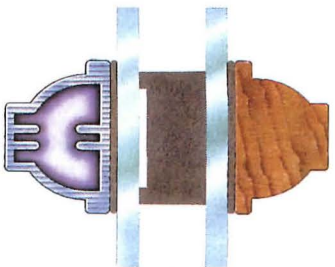

EXIT
UNITED STATES POST OFFICE
GLENDALE
CHANGE

Unfortunately for our esteemed competitors, we haven't been sitting around on our laurels all year.

We've been busy refining and improving Integral Light Technology™ and The Architect Series.™ And this year we have two important evolutions to announce.

First, windows in The Architect Series are now available with exterior aluminum cladding. Great news for people whose love of beauty is rivaled only by their dislike of spring painting.

FRUSTRATING NEWS FOR ANY WINDOW ARCHITECT SERIES. INTRODUCING THIS



Integral Light Technology:™ New interior spacer and exterior aluminum cladding.

Second, we're introducing a new kind of between-the-glass spacer. It not only improves aesthetics and insulating qualities, it makes it easier to build windows with elaborate muntin patterns...

Pella®

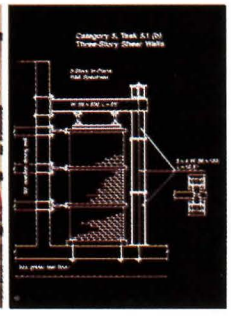
BUILT TO IMPOSSIBLY HIGH STANDARDS. OUR OWN.™

INFO

TECHNOLOGY & PRACTICE

Seismic Testing at UC San Diego

WHILE TREMORS OF FEAR OVER A POTENTIAL earthquake along the New Madrid fault line last December proved unfounded, another seismic-related event is occurring as predicted. The first test of a full-scale masonry building's response to simulated earthquakes began last month at the Charles Lee Powell Structural Systems Laboratory at the University of California, San Diego (the largest reaction-wall testing facility in the United States). Previously, tests to determine a building's probable response to seismic loads have been limited to the analysis of isolated substructures (above).



Expected to require up to 24 months to complete, the testing represents state-of-the-art seismic analysis in determining the success of modeling techniques for predicting the structural behavior of a five-story building subjected to an earthquake. The test represents the final experimental phase of research begun in 1984 by the Technical Coordinating Committee for Masonry Research.

The results of the two-year test will be incorporated into performance-oriented national guidelines, leading to the efficient and safer construction of masonry buildings than current prescriptive engineering design analysis standards. Researchers hope the testing will lay the groundwork for future revisions in seismic regulations throughout the country.

New Guidelines for Blast-Resistant Glazing

INCREASING THREATS OF BOMB, BALLISTIC, and other terrorist attacks, as well as "electronic invasion," have placed architects in the unfamiliar role of designing for security. Architectural solutions to such threats have generally precluded glass. But recent testing of new glazings has produced the *Security Glazing Design Guide,* a new manual and IBM-compatible software first made available this month, that allows architects to evaluate glazing systems according to their defense against different security threats.

The Texas Tech University Glass Research and Testing Laboratory was contracted last year by Monsanto to perform tests on the resistance of architectural glazing to bomb blasts. The results indicate some constructions of laminated glass with a nominal thickness of 6mm can resist blasts loadings of up to 60psi for 6 milliseconds. Monolithic glazing of the same thickness and under equal loads threw shards of glass up to 9.4 meters from the test frames (below).

In addition, ballistic threat studies were conducted at the H.P. White Laboratory in Street, Maryland. More than 50 tests with various caliber weapons were conducted on 30 glass specimens, and the study revealed new glass products that survive ballistic attack with spalling and prevent projectiles from breaking or penetrating the glazing surface. The results have been compiled into a design manual that contains formulations for glazing to resist blast loads. The manual also compares the resistance of laminated glass to ballistic and forced-entry attack with other common building materials. The new design guidelines and compatible software are available free to qualified architects. For more information, contact: Monsanto Company, 800 North Lindbergh Boulevard, St. Louis, Missouri, 63167, (314) 694-1000. ■

CFC Update

Four years ago, the idea of abolishing chlorofluorocarbons (CFCs) to conserve the ozone layer was considered unthinkable. Under the landmark 1987 Montreal agreement, however, the CFC industry reluctantly agreed to support a 50 percent decrease in production by the year 1998. Now, the United States and other signatories have amended the original agreement to eradicate the pollutant by the year 2000. Specific requirements for phasing out CFCs, related halons, carbon tetrachloride, methyl chloroform, and hydrofluorocarbons (HCFCs) were also written into the Clean Air Act of 1990.

This past November, some 1,500 representatives from chemical, refrigeration, HVAC, insulation, and electronics industries gathered at a conference in Baltimore to discuss the nuts and bolts of phasing out these materials. And there is a lot at stake. An industry trade organization, the Alliance for Responsible CFC Policy, estimates that the value of installed equipment relying on CFCs exceeds $135 billion in the United States alone. Commercial chillers, auto air conditioners, refrigerators, and foam insulation are among the products being redesigned to use substitute chemicals—many of which are not yet approved for commercial use.

Chemical companies are cooperating on safety and toxicity testing to speed the process along, and some manufacturers are already building plants to produce chemicals not yet approved for use. Research laboratories are bustling with activity to meet the challenges—and to reap some of the profits that could result from winning technologies. An entire industry has sprung up to reclaim and recycle CFCs, and all these developments will exert a big impact on buildings, particularly with HVAC equipment, insulation materials, and refrigeration.

New TITUS® air diffuser harmonizes with your ceiling

Conventional air conditioning diffusers can fill the ceiling with protruding louvers or large expanses of perforated metal. But here is a diffuser that is visually smooth *and* superior in performance.

The TITUS® Modu-Bloc diffuser (foreground in ceiling at left) gives you clean, unobtrusive lines, flush with the ceiling. The diffuser blends with whatever ceiling system you have selected, because a piece of the actual ceiling material becomes the diffuser's center panel. This material can be acoustic tile, texture coated sheet rock, or anything that can be formed or cut into a square panel. The mounting can be standard tee-bar, narrow tee or surface.

Performance and layout flexibility

Designed for use in modern variable air volume systems, the Modu-Bloc diffuser projects a tight, horizontal blanket of air across the ceiling for draft-free comfort — *plus protection against ceiling smudging.*

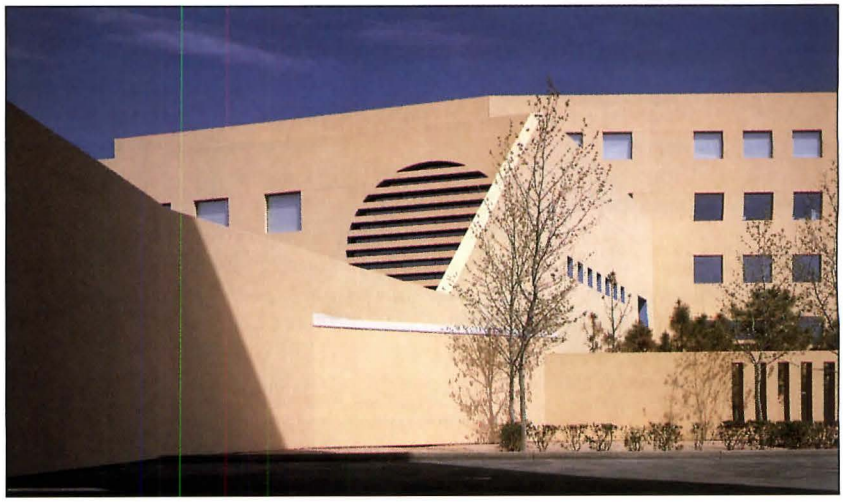
All four outlet slots are individually adjustable for both angle and volume of air flow. This means you can be flexible in your layout; you can locate diffusers with an eye to both aesthetics and structural realities, and still maximize heating and cooling comfort.

Call today for data on Modu-Bloc, the design-conscious diffuser.

TITUS Modu-Bloc diffusers are installed throughout the IBM National Marketing and Technical Support Center at Solana, in Southlake, Texas. Joint venture of IBM Corporation and Maguire Thomas Partners. Design architect: Legorreta Arquitectos. Architects of record: LPA. Mechanical engineers: Carter & Burgess Inc. General contractor: HCB Contractors. Mechanical contractor: Brandt Engineering Company Inc.

Above: Employee entrance lobby. The ceiling diffuser in the foreground is a 24" x 24" TITUS Modu-Bloc, installed in a plaster frame. The center panel of the diffuser consists of the same material as the ceiling.

Right: View near the main entrance.

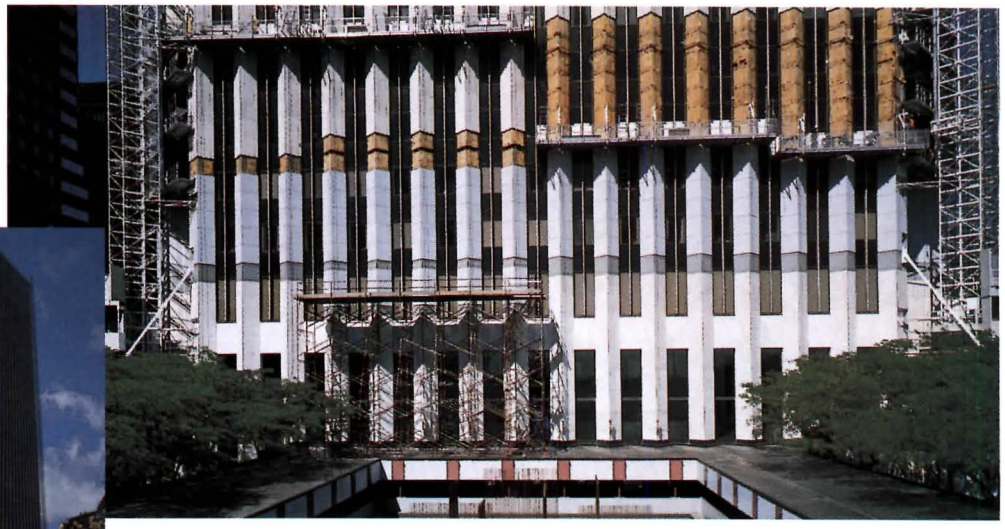


Circle 73 on information card

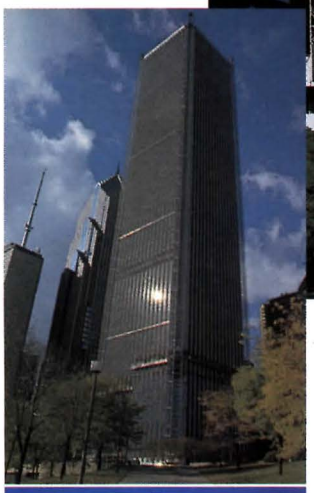
TITUS®
Philips Industries Inc.
990 Security Row
Richardson, Texas
Phone 214-699-1030
FAX 214-644-4953

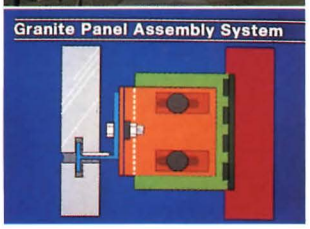
Set in Stone

Technical details distinguish well designed stone cladding from distressed veneers.



THE IMAGE OF A STRONG STRUCTURE THAT will weather the ages contributes to the continuing appeal of building with stone. Today, however, those enduring characteristics are often embodied as a mere facade, especially in high-rise construction. Granite, marble, sandstone, limestone, travertine, and slate are increasingly being applied to curtain walls as stone-cutting technology has advanced to produce panels less than 2 inches thick, pushing stone veneers closer to their calculated stress limits. Such "thin stones" achieve an economy of reduced weight, lighter support structure, and lower material costs. Dimensions approaching 3/4 of an inch are now possible, allowing a safety margin for construction tolerances and variations in the veneer as slim as a panel's profile. Such attractive and economical finishes, however, can take their toll on a building's design and safety (caption at right).





The ability to achieve such slender dimensions has created an increasing need to evaluate the properties and connection methods of stone veneers. According to Ian R. Chin, principal of Wiss Janney Elstner Associates, the architects responsible for recladding the 18-year-old Amoco building in Chicago, 1 1/4-inch-thick stone has become widespread in its application. But, Chin maintains, "architects should not specify such dimensions before the properties of a particular stone are fully evaluated and support systems engineered." All experts agree that architects designing with thin stones must appreciate the importance of materials testing.

Ava Szypula, building materials laboratory director for TestWell Craig, a testing facility in Ossining, New York, points out that when stone is analyzed for thin-veneer applications, frequent confusion arises over defining the important physical properties of the stone. "There is no bad stone," Szypula says, "but you cannot look at isolated components. Thickness, span, and stone type must be considered together with natural properties: strength, durability, and response to freeze-thaw cycles." Strength of the material is also subject to frequent misconceptions. Hardness, while an indication of resistance to scratching, is not proportional to strength. Flexural strength (resistance to bending), as opposed to compressive strength, is the dominant focus of stone analysis for thin veneers. Finish choices also influence final strength in stones such as granite. A flamed or thermal finish can significantly reduce a panel's strength in comparison with a polished surface.

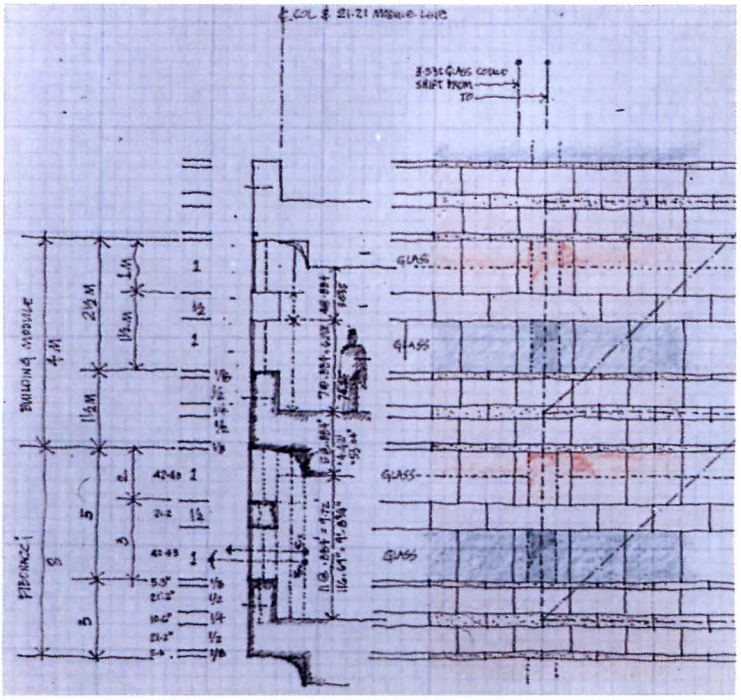
For further information, the Marble Institute of America has released *Dimension Stones of the World* containing ASTM test data for absorption, density, compressive and flexural strength, and hardness for granite, limestone, marble, onyx, slate, quartz, and travertine. Contact: (313) 476-5558.

—MARC S. HARRIMAN

In less than 20 years, a stone veneer can require total replacement. Since Chicago's 80-story Amoco building was faced with 1 1/4-inch-thick Carrara marble cladding in 1973-1974 (top left), the originally straight, 50-by-45-inch stone panels have bowed into warped, dish shapes. This type of marble distress, termed "hysterisis," is caused by uneven expansion of the exposed surface in relation to its more stable rear face. Expected to take three years to complete, at an estimated cost of $60 to $80 million, all 43,000 panels are currently being replaced with 2-inch-thick Mt. Airy granite panels (above), chosen for improved strength, durability, and to maintain the building's distinctive white appearance. The existing anchoring system (a clip angle set into panel kerfs, which is a common attachment method) is also being improved. Continuous, extruded, stainless steel shelf angles for supporting the top and bottom of the new panels (detail, center left) will replace the original 3-to-4-inch bent-steel angles that are intermittently placed at the base of the existing marble panels. A compressible foam pad under each shelf provides a pressure-relieving joint, accommodating vertical movement by allowing each stone panel to expand, thereby preventing stress cracks and spalling.

GORDON SCHENCK PHOTOS

Winner of a 1990 Tucker Award for stone application from the Building Stone Institute, the wall system of the Charlotte-Mecklenburg Government Center (top left and right) reflects current technology and construction methods. On the cutting edge of thinness, stone panels typically measure only 3/4 of an inch thick and are mounted on steel trusses (facing page, left). Exterior panel proportions (below) are carried through to the building's interior (bottom left), and their dimensions create interchangeable bands of glass and stone cladding along the flush face of the building (facing page, right).



Charlotte-Mecklenburg Government Center
Charlotte, North Carolina
J.N. Pease Associates, Architects

REPRESENTING THE SEAT OF GOVERNMENT for the Charlotte City Council and Mecklenburg County Commission, the Government Center building is designed to serve as a lasting civic symbol. Its stone-and-glass veneer was chosen to relate to the sandstone, limestone, and glazed curtain wall facades of the adjacent office buildings that constitute a larger government complex.

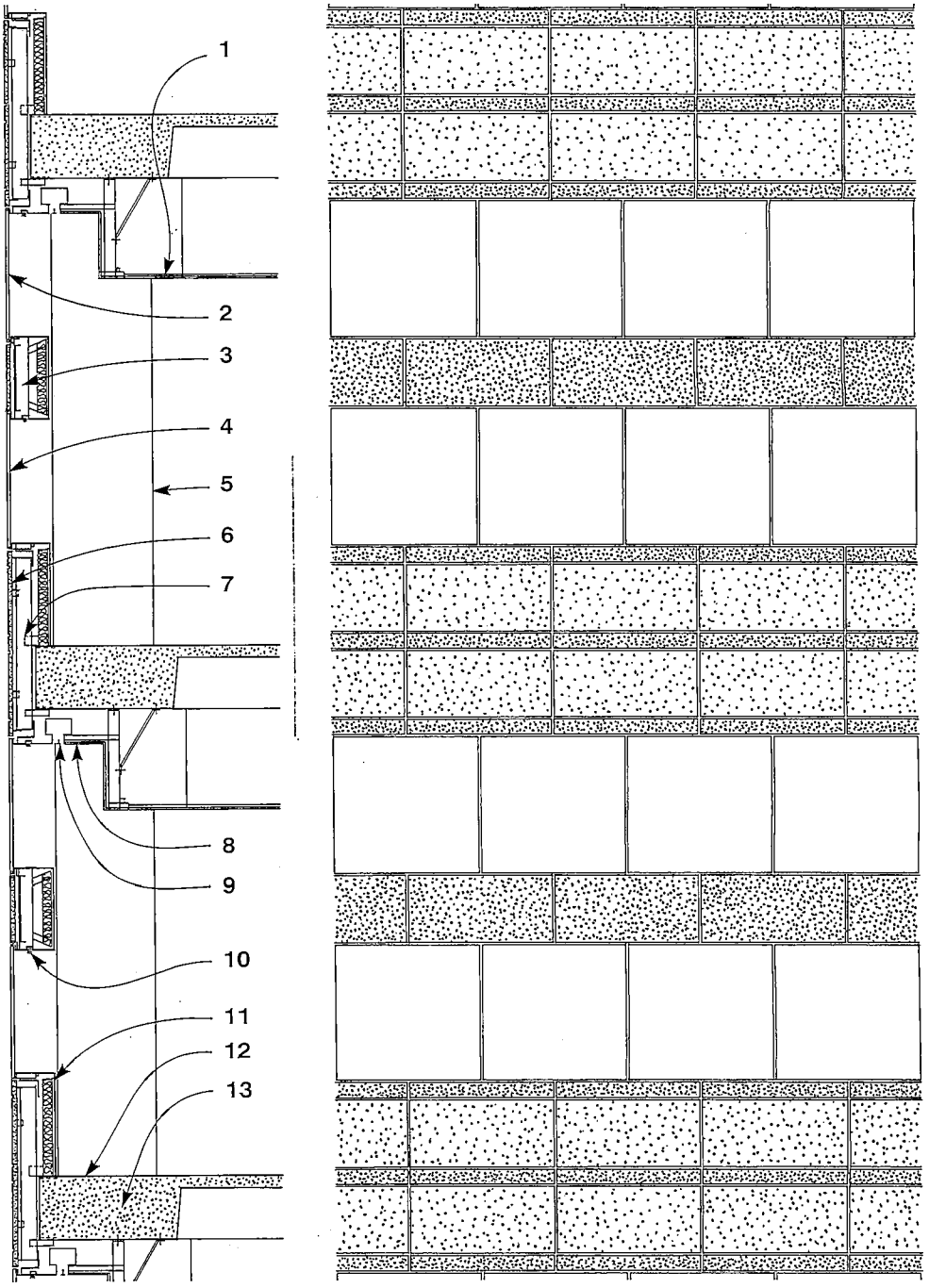
Rose-colored granite sheathes the building and defines its cylindrical meeting chamber, drawing the public to the center's focal point. The apparently monolithic, 14-story building is scaled and detailed with alternating bands of polished and flamed textured stone. The dimensions of its intricate ashlar pattern are based on the golden mean. Three-quarters of an inch and 1¼-inch thick granite spandrel panels, based on modules of 3½ feet and 5 feet in width, are mounted on load-bearing steel trusses that straddle each of the concrete floors.

The added depth of the truss system provides superior support in comparison with shallower standard curtain wall framing. This structural system allows the stone panels to be preassembled, providing better quality control and reducing the on-site labor required for hand setting. The trusses also support the framework for two bands of glass for each floor, designed to offer views and to provide maximum daylight.

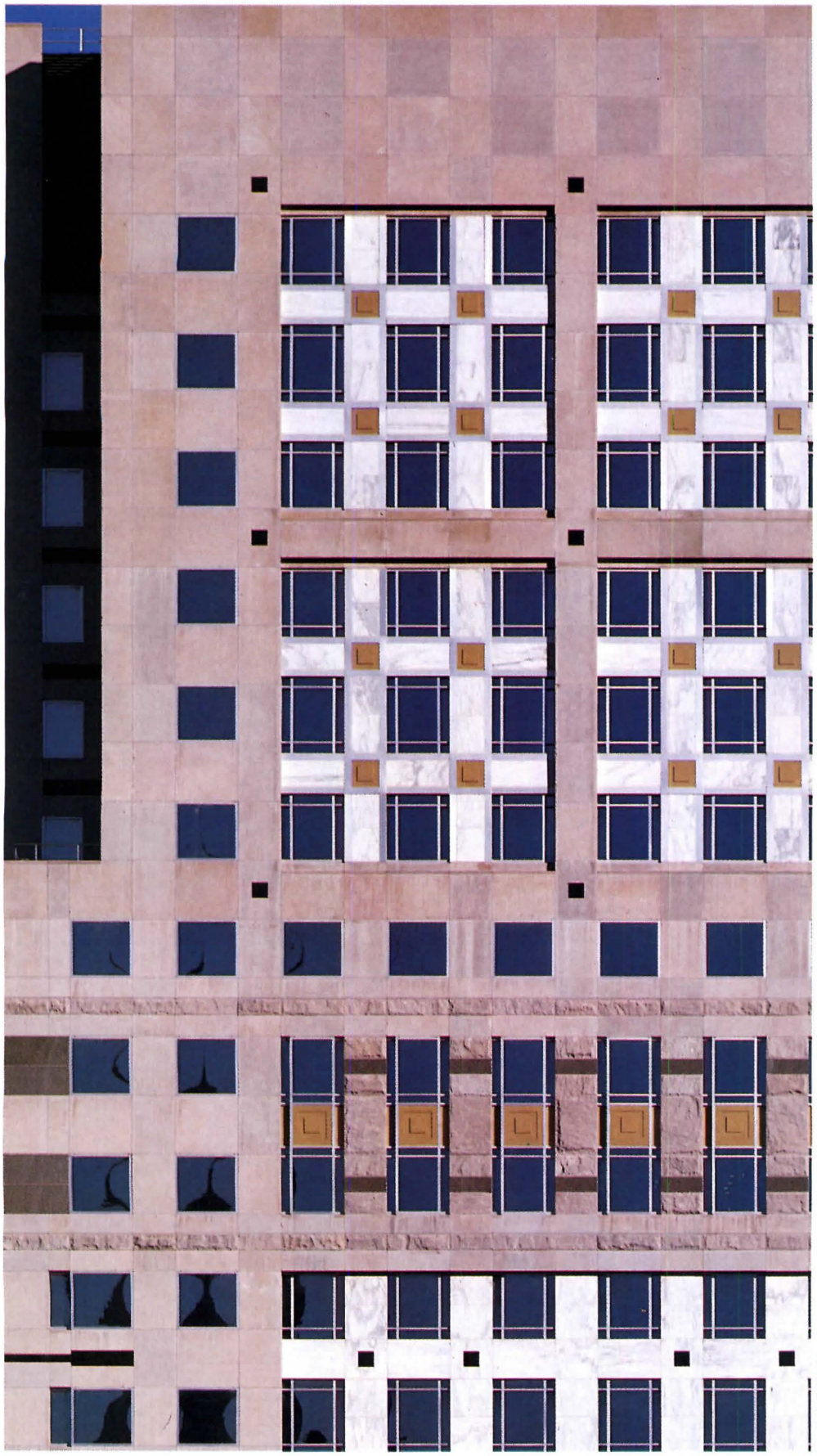
The architects' decision to keep the glass-and-stone claddings flush with one another also aids in the technical success of the wall system by providing a four-sided structural seal around each of the panels. As a material compatible with metal, glass, and stone, silicone was specified for all connections.

The ashlar-patterned facades also contribute to the technical success of the exterior. Dividing the veneer into many individual pieces allows for greater structural movement than would a large-panel configuration. The many-jointed configuration allows thicker horizontal expansion joints beneath stone spandrels—where deflection from truss loading occurs—to be integrated into the overall facade pattern.

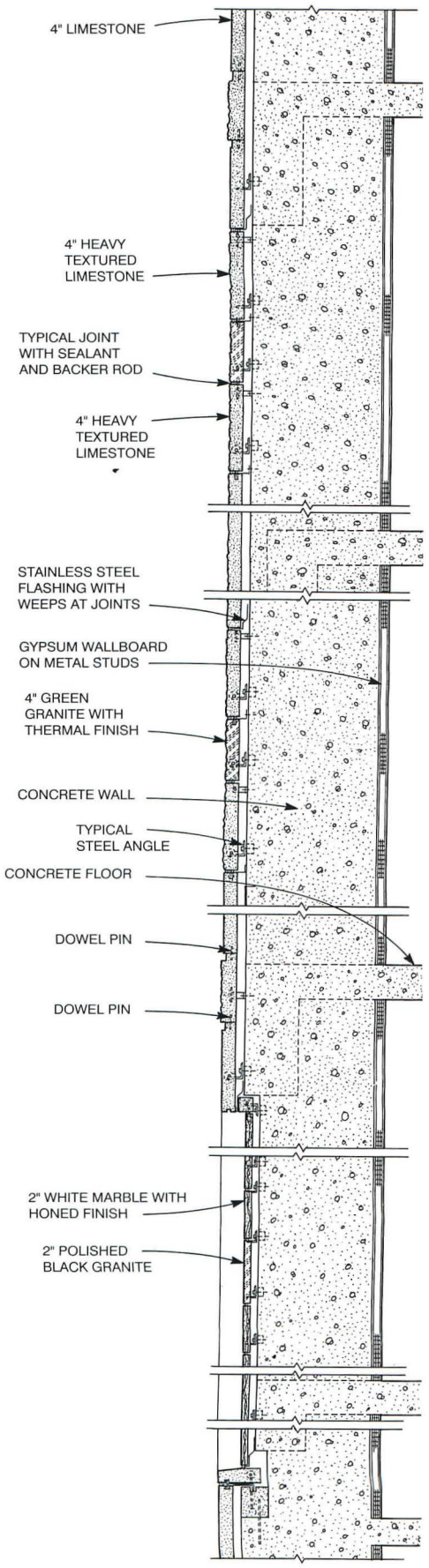
In 1990, the cladding withstood Hurricane Hugo, a test equal to any preliminary mock-up. While adjacent curtain wall structures suffered considerable damage in the storm's aftermath, Government Center survived heavy winds and rains intact.



1 SUSPENDED ACOUSTICAL CEILING IN OFFICE AREAS
2 UPPER LIGHT—FLUSH REFLECTIVE INSULATED GLAZING MOUNTED ON FOUR SIDES WITH STRUCTURAL SILICONE ADHESIVE
3 COMPOSITE LIGHT SHELF, INCLUDING GRANITE, MULLIONS, SILL, HEAD, AND FRAMING
4 LOWER LIGHT—FLUSH REFLECTIVE INSULATED GLAZING MOUNTED ON FOUR SIDES WITH STRUCTURAL SILICONE ADHESIVE
5 CAST-IN-PLACE CONCRETE COLUMN
6 2CM GRANITE MOUNTED ON STEEL TRUSS FRAME
7 TRUSS FRAME WELDED TO EMBEDDED STEEL PLATES
8 CONTINUOUS GYPSUM WALLBOARD COVE AT PERIMETER GLAZING
9 SLOT MECHANICAL DIFFUSERS
10 1" BLINDS IN RECESSED POCKET
11 GYPSUM WALLBOARD ON METAL STUDS
12 CARPET ON 4" SLAB
13 CAST-IN-PLACE CONCRETE STRUCTURE WITH SKIP-JOIST FRAMING SYSTEM



MICHAEL MORAN



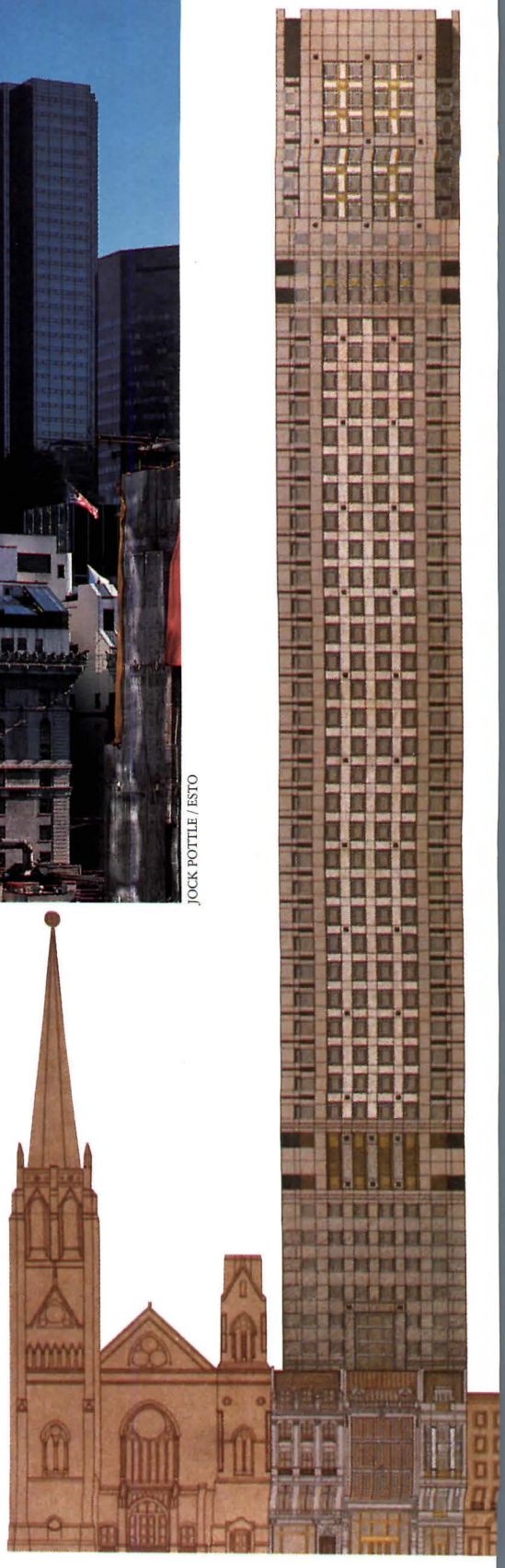
712 Fifth Avenue
New York, New York
Kohn Pedersen Fox Associates and
Schuman Lichtenstein Claman Efron Architects

DUBBED "LIMESTONE ALLEY" FOR ARCHITECtural landmarks such as Rockefeller Center, Fifth Avenue now boasts a new 500,000-square-foot, 50-story tower to add to its skyline. Predominantly sheathed in a light-textured Indiana limestone skin, the stone massing of the mixed-use building extends from a five-story solid masonry base. Incorporating a new public atrium and retail arcade with the landmark Rizzoli and Coty buildings, 712 Fifth Avenue respects the scale of West 56th Street's historic preservation district. The main body of the building transforms as it rises, separating into distinctly profiled planes articulated by its inset crown. Set back 50 feet from Fifth Avenue, the base and top of the building's shaft are defined by thermal-finished green granite quoins and heavy-textured limestone bands at floors 13, 14, 43, and 45. Slender and stylized polished-black-granite quoins at the corners striate the veneer at each floor level. White Vermont marble, with a honed finish, highlights the recessed midsection of the building's office space.

The expression of the facade as a veneered structure is articulated by individual panels that are stacked to allow joint lines to continue uninterrupted. Panel thicknesses are adjusted to the type and location of the veneer. Limestone, the weakest of the building's stones, is maintained at four inches in thickness and is anchored with steel angles to a solid, continuous masonry and concrete wall backing. Slimmer Vermont marble panels, chosen for their varied veining, were specified for the inset skin. Originally designed to span the height of two windows, the 2-inch-thick panels were reduced to half their original height when the stone proved too difficult to cut at the quarry and handle without risk of cracking.

Granite panels correspond to the respective thickness of the adjacent limestone and marble veneers, enabling them to be dowel-connected to one another. The architects took advantage of the variable nature of the specified stones to make a subtle design statement. Gray Indiana limestone was chosen over a more commonly applied buff color, because it lightens in color and texture (but not in corresponding strength) as it weathers, creating a facade that becomes more lively with age. ■

JOCK POTTLE / ESTO



Standing 50 stories tall among legendary giants, 712 Fifth Avenue (above) is clad in a stone veneer that combines limestone, granite, and marble panels of varying thicknesses (facing page, section). Adjusted in dimension according to each stone's flexural tolerances and resistance to weathering, the three stone types with five separate surface finishes are all visible where the uppermost floors are separated from the building's marble midsection between the 43rd and 45th floors (facing page, photo). Together they form a cohesive facade through the building's transformation from a distinctly defined base, middle, and top. Joining contemporary construction techniques with an expression of more traditional methods, the lower stories are also articulated with rough-textured Indiana limestone. They recall older, load-bearing-stone landmark structures as the brownstone Fifth Avenue Presbyterian Church, which sits at the foot of the tower (right).

Which Fair is celebrating its thirtieth birthday in Milan on 12th April?

The Salone del Mobile is thirty years old. A special occasion for the world of interior design.

From 12th to 17th April 1991 two hundred thousand buyers and retailers, fifty thousand of whom will have arrived from one hundred and twenty countries, as well as journalists, designers and industrialists will be visiting Milan, Europe's furniture capital.

The Fairgrounds will be ready for them. And so will the 5th Furnishing Accessories Exhibition. Not to mention the "Thirty years of Design" exhibition, a journey into the ways of thinking and the lifestyles that have influenced the last three decades of furniture and interior design.

Happy birthday to the Salone del Mobile. Let's celebrate in style, furniture style.

Cosmit, Organizing Committee of the Italian Furniture Exhibition,
20123 Milano, Corso Magenta 96, Tel. 02/48008716, Fax 02/4813580, Telex 334394 Cosmit I.

FIERA MILANO

Circle 75 on information card

Coping with Staff Changes

The current recession demands rethinking strategies for shifting personnel.

WITH A SLOWDOWN IN CONSTRUCTION engulfing virtually every region of the United States, architecture firms from coast to coast are reassessing their directions in an effort to increase efficiency and diminish costs. In many cases, this economic downturn means cutting back staff.

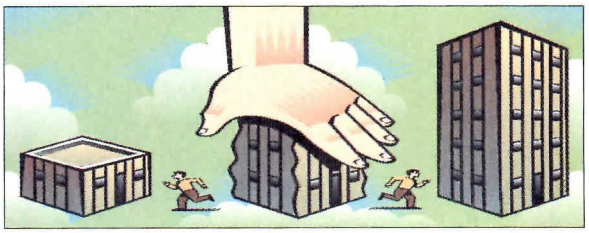
"Recession hits small firms like a tidal wave," claims Louis Marines, executive director of the A&E Management Academy in San Francisco. The main means of survival for such practices, expert observers agree, will be to find a specialized niche in a changing market. Robert Gutman, who teaches the history of practice at Rutgers and Princeton universities, adds that large firms working in a diverse geographic area and markets, though less susceptible to the recession, will need to cut some staff, perhaps lease space or move, and provide fuller and better services to prosper in the long run.

Weld Coxe, president of The Coxe Group, a managerial consultant firm based in Philadelphia, compares the current situation to the 1973 recession, in which a triage process weeded out marginal firms. He argues that firms will dissolve, regroup, and reform. Lee Cott of Bruner Cott & Associates in Cambridge, Massachusetts predicts that small firms will have to become the equivalent of specialized boutiques, large firms will become comparable to full-service shopping malls, and medium-sized practices will be squeezed in between. Bruner Cott has laid off 30 out of 40 architects; "We miniaturized our firm rather than cutting the heart out of it," Cott explains.

Such cases notwithstanding, the principle of "up or out" still holds. Says Coxe, "The people who make the most difference turn over rapidly until they stick to the top of a firm." Even now, he maintains, "there's plenty of opportunity for people with talent." The Coxe Group's recruitment arm is doing a brisk business placing architects whose experience includes designing health facilities, educational buildings, and engineering design, as well as those with management and marketing skills. According to Coxe, there is also still ample corporate work, because "corporations have to reinvest to compete internationally. There's never been a greater demand for quality," he adds, "but almost all firms in the hardest hit locations have been letting very good people go."

How do you avoid laying off the wrong architects at the wrong time for the wrong reasons? Larry Hirschorn, a principal at the Wharton Center for Applied Research in Philadelphia and the author of *Cutting Back: Retrenchment and Redevelopment in Human and Community Services*, suggests that shrinking a firm's size can be an opportunity to rethink its strategies. Principals should ask themselves such questions as: What business are we really in, and why? Are we sufficiently diversified, and are we appropriately tailored for the changing marketplace? Do we have our marketing priorities in order?

This reevaluation should be undertaken before a much-anticipated commission falls through, forcing layoffs. A periodic firm review should identify the very best people at all levels in the office, regardless of the job to which they are presently assigned, suggests Steven Foote, a principal with Perry Dean Rogers. At the Boston Society of Architects' November 1990 "Build Boston" conference, Foote moderated a symposium on staff layoffs by large firms. "You have to be prepared to move people to jobs that are still going, and lay off people who are on billable time," Foote says. Warren Freedenfeld, of Freedenfeld & Associates in Cambridge, who moderated a similar session for small firms and recently furloughed almost half his staff, suggests that an architect know exactly what the rock-bottom overhead figure is—which will determine how many people must be let go—and which employees are best able to help produce income. His own firm now employs those practitioners "capable of generating the most work and handling the greatest variety of tasks."



PETER HOEY ILLUSTRATIONS

During this recession, small firms will become specialized boutiques, large firms will be like full-service shopping malls, and medium-sized firms will get squeezed in between.

In addition to reassessing personnel, and before reducing the staff, Freedenfeld recommends that a firm identify and pursue reliable, income-producing markets, not waste time with uncertain ones, and strengthen ties with former clients who may offer future work or facility-management needs. At the same time, he says, most firms can diversify through proper marketing. Freedenfeld concludes, "This crisis will do us wonders. Those of us who come out of it will have questioned our whole *modus operandi*. Our firm is far, far more efficient than we ever have been. There is no fat. We waste no time, make fewer errors."

Management consultant Cynthia Woodward, formerly RTKL's director of personnel, recommends that a firm evolve a strategic plan and possible alternatives to pursue if "receivables fall 10 percent, 20 percent, and so on." She suggests analyzing reduced staff costs, leased-out space, benefits, shortened hours, and the temporary farming out of staff to firms that are shorthanded.

Before cuts are made, an owner must also safeguard a firm's "corporate memory"—the often undocumented knowledge of projects and office procedures that gradually accumulates over time among employees. If lost, a firm is forced to duplicate earlier research or decisionmaking—in a sense, reinventing the

wheel. This situation is not a problem in firms where a principal heads each project, but is frequently a concern of large firms. Coxe maintains that, at junior levels, corporate memory is short in the best of times because turnover is always rapid. To make sure project information is retained, many firms appoint two key people to deal with clients.

"Painful as it is, it's better to make a surgical cut than to risk continued hemorrhaging," says Foote. Hirschorn stresses that cuts should be made fairly and rationally to avert further instability. Woodward recommends that a firm develop written guidelines for furloughing employees (in part to avert future equal-employment-opportunity complaints), in which the principals specify how staff will be notified and how severance pay will be handled. She recommends that everyone be told on the same day and around the same time to prevent piecemeal agony and rumors. Principals must also decide how much to tell employees. Most personnel experts agree that providing more information, rather than less, prevents rumors, resentment, and anxiety. And instead of the customary Friday-afternoon firing, after which victims face an idle weekend confronting their families and themselves, Woodward and others suggest it be done early in the week, so the anxious can immediately begin looking for new work.

After licking raw wounds, it is crucial for a firm to rebuild morale to ward off raiders looking for expert staff. Bill Truby, director of the A&E Management Academy, whose background is in psychology, stresses that "it's now doubly important for the firm to have a vision so that those who remain can have a reason for loyalty." Typical managers, he says, think payment is the main motivation; they are wrong. In a recent national survey of thousands of managers and staff in a variety of corporations, three items ranked as most important to staff were: full appreciation of work done; a feeling of being involved; and getting help with personal problems. Managers, however, rated these factors respectively 8th, 10th, and 9th in importance. In addition, Truby says, "there's no greater motivator than being adequately rewarded for your work while belonging to a team." The benefits of real teamwork, claims Truby, can improve productivity between 30 and 60 percent.

One result of a staff reduction is extra space that a firm cannot afford. Unfortunately, it often occurs when many other firms are trying to lease their own leftover square footage and vacancy rates are high. If possible, subletting and sharing space and resources with other professionals can be productive even in good times. Over a decade ago, California architect Sanford Hirshen converted a stable into a studio and offices and sublet space to a number of small landscape architecture firms, as well as a physician, a small developer, and a computer expert. "It's a community of people," he says. Sharing space and resources with engineering firms, which tend to be more business-oriented than architects, is also a promising route, according to Marines.

Coxe warns, however, that a lease is the largest expense after payroll. "For firms looking at a long-term nose dive, the lease can be the hardest thing to cope with—the breaker." Coxe suggests hiring a lawyer and, if necessary, breaking the contract. "It isn't fair that you go out of business because your landlord is strangling you," Coxe maintains. He also recommends that a practice should avoid long-term leases, even if a short lease costs a few extra dollars.

One result of staff reduction is extra space, so a practice might want to avoid long-term leases even if a short-term lease costs a few extra dollars.

A pernicious side effect of reducing firm size can be a client's perception that the firm has changed. Woodward counsels that if senior staff members are let go, a principal should immediately inform clients about a successor, arrange an introduction, and provide reassurance that the firm's ability to deliver services has not lessened.

Preventing such diminished capacity of a firm is one reason temporary employment agencies—which can promptly provide appropriate freelance talent while keeping employee overhead at a minimum—are coming into their own. Though many practitioners continue to regard such agencies as unprofessional, "just out trying to sell bodies," as the president of a well-known large firm puts it, temporary agencies are proving so useful that the Boston Society of Architects invited the New York-based firm Consulting for Architects to open an office in the BSA's building.

Among the advantages of temporary agencies is that they can provide staff for a day or a year—for new projects, specialized ones, or general backup. Because they do not receive benefits, freelancers can dramatically lower the cost of a project and give smaller firms the flexibility to compete with their larger counterparts. Existing personnel are usually relieved to see temporaries hired, knowing that the newcomers pose no threat to their seniority. Other advantages of temporary agencies—according to Alice Rudolph, founder and vice president of Architemps, which has offices in Chicago and Long Beach, California—are that they free principals and personnel departments from administrative and accounting work, and from screening potential employees. Rudolph says temporary jobs turn into permanent positions about 10 percent of the time, and she maintains that 75 percent of her company's clients become repeat customers.

One criticism of temporary agencies, admits Sandra Fields, president and founder of Archistaff in New York City, is that their employees may be less committed to a design firm. Architemps' Rudolph counters that "every assignment is an audition. If the client really likes the temporary staffer, the job may be a permanent opportunity. And staffers have to do a good job if they want to work for us again."

An alternative way of temporarily staffing up, says Marines, is for a firm in a stricken region of the country to link up with one in an area of staff shortages. For example, Morris Architects of Houston has sent several employees to work in Honolulu with Stringer Tusher & Associates.

Marines suggests that mechanisms are needed to match architects with firms that are hiring. A promising beginning is a newly formed career bank at AIA national headquarters. It has the first nationwide employment database for architects and is available to architecture firms, corporations, and government agencies seeking staff members. The program will "conduct effective national recruitment campaigns at a reasonable cost," according to the AIA. For information and registration materials, call (800) 242-6381. ■

—ANDREA OPPENHEIMER DEAN

How Young Practitioners are Coping with Layoffs

BOUNCING FROM FIRM TO FIRM, PROJECT to project, a young architect or intern gathers a variety of experiences on the path through internships, junior-level technical jobs, licensing exams, and chosen specialization. With the current economy continuing to decline, instability has become even more accentuated for the architect just beginning his or her professional career.

Less experienced practitioners may be particularly vulnerable to staff cuts, especially at the beginning of an economic downturn, but they also have a greater array of options from which to plan their next move. The younger members of the profession generally have fewer obligations to families and banks, and can be more flexible in efforts to secure work. Junior-level architects and architect-interns throughout the country admit they are confronting an acutely difficult job market, but also claim they are making the best of a challenging situation. Creativity, after all, should be an architect's strongest talent.

Consider, for instance, Jackie Lange. After earning a bachelor's degree in architecture from the University of Texas in 1989, Lange moved to San Francisco, started working for a local commercial architecture firm, and quickly switched to residential work. Last fall, however, her full-time position was shortened to three days because her firm needed to cut costs. With her income severely curtailed but with a part-time job she enjoyed, Lange needed to find ways of earning more money. The 25-year-old architect-intern is now trying to market the jewelry she had been designing as a hobby, hardly what she'd planned when she moved to prospering San Francisco only one year ago.

What Jackie Lange has been learning in San Francisco, her counterparts in other regions have known for some time. A Minneapolis designer with two years' experience has been steadily looking for work for six months, and is considering taking a retailing position until the industry picks up again. A landscape architect in Washington, D.C., was one of four cut from a firm with a staff of 16. He spent over three months contacting more than 80 area firms, but none was filling positions. He has recently expanded his search to different markets and other cities where the economy may be a little better.

These three struggling young professionals share more than employment woes—all plan to return to school next fall. In fact, many young architects who do not already have advanced degrees plan to apply to masters of architecture programs this year. "If I were young and got laid off from my job, the first thing I'd consider is borrowing some money and returning to school," advises Phillip Szujewski, AIA, a senior vice president at Perkins & Will's New York City office.

Many young professionals are pursuing architecture-related projects: designing architectural props for TV studios, attending graduate school, or writing about architecture.

Those not interested in returning to architecture school do have some cause for optimism. Sandra Fields of Archistaff, a New York City architectural placement agency, asserts, "Junior architects with a few years' experience and achievement are very desirable now." As Fields points out, young architects can capably perform work requiring some expertise at bargain rates. Interns just out of school, however, probably face a tougher search. Placement professionals urge candidates for entry-level jobs to include technical experience in their portfolios—the kind of work a firm will most likely require. In particular, computer expertise and CADD know-how remain in great demand.

Many young professionals are finding fulfilling jobs in architecture-related fields. After graduating from the University of Texas at Austin last May with a bachelor's degree in architecture, Waldo Gibson knew that Austin's job market was all but hopeless in the wake of torrential overbuilding. Rather than attempting to tap a dry well, Gibson became marketing director of a design and communications firm. Business is very healthy; close to 85 percent of the companies interviewing Gibson's firm decide to use its services.

Even in Los Angeles, the job market for architects is discouraging, according to Laura Fedro, an interior designer who moved to booming Southern California from the Northeast last year. Yet she and her three architect housemates are supporting themselves through temporary design and technical assignments. Two are building an architectural model of a Los Angeles office tower as a prop for Fox Television, and Fedro works at a vintage clothing and textile shop, which she feels will eventually help her postponed design career.

It may be difficult in the present climate for jobless architects to view their situation as liberating. Such freedom is often unwanted, to say the least. However, enterprising interns or junior architects can turn their current circumstances into advantages by realizing that above all, a soured economy demands flexibility. An architect who spends a year or two designing jewelry, for example, will certainly acquire a refined sense of materials and detailed joinery—skills difficult to master on the drafting boards.

Some architects just out of school or at the start of their careers will no doubt become disenchanted when confronted with the harsher side of the architectural profession during the difficult months ahead. But those who manage to weather the storm will be all the more dedicated to the practice of architecture after having stuck with it through leaner times.

—STEVE BODOW

Steve Bodow was recently laid off from a New York City architecture firm and is currently writing about architecture.

ENERGY CONSCIOUS CONSTRUCTION: BECAUSE THERE ARE TWO SIDES TO EVERY STORY.

Occupant:
"I want a comfortable building with low operating costs."

The Building Team:
"We want that, too. But without increasing first cost."

With Energy Conscious Construction (ECC), both sides get what they need. For occupants — a comfortable, productive work environment. For the owner, architect and engineer — improved energy efficiency *without expensive change orders or unnecessary construction delays.*

ECC is a program with monetary incentives and free consultation from The Connecticut Light and Power Company (CL&P) and Western Massachusetts Electric Company (WMECO). Its aim is to encourage additional energy-saving measures in new, nonresidential construction projects in the CL&P and WMECO service territories. *Typically, the incentives for the energy-saving measures in ECC can cover the incremental cost — with the added reward of lower electric bills from the day the building is occupied.*

For more information and a free copy of our ECC guidebook *Energy and Economics: Strategies for Office Building Design*, simply fill out the coupon. Or call 800-545-0663.

NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY • HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY • NORTHEAST NUCLEAR ENERGY COMPANY

THIS ENERGY CONSERVATION MESSAGE IS PAID FOR BY CL&P AND WMECO CUSTOMERS.

Circle 104 for more information

Circle 106 to have a CL&P/WMECO representative call.

YES, I'm interested in ECC. Please send me more information. Also, send me the free guidebook *Energy and Economics: Strategies for Office Building Design.*

☐ I'm an architect or engineer. ☐ I'm an owner or developer.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

☐ Please have a representative contact me

Mail Coupon to: Northeast Utilities,
P.O. Box 3023, Wallingford, CT. 06492-3023

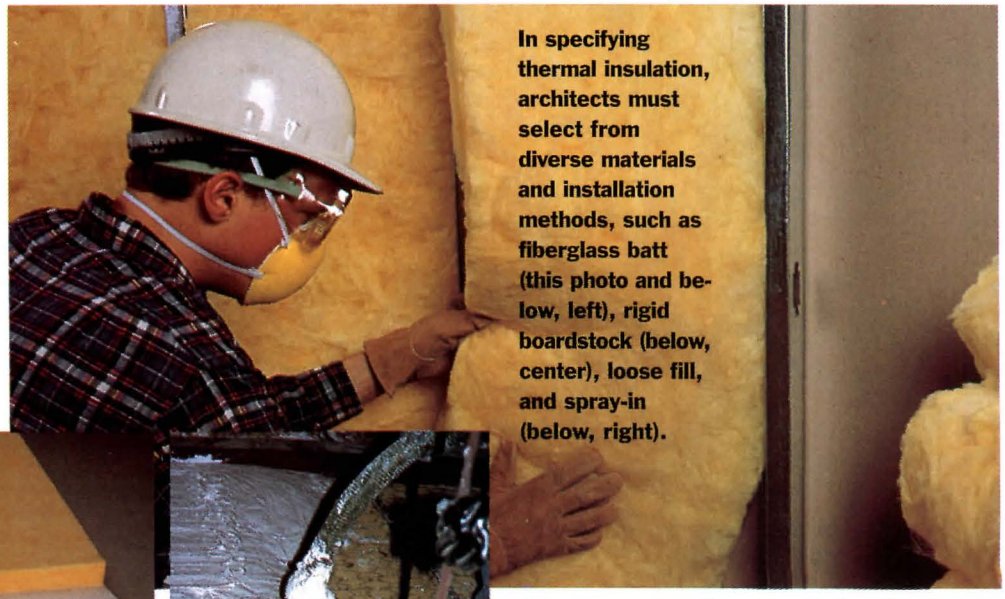
ONAODOUEXXC

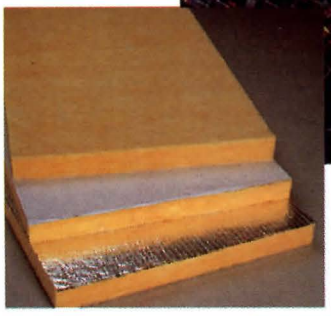
Insulation Update

Higher densities and new forms of insulation offer greater energy savings.

IN HOMES AND LIGHT COMMERCIAL BUILDings, insulation is the single most important defense against high energy bills in most of the country—even in southern climates where cooling loads exceed heating loads. Insulation's primary purpose is to retard *conductive* heat flow through the building envelope, but it also plays another important role: retarding *convective* heat flow through the envelope, a function that is rarely considered in selecting insulation systems.

Most architects prefer insulation details and materials they have relied upon over the years: fiberglass batts in walls; loose-fill fiberglass or cellulose in ceilings; rigid foam insulation on foundation walls and, perhaps, as part of wall systems. While effective, these systems are not the only alternatives currently available. Dozens of new materials or different formulations of existing materials have been introduced over the past decade. For example, manufacturers have produced high-density, high R-value fiberglass batts. New contractor-applied, cavity-fill insulation systems are also available, some of which may edge out batt insulation over the next decade. Even rigid insulation materials—products of the heightened energy awareness in the 1970s—are undergoing rapid change.





In specifying thermal insulation, architects must select from diverse materials and installation methods, such as fiberglass batt (this photo and below, left), rigid boardstock (below, center), loose fill, and spray-in (below, right).

High-density fiberglass batt insulation

FIBERGLASS AND MINERAL WOOL BATT INSULation works by trapping pockets of stationary air between fibers. Higher R-values can be achieved by applying thicker layers of insulation, or by increasing the density of the material. Insulation density, however, can only be increased up to a certain point, after which the R-value will actually drop and conduction through fibers will increase.

Responding to the demand for higher-R-value wall and ceiling systems, the three largest manufacturers of fiberglass insulation—Owens Corning, Certainteed, and Manville—have recently introduced higher density batts for 2x4 walls, 2x6 walls, and 2x10 ceilings. The standard for 2x4 walls had always been 3½-inch R-11 batts, though the somewhat denser R-13 batt was also available. Now all three manufacturers also offer a 3½-inch R-15 batt. The fibers are much more tightly packed, and the batt feels much more solid. The result is an R-value of almost 4.3 per inch—a 36 percent improvement over the standard R-11 product.

For 2x6 walls, these manufacturers have introduced 5½-inch batts that provide R-21. It is interesting to note that the standard R-19 batts are actually 6¼-inch thick, and were originally designed to provide extra ceiling insulation; they were not designed to fit into 2x6 walls, which measure 5½ inches thick. By compressing them into 2x6 wall cavities, the R-value drops to R-18 (when compressed, the R-value per inch increases, but the total R-value drops).

Finally, manufacturers have introduced a new 8¼- or 8½-inch-thick batt that insulates up to R-30. This product is designed primarily for 2x10 cathedral ceilings, so that a full R-30 can be provided along with an air space for ventilation. All three of these new fiberglass batt products are available unfaced or with a kraft facing.

Loose-fill alternatives

LOOSE-FILL INSULATION THAT IS BLOWN OR poured into wall or ceiling cavities has been used widely for years. Cellulose, chopped fiberglass, or chopped mineral wool provides the fastest and least expensive way to insulate flat ceilings in an attic. Perlite, vermiculite, and polystyrene beads are alternatives, though they are much less common.

Until recently, the only way to insulate the walls of an older wood-frame building was to blow cellulose or another loose-fiber insulation into the wall cavities through holes along the outside of the building. The problem is that these materials settle over time, and they may allow considerable air to leak

through them, significantly reducing the overall R-value. In attics, this problem may be exacerbated by insulation blown away from the eaves by wind entering the structure through soffit vents. In wall systems, settling can cause heat loss at the tops of the walls, resulting in water condensation and mildew on inner wall surfaces. Air leakage through loose cellulose, fiberglass, or mineral wool can also contribute to moisture problems in the wall cavity. Far better from an energy standpoint are the blown or sprayed insulation systems described below that produce a semi-rigid insulation material.

Rigid boardstock insulation

RIGID BOARDSTOCK INSULATION, FIRST introduced in the 1950s, has become increasingly popular as a way of boosting R-values in wall systems or providing an entire insulation system in built-up roofing systems. Unfortunately, its most popular forms—extruded polystyrene and isocyanurate—have been produced with chlorofluorocarbon (CFC) foaming agents that have been linked to ozone depletion (see chart, page 96). As a result, most rigid insulation materials are currently undergoing rapid changes to address concerns over such environmental issues.

Extruded polystyrene (Styrofoam, manufactured by Dow Chemical; Foamular, produced by UC Industries; and Amofoam, made by Amoco Chemical) is considered one of the best types of insulation for below-grade applications because of its moisture-resistance properties. Until recently, it was produced by extruding liquid styrene with CFC-12, creating a strong cellular structure. With restrictions on the use of this foaming agent, Dow Chemical and Amoco Chemical have now switched entirely to HCFC-142b, a CFC substitute that is much less damaging to the stratosphere. UC Industries is also in the process of switching to more environmentally safe materials. The thermal performance and structural properties of these new insulation products are rated the same as conventional extruded polystyrene.

Expanded polystyrene insulation (generally known as EPS or beadboard) is produced by about 150 fairly small manufacturers throughout the country and is the least expensive type of rigid boardstock insulation. It is made by expanding beads of polystyrene using pentane and molding the resulting foam into large blocks, which are then cut into desired dimensions. Most EPS insulation is low density (about 1 lb./ft^3), but denser alternatives are now available. At higher density (2 lb./ft^3), the material performs more like extruded polystyrene, with better moisture resistance, higher R-values, and greater strength than its less dangerous counterparts.

Isocyanurate is another common type of high-R-value boardstock insulation material for walls and roofs. Although the product has changed little over the past 10 years, some significant changes in its properties and thermal performance are likely to occur over the next few years, as manufacturers replace its CFC-11 contents with other types of foaming agents that are less damaging to the atmosphere (see sidebar, facing page).

Phenolic foam insulation is a newcomer to the rigid insulation field, introduced in the early 1980s by Koppers and currently manufactured by Manville under the trade names Insul-Shield Premier and Weathertite Premier. These products offer the highest R-value of any insulation material on the market (R-8.3/inch), and their very small, tight cell structures retain R-values more effectively than isocyanurate. Phenolic foam is also resistant to very high temperatures—higher even than those resisted by isocyanurate. Unfortunately, it also absorbs moisture more readily than isocyanurate, and, at least in the past, problems with thickness tolerances have occurred. As with isocyanurate, the foam is likely to undergo some changes as CFC-11 is eliminated from its production. Manville is redesigning the material and expects to introduce an improved product later this year. Whether phenolic foam's high performance can be maintained after CFC-11 is phased out remains to be seen after it becomes commercially available.

Another type of rigid insulation is produced by molding high-density fiberglass and binder into a rigid or semi-rigid board. Several rigid fiberglass insulation products are currently available, though not widely marketed for wall and ceiling insulation applications. The R-value typically ranges from R-4 to R-4.7 per inch of thickness. As environmental concerns reduce the popularity of rigid-foam insulation materials, rigid fiberglass is likely to be specified more frequently.

Spray-in insulation

THE NEWEST AND MOST RAPIDLY EVOLVING type of insulation is sprayed into open wall and ceiling cavities using specialized equipment before interior finish materials are applied. Among its advantages are ease and speed of application and the ability to seal around wires and wall penetrations. Cost is highly variable, depending upon the type of insulation, area to be insulated, and the contractor performing the installation.

Polyurethane, the oldest type of spray-in insulation, has changed little from products available ten years ago. The foam components

The successful performance of an insulation system depends on more than simply specifying a high R-value. A building's actual energy efficiency is also dependent on the method of installation (below center) and choice of the insulating material most appropriate to the specific application. When fiberglass batt insulation is compressed to fit between studs that are narrower than the thickness of a specified roll, for example, the R-value will decrease from expected performance levels. The fewer breaks in the insulation, the better a system will perform as a thermal barrier; areas where rigid board panels (below right) or batt roll edges meet studs and joists (below left) are subject to air leakage, thereby reducing a structure's insulating capacity.

are mixed on site and sprayed into open cavities in the structure. Polyurethane bonds extremely well to most surfaces and hardens with a rigid skin that is fairly impermeable to moisture. The R-value is high (about R-7/inch) but drops over time as CFC-11 diffuses out and air enters the cell structure. Some architects specify a thin 1- or 2-inch layer of spray polyurethane in a wall or ceiling cavity to provide a tight infiltration seal, and a less expensive fiber insulation to fill the cavity. Polyurethane should not fill a cavity fully because it cannot readily be trimmed back if applied too thickly. As CFCs are restricted, the increasing cost of polyurethane is making such products less competitive with other types of spray-in insulation. How well a reformulated, non-CFC-based urethane will perform is unknown, though some hand-held, cannister-based polyurethane foam sealants now incorporate alternative foaming agents quite successfully.

Open-cell isocyanurate is a very new type of spray-in insulation produced by the Canadian company Icynene. The insulation components are mixed on site and sprayed into open wall and ceiling cavities, but water replaces CFC foaming agents to produce an open cell structure with air or carbon dioxide in the cells. The R-value is lower than polyurethane's (R-4.3 per inch), and the foam consistency is much different. Rather than being a hard material, Icynene is soft after curing—with the consistency of angel food cake. The foam remains flexible, and a tight air seal can be maintained, even with seasonal expansion and contraction of wood framing members. Icynene is currently available only in Canada, but it may become available in the United States soon, since code agency testing has been completed. Other non-CFC formulations of Isocyanurate insulation are likely to be developed over the next few years.

Once applied primarily in the West, wet-spray cellulose is becoming increasingly popular throughout the United States. Chopped cellulose (recycled newspaper or cardboard treated with a borate fire retardant) is mixed with water and an acrylic binder and sprayed into open wall or ceiling cavities. The material adheres to the sheathing and dries in place. Especially when wires run through the wall, the cellulose provides a tighter insulating wall system than fiberglass. For wall and ceiling cavities that are to be covered with drywall or other paneling, the insulation is shaved back flush with the inside of the studs by employing a special screed roller.

CFCs and Foam Insulation

IN FOAM INSULATION MATERIALS, CHLOrofluorocarbons, or CFCs, have played an important role that is best understood by examining how insulation works. All insulation materials trap pockets of gas. The ability of a gas to insulate is measured by its gas-phase conductivity. Air would insulate to approximately R-5.5 per inch if it were kept perfectly stationary, eliminating convective heat transfer. High-density fiberglass boasts a greater R-value than standard fiberglass because pockets of trapped air in the denser material are smaller, preventing air from circulating as effectively. In reality, an R-value of 5.5 per inch cannot be obtained with air because of conductive heat loss through the cell walls or fibers. The best insulating materials with air can only reach about R-5 per inch.

To achieve higher insulation values than R-5 per inch, a gas other than air must be employed as the insulation material. Gases with a higher-density than air, such as argon and CFCs, have lower gas-phase conductivity. For this reason, argon gas is used in windows (ARCHITECTURE, July, 1990, page 95), but cannot be incorporated into foam insulation because it cannot easily be integrated into the cell structure. CFCs are ideal for foam insulation because of their phase-change properties and low conductivity. They boil at very low temperatures but can be kept in a liquid state under pressure. Liquid CFC is mixed with foam insulation's raw materials under pressure, then extruded in controlled atmospheric conditions. The liquid immediately "boils," producing tiny bubbles of gas that get trapped in the insulation's cell matrix. Because CFCs are so chemically stable, they last for decades, maintaining R-values as high as R-8 per inch.

Unfortunately, CFCs destroy the protective stratospheric ozone layer and are very potent greenhouse gases contributing to global warming (a CFC molecule traps heat 10,000 to 20,000 times more effectively than a carbon dioxide molecule). As a result, all CFC-containing compounds are being phased out. As replacements, less stable HCFCs (hydro-chlorofluorocarbons) and HFCs (hydrofluorocarbons) are being developed and tested, since these compounds contain hydrogen to help them break down in the lower atmosphere. HCFCs still contain chlorine, and they will still deplete ozone to some extent, but most have approximately 1/20th the ozone depletion potential of CFC-11 and CFC-12. HFCs contain no chlorine and will not harm the ozone at all.

Extruded polystyrene used to contain CFC-12, but after restrictions were placed on CFCs, manufacturers found that HCFC-142b could be easily substituted. HCFC-142b has been commercially available for some time, and most manufacturers have already modified production with this foaming agent.

Safer but less stable compounds are being developed with significantly less ozone depletion potential than CFCs.

Urethane, isocyanurate, and phenolic foam insulation materials are produced with CFC-11, for which there are currently no commercially available alternatives. Chemical companies are moving ahead quickly with research on substitutes, such as HCFC-123 and HCFC 141b. Toxicity and fire safety testing of these foaming agents will take time, however, and these substitutes are not expected to be commercially available for at least another two years. Exactly how the properties of foam insulation materials will change with different agents is not known, but with HCFC-123 or HCFC-141b replacing CFC-11, the initial R-value will be approximately 11 percent lower. In addition, the structure's fire-resistance capability may be affected.

For the environmentally concerned architect, numerous insulation materials are currently available that do not use CFCs. In some cases, thicker walls must be constructed to obtain overall efficiency levels comparable to those obtained with high R-value insulation materials. Within a few years, however, all highly damaging CFC-based insulation materials will be banned, so this particular environmental concern will largely disappear. —A.W.

COMMON INSULATION MATERIALS

Type of insulation	R-value per inch *(range)*	Available thickness *(inches)*	Location of materials	Installation method	Resistance to: † Water abs.	Moisture damage	Direct sun	Fire	Max. temp.	Environmental concerns
BATTS, ROLLS										
Fiberglass	3.17 (3.0)	1" - 13"	Wall, floor, & ceiling cavities	Between studs, joists, or rafters	2	1	1	2	180°F	Fibers may be carcinogenic.
Rock Wool	3.17 (3.0-3.7)	3" - 8"	Wall, floor, & ceiling cavities	Between studs, joists, or rafters	2	1	1	1	>500°	Fibers may be carcinogenic.
RIGID BOARD										
Expanded Polystyrene (EPS)	4.0 (3.6-4.4)	1/4" - 10"	Wall, ceiling, & roof	Glued, nailed	3	2	4	4	165°	Foam produced with pentane gas may contribute to smog and ground-level ozone pollution.
Extruded Polystyrene (Styrofoam®) (Foamular®)	5.0	3/4" - 2"	Foundations, sub-slab, wall, ceiling, & roof	Glued, nailed	1	1	4	4	165°	Some extruded polystyrene produced with CFC-12, which depletes stratospheric ozone. Dow and Amoco have now switched to less-damaging HCFC-142b.
Isocyanurate (Thermax®) (Hi-R®)	7.0 (5.6-7.7)	1/2" - 4"	Wall, ceiling, & roof	Glued, nailed	2	1	4	4	200°	Produced with CFC-11, which depletes stratospheric ozone. Alternative foaming agents are not yet available.
Phenolic Foam (Manville)	8.3	1/2" - 3"	Wall, ceiling, & roof	Glued, nailed	3	2	2	2	300°	Produced with CFC-11, which depletes stratospheric ozone. Alternative foaming agents are not yet available.
Rigid Fiberglass	4.4 (3.8-4.8)	1" - 3"	Wall, ceiling, roof, & foundation walls	Glued, nailed	2	1	1	2	180°	Smaller health risk from fibers because they are not loose. May be some out-gassing of resins used as binders.
LOOSE, POURED, OR BLOWN										
Fiberglass	2.2 (2.2-4.0)	Any	Ceiling cavities	Poured and fluffed, or blown by machine	2	1	1	2	180°	Loose-fill may pose greater risk than fiberglass batts in terms of carcinogenic problems.
Rock wool	3.1 (2.8-3.7)	Any	Ceiling cavities	Poured and fluffed or blown by machine	2	1	1	1	>500°	Shorter fibers with blown mineral wool may pose greater health risk than fiberglass batts.
Perlite	2.7 (2.5-4.0)	Any	Hollow concrete block	Poured	3	2	1	2	200°	None known.
Cellulose	3.2 (2.8-3.7)	Any	Ceiling cavities	Blown by machine	4	4	2	3	180°	Cellulose provides a major market for recycled newspaper and cardboard.
Wet-Spray Cellulose	3.5 (3.0-3.7)		Wall cavities	Sprayed into open cavities	4	3	2	3	165°	Same as for cellulose.
Blown fiber with binder (Blow-in-Blanket®)	3.5 - 4.0		Wall & ceiling cavities	Blown dry into mesh-screen-faced cavities	*	*	*	*	165°	Some variation with different fiber materials.
Polyurethane	6.2 (5.8-6.8)		Wall & ceiling cavities, roofs	Foamed into open cavities	1	1	4	4	165°	Most urethane produced with CFC-11, which depletes stratospheric ozone. Some formulations are available with less-damaging HCFC foaming agents.
Open-cell Isocyanurate (Icynene™)	4.3		Wall & ceiling cavities	Foamed into open or closed cavities	3	2	NA	3	165°	None known.
Magnesium Silicate (Air Krete®)	3.9		Wall cavities	Foamed into open cavities	3	2	NA	1	>500°	None known.

† **1** = EXCELLENT **2** = GOOD **3** = FAIR **4** = POOR

* Properties depend on fiber insulation used.

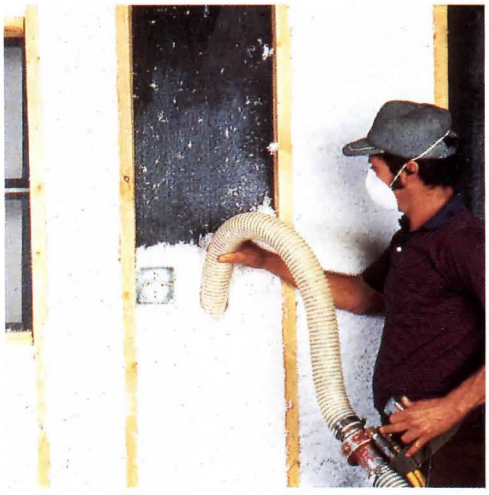
Sources: *The Superinsulated Home Book*, John Wiley & Sons, 1985; author's communication with manufacturers, industry experts.

For cavities that are to be left open (such as gymnasium ceilings), somewhat different fibers and chemical formulations are used, and screeding is not required.

Wall cavities that are to be sealed pose problems for insulation that requires drying, particularly if the exterior walls are sheathed with impermeable plywood and the interior is covered with a polyethylene vapor barrier. Some wet-spray cellulose contractors recommend against an interior vapor barrier; a better solution is to leave the cavity open for a few days or longer to let the cellulose dry out. The moisture content of wet-spray cellulose is also influenced by the installer. A skilled installer may be able to keep the moisture content as low as 20 percent and still achieve adequate adherence.

The Colorado company Ark-Seal International has pioneered and patented another process to blow dry-fiber insulation into open or closed wall and ceiling cavities. The fibers are first coated with an acrylic binder so that they remain semi-rigid once in place, and will not settle. Called Blow-in-Blanket, the system's insulating materials consist of chopped fiberglass, chopped mineral wool, or cellulose insulation. For application in open cavities, a nylon screen is first stapled to the inner surface of the studs (with metal studs, the screening is secured with quick-drying mastic). The screen is then perforated with holes to allow a hose to be inserted, and the insulation is blown in. In retrofit applications, holes are drilled through outside walls, as with blown-in cellulose insulation.

The most unusual of all the new spray-in insulation products is a magnesium silicate foam called Air Krete. Composed entirely from inorganic minerals, the foam is totally fireproof and free from volatile organic chemicals (VOCs) that may be released from plastic foams and binders used in fiber insulation materials. As a result, Air Krete is often the insulation material of choice for people with acute chemical sensitivities. The delicate, white foam insulates to about R-4.5 per inch, and must be protected by the drywall shortly after installation. The material can be installed into closed cavities (stud walls, masonry block cores, curtainwall systems) or into open cavities that will be finished with drywall or paneling by attaching screening to the inside of the studs and foaming through the screen. Because of its excellent fire-resistance properties (flame spread=0; fuel contributed=0; smoke developed=0), Air Krete is becoming increasingly specified for commercial buildings and schools.



Ark-Seal's Blow-in-Blanket insulation is installed by first mixing dry-fiber insulation, consisting of either chopped fiberglass, chopped mineral wool, or cellulose, with an acrylic binder. The mixture is then blown into a cavity that has been faced with nylon mesh. A polyethylene vapor barrier and drywall can then be installed in normal fashion. Because of the binder, there is no settling of the insulation, and a very tight air seal is achieved around wires and other penetrations. The system can be applied on walls (above left) as well as sloped ceilings (above right). Because the insulation consists of dry materials, Blow-in-Blanket does not settle after it has been installed. And unlike wet-spray cellulose, high moisture content is not a concern.

Radiant barrier insulation

APPLYING ONE OR MORE LAYERS OF A REFLECtive film as an insulating material remains a controversial topic. Some radiant barrier manufacturers promote these materials through misleading claims of energy performance. A radiant barrier placed next to a one-inch air space provides an R-value of approximately 2½. A ¼-inch radiant barrier "bubble-pack" material will insulate to about R-1. Next to an air space, however, it will provide about R-3.5. With multiple layers of foil and bubble-pack, the maximum R-value achievable is approximately R-5 per inch. Much more cost-effective materials are available for insulating wall and ceiling cavities. Radiant barriers are, however, effective at reducing cooling loads in attics.

To make room for thicker wall insulation, Blue Heron Construction Corp. of Shaftsbury, Vermont, uses lightweight "Larson Trusses." Fabricated out of 2x2s and ⅜-inch plywood webbing, the trusses are hung outside a structural 2x4 or post-and-beam wall system (above). The 8-inch-deep trusses provide space for up to R-30 fiberglass batts, installed from the outside before sheathing (right).

Future insulation materials

EXPECT TO SEE GREATER APPLICATION OF high-density fiberglass batt insulation and low-moisture-content, spray-fiber insulation materials in the near future. Also expect to see new boardstock and spray-in foam insulation materials foamed without CFCs, and even new batt insulation materials made from recycled plastics. Further off in the future, there are sure to be innovative new insulation technologies that offer even higher R-values than today's best products.

One such product is a multi-layer foil material recently developed by scientists at Lawrence Berkeley Laboratory in California. With the same basic technology employed in high-performance windows, a low-conductivity gas such as argon or krypton is sealed between multiple layers of foil, with the resulting system packaged into batts. Crumpled foil is inserted between the layers of foil to keep them separated. Depending on the low-conductivity gas incorporated, R-values in prototype samples range from R-8 to R-15 per inch. Lawrence Berkeley Laboratory has applied for patent protection of this system and is in search of a manufacturer.

Another technology being pursued is evacuated-panel insulation, a principle employed in the manufacture of Thermos bottles. A hard vacuum (10^{-6} torr), measuring only $^1/_8$-inch thick, can insulate to R-15. A soft vacuum (10^{-1} or 10^{-2} torr), with a matrix of silica powder or silica aerogel, can insulate to R-20 or R-25 per inch. While exciting, the evacuated-panel insulation materials will probably be limited primarily to appliance insulation (refrigerators, freezers, and water heaters). Production costs will be too high, and the likelihood of puncture too great, to justify the use of these products in cavity-insulation applications.

Effective insulation systems demand more than simply specifying the right material. With batt insulation, for example, compression and improper fit can significantly reduce the overall R-value. Moisture that is allowed into the wall or ceiling cavity can also reduce performance and, more seriously, damage structural components. Vapor barriers, weather barriers, and drainage must also be properly detailed. For the insulation system to perform as planned, make sure a reputable insulation contractor is employed, and have the general contractor provide on-site quality control. Even the best insulation system design will not meet performance expectations if it is not properly executed on site. ■

—ALEX WILSON

Learning About Insulation

NEW TECHNOLOGIES HAVE PERMITTED the manufacture of insulation substitutes that are equal or superior to conventional insulation, and less harmful to human health and the environment. With increasing concern over issues such as CFCs, indoor air quality, and energy conservation, the importance of proper insulation specifications and detailing continues to grow. Architects must not only understand existing, well-tested methods and products, but must also keep up with new installation techniques, such as spray-in applications and improved materials like high-density batts. Liability issues arising from asbestos fibers, moisture damage, and inadequate fire protection have also spurred the profession to seek better knowledge of correct insulation applications.

The newly formed SPEC Institute (above), offers seminars (left) to inform architects of the latest insulation technologies and their applications.

One organization designed to help fill the recently created gap between insulation methods and materials is the Systems and Products for Energy Conservation (SPEC) Institute of Englewood, Colorado. Sponsored last year by the Manville Corporation and modeled after its 18-year-old Better Understanding of Roofing Systems Institute (BURSI), the SPEC Institute offers architects training in energy conservation by providing the latest information on building insulation technology. A two-day course of classroom seminars conducted by a faculty of scientists and engineers experienced in the specification, manufacture, testing, and installation of insulation products and systems is designed to help professionals design energy-conserving buildings that incorporate current health, safety, and environmental features.

Throughout the seminars, training is provided in the thermal dynamics of wall, floor, and roof systems; moisture control through vapor retarders and ventilation; and acoustical planning for sound transmission and absorption. The energy performance of new and existing insulation products is presented in relation to building systems in new construction and renovation projects. Instruction is limited to about 20 students per session, and open to architects and engineers.

As indicated by the overwhelming response the SPEC Institute has received, architects clearly need more information on the rapid changes in insulation technology to meet health, safety, liability, and environmental concerns. So far, the industry has kept pace. —M.S.H.

An expert faculty of scientists and engineers provides training and the latest information on fire testing (above), acoustical properties (right), environmental issues, health safety, and fibrous composition of insulation. The first two-day training course was held in August, 1990.

Equal Opportunity Design

Through research and discussion, architects are creating environments accessible to all Americans.

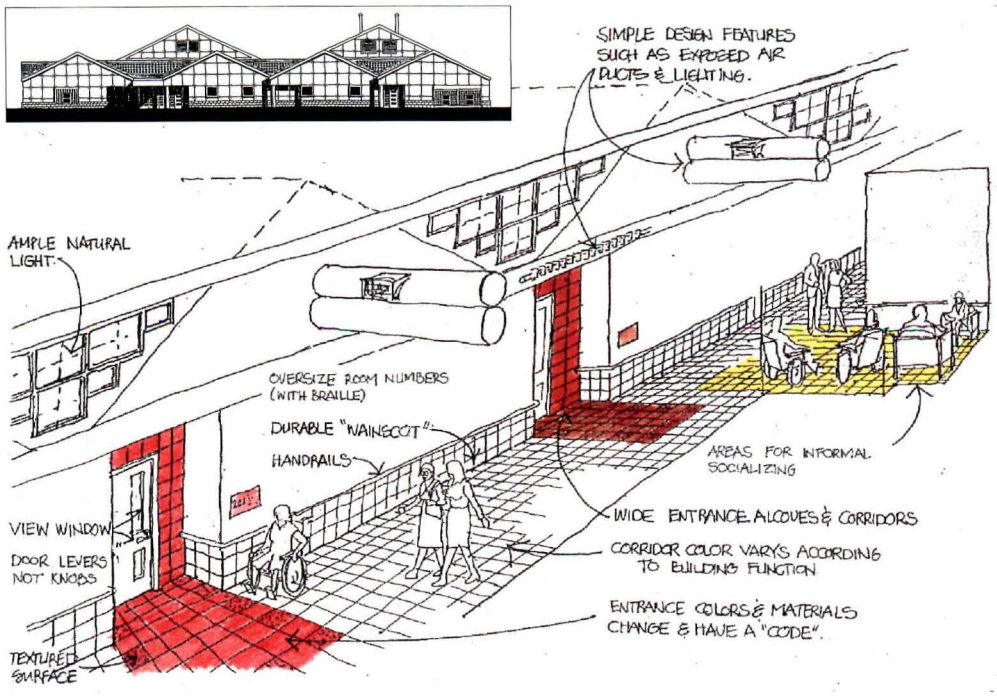
THROUGH THE AMERICANS WITH DISABILITIES Act of 1990 (ADA), Congress has ruled that discrimination on the basis of mental and physical impairments is unlawful. This sweeping civil rights legislation is intended to open a full range of places and services to those with disabilities: from the workplace to the shopping mall, from transportation systems to telecommunications. Accessibility in multifamily housing, one sector notably absent from the ADA, is addressed in the Fair Housing Act.

While the law stipulates when and where access is mandatory, it does not say how—this task has been relegated to a host of government agencies. In regard to accessible design, the U.S. Architectural and Transportation Barriers Compliance Board (ATBCB) has been charged with supplementing current federal minimum guidelines by April 26, 1991. The Department of Justice will issue regulations consistent with these guidelines by July 26 of this year. Until then, architects are advised to adhere to the Uniform Federal Accessibility Standards (UFAS), available from ATBCB. UFAS outlines minimum accessibility requirements for federally funded projects, which must be undertaken in accordance with the Architectural Barriers Act of 1968—a precursor to the ADA.

Compliance with the new regulations will be phased over several years. By January 26, 1992, easily removable barriers must be eliminated and subsequent alterations affecting major activity areas in such private establishments as restaurants, hotels, theaters, and shopping centers must conform to the law. New commercial facilities occupied on or after January 26, 1993, must comply as well. Under ADA regulations, all work commissioned by state and local governments must be accessible beginning January 26, 1992, even if the projects do not receive funding from the federal government.

Admittedly, the dates and demands may seem overwhelming at first. But while an alphabet soup of organizations is currently involved in elaborating the requirements of the ADA, ever-growing numbers of architects are already meeting the intent of the law. Whether spurred by specific client requirements or personal commitment, many architects are searching for ways to accommodate all users: from the very young to the very old; from a person with a temporary impairment to one with a permanent disability. Some call it "designing for the life span" or "lifelong access;" others, "universal design."

"Architects have to adopt a different attitude about how to approach design," explains former AIA President Sylvester Damianos. "To do so, we must fully understand what the problems are." In his own work, Damianos has found that it takes more than merely being told to design differently. "The guidelines are great, but you really have to accompany someone with a physical limitation," he notes, to fully appreciate how difficult it can be to maneuver through the built environment. Damianos encourages architects to develop a rapport with disability groups within their own community, and to turn to them for assistance during initial project research and subsequent design review.



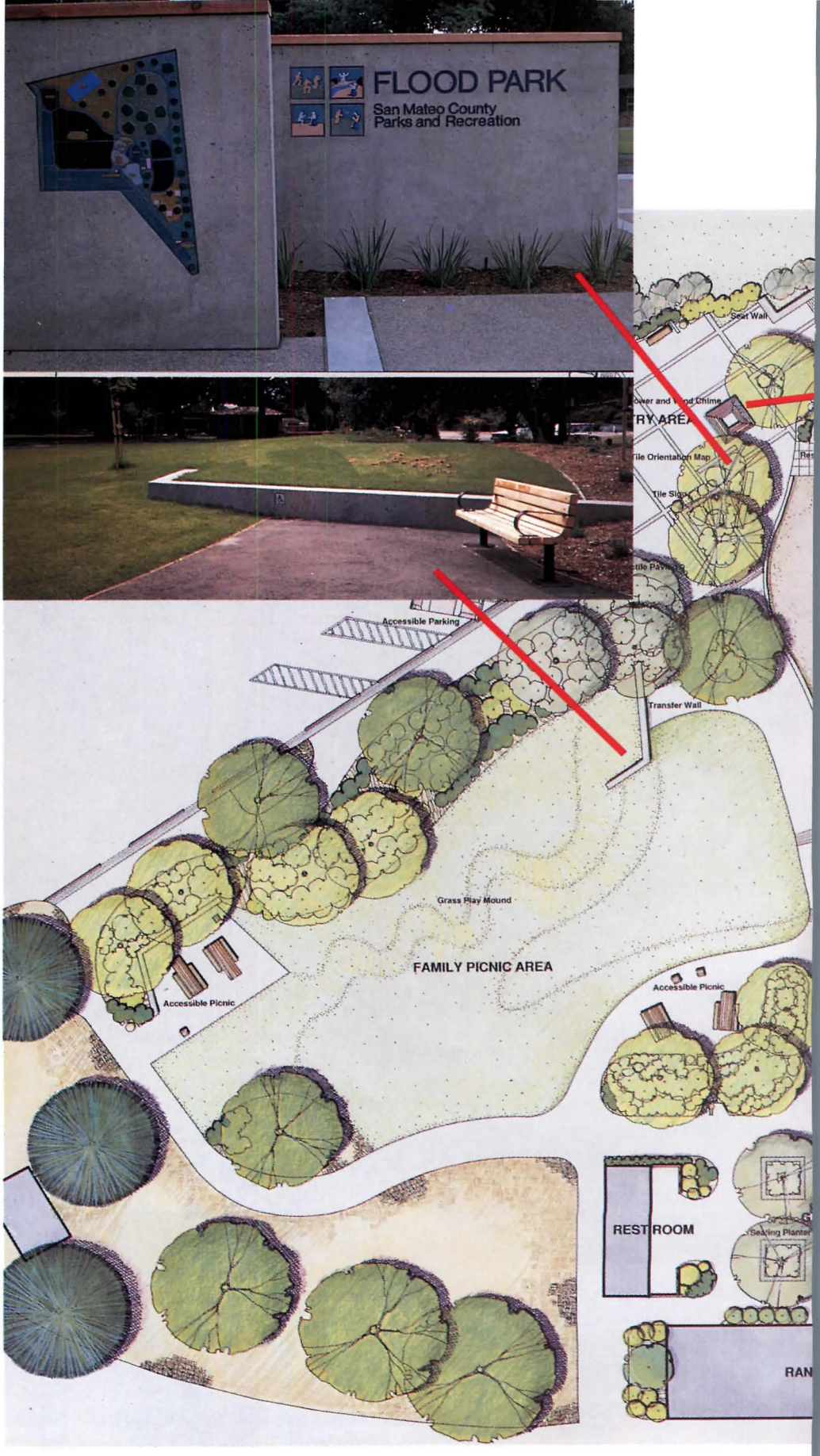
Public School 233 (above), located in the Borough of Queens, will be New York City's first public school designed specifically for adolescents and young adults with severe developmental and physical disabilities. The range and degree of impairments—from emotional problems to muscular, visual, and hearing deficiencies—required a sensitive design by Gran Sultan Associates of New York. An institutional image was purposely avoided: the facility's scale and pitched roofs (inset) blend comfortably within a residential neighborhood. Changes in color and texture, wide corridors, clerestory lighting, and oversized graphics help students navigate from one area to another. Developed by the New York City School Construction Authority, the facility will be completed this July.

Some architects are actively seeking ways of making other professionals aware of universal design. Dennis Jones, AIA, an associate professor at Virginia Polytechnic Institute and State University, for example, recently participated in a meeting on universal design leadership that was sponsored by the National Endowment for the Arts. He, like others familiar with designing for accessibility, has found that the most successful examples are "quiet and subtle." This invisibility is best achieved when architects consider the challenges facing users with disabilities from the very beginning of the design process.

Not every supporter of the ADA is convinced that universal design is the answer. "One size can't fit all," argues Thomas D. Davies, Jr., AIA, associate director of architecture and barrier-free design for the Paralyzed Veterans of America (PVA). "The needs for some disabilities are mutually exclusive with others." An asthmatic, for instance, may find climbing up a few stairs less exhausting than walking a much longer distance on a ramp. An elderly person with balance problems may feel safer in a narrow bathroom where a wall or fixture is always near at hand. And visually impaired walkers have trouble distinguishing the street from the sidewalk at a standard curb cut. Davies also cites geographical differences: "Building codes are typically regional. A 5 percent ramp that would be fine in Florida would be dangerous in snowy New Hampshire."

In regard to the ADA, for which PVA lobbied hard, Davies believes the law is too ambiguous. "Accessibility is a very complex issue that has been greatly oversimplified. The goals are terrific, but it will be up to architects to make it work." Fortunately, as demonstrated on the following pages, a few practitioners are trying to do just that.

—Nancy B. Solomon



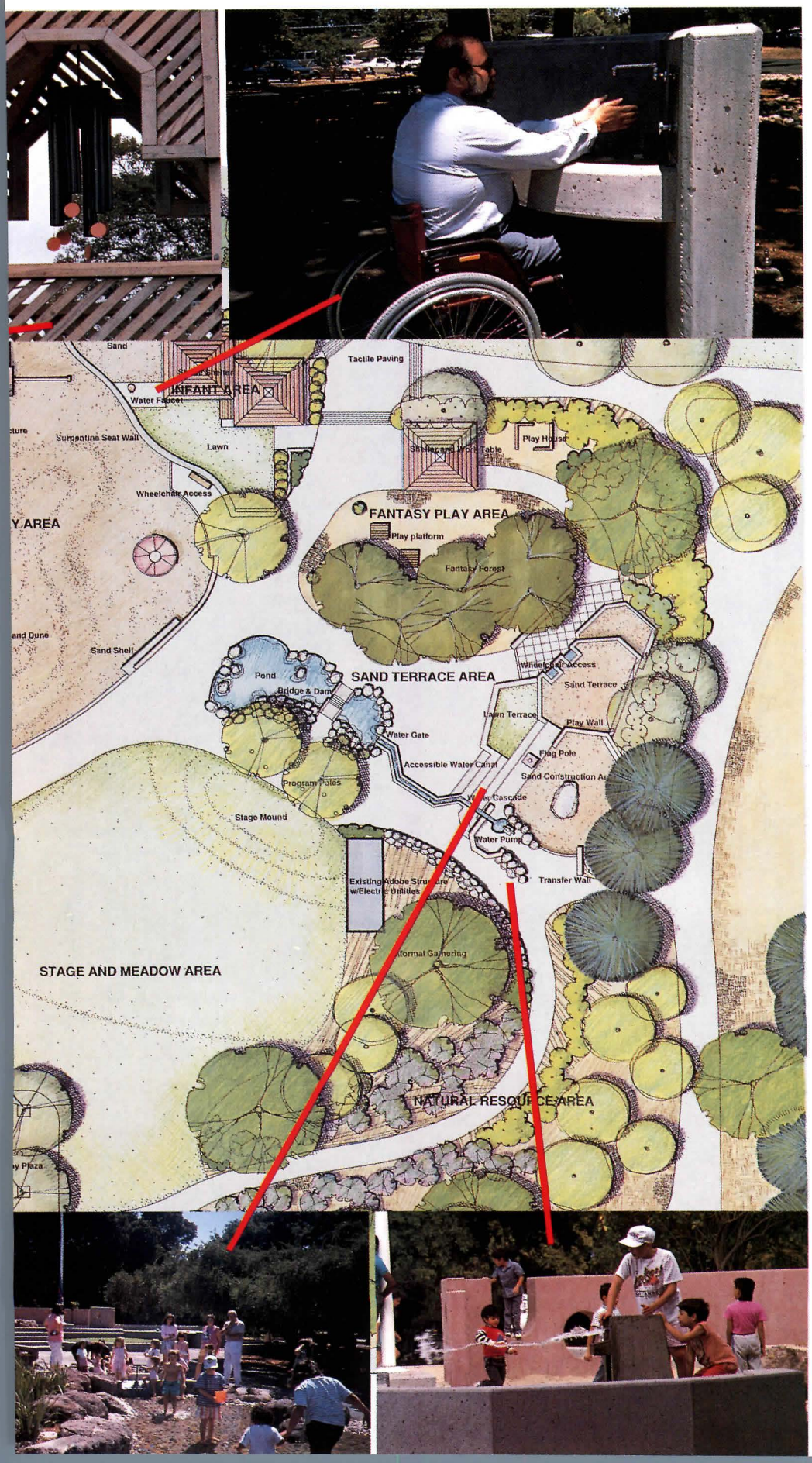
For more information on accessibility, contact:

AIA Public Affairs, 1735 New York Avenue, NW, Washington, D.C., 20006
Contact: Elizabeth L. Wainger (202) 626-7411

Architectural and Transportation Barriers Compliance Board, 1111 18th Street, NW, Suite 501, Washington, D.C., 20036
Contact: Ellen Harland, AIA, (202) 653-7863

Adaptive Environments Center, 374 Congress Street, Suite 301, Boston, Massachusetts, 02210
Contact: Elaine Ostroff (617) 695-1225

Barrier Free Environments, Inc.,
P.O. Box 30634, Raleigh, North Carolina, 27622
Contact: Ron Mace, FAIA, (919) 782-7823



Flood Park
Menlo Park, California
Moore Iacofano Goltsman and Lawrence Wight

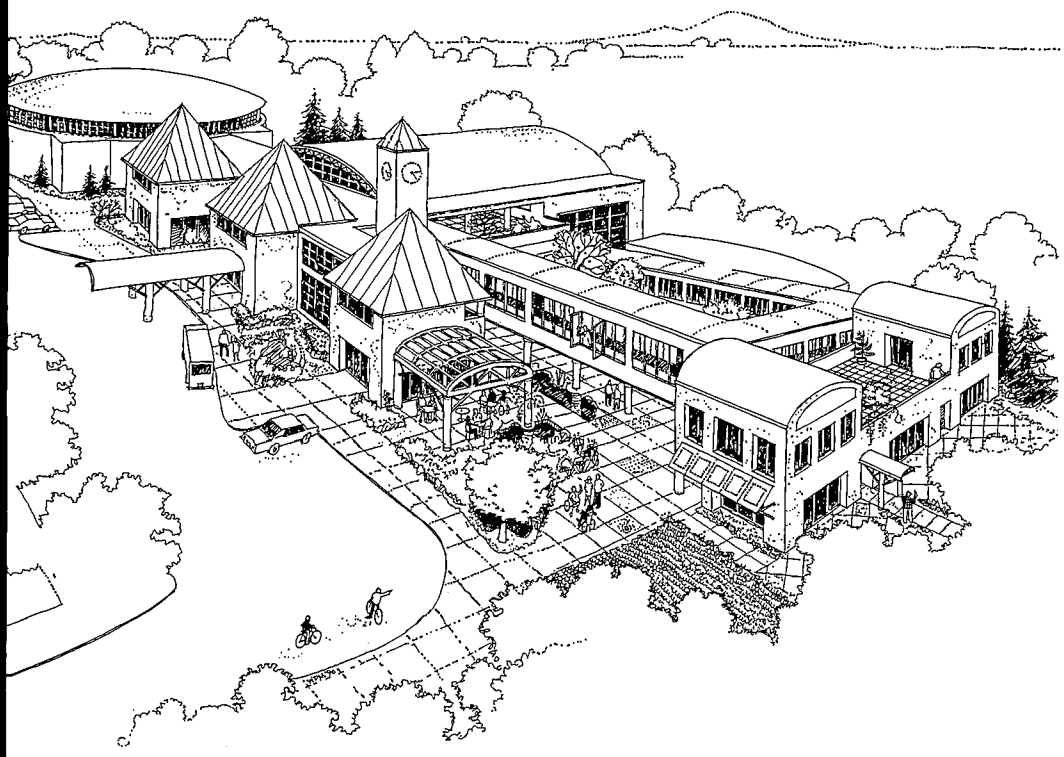
NOT LONG AFTER SAN MATEO COUNTY installed $42,000 worth of swings, slides, and elevated decks in Flood Park's 22 acres, a local disability-rights group complained to the government that many physically challenged people in the community were excluded because the new equipment was inaccessible. Concerned about its oversight, the county commissioned the Berkeley-based firm of Moore Iacofano Goltsman (MIG) to revise the master plan (these pages).

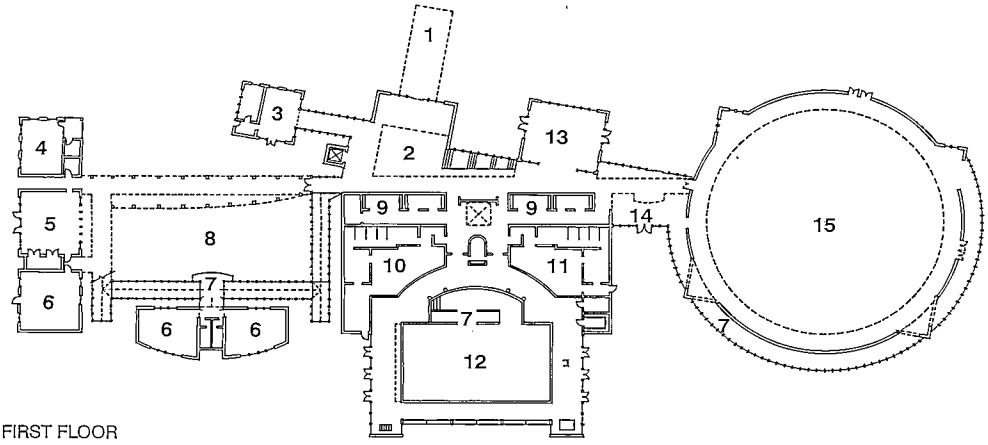
MIG embarked on a three-phased design for the park: the first phase, which has been completed, addresses the play area and picnic facility. The playground strives to accommodate people of all abilities. A colorful tile map at the entrance (facing page, top) is simple enough to be understood by the very young, and tactile for the visually impaired. Faucets are accessible to those in a wheelchair (top right), and transfer walls bordering sandy and grassy areas (facing page, center) allow a wheelchaired visitor to shift onto the natural setting. A wind-chime tower (top left) orients a visitor both visually and aurally.

To encourage cooperation among children, MIG created a water feature—consisting of a pump, chute, and dam (bottom, left and right)—that works most effectively when several youngsters coordinate their efforts. Notes principal Susan Goltsman, "None of these items came off the shelf, so we created prototypical models for disability consultants to test out." Despite its research, MIG has found that, in some cases, visitors interact with the completed environment differently than had been anticipated. "There are always surprises," Goltsman concedes.

The designers had to wrestle with conflicting concerns. For instance, to prevent an able-bodied child from slipping, concrete transfer walls were finished in a lightly sandblasted, nonskid surface. But this texture made it difficult for a person in a wheelchair to transfer to the grass. To rectify the situation, "transfer boards"—smooth plastic sheets that can be placed over the wall—are now available from the park rangers.

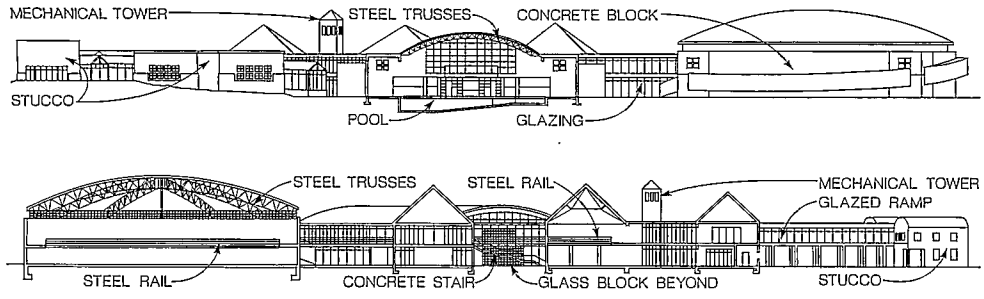
"There are no perfect solutions," laments Goltsman. "It's easy to say 'universal design,' but *difficult to achieve because different* disabilities have different needs. We tried to address them all—at least in a general way—but I am sure we left something out."





FIRST FLOOR

1	ENTRANCE CANOPY	6	OFFICE	11	MEN'S LOCKERS
2	LOBBY	7	RAMP	12	POOL
3	CAFE	8	COURTYARD	13	EXERCISE
4	STORE	9	DRESSING CABANAS	14	VESTIBULE
5	RECREATION	10	WOMEN'S LOCKERS	15	MULTIPURPOSE ARENA



Heather Farm Facility
Walnut Creek, California
Hirshen Trumbo & Associates and
Jacobson, Silverstein, Winslow Architects

SCHEMATIC DESIGNS HAVE RECENTLY BEEN completed for what promises to be the first health and recreation facility in this country to provide fully integrated services to those with and without disabilities. The 65,000-square-foot center, to be located within Heather Farm Park in Walnut Creek, California, will be built and operated by the Contra Costa Health and Recreation Association (CCHRA), a coalition of nonprofit organizations representing people with physical limitations. The design is a collaborative effort between Hirshen Trumbo & Associates and Jacobson, Silverstein, Winslow Architects, both of Berkeley, California.

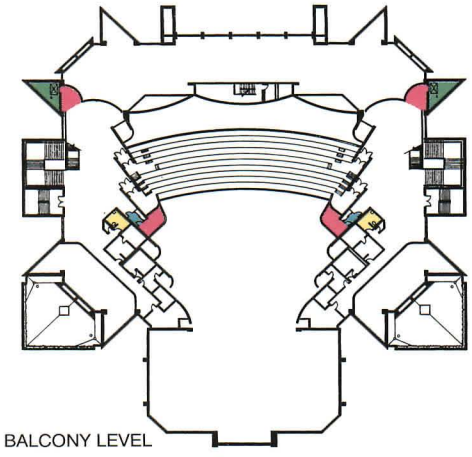
Discussions with disability consultants had a significant impact on the design. The architects, for instance, initially tried to minimize circulation, believing short corridors would be easier for someone in a wheelchair or on crutches. But this decision was rejected by the advisers as evoking an institutional atmosphere. "What they had in mind," says principal Murray Silverstein, AIA, "was a truly recreational building, where a sense of motion was a great pleasure."

With this new understanding, the design team pulled the programmatic elements apart. The building became a series of separate and clearly articulated functions (top left) linked by a generous, ramped circulation system (plan).

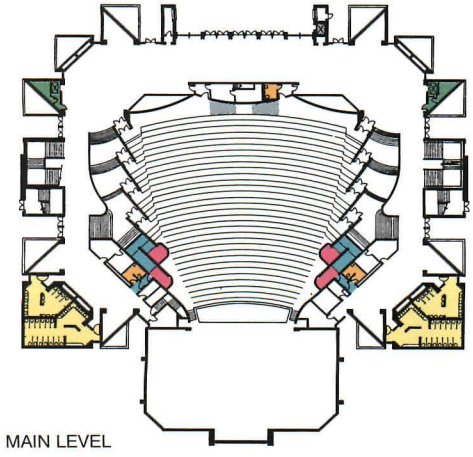
The shape of the gymnasium was also transformed. The architects originally envisioned a rectangular room for the basketball courts, which will be used by competitors both in and out of wheelchairs. But the consultants preferred a circular arena (sections) that could house not only basketball tournaments but also games for the blind and a theater-in-the-round.

The complex will provide a full range of activities: lap swimming, swimming lessons, and physical therapy sessions will be offered at the centrally located pool. A ramp and lift have been discreetly incorporated into its design. The nearby male and female locker rooms will be large enough for wheelchair access. Private, unassigned dressing cabanas will also be available for those who require assistance. In addition to an exercise room, exercise stations geared to a range of abilities will be located on a temperature-controlled ramp that winds around the courtyard.

MARK BOISCLAIR PHOTOS



BALCONY LEVEL



MAIN LEVEL

- NEW BALCONIES; LOGE SEATING AND LOBBY
- ACCESS PATH
- NEW ELEVATORS
- NEW ACCESSIBLE TOILETS
- REMODELED UNISEX TOILETS
- EXISTING FEATURES FOR PEOPLE WITH DISABILITIES

Phoenix Symphony Hall
Phoenix, Arizona
Wyatt/Rhodes Architects

THE PHOENIX SYMPHONY HALL IS PART OF the city's civic plaza, a convention center complex that occupies six downtown blocks. When originally built in 1972, the facility received recognition for its barrier-free design, but as attitudes changed and technological developments allowed people with disabilities to venture farther from their homes, the center was viewed as falling short of today's accessibility standards.

After completing a $54 million expansion of the convention center in 1985, which greatly improved access for physically challenged visitors, the city turned its focus to Symphony Hall. "We felt we had no choice but to bring the hall up to the same high standards as the rest of the complex," asserts David L. Schupbach, Assistant Director of Phoenix's Community and Economic Development Department. City officials and the center's staff met collectively with representatives of the community and Phoenix architect Michael Rhodes, AIA, of Wyatt/Rhodes Architects. As Rhodes recalls, "People with disabilites wanted to have as much choice in seating as possible." But the auditorium's original design (top left) prevented physically restricted patrons from being able to select from the range of ticket prices and viewing locations that most concertgoers took for granted. Wheelchairs could only be accommodated behind the orchestra seats and, without an elevator, the balcony was completely inaccessible.

Taking advantage of the auditorium's significant rake, Rhodes broke through the wall above the orchestra seats (top right) to insert four small boxes that are entered from ramps off the main lobby. Two similar spaces are located on an upper balcony level. The six new boxes—which offer an excellent view of the stage—can hold up to twenty wheelchairs. Movable chairs are available for companions. Instead of losing standard seats to make room for the bulkier wheelchair, the architects succeeded in increasing the number of places in this 2,500-seat hall, and the original 24 wheelchair spaces in the rear are still available as needed.

In addition, two elevators were installed, one on either side of the lobby, so the elderly and infirm could enjoy a balcony view without having to exert themselves on the stairs. Toilet facilities were improved for all concertgoers: the men's facilities were doubled; the women's facilities tripled; and five private, unisex toilet rooms were added throughout for those requiring assistance. An infrared system was installed to transmit sound directly to hearing-impaired listeners who are equipped with special headphones.

The $1.6-million renovation, which also included acoustical modifications and expansion of the orchestra pit, was completed in September, 1990. While pleased with their success, the disability consultants had one final concern: would the price for the new, well-placed seats be out of financial reach for some physically limited patrons? "By agreement and policy, these box seats will not be sold at a premium," Schupbach reassures. They are, however, considered top-price tickets, equivalent to the first few rows of the orchestra or balcony. ■

Architects Agree there's no Equal*

*Based on the results of the Fifth Annual Study of U.S. Architects conducted by Readex®, Inc., an independent research company.

Graphics Standards

New video adapters and monitors offer significant technical and safety improvements at lower prices.

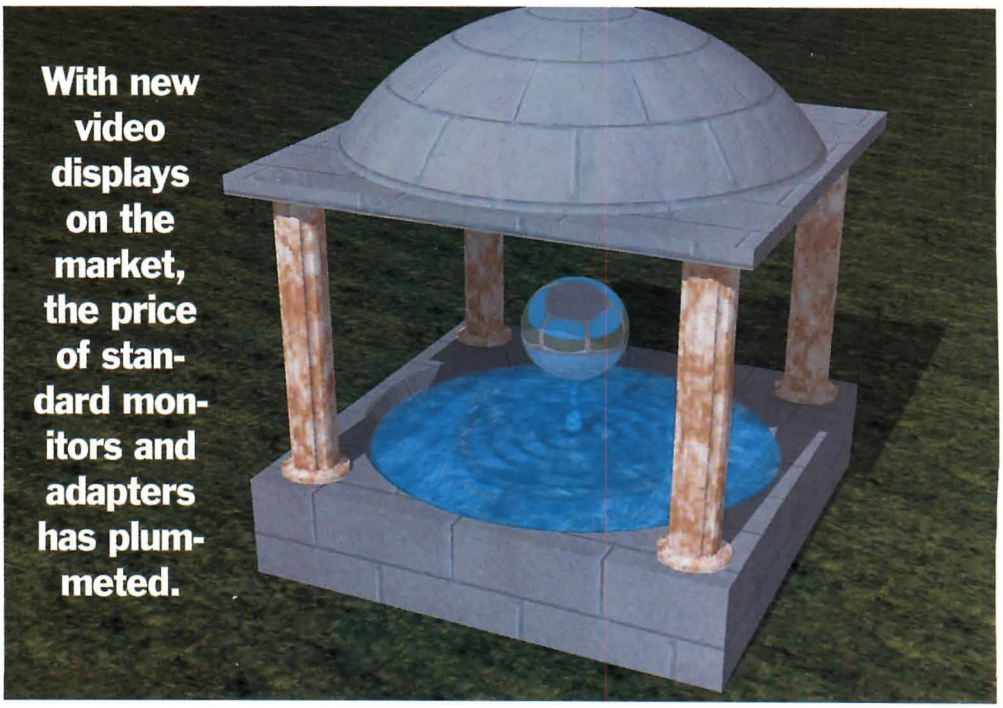
COMPUTER DISPLAY TECHNOLOGY IS DEVELoping so fast these days that several new generations of adapters and monitors are coming to market simultaneously. The recent advances in video display technology will be most beneficial to those who use computer-aided design, but anyone who spends a significant amount of time in front of a computer terminal will find that the new features greatly improve productivity.

Since many of the changes in video display technology affect the fundamental components of the machines, an understanding of video-related terminology may be helpful. Video adapters are printed circuit boards in computers that act as an intermediary between a central processing chip and a monitor. They translate binary data produced by the chip into a signal that can be projected on the glass screen of the monitor. Video adapters that have been engineered to handle drawings in addition to text are called graphics adapters, graphics boards, or graphics cards. (Apple Computer calls them display cards.) These adapters typically measure 12 inches long, 5 inches high, and less than an inch thick. They plug into a narrow socket called a slot inside the computer and are connected to a monitor by a cable.

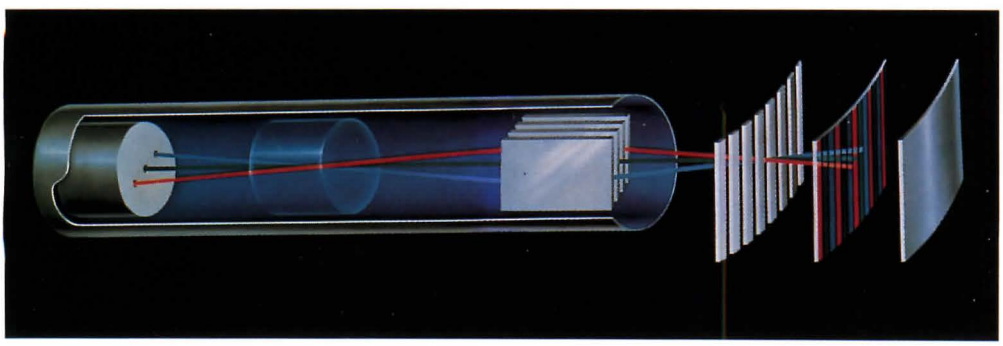
The monitor's job is to display information as the computer is processing it. Monitors contain a glass tube to which tiny dots of phosphor have been bonded, a perforated metal plate called a mask, and one or three electron guns. Electrons from the gun pass through the mask and light up specified dots of phosphor, producing points of light called pixels, or picture elements. Each pixel contains red, green, and blue phosphors, arranged in a triangle. The distance between triangles is the dot pitch. The gun shoots electrons at the phosphor dots in lines from left to right, beginning at the top of the screen. The speed at which the gun moves determines the scan rate. Resolution is determined by multiplying the number of pixels across a line by the number of lines. In general, higher scan rates, higher resolutions, and smaller dot pitches give sharper and clearer images.

There are two kinds of computer monitors: digital and analog. The earliest IBM monitors for the personal computer were digital, and they were limited to 16 colors. An analog monitor can produce more colors than a digital monitor because the voltage of its electron gun can be varied. The two kinds of analog monitors are called fixed frequency and multiscanning; the best known is the NEC MultiSync, introduced in 1985. Multiscanning monitors avoid the need to buy a new monitor for every new video adapter with a different horizontal scan frequency.

The size of monitor screen for CADD usu-



With new video displays on the market, the price of standard monitors and adapters has plummeted.

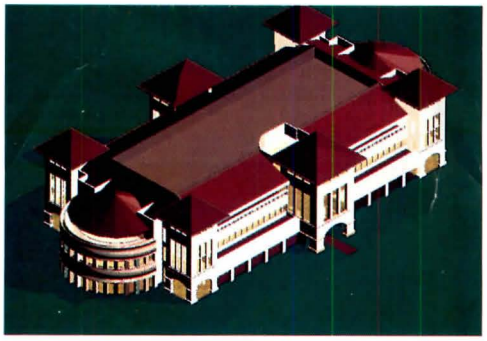


The conceptual illustration (above) was created with Big D and rendered on the Hercules Graphics Station Card. Final touches were added in 24-bit color mode. One of three major designs, Sony's Triniton system (left) demonstrates how the electron gun is used in a picture tube of a color monitor: a single gun produces three beams that converge on one lens; vertical slits in aperture grille and stripe phosphors ensure brightness; cylindrical screen reduces ambient light reflection.

ally ranges from 13 to 21 inches, measured diagonally. The viewable area, which contains the phosphors, is generally about an inch less than the glass area. The dimensions typically fall in a 4:3 ratio, a carryover from television. This means that there are four units of width for every three units of height. Thus, a resolution of 640 by 480 means that the monitor will display 640 pixels in each of 480 lines. Larger monitors call for higher-resolution video adapters. Otherwise, displaying a low-resolution image on a a large monitor would simply result in fatter lines and bigger, chunkier text than on a small monitor. Video adapters and monitors should therefore be purchased together as a matched set, called a video display system, to ensure that they will work together properly. Purchasing a complete system also simplifies troubleshooting should one component falter.

With so many new video displays on the market, the price of standard monitors and adapters has plummeted. Adapters meeting the current basic color standard, called the Video Graphics Array (VGA) when it was introduced by IBM in 1987, are now available at list prices of less than $150. Basic color monitors that support those adapters are being offered at list prices below $500. Architects willing to accept monochromatic graphics can order complete displays, including monitor and adapter, by mail for less than $120 plus shipping. Moving up in either color or monochrome display systems produces big gains in performance for small increases in price, up to approximately $5,000. For monitors costing more, features become specialized and prices mount rapidly.

For drafting, monochromatic monitors may be sufficient, because construction documents will eventually be photocopied or printed. Architects who want to use color to provide cues about layers or functions on the CADD drawing may find 16 colors useful. For more complex tasks such as rendering, thousands or millions of colors will be necessary for smooth shading transitions and true material textures. The current standard number of colors produced by most graphics adapters is 256, which is awkward for architects since it is far more than needed for simple drafting, but it is not nearly enough required for photorealism.



A proposed office building (above) in Nuevo Leon, Mexico, was modeled in stereographic 3D by Mexican architect Luis Morgan. He used Professional 3D/Solids, a design and rendering program from Point Line, and the Metheus 1228 graphics adapter. The program supports 256 colors, a resolution of 1,024 by 1,024, shading, and shadows. Viewing the model in stereographics requires CrystalEyes glasses.

IBM developments

"STANDARD" HAS BECOME A WORD OF rather fleeting significance for video displays in the IBM world. VGA itself incorporates some 18 specifications, including most previous IBM video standards. Most commonly, VGA means a resolution of 640 by 480 with 16 colors. By increasing the scan rate of the VGA monitor from 31.5 kilohertz to 35.5 kilohertz, the resolution can be increased to 800 by 600, identified by some vendors as Super VGA. A resolution of 1,024 by 768 is referred to as Extended VGA, or IBM 8514.

Standardization is under way by a consortium of manufacturers that wants to expand the VGA standard to offer greater resolution and more colors.

In 1987, IBM introduced the 8514/A video adapter and the 8514 monitor for its PS/2 line of computers. The display achieves 1,024 by 768 resolution at $1,350 for the adapter and $1,665 for the monitor. IBM cut a corner by interlacing its scanning, like a TV set. This means that instead of scanning each line in sequence, the monitor scans every other line, filling in the intermediate lines on the next pass. With interlacing, the horizontal scan rate needs to be only 35.5 kilohertz, rather than 48 kilohertz, to achieve 1,024 by 768 resolution. However, unless the components are well matched, as they are in the IBM 8514 display set, interlacing can produce an irritating flicker.

The significance of the 8514 was that it was the first IBM graphics product for the PC market that took over many of the processing responsibilities that VGA adapters pass on to the host computer. (A VGA adapter is essentially a frame buffer. The host computer does the work of deciding which pixels to light; the VGA adapter stores them and passes them along to the monitor.) The 8514 contains the circuits and chips necessary to process many drawing commands and perform pixel-lighting calculations on its own.

But the 8514 standard never became as popular as VGA, partly because it was designed for IBM's proprietary Micro Channel technology. After years of engineering, IBM's competitors cracked the 8514 specification and began offering clones—just in time for IBM's announcement of its next video standard, the Extended Graphics Array (XGA), also for Micro Channel computers. XGA resolution is 1,024 by 768, with 256 simultaneous colors. IBM claims that the XGA is 50 to 90 percent faster than VGA adapters, and its retail price is $1,095. Shipments began this past November.

Texas Instruments graphics

IN THE MEANTIME, TEXAS INSTRUMENTS began mounting a serious challenge to IBM's dominance in standard-setting with the release, also in 1987, of its 34000 family of programmable graphics processing chips. The family not only emulates other graphics standards, such as VGA, but optimizes graphics and works much faster than VGA by taking over functions that previously had to be performed by a host computer. In 1989, the company released Texas Instruments Graphics Architecture (TIGA), software that links DOS-based programs to a library of graphics and video functions provided by the new chip set. The beauty of TIGA is that the program developer writes one software interface, called a driver, which enables the program to work with every video adapter using the TIGA graphics interface. The 34000 graphics library includes more complex functions such as drawing a circle directly rather than creating it from a series of short lines, as it had to be done with older CADD programs. Still missing from the library, however, are shading and lighting primitives.

Several other CADD companies have developed generic TIGA drivers, intended to work on any video adapter that uses the 34000 family of chips. Versacad's TIGA driver appeared on its new Version 6, released earlier this year. Although generic TIGA drivers for Autocad are available from third parties,

some vendors elect to write their own. Hercules, for example, wrote the Autocad driver for its Graphics Station, a TIGA-based video adapter. With two megabytes of memory, it is priced at $1,495. The two-megabyte version is required to run Autocad Release 11. Bypassing the TIGA interface, Evolution Computing wrote its own assembly-language driver for the Texas Instruments 34010 chip in the Hercules Graphics Station, achieving maximum speed and colors in its new Fastcad 3D program.

Software competitive with TIGA, called the Direct Graphics Interface Standard (DGIS), is available from Graphic Software Systems. Hewlett-Packard provides both TIGA and DGIS drivers for its Intelligent Graphics Controller 20. More than 150 manufacturers of video adapters have incorporated the 34010 or 34020 chip set, according to Texas Instruments.

New graphics standards

A PARALLEL EFFORT IN STANDARDIZATION is under way by a consortium of manufacturers that wants to expand the VGA standard to offer greater resolution and more colors. The consortium, called the Video Electronics Standards Association (VESA), is also making the hardware and software work together. A well-designed driver would enable the CADD program to query the computer to determine the capabilities of any adapter board meeting the VESA standard, automatically offering it to the user during initial configuration. Gary D. Lorensen, a software engineer for Everex, a major vendor of video adapters, credits George J. Dulchinos, systems engineer for Bentley Systems, with having written a model VESA driver for Intergraph's MicroStation CADD program. Unknown to Bentley Systems, Everex was working on a new high-performance, VESA-standard adapter. Upon installing it in a computer and reconfiguring MicroStation, Lorensen found that the program recognized the board, offered it as an option, and made use of its expanded resolution and color capabilities. Generic CADD also has a VESA driver, written by Lorensen.

Computer companies are also competing to establish a standard video chip for expanded VGA specifications. One of the leaders is Tseng Laboratories, with its ET4000 chip. The concept is similar to the Texas Instruments approach: by writing a single driver, a software developer would enable users to run its program on many video adapters.

Late last year, Edsun Laboratories introduced what it calls Continuous Edge Graphics, which brings smoother lines and more colors to VGA. By a technique of color mixing, the Edsun chip increases the apparent resolution and color realism of inexpensive monitors. Thus, an actual resolution of 320 by 200 looks as if it were three to four times higher. As a side benefit, the technology increases the number of simultaneous colors available on a VGA card—from 256 to more than 700,000. Edsun's new chip technology promises to enhance the quality of images generated by architectural animation programs such as ASG's new Model Vision, which works at 300 by 200 resolution.

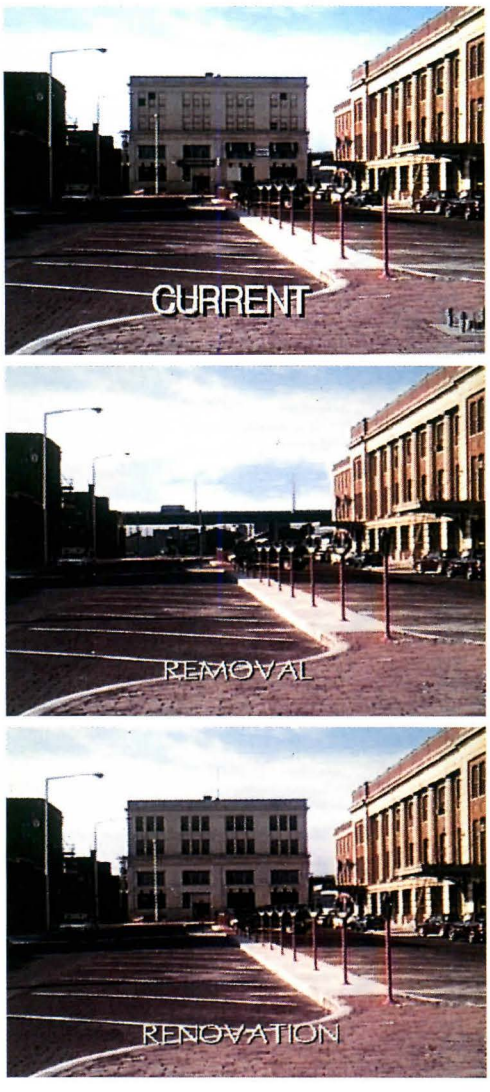
One of the first manufacturers to offer an Edsun-enhanced VGA card is Definicon. Its CAD RACE ("Resolution And Color Enhancement") video adapter is priced at $495, with an actual 1,024 by 768 resolution and 792,000 colors. At Comdex this past November, Definicon ran Autocad on its 1,024 adapter and a 14-inch IOcomm monitor priced at $549.

A leading standards-setter in modeling, rendering, and the graphic arts is Truevision. In 1984, the company, then part of AT&T, introduced its Image Capture Board, one of the first graphics adapters capable of displaying more than 256 colors on personal computers. It presented a palette of 32,000 simultaneous colors, opening new vistas of color realism on DOS-based computers. Truevision's current top-of-the-line graphics adapter, the Targa+, broadens the range to more than 16 million simultaneous colors. The Targa+/32 is priced at $1,995, a reduction of $3,000 since last summer.

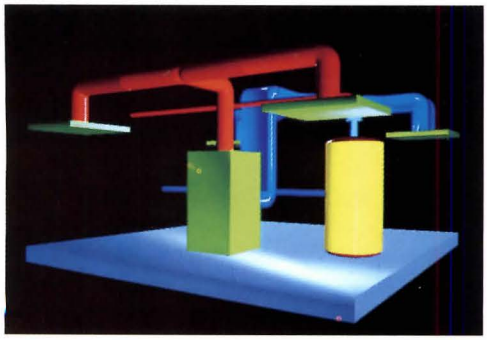
When Evolution Computer introduced Fastcad 3D last year, the first architectural CADD program with Pixar's new RenderMan interface, it was able to generate the photorealism of 16 million colors only through graphics adapters from Hercules and Truevision. Big D, another modeling and rendering program, supports a large number of graphics adapters with 256 colors, but only one that is capable of photorealism: Targa+.

In 1987, Truevision defined another new market—computer video. Its Vista line and related VIDI/O Box enables television images to be displayed on a computer and computer images to be displayed on a TV or VCR. Vista adapters are priced from $2,995 to $4,795.

Connecting VGA and other graphics adapters is becoming more important to architects than it was previously. For example, VGA supports virtually all DOS-based programs, but some high-performance adapters support only a few CADD programs. To use



Restoration last year of the Burlington Northern railroad depot in Lincoln, Nebraska, raised questions about what should be done with adjacent buildings. The Emporium (center in photos, above) was an historic but run-down building that was mostly vacant. Joseph L. Gerdom, a partner in Simulation Technology of Lincoln photographed the building with the depot at the right (top), constructed a computer model of the site without the Emporium (above center) and with its exterior restored (above). The simulation and five-minute video that accompanied it helped persuade the city to keep and restore the Emporium. Gerdom initially created the images with Freestyle 16 software and the Vision 16 video graphics adapter, both from Everex, in 32,000 colors at 512 by 484 resolution. Then he exported the images to Autodesk's Animator to produce the videotaped animation. The project architect was David L. Erickson, AIA, of Lincoln.



Model Vision, a new rendering and animation program from ASG, was employed to create this HVAC model (above). The program provides real-time animation at a resolution of 320 by 200 in 256 colors, or still images at a resolution of 640 by 480. ASG requires a VGA adapter by STB and the Magni VGA Producer for output directly from the computer to videotape. The lower resolution permits realistic speeds.

the full library of programs, a user would need two monitors. One way to avoid this expense is to build in the circuitry to pass a VGA signal through the high-resolution adapter. The Metheus UGA 1228, a high-resolution graphics adapter priced at $2,699, permits a cable from a VGA adapter to be plugged into the UGA adapter and carry the VGA signal directly to a single monitor. If a program has a driver for the UGA adapter, it is used; if not, it defaults to VGA mode. The Vectrix EX1280 takes this concept one step further, building in VGA circuitry on the Vectrix adapter. This system configuration eliminates the need for two video adapters, and avoids tying up a precious expansion slot inside the computer.

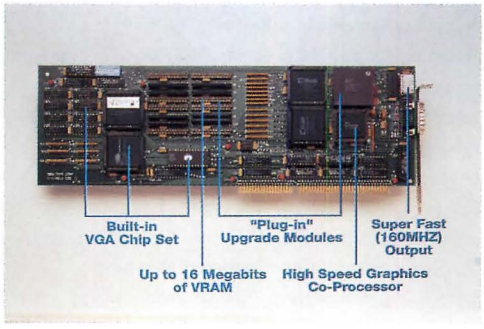
Few presentation techniques have a more stunning effect than stereo images. Point Line Graphics has taken the lead in this technology. Its Professional 3D/Solids program, priced at $2,495, can generate two separate images from slightly different points of view. The viewer wears special glasses, called CrystalEyes/PC, priced at $995 from Stereographics Corp. A box on the monitor emits infrared signals that switch the shutters in the glasses to synchronize with the images as they appear on the screen. The emitter box connects to a video adapter that is stereo-ready, such as the Metheus UGA 1228. To project stereo, the monitor must have a vertical scan rate of 120 hertz. No monitor manufacturer claims a rate that fast, but a few, such as the Nanao 9500, a 20-inch model priced at $3,999, can achieve it.

Macintosh developments

COMPARED WITH THE CHAOTIC IBM PC world, the Macintosh market is a model of order because Apple sets the basic standards. Apple sells three display cards, priced from $648 to $1,999, and five monitors, priced from $299 to $1,999. Video controllers are built into the boards of the LC, IIsi and IIci. In the Classic, SE, and Plus models, both a video controller and a 9-inch monitor are built into the computer. Macintosh's best-selling color monitor, priced at $999, is 13 inches and provides a resolution of 640 by 480.

Apple's two top displays provide 16 million colors. The more expensive version also offers graphics acceleration for software using Apple's QuickDraw system, but not for CADD programs, which use vector technology. Into this vacuum jumped Radius, with its QuickCad, a separate adapter that can perform display list processing, for $1,495. Apple sniffs at display list processing as "older-generation technology," but it's hard to pass up, since it pans, zooms, and redraws 10 to 30 times faster in a CADD program. While Apple's largest color monitor is 13 inches, Radius, like several other manufacturers, sells larger 19- and 21-inch display systems to match the sizes offered to DOS users.

Macintosh claims the lead in color matching, which is especially important to architects, and in the marriage of television and computer video. Radius offers a PrecisionColor Calibrator, a program priced at $695, to match colors on the monitor with standardized color models such as the Pantone Matching System, which Radius licenses. SuperMac has announced a ColorPicker, also supporting Pantone, free with its display card. Purchased separately, the SuperMatch Display Calibrator is priced at $699. It is intended to assure that what the user sees on the screen will match the color of the output. The weak link in color matching, however, is the output.



High performance video adapters today often contain the circuitry necessary to run programs that support the Video Graphics Array standard. With special drivers, the Moniterm PC1280C (above) can also run CADD programs like Autocad, MicroStation, and Point Line at higher resolutions with instantaneous hardware pan and zoom. The flange at the bottom of the adapter plugs into an AT-class computer.

The new generation of software and graphics cards permits unprecedented realism in textures and colors on affordable computers. An interior model (above), based on Southwestern designs and authentic Indian rugs, was modeled in Fastcad 3D, the first CADD program that supports Pixar's Renderman interface, with the Hercules Graphics Station 1024 video adapter. Note the accuracy with which surfaces are represented.

SuperMac also makes PixelPaint Professional, one of the first 32-bit programs that takes advantage of the Macintosh's advanced color handling capabilities. The new Tektronix color thermal printer, the Phaser PX, comes surprisingly close to being able to match monitor colors with color printed on paper or film colors. The Phaser PX is priced at $7,995.

Advances in monitor design over the past few months have focused primarily on safety, comfort, and convenience. Manufacturers are trying to make new monitors safer by limiting the emission of X-rays, electromagnetic radiation, and radio interference. New monitors also are being designed to minimize glare, eye strain, and back strain.

Although the improvements in video display technology are currently most useful to those working in visually oriented tasks such as computer-aided design, improvements in any area of computer technology traditionally seep into other areas rather quickly. Any advancement in the area of video display is therefore bound to increase user comfort and productivity for anyone who works at a computer. ■

—OLIVER R. WITTE