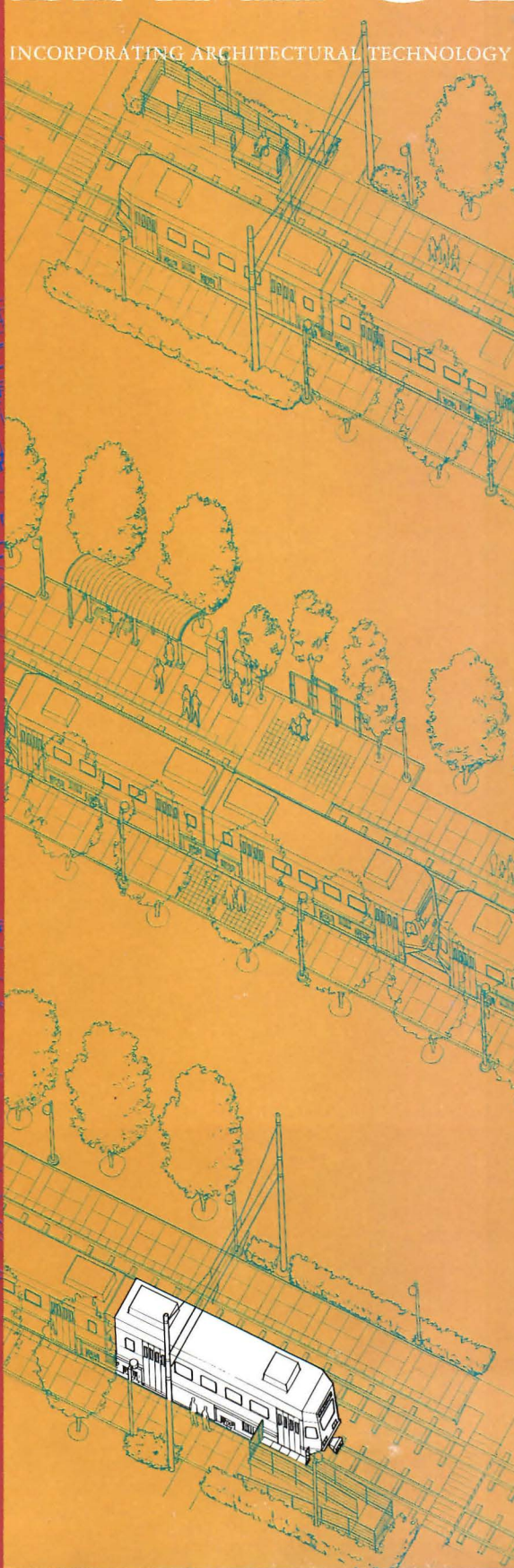
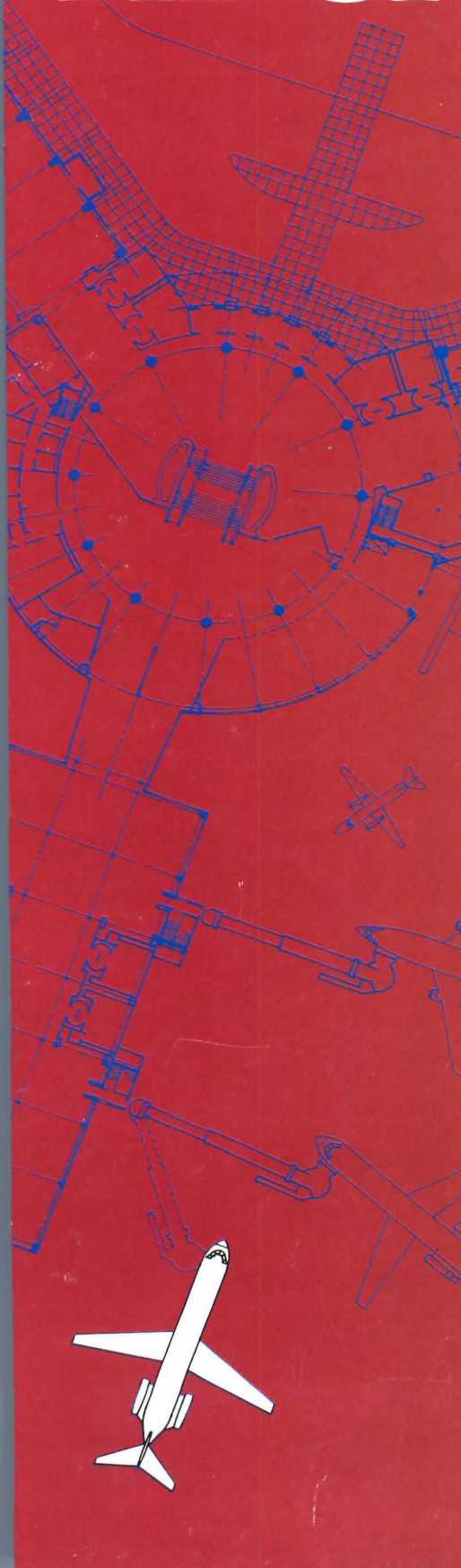


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Brown Into Green

Cities in developing nations demonstrate how small-scale initiatives can achieve sustainable communities.

World's Largest Metropolitan Areas

(population in millions)

1950

New York	12.3
London	10.4
Tokyo	6.7
Paris	5.4
Shanghai	5.3

1980

Tokyo	16.9
New York	15.6
Mexico City	14.5
Sao Paulo	12.1
Shanghai	11.7

2000

Mexico City	25.6
Sao Paulo	22.1
Tokyo	19.0
Shanghai	17.0
New York	16.8

SOURCE: UNITED NATIONS

Of all the speakers at this year's AIA convention, billed as "Architecture at the Crossroads," none offered as clear a path toward a sustainable future as Jaime Lerner, former mayor of Curitiba, Brazil. In his presentation, Lerner outlined how his city of 2.2 million transformed itself from an overcrowded, polluted "brown" provincial capital into a self-reliant "green" community. In Curitiba, citizens trade garbage for food or bus tickets. Most of them ride the city's bus system, which now serves 1.3 million passengers daily—50 times as many riders as 20 years ago. They work and socialize in Curitiba's urban core and enjoy the benefits of more green space, which has expanded from one-half square meter to 50 square meters per person.

Over the next century, our notions of urbanism will be tested in places like Curitiba, as more people in the developing world migrate from impoverished rural areas to cities that, although overcrowded, offer better jobs and services than the countryside. At current rates of expansion, urban population as a whole will double in 22 years. By 2000, the world's largest cities, with 10 million or more inhabitants, will be concentrated in the developing world. These megacities will continue to double in population every 10 to 15 years, overwhelming government attempts to provide clean water, adequate sanitation, public transportation, and other services.

In the past, the developing world looked to industrialized nations to provide solutions to these problems, often without success. Now, places like Curitiba; Mexico City; and Karachi, Pakistan, are devising their own methods of installing services, building infrastructure, and improving housing through local initiatives. In Mexico City, for example, a megalopolis plagued by the world's worst air pollution, communities organized to clean up and rebuild their neighborhoods after the 1985 earthquake. In Karachi, a city that provides only two-thirds of the water supply needed to support nearly 11 million inhabi-

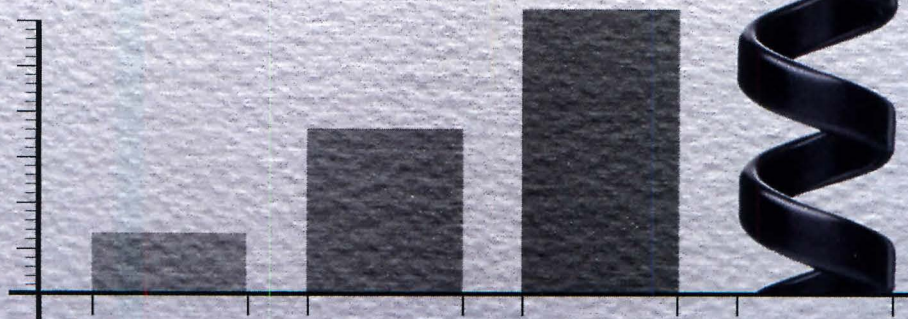
tants, the 800,000 multi-ethnic residents of the Orangi district demonstrated to the city that they could initiate their own sewer system, house by house. Propelled by the activism of architect Akhter Hameed Kahn, who encouraged a small investment from each household, residents proved to the district that its own sewage system could be installed for only \$40 per dwelling. As Jaime Lerner noted in his AIA speech, "It is local action that will guarantee global survival."

Such "brown" cities have much to teach planners and architects about "green" development. For example, although one out of five Curitiba citizens owns a car—a high rate for Brazil—its gasoline consumption is among the nation's lowest. While car-oriented cities may dominate the developed world, careful land use and transit planning can reduce the need for driving. In this country, architects now have the opportunity to help boost mass transit through the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The federal law encourages cities to steer their own growth by planning transportation systems in concert with community development and preservation (pages 101-103, this issue). Architects can help the ISTEA-supported integration of infrastructure and land planning by designing the public spaces in and around transportation facilities to create more livable cities.

Through ISTEA and other localized initiatives, American cities can begin the slow process of changing car-dependent infrastructure. It is not too late for New York and Los Angeles to implement the strategies that worked for Curitiba. In the words of Jaime Lerner, "Even megacities can preserve a human scale, and cities can change a country."

Debraan K. Dietz

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Colorado boycott controversy

Your article "Colorado Boycott Spurs Controversy" (ARCHITECTURE, June 1993, page 33) is one of the best samplings of Orwellian journalism I have read in recent weeks. From the first sentence to the last quote, Heidi Landecker weaves more deception than some of the best activist journalists in the business.

By law, all citizens of the United States are protected against discrimination. A truly rational human being refuses to buy into the notion that national origin, skin color, gender, or religious beliefs can make one group "better" than another. However, all societies and cultures discriminate based upon behavior and establish, via laws and culture, what constitutes "normal" and "deviant" behavior. Hence we have laws regarding crime, fraud, and other non-productive conduct. The Organization of Lesbian and Gay Architects and Designers (OLGAD) seeks to tell society that their members' behavior is normal. But OLGAD's primary membership requirement is the practice of deviant behavior.

Colorado's Amendment 2 does not exclude homosexuals from protection against discrimination per se (and notice that Amendment 2's language was not provided for our perusal in Landecker's article). When special privileges are granted to a particular group, there is extreme danger. That danger looms even larger if a group defines itself based upon its conduct.

Achievements within the design community should not be based upon sexual orientation, but upon hard work, talent, and skill—all commendable qualities. Sexual orientation should be played out in private and not upon the drawing boards or in the political arena.

Last, the quote describing Colorado for Family Values as "dangerous people" is interesting if not tragic. Dangerous to whom? The voters of Colorado have pointed out that equal protection under the law is not to be a special privilege. How sad that the AIA Board has been sucked into this ruse of rights.

*M.C. Stevens, AIA
Arlington, Virginia*

I wish to take issue with the recent article on the Colorado boycott. Are we to look forward to the opportunity to qualify our profession by its association with gay advocacy and other extremist agendas when our profession is getting its life-blood sucked out of it by the likes of pro bono competitions and public work that's going design-build?

We had better start educating the general public about what good design is and about the architect's role as a generalist. If we can't muster a unified voice, we are all going to be working for interior designers as space planners.

*Christopher McFadden, AIA
Palm Desert, California*

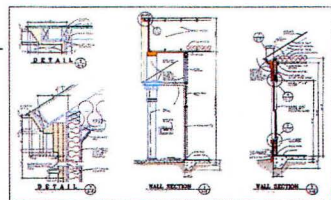
It is unfortunate that the AIA has become a mouthpiece for homosexuals, who describe their perversion as just another alternative lifestyle.

Unlike author Heidi Landecker, I was not at all surprised that the homosexual boycott of Colorado was drawing mixed support from design organizations. The membership of most of the professional design orga-

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nizations is composed of a cross section of the American people, and the majority of Americans do not support such foolishness. If the homosexuals want publicity, there are reportedly publications which cater to that element. Reserve ARCHITECTURE for architects and architecture and keep its pages open for architectural debate, not social change.

*Patrick D. Bass, AIA
Shreveport, Louisiana*

Heidi Landecker's article promulgates a few misconceptions that need to be addressed. First, as a Colorado citizen, any person, homosexual or not, is assured protection from discrimination by existing constitutional law.

All Amendment 2 does is prohibit the addition of sexual orientation as a specific criterion for determining discrimination.

Second, since the boycott was called for, many more travelers and organizations have not boycotted Colorado than those who have.

And why is Landecker surprised that the Boycott Colorado move-

ment has received mixed support from design organizations? The idea of legal protection for homosexuals is far from accepted by society as a whole.

Finally, the notion that Colorado for Family Values is composed of "dangerous people," who do not represent the views of the state as a whole, as advanced by the unchallenged quote from designer Rick Blair of Denver, is a deliberate misrepresentation of reality. To think that a group concerned with preserving and promoting the American family would be labeled as dangerous is an indication of how far removed from the mainstream the design profession has become.

While no one organization can reasonably claim to represent the views of an entire state, one must conclude that since Amendment 2 was approved by a majority of Colorado voters, Colorado for Family Values must come closer to representing the views of the state than does Mr. Blair's position.

*Mark C. Vinson, AIA
Chandler, Arizona*

Editor's note: The exact wording of Amendment 2 is as follows: "Neither the State of Colorado, through any of its branches or departments, nor any of its agencies, political subdivisions, municipalities, or school districts shall enact, adopt, or enforce any statute, regulation, ordinance, or policy whereby homosexual, lesbian, or bisexual orientation, conduct, practices, or relationships shall constitute or otherwise be the basis of, or entitle any person or class of persons to have or claim any minority status, quota preferences, protected status, or claim of discrimination."

Treehugger journalism

In an attempt to show bold leadership, ARCHITECTURE is stepping up to declare that our old growth forests are sacred and should have no more logging allowed ("Survival of the Forests," June 1993, pages 117-119).

I was not aware of it, but perhaps these insightful architects have been attending the countless public forums and debates that have been focusing on this specific problem in

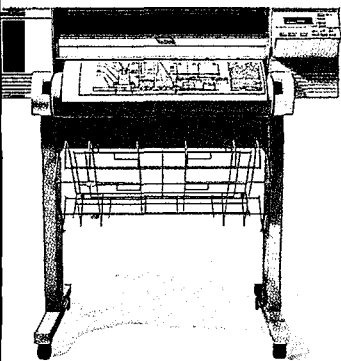
the Pacific Northwest for many years. We have had experts from all sides of the issue respectfully disagree on exactly how the issue would be best addressed. Professional foresters, who have devoted their entire working lives to this difficult question, still have honest differences about the proper solution.

If the AIA really wanted to play a constructive role in the ongoing dialogue, they should have been actively involved in the process long before now. It seems the staff of ARCHITECTURE is a group in search of a cause—any cause—whether closely related to architecture or not. Perhaps they should re-examine the serious needs of the profession itself and reorganize their priorities.

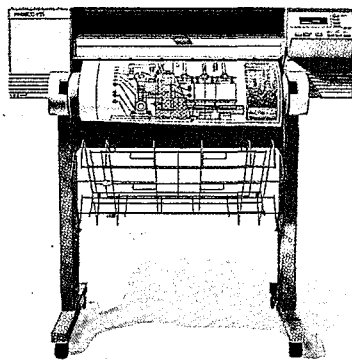
Obviously, we, as architects, wish to continue to be responsible world citizens, but these continuous politically correct diatribes only work against us all. Leadership in these areas is best shown by action, not by grandstanding.

*Greg McKee, AIA
Kirkland, Washington*

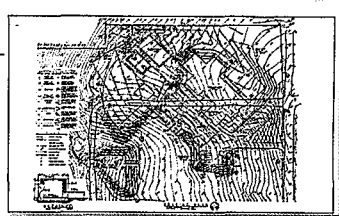
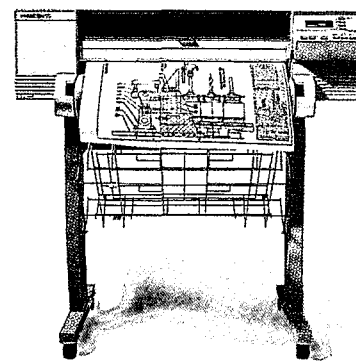
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Letters

Faux green

Thank you for your timely and thoughtful June issue dedicated to ecologically responsible building projects. To me, however, listing Wal-Mart among these projects is like saying someone who commutes to work in a gas-guzzler is ecologically responsible because he only washes his car once a year.

I have seen a few Wal-Mart stores in my travels. They are always in the outer reaches of suburbia, surrounded by acres of parking and miles from any mass transit, urban core, or other place where people might be seen walking. One aspect of the "green revolution," which assures that companies will use it as a public relations gimmick, is that it is just economic good sense not to waste money on energy. Just get your customer to waste the energy driving to the store. I will see Wal-Mart as being committed to the environment when they rehabilitate a vacant building located in an urban core served by public transportation.

*Andreas von Foerster, AIA
Neskowin, Oregon*

Rediscovering history

Your article "*The Fountainhead* at 50" (May 1993, pages 35-37) brought back memories of my early years as an architect. I read the book and saw the movie, but it did not influence my career nor my philosophy about architecture.

Having studied at a program based on the Ecole Des Beaux Arts and perceiving architecture through that experience, the premises of the Modern movement did not satisfy my esthetic expectations. But the Postmodern movement did not change any of the principles of the International Style, nor improve the quality of architecture. The profession is lacking the idealism that not only inspired the Classicists of the 19th century but also the Modernists of the early 20th century. It is necessary for the architectural profession (and it should start at the university level) to have a broader knowledge of cultural and historical facts related to the profession to be able to serve society effectively.

*German C. Sonntag
Santa Monica, California*

Civic linguini

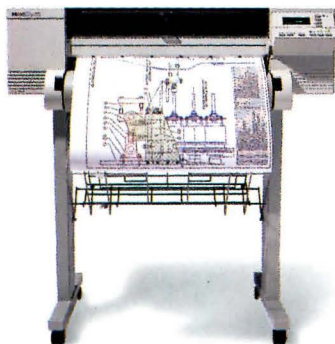
I was relieved to learn from your magazine that the age of rugged individualists characterized by Howard Roark is over (May 1993, pages 35-37) and that our architecture is now safely in the hands of "responsible, sensitive, and, above all, humble" architects who give us civic monuments like Peter Eisenman's Greater Columbus Convention Center (pages 52-63) which was inspired (believably) by a bowl of linguini.

*Richard G. Williams, AIA
WEGROUP Architects & Planners
Eugene, Oregon*

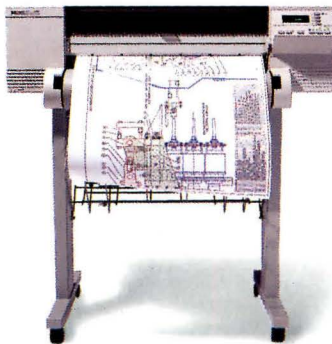
Correction

In our news article on the 1993 AIA Firm Award (June 1993, page 22), we misidentified Louis Bakanowsky, who is chairman of the Visual Studies Department at Harvard. Bakanowsky does not head a New York City graphics firm affiliated with Cambridge Seven Associates. That firm, Chermayeff & Geismar, is headed by two of Cambridge Seven Associates' original principals, Ivan Chermayeff and Tom Geismar.

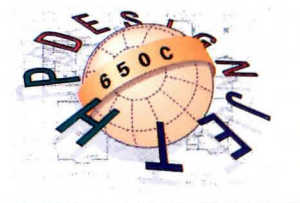
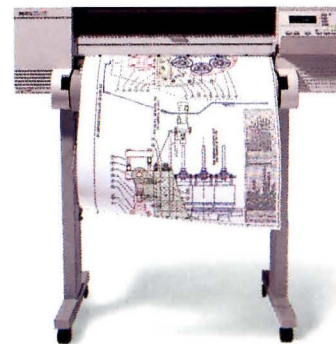
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Events

August 9-12

IESNA's Annual Conference on Lighting, an educational forum highlighting design, specification, and applications in lighting. Contact: (212) 705-7269.

August 13

Deadline for 8th Annual Doug Mockett & Company/Wood and Wood Products Design competition. Contact: (310) 318-2491.

August 14-18

Annual meeting of the National Wood, Window, and Door Association in Traverse City, Michigan. Contact: (708) 299-5200.

August 17-January 2

Women and Machines from Home to Office, an exhibition at the Cooper-Hewitt, National Museum of Design in New York City. Contact: (212) 860-6868.

August 18-20

Business Energy Expo, a trade show sponsored by Florida Power & Light. Contact: (305) 448-7450.

August 30

Binders due for the 1994 AIA Honor Awards. Contact: (202) 626-7464.

August 30

Submissions due for the AIA 25-year Award. Contact: (202) 626-7464.

August 31

Call for entries for the 1993 DOC awards sponsored by the Monsanto Company. Contact: (800) 543-5377.

September 1

Submission deadline for The Architect's Dream, a competition sponsored by the Contemporary Arts Center and the AIA Cincinnati chapter. Contact: (513) 421-4661.

September 1-4

National Association of Women in Construction 1993 annual convention and trade show in Dallas, Texas. Contact: (800) 552-3506.

September 23

Managing for a Quality Future, an AIA-sponsored seminar in Washington, DC. Contact: (202) 626-7467.

September 24

Papers due for Sustainable Strategies for Communities and Building Materials, a competition sponsored by AIA's Committee on The Environment. Contact: AIA, (202) 626-7300.

September 30

Project Administration, an AIA-sponsored seminar in Columbus, Ohio. Contact: (202) 626-7467.

September 30-October 1

Critical Issues in Design Liability, a symposium sponsored by Georgia Tech School for Continuing Education. Contact: (404) 894-2547.

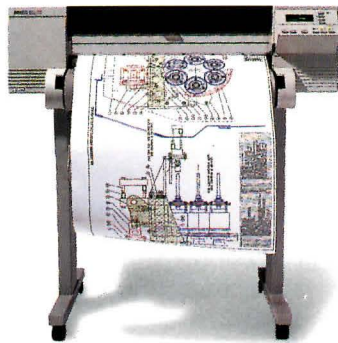
October 2-6

Annual meeting of the Sealant, Waterproofing & Restoration Institute in Portland, Oregon. Contact: (816) 561-8230.

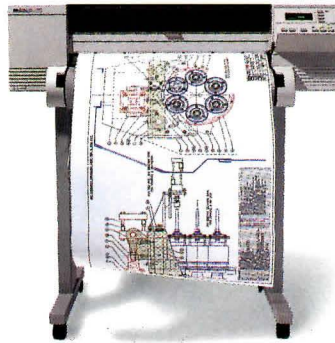
October 5-6

Health Focus, a two-day conference on healthcare design and management issues, that is sponsored by the Institute of Business Designers in Chicago. Contact: (800) 677-6278.

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World Congress Takes on the Environment

Green architecture in all its hues dominated the World Congress of Architects, a meeting that joined the AIA's annual convention with the triennial assembly of the International Union of Architects (UIA) at Chicago's McCormick Place in June. Despite its environmental message, this gathering, billed as a "cross-roads" for architecture, ended up more like a freeway interchange, with presentations and seminars heading off in various directions.

AIA President Susan Maxman's environmental message was unequivocal: "Knowledge and riches haven't helped us much" except to "make a mess" of the planet. Maxman encouraged fellow architects to abandon heedless consumption and move toward an ecological trusteeship in architecture. "If we as a profession aren't willing to take responsibility," she pointed out, "we will be unable to enfranchise our creative potential."

Setting the week's tone was architect Fumihiko Maki, the compassionate Modernist from Tokyo, who received the UIA's highest award for lifetime achievement in a ceremony at the Chicago Theater, followed by a "March with Maki" down State Street. Maki remarked that architects nowadays "are not guided by clear directions, yet their responsibilities have become more enormous."

Peter Calthorpe, a planner from San Francisco, blasted the insular design of American communities as wasteful, but his call for mixed-use metropolitan planning could not be matched easily by solutions for existing urban infrastructure patterns, many of which are hostile to low-impact transportation, such as bicycles and walking.

In contrast, Jaime Lerner, an architect and former mayor of Curitiba, Brazil, told the audience of Curitiba's improvements in infrastructure and waste management. As a politician and planner, Lerner's innovations have bridged much of the gulf between Curitiba's wealthy and poor, he said, turning its urban investment into "a cost shared by all."

But the environmental agenda of the convention also came under fire. Chicago architect Margaret McCurry called it "narrow." New York architect Peter Eisenman said that ranking sustainability over esthetics was "obsessive" and asked, "Who



isn't for the environment?" Architect Helmut Jahn maintained that "it cannot just be architects who are responsible for saving the planet."

But Maxman quickly defended her position: "If you look at the obstacles" to sustainable architecture, Maxman explained on the convention's final day, "you will never get to the opportunities."

Apart from the philosophical volleys, plenty of creativity emerged in brainstorming sessions about sustainable architecture, defined as design that meets our current needs without jeopardizing future generations. Architects at these sessions developed ideas for how a sustainable world would function in the year 2020. Participants conceptualized how to harness carbon dioxide for use as a resource and discussed world land management that would function much like smaller scale crop rotation to preserve global resources.

Now that the World Congress is over, the AIA is taking its sustainable architecture agenda to the White House. The Institute recently initiated an offer to the Clinton administration to "green" the White House. On July 23, brainstorming began for retrofitting the executive mansion with technologies to improve indoor air quality and energy efficiency.

The AIA has assembled close to 100 building experts, across several disciplines, to serve as volunteers on the project.—Bradford McKee

TOP LEFT: UIA medalist Fumihiko Maki (left) and UIA President Olufemi Oluwole (right).

TOP RIGHT: AIA President Maxman delivers environmental message.

ABOVE LEFT: Left to right, Vice President Walter Blackburn; Treasurer Lawrence Segrue; 1994 First Vice President/President-Elect Chester A. Widom; Vice President Michael Stransky; Secretary Betsey Dougherty; Vice President Raj Barr-Kumar; and 1993 First Vice President/President-Elect L. William Chapin.

ABOVE RIGHT: Former Mayor of Curitiba, Brazil, Jaime Lerner, enumerates how his city has reduced waste through resource management.

- 24 **Housing Competition**
- 28 **New Mass Transit**
- 30 **Women's Exhibit**
- 31 **Golden Mean Symposium**
- 25 **Details**
- 35 **On the Boards**

Chicago Tribune Names Competition Winners

Architecture alone cannot solve the problems of Cabrini-Green, a 71-acre public-housing development on Chicago's Near North Side. That consensus was reached by the winners of an ideas competition, sponsored this spring by the *Chicago Tribune*, to develop a new master plan for the crime-plagued superbloc complex built after World War II.

Any overhaul of Cabrini-Green "must combine social issues and community values," maintains the winning team of three architects from North Dakota State University, which comprised assistant professors Jim Nelson and Don Faulkner, and recent graduate Larry Carcoana. The solution, they added, must "weave together the existing urban fabric."

Cabrini-Green's safety and integrity fell deeply in doubt last October, when 7-year-old Dantrell Davis was killed by a sniper as he walked through the complex on his way to school. The *Tribune* competition, prompted by Dantrell's murder, was dedicated to his memory.

The jury chose three winners in June, out of 300 entries from 10 countries. Taking top awards in addition to the North Dakota team were Belgian architect Lucien Kroll, and a team from the firm of O'Donnell Wicklund Pigozzi and Peterson of Deerfield, Illinois. That group comprised David Kuffner, Keith

Brown, Ron Reed, Joel Stauber, David Rodemann, Robert Hunter, Ed Deam, and Leonard Peterson.

The winning proposal by the North Dakota State team would turn the Cabrini-Green complex into a more Chicago-like neighborhood, with row houses, town squares, community centers, and a marina on the nearby Chicago River. To integrate the public housing into its surroundings, the North Dakotans would thread Cabrini-Green with extensions of Chicago's streets, which now end abruptly at the development's margins. The architects looked back to Daniel Burnham's 1909 plan for Chicago, from which they adopted diagonal streets as integrating elements. Cabrini-Green's two halves would be connected by a major diagonal boulevard through the center.

One of the winning team's key concepts was a mix of residents. The architects proposed that about 35 percent of residents would require public assistance, but the balance would be higher income homeowners. "It's diversity that makes [a neighborhood] vibrant," Jim Nelson contends. "You live next to each other, and you coexist."

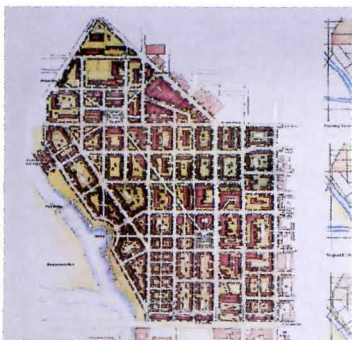
With about 7,000 residents occupying 2,800 units, Cabrini-Green could accommodate 8,000 additional units with an average 2.5 people each. Nelson's team would leave about 80 percent of Cabrini-Green's 78 buildings intact, demolishing only those structures in the path of planned

streets. Cabrini-Green's 23 high-rise and 55 low-rise buildings were built between the 1940s and 1960s. Most are all concrete or consist of concrete frames with brick infill.

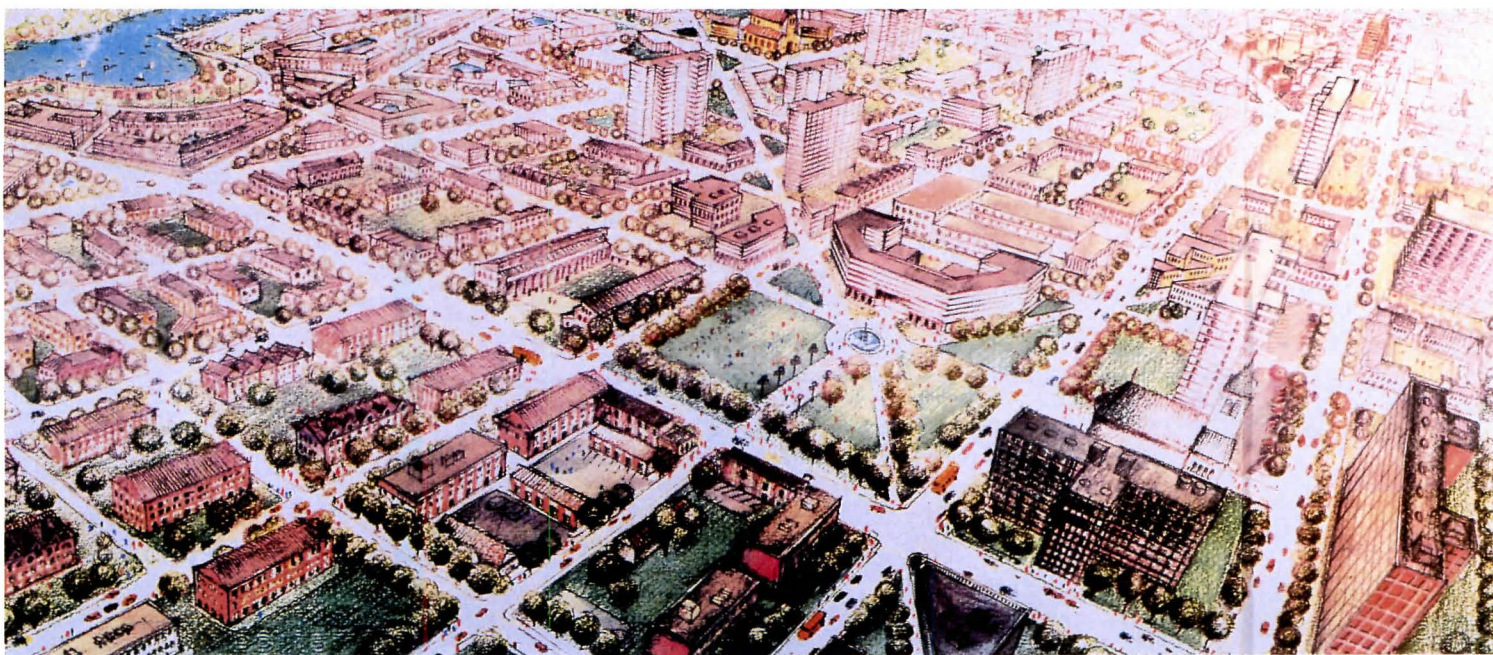
Given the tragic impetus for the competition, the jury was moved by the North Dakotans' comprehension of children's needs in Cabrini-Green. New schools, in their plan, would be built for about 450 kids each. The team also planned Cabrini-Green as a walkable community, "so you could get anywhere in that neighborhood in 10 minutes," Nelson explains.

Architect Lucien Kroll placed second in the competition with his populist proposal for a verdant, Neo-Medieval village for Cabrini-Green. Kroll has never visited Chicago, but suggested similar improvements to public housing in Nîmes, France. His design would shake up the rectangular definitions of Cabrini-Green with a pell-mell geometry, which Kroll calls "happily chaotic."

The Belgian architect would cap Cabrini-Green's oblong towers with informal outgrowths resembling large cottages. Ground-level development echoes this pattern with girdles of smaller scale buildings around the brick monoliths. Kroll would brighten the buildings with liquid pools of color and randomly place portals and terraces across their facades. He iterated that improvements to Cabrini-Green would not be merely architectural: "The answer is not a cosmetic one," but should be



FIRST PLACE: Plan mends urban fabric.



FIRST PLACE: North Dakota State team's scheme reintegrates Cabrini-Green with surrounding street patterns and Chicago River to the west.

more holistic. Any rehabilitation design for the complex needs “a form that expresses a desire to live together.” Kroll’s buildings would harbor mixed uses, integrating community and commerce, unlike the complex’s original architects, who, he points out, “tried to erase any signification of an existing culture.”

The jury seemed to agree with Kroll’s assessment. Jurors spent their first working day touring Cabrini-Green and interviewing building managers. They steered away from “radically futuristic” designs, says juror Devereux Bowly, a Chicago legal services attorney and author of *The Poorhouse*, a history of Chicago’s public housing. “The Modern movement in architecture as applied to housing was a disaster,” Bowly declares. “The kind of housing that people like—that poor people like—involves more traditional designs, not high-rises.”

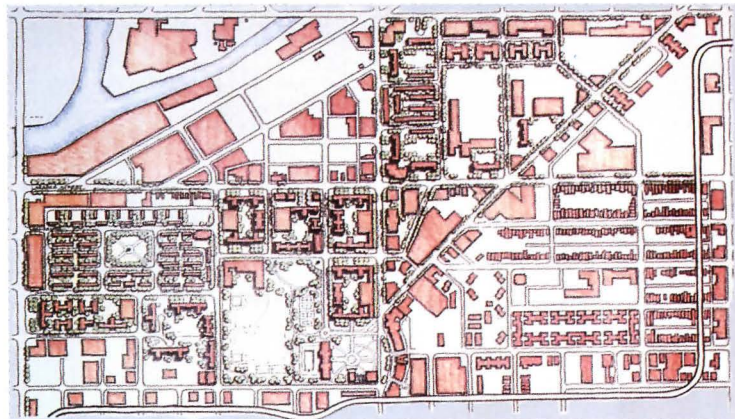
The third-prize winner by O’Donnell Wicklund Pigozzi and Peterson (OWPP) of Deerfield, Illinois, underscored that traditionalism. OWPP envisioned “Northtown 2003,” a scheme that embraced long-standing principles of town planning. For example, the OWPP team called for the Chicago Housing Authority, which owns Cabrini-Green, to lower the costs of land on the site for developers, who could pass on the savings to attract middle-income residents. By way of social compact, the firm planned to leave most buildings in place, so as not to repeat the discontinuity that ensued after “Little Hell,” the original neighborhood on the site, was razed.

Besides Bowly, the jury comprised Chicago architect Cynthia Weese, newly appointed dean of Washington University’s School of Architecture, who acted as chair; Vincent Lane, head of the Chicago Housing Authority; Hattie Calvin, head of Cabrini-Green’s residents’ advisory council; Joseph Gonzalez, design partner of Skidmore, Owings & Merrill in Chicago; architect Christopher Lee, partner in the firm Johnson & Lee; and Clarence Page, Pulitzer-Prize-winning *Tribune* columnist.

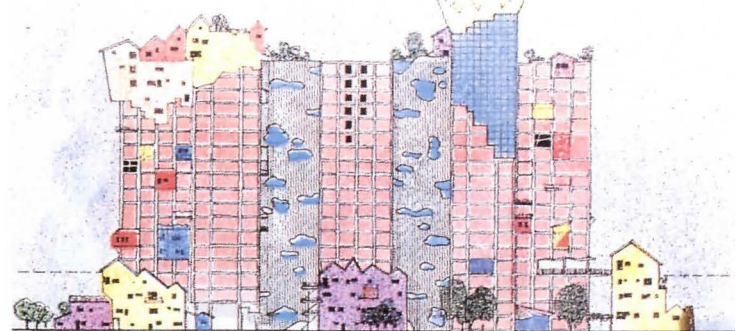
Runners-up included a team from Florian-Wierzbowski Architecture of Chicago that tweaked the premise of the competition, submitting entry boards with identical photos of Cabrini-Green marked “before” and “after,” titled “First Things First—Reprogram Don’t Rebuild.” —Bradford McKee



HONORABLE MENTION: Florian-Wierzbowski challenges competition’s premise.



THIRD PLACE: O’Donnell Wicklund infills street grid and adds public transit.



SECOND PLACE: Lucien Kroll proposes villagelike additions to oblong towers.






SECOND PLACE: Kroll proposes “green mile” through towers of Cabrini-Green.

Details

Steven Holl Architects has won a competition to design the Museum of Contemporary Art in Helsinki, Finland, selected from among more than 516 firms. **Franklin D. Israel** and partners **Barbara Callas** and **Annie Chu**, in collaboration with **BOOR/A Architects** of Portland, Oregon, won a competition to design a new, 110,000-square-foot arts center at the University of California-Riverside. The team was selected over **Tod Williams/Billie Tsien, Peter Eisenman**, and **Antoine Predock**. **Thompson Vaivoda & Associates** of Portland, Oregon, is designing the Evergreen AirVenture Museum in McMinnville, Oregon; its centerpiece will be Howard Hughes’s Spruce Goose. **MSKTD & Associates** of Fort Wayne, Indiana, is renovating a Christian Science church in Huntington, Indiana, into the new Dan Quayle Center and Museum. The grand opening is slated for fall. MTV has retained **Arquitectonica** to design a headquarters in Miami for its Latin America venture. **Brennan Beer Gorman/Architects** of New York has completed the master plan for the Northeast Corridor Transit Interchange in Secaucus, New Jersey. The Washington, D.C., firm of **Smith Blackburn Stauffer** has been selected to renovate Constitution Hall in the nation’s capital, home of the Daughters of the American Revolution. Santa Monica College in California has commissioned the local firm of **Steven Ehrlich Architects** to design a new library and has selected **Anshen + Allen Architects** of Los Angeles and **John Mason Caldwell** of Marina del Rey to design a new 34,000-square-foot annex to its science building. **Hammel Green and Abrahamson** of Minneapolis, and associates **Legat Architects** of Schaumburg, Illinois, are designing the \$10 million Spurlock Museum of World Cultures at the University of Illinois in Champaign/Urbana. **Cambridge Seven** has designed the \$35 million TBI River Villa in Bangkok, Thailand. Ground has been broken for **Johnson Fain and Pereira Associates’** 64,000-square-foot Los Angeles Area Chamber of Commerce. **George S. Lewis**, 77, executive director of the AIA New York chapter from 1969 to 1986, died June 25. And **Paul Albert Thiry, Sr.**, principal architect of the 1962 World’s Fair in Seattle, died June 27. He was 88.






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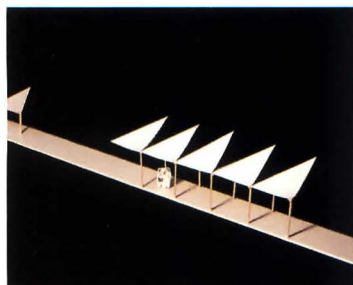
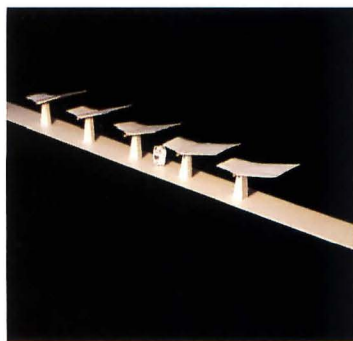
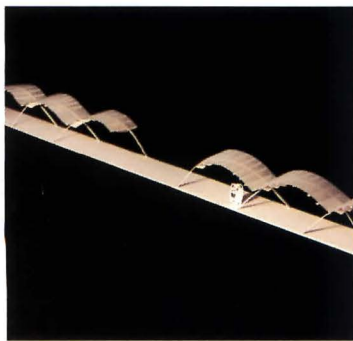
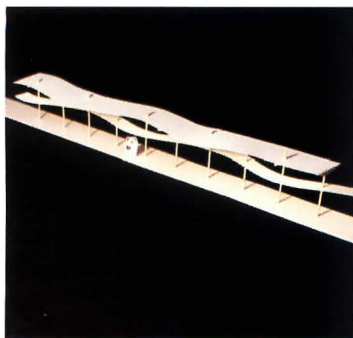
Designs Proposed for Chicago Light Rail

Like many other American cities (pages 54-65, this issue), Chicago is developing a new light rail system. The \$750 million Central Area Circulator will augment Chicago's elevated trains, serving an 8-square-mile area on 12 miles of track along four corridors—Lakefront, running from the Chicago River south to McCormick Place; North Michigan Avenue; Riverbank, along the north side of the Chicago River; and a central east-west stretch through downtown called Cross-Loop.

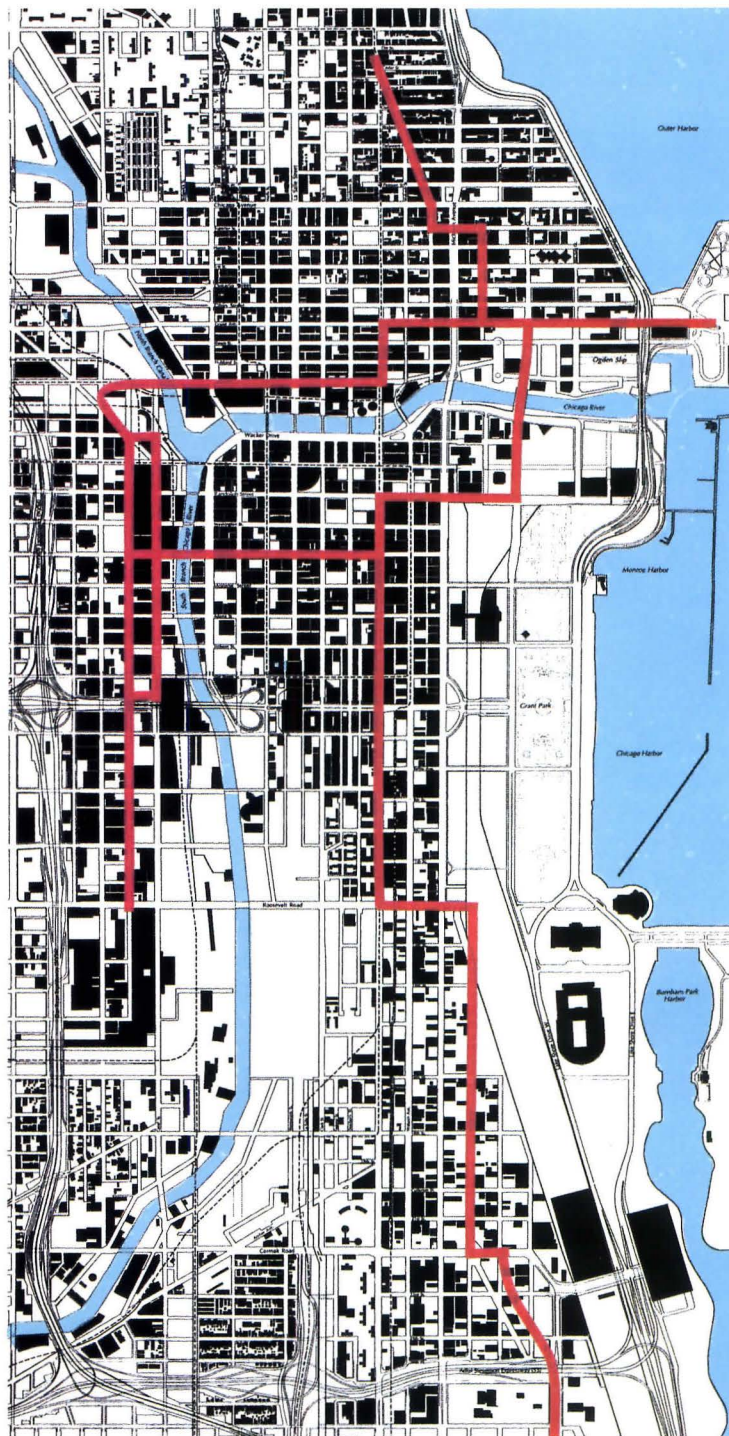
Four possible designs have emerged for the 33 station canopies of the Circulator, which is scheduled to begin operation in 1998. Choosing one will be formidable, as the rail line will travel through 18 "character" zones within downtown Chicago, says Martha Lampkin of Boston-based Sasaski Associates, prime planner of the new system. Only one canopy will be selected, Lampkin explains, because the Circulator's architecture must carry a strong identity amid the density of Chicago. However, the canopies must not block views of the city, Lampkin adds. As a result, the proposed designs by Ross Barney Jankowski incorporate strongly articulated horizontal canopies supported by unobtrusive vertical elements.

One concept for the stations calls for six featherweight arches intersecting upon the platform. A second design envisions a marching quintet of aerodynamic awnings mounted on stout columns. Another concept suggests two sets of triangular, sail-shaped canopies, which may consist of fabric. The fourth alternative comprises an undulating pair of ribbons set on 10 delicate posts, symbolizing the continuous rhythm along the path of the Circulator.

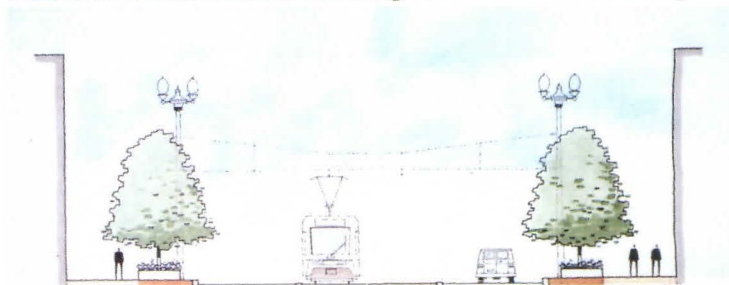
Given the multifarious profile of downtown Chicago, associate architect Carol Ross Barney observes that the canopy design became a tug-of-war between diversity and sameness. The suggested designs are thus high tech and simple, rather than historicist. As Lampkin notes: "The tradition of Chicago architecture is very progressive, one of structural expression with minimal embellishment." The public will review the station designs later this month. Design development of the Circulator, which will carry 120,000 riders a day, will be completed mid-1994. —B.M.



STATIONS: Ross Barney's alternatives.



CIRCULATOR MAP: Twelve miles of track along four corridors of central Chicago.

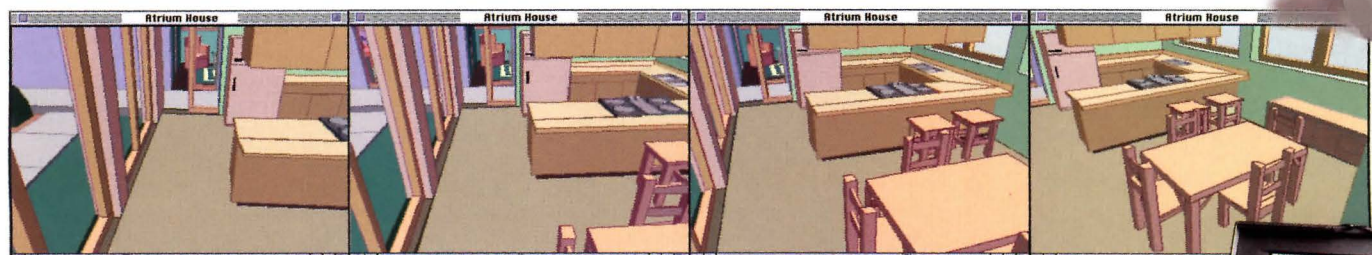


SITE SECTION: Light rail extends down center of street.

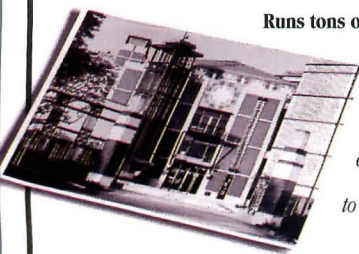


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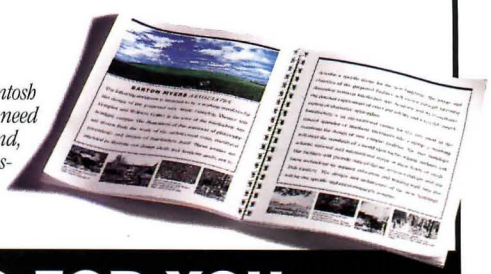
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					2	3	4
					JULY	AUGUST	SEPTEMBER
Final Space Plan	6/26	7/2	7/31	8/20			
Port Authority Space Plan	8/5	8/20	8/26	9/10			8/20
Final Preliminaries	9/8	9/14					9/10
Design Development							
Procedure	6/29	7/18	8/29	10/23			
Design						7/18	
Estimate	7/23	8/24	9/30	10/26			8/24
Construction Documents							
Structural Reinforcement	9/25	10/22	11/12	12/1			

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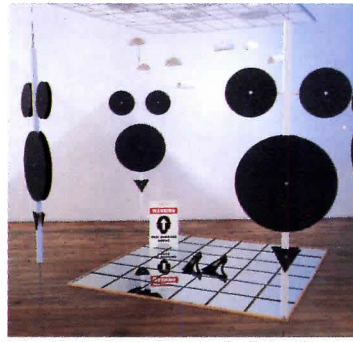
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EXHIBITION: Shattering male myths.



GLASS BLOCK CEILING: Symbolizing limits.



GALLERY OVERVIEW: Witty vignettes.

Chicago Show Confronts Sexism in Profession

To expose the inequities of pay, position, and power between male and female architects, three architects mounted an epigrammatic show of sculpture at Chicago's Randolph Street Gallery, coinciding with the World Congress of Architects in June. "More Than the Sum of Our Body Parts" was organized by Kay Janis, a project coordinator at G. Goldberg + Associates; Carol Crandall, who has her own practice and is past president of Chicago Women in Architecture;

and Sally Levine, principal of Levine Design and adjunct faculty member at the School of the Art Institute of Chicago. The three collectively call themselves CARY, an acronym taken from Caryatid, and Chicks in Architecture Refuse to Yield.

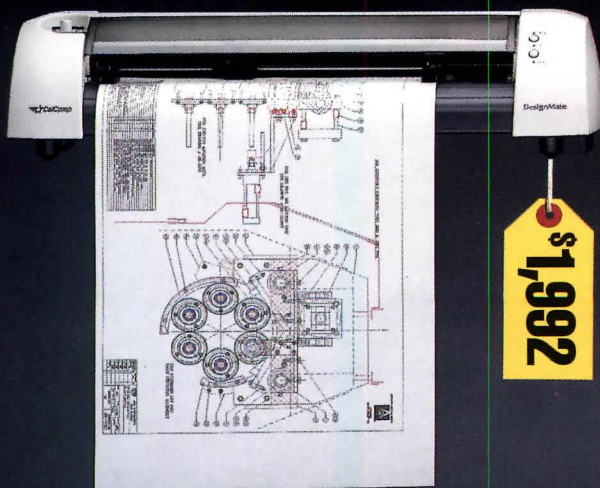
Eight multimedia vignettes produced an unforgiving but witty indictment of the profession's patriarchy. Most emblematic was *The Glass Block Ceiling*, an installation of hanging, abstracted female figures around a plane of glass blocks, suspended over a mirrored floor. Visitors could view the glass block ceil-

ing through floating masks representing the perspective of women professionals. A pair of evening pumps rested beside a warning sign: "Men Working Above."

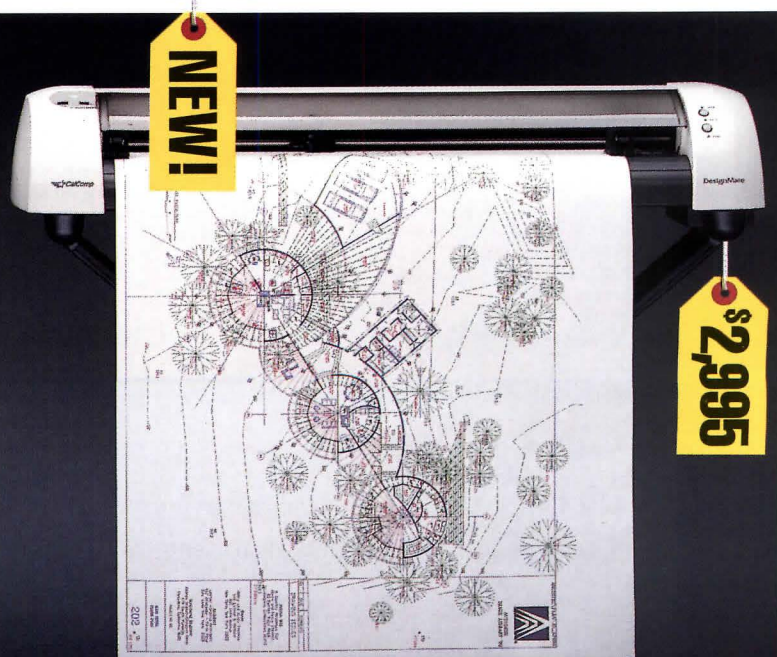
Water Cooler Wisdom—If Only These Jugheads Could Talk staged a mocking *mise en scene* of male architects, portrayed as bottle-heads in front of a bulletin board littered with sexist remarks, which were gleaned from the architects' experience. *There Were Three Professionals in a Boat* compared the status of women architects to doctors and lawyers, underscoring the difference

between them. While the medical and legal professions have set policies on family leave, pay equity, gender bias, and sexual harassment, the architecture profession has not. As *The Glass Block Ceiling* noted, 57 percent of male architects have reached partnership level after 10 to 14 years of experience, while only 33 percent of women with that degree of experience have been named partners in firms. "What's been interesting," says Levine, "was how much people identified with the issues . . . not only the women, but the men."—B.M.

Big Hit. Bigger Hitter.



A to D-Size



A to E-Size

Exhibit and Symposium Examine Golden Mean

Does the Golden Mean remain a classic paradigm for design? According to a day-long symposium and accompanying exhibition at NeoCon '93, this age-old geometric ordering device not only endures, but deserves renewed scrutiny, given current stylistic uncertainties.

The June event, held at the Merchandise Mart in Chicago and sponsored by INTERIORS and ARCHITECTURE magazines, was organized to reveal the longevity of the geometric proportional system and its applications to contemporary architecture and design.

In her opening remarks, Beverly Russell, who co-curated the exhibition with geometer Rachel Fletcher, pointed out that the Golden Mean supersedes the contemporary "isms" that quickly have become "wasms." Fletcher explained its basis in nature, noting that the proportion "is not simply a mechanical device, but unites diverse elements without compromising the parts." She outlined the basic principle of the



EXHIBITION: Cindy Coleman's design.



CARPET TILES: Lalvani for Milliken.



PANELS: Finished in Nuvel by Formica.

Golden Mean as the ratio of two unequal parts of a line; the shorter part relates in length to the longer as the longer part relates to the whole. Numerically translated, the ratio is 1:1.618.

During the symposium, most speakers explained the relevance of the Golden Mean to history. Fletcher related its proportional system to the villas of Andrea Palladio. British architect Michael Manser outlined its application in contemporary architecture, noting that Norman Foster, Richard Rogers, and others intuitively draw upon the geometry in

designing their buildings. Brent Porter, an architecture professor at Pratt Institute, related how Persian mosques and Asian temples were detailed according to the Golden Section. He maintained, "The beauty of the Taj Mahal is not only what we see, but what we measure."

Other symposium panelists—primarily practicing architects—were not convinced of the Golden Mean's relevance. Neil Frankel, design principal of Perkins & Will, said the proportional system interested him "as a form of discipline" but is not a panacea for solving de-

sign problems. Chicago architect Stanley Tigerman criticized the proportional system as formulaic and retrogressive. "Everybody is concerned about Deconstructivism as being too arcane," quipped Tigerman, "when nothing is more arcane than the Golden Mean."

But as illustrated by the accompanying exhibition, "Harmony By Design," elegantly designed by Cindy Coleman and Roger Whitehouse, the Golden Mean continues to remain an important tool of proportion for architects as diverse as Ricardo Bofill and Steven Holl.—*B.M.*

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Bay Area Rapid Transit commissions the terminus of its 15-mile rail extension.

**East Dublin/Pleasanton Station
Dublin, California
Stone Marrassini Patterson**

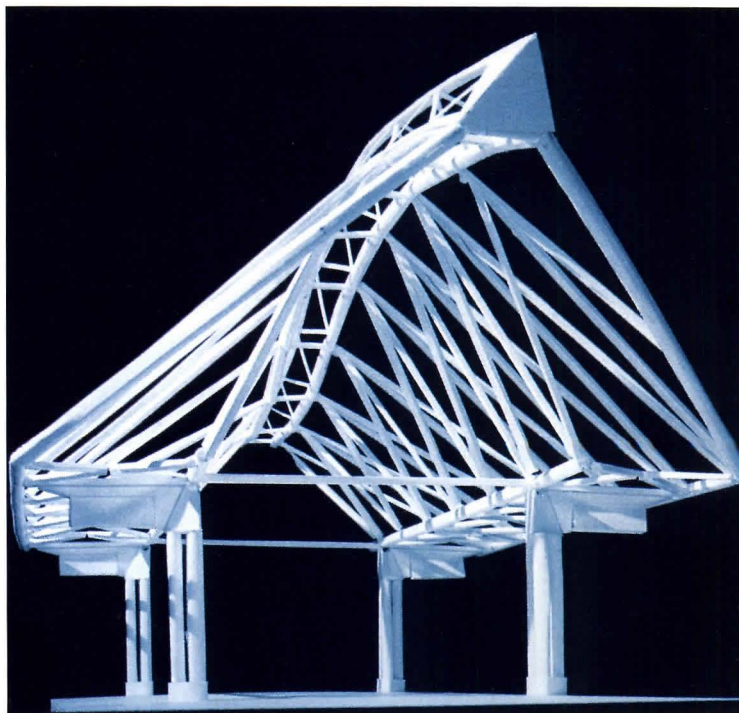
Crowned by a undulated canopy, the East Dublin/Pleasanton station will serve as the outermost stop on a 15-mile planned extension of the Bay Area Rapid Transit (BART) system. Three stations are slated for the new rail line, which will run from San Leandro south to Dublin.

The sine-wave-shaped canopy designed by Stone Marrassini Patterson (SMP) is derived from the rising and falling sound of a speeding BART car. The design also reflects the silhouettes of the nearby mountains and will be highly visible to motorists on Interstate 580, which surrounds the site. The station will feature a small service building at either end of its 700-foot-long platform, which will be flanked by a pair of chevron-shaped parking areas to the north and south. Pedestrians will follow tree-lined walks and pass beneath the station to enter the concourse at grade. Canopies on the lower entry level will be angled out from the station to cover patrons arriving by street-car or bus. Passengers will walk through the concourse to escalators or elevators leading to the platform.

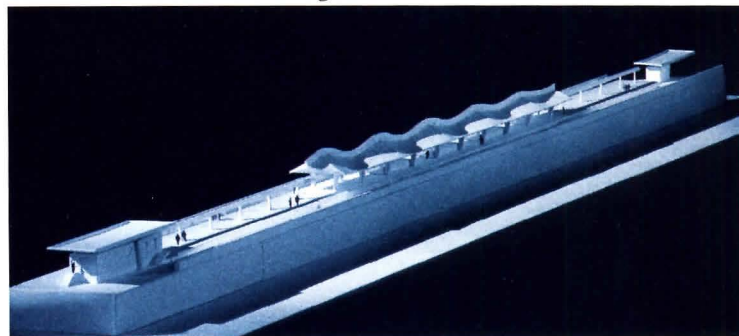
SMP tapered and canted the station canopy to emphasize its place at the beginning and end of the rail line. The canopy will be supported by columns constructed of clustered, 8-inch pipes welded together at the base and capital. The tubular-steel frame of the canopy, resembling a rib cage, will be evident from its underside, infilled with flat, triangular aluminum paneling. On top, the canopy will be clad in terne-coated copper strips converging at a central spine of glass.

At night, motorists on the freeway will notice a bright, waving strip of light from the station's lamps—beckoning them, says SMP's studio design leader Bill Diefenbach, to abandon their "resource-consuming" vehicles for public transportation. "The form had to be simple and dynamic to be recognizable from a speeding car," notes SMP's Diefenbach.

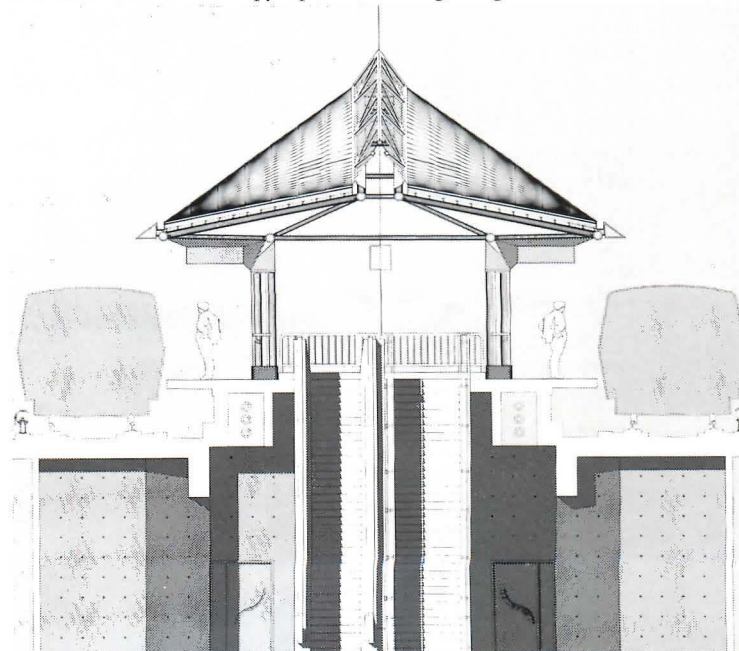
Track construction and realignment of I-580 must precede construction of the platform and may take a year or more. The completion of the East Dublin/Pleasanton terminus is scheduled for September 1995.—*B.M.*



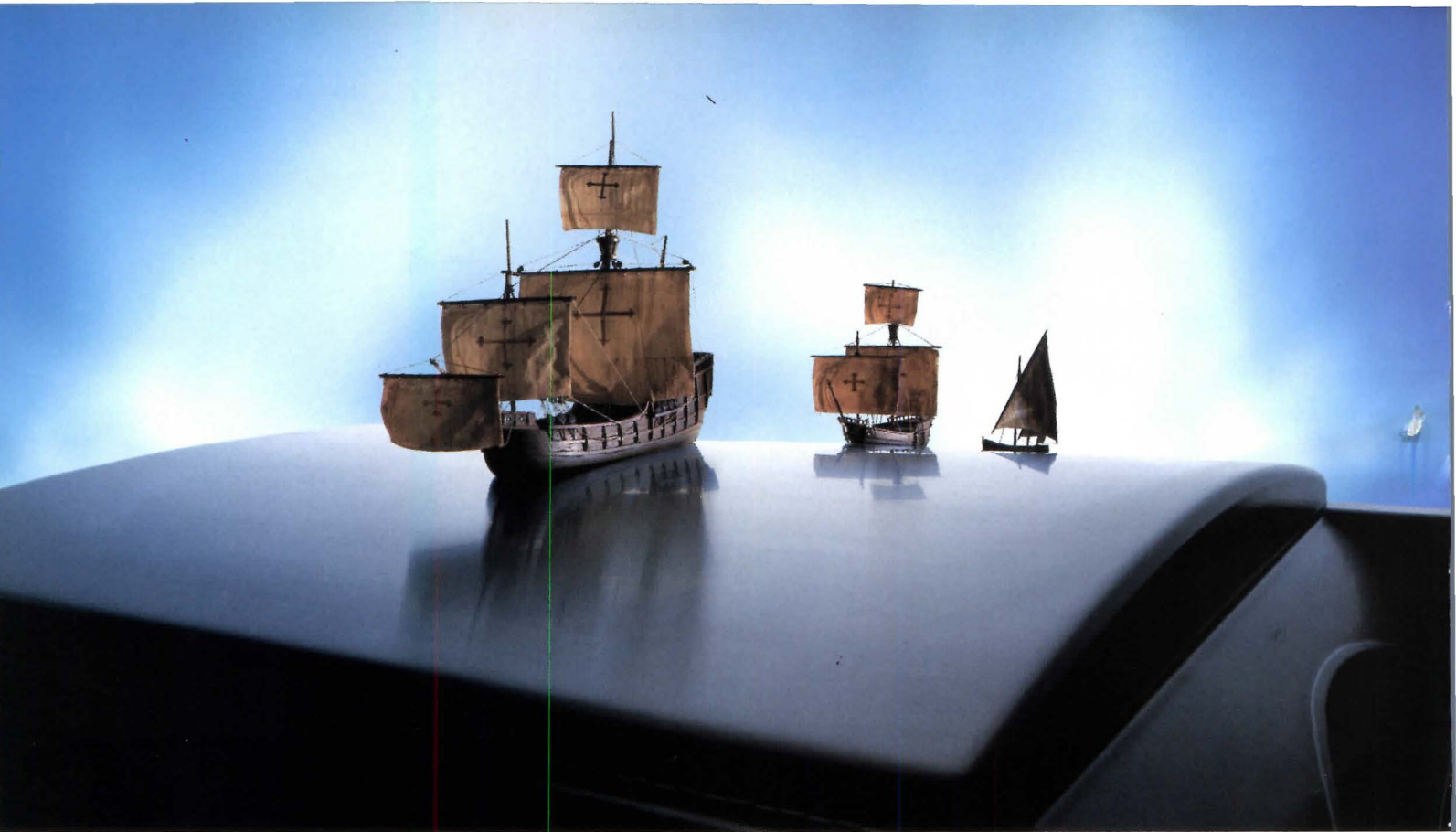
CANOPY MODEL: Tubular-steel rib cage will be visible from underside.



SITE MODEL: Sine-wave canopy represents the beginning and end of line.



NORTH-SOUTH SECTION: Central spine of glass will be underlit for strong definition.



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Toward a New Infrastructure

Transportation systems must be transformed from gray utilities to culturally rich amenities.

Infrastructure development has been proposed by President Bill Clinton as a means of improving our economy. But infrastructure initiatives should not be limited to simplistic ideas about economic productivity based solely upon the efficient transfer of goods, services, and people. Productivity must be supported by a work force living in equitable, attractive, and culturally rich places. People who come home every night to a decaying and dysfunctional neighborhood dominated by automobile traffic and a degraded natural landscape cannot be happy and productive workers.

Conserve existing resources

Since the end of World War II, we have completed a 45-year process of building an armature for our cities. Existing metropolitan infrastructure systems—single-use, dead-end cul-de-sacs; surface parking; freshwater supply; sewage treatment plants—were overbuilt in the suburbs or are now underutilized in cities whose population has declined. In many locales, driving and work habits have produced a large, congested highway and rail system during rush hour, which is underused the rest of the time. The next era of infrastructure should not extend outward, creating a third or even fourth ring of roads and transit around the city, but should refocus inward upon systems already constructed.

Any new infrastructure construction must be based upon the quality and structure of local natural systems. In the past, infrastructure has been built without regard for nature, denying the critical relationship between the two systems that support basic survival, culture, industry, and human comfort. Even in our global, information-based society, we still need living forests to create timber and replenish the air we breathe with oxygen.

Instead of building new infrastructure the same old way, we should develop policies and projects to conserve existing resources, provide physical connections to communities, and encourage citizen participation.

Since our metropolitan areas are already victims of urban sprawl, we should foster new infrastructure projects that build on past investments. Rather than building entirely new transportation corridors, we should improve older highways through the redesign of interchanges that will integrate them into their surroundings. To balance the existing investment disparity between city and suburb, those living in exurban areas should be required to pay the true cost of transportation, sewage, and water systems rather than simply the construction price tag. Before we consume more raw land, we should successfully capture the full potential of the investments we have already made.

Projects that link and integrate infrastructure with compact, mixed-use development should take priority. Transportation planning should begin with the premise that we must reduce travel time to work by consolidating destinations and providing convenient access to alternate modes of travel. Architects and urban planners must recognize that there is no such thing as free parking, even if the driver does not pay for the privilege. Further nurturing our car culture will result in continued wear and tear on city streets, deteriorating air and water quality, and disruption of neighborhoods and natural habitats. By promoting projects that incorporate employer-based transportation support programs, we must incrementally change worker habits and decisions over business locations.

Community connections

Infrastructure systems must improve the sense of connection between our citizens living in introverted neighborhoods and the larger community. Projects must be designed to address the basic inequity of service between inner-city and suburban neighborhoods. Currently, transportation systems segregate low-income families from the wider range of jobs, goods, and services available to middle- and upper-class suburban residents. Inner-city residents are taxed at higher rates

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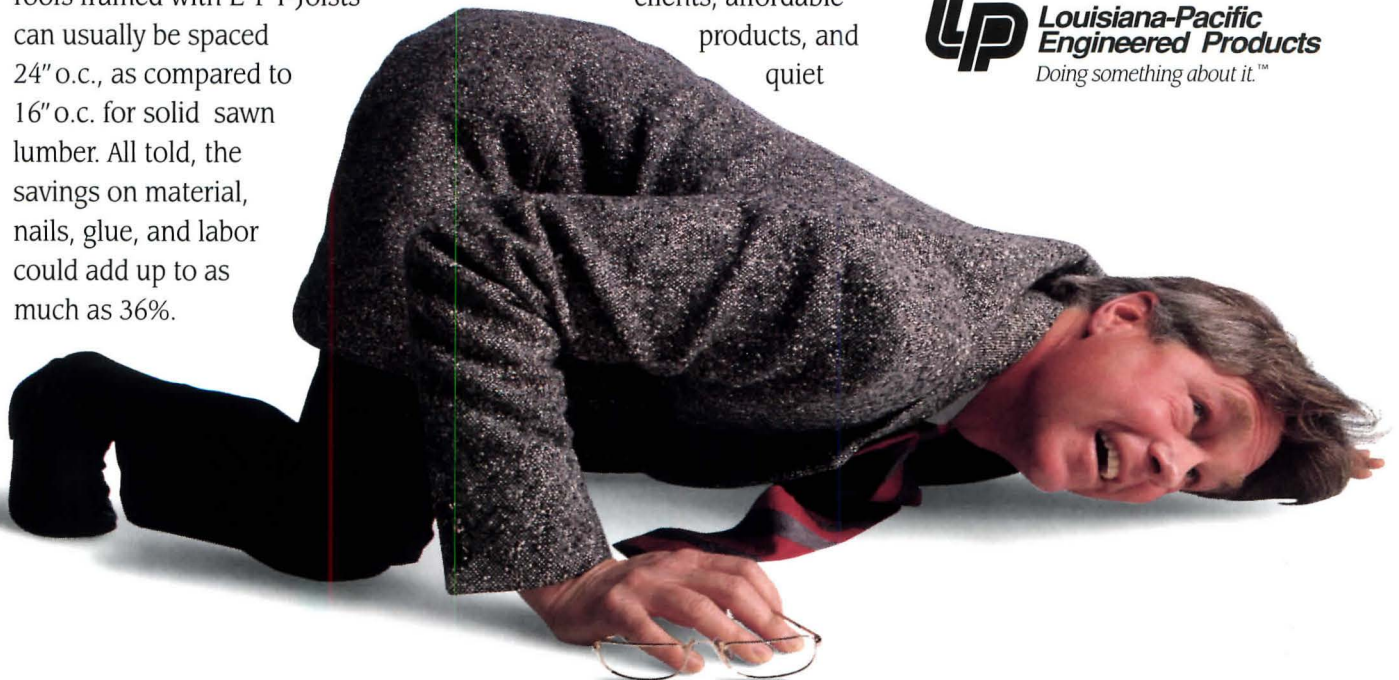
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to maintain the water and road systems that serve people coming from the outer edges. Highways subdivide inner-city neighborhoods to accommodate the commutes of suburban workers crisscrossing the metropolitan area. Dispersed employment centers in the suburbs are poorly served by mass transit, further reducing access to jobs for families without automobiles. Our highways need to be regarded as multifunctional transportation corridors, accommodating high-occupancy vehicles, light rail, and bus lines—serving not only the central city, but all the neighborhoods along their paths as well. The narrow focus of existing infrastructure has created invisible barriers between economic and ethnic classes, further segregating our society.

Infrastructure projects should improve formal, spatial, and esthetic connections, creating a heightened sense of place. Beautiful infrastructure, inspired by and responsive to the physical and topographical features of a locale, is fundamental to creating community identity and a personal sense of orientation. We have traditionally conceived of infrastructure as a neutral, gray utility, as objects and spaces devoid of cultural expression or celebration—out of a fear of distracting the auto driver; or drawing attention to the city's messy plumbing; or the misguided notion that beautiful, esthetically designed parkways or transit stations are too expensive. These systems, if visually enriched, could become essential cultural symbols of our society. Highways should be conceived of as environmental corridors, rather than as sound-proofed channels for moving cars. Infrastructure should become an instructional and spatial framework for finding our way through the metropolitan landscape.

Citizen involvement

Architects and planners should encourage infrastructure projects that evolve out of public participation. Federal programs should encourage projects that are derived from the diverse needs and demands of residents and users. Over the long term, such participation increases the effectiveness and acceptance of the system as a cultural amenity and minimizes the possibility of protracted citizen protests and environmental lawsuits.

Defining local marketplaces begins with citizens tailoring infrastructure to meet local needs. Citizen participation in place-based infrastructure enfranchises the citizen, creating educated users and a long-term commitment to supporting the project's construction as well as its operating costs.

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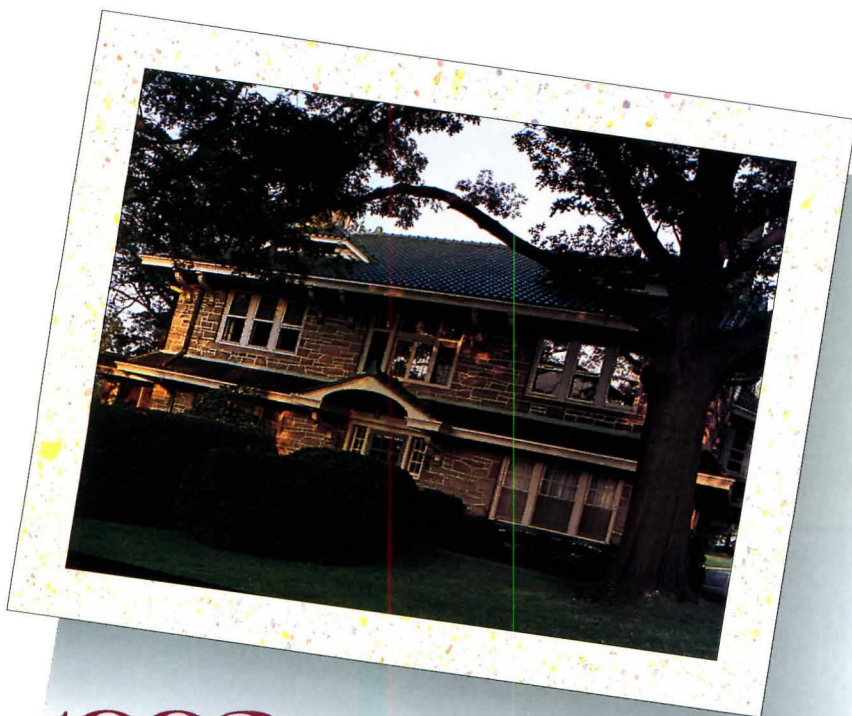
You might think that a pretty penny was paid for the roof on this former home, now owned by the Southminister Presbyterian Church as assistant minister's residence and activities center. But the life cycle cost of this roof would make it a thing of beauty in the eyes of even the most avid of penny-pinchers.

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Ecologically sensitive infrastructure

Projects should be designed to preserve the environment, incorporating natural systems such as rivers, meadows, and wetlands within our man-made infrastructure. Whenever possible, architects and planners should choose multifunctional systems over single-use highways, light rail, or bus lines.

Such systems require more land, but those property costs are minor when compared to the long-term expense of maintaining single-use systems. A good example of a multifunctional system is Boston's Fenway, which provides drainage, a transportation corridor, and a network of neighborhood parks.

We should promote projects that incorporate native vegetation, providing protection against the invasion of plants that undermine and destroy natural habitats. For example, the interstate highway systems of the East Coast have allowed the destructive vine kudzu to spread. Not only has kudzu destroyed native plant and animal habitats, it also envelops power lines and bridges, thereby increasing local maintenance costs.

We must strive to develop infrastructure projects that protect and replenish natural

systems. Water quality is rapidly becoming the primary environmental issue in both the public and private sectors. Industry cannot survive without large quantities of clean water, nor can we live with water supplies contaminated with mercury and other chemicals. Incentives should be established to promote projects that clean their wastes on site and recharge local water resources. Excellent models found abroad and, to a limited degree, in the United States effectively utilize natural systems to clean water. Duckweed can be established to clean polluted soil. Wetland cattails draw heavy metals from the ground into their roots and leaves, which can be harvested and the metals reclaimed.

As a ground rule, we must encourage infrastructure projects that are based on aggressive recycling. For example, in Newark, New Jersey, Mayor Sharpe James has instituted recycling to both clean up the city and reunite his citizens in a common civic mission. Plastics are collected and recycled into new public benches, which are placed in neighborhood parks and on streets. In Phoenix, Arizona, the public works department shreds thousands of discarded tires, re-

cycling them into a new road surfacing material to replace asphalt.

In constructing a new infrastructure, architects and urban designers can create the systematic framework to fulfill each community's basic mission, providing a base for its citizens to be productive, nurturing social equity and individual identity, and replenishing natural resources. Infrastructure can become the vessel to carry forward the dreams of a new society into physical reality.

Like the ribs and planks of Noah's ark, which carried animals and humans across stormy seas, the collective wealth of our community's infrastructure binds us together, providing a public landscape upon which to find our common ground.—*William Morrish and Catherine Brown*

William Morrish, an architect and urban designer, is Dayton Hudson Professor of Urban Design and Director of the Design Center for American Urban Landscape at the University of Minnesota.

Catherine Brown, a landscape architect and urban designer, is Director of Special Projects for the Design Center for American Urban Landscape.

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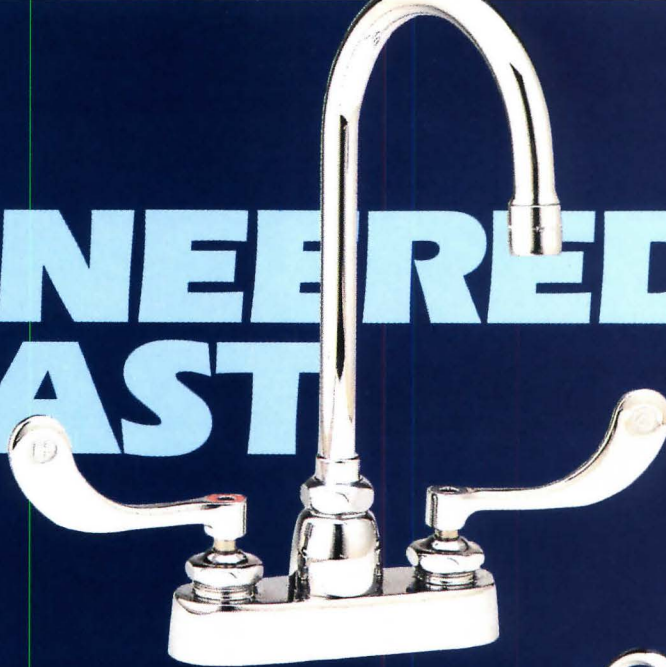
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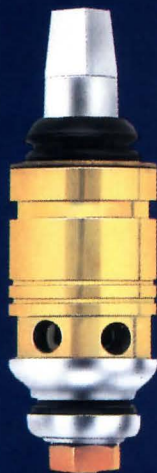


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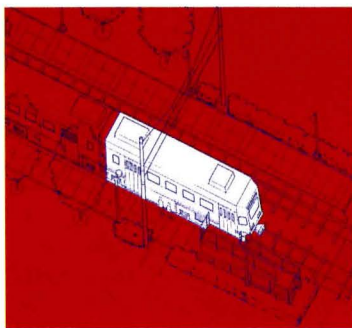
PLANES, TRAINS, AND AUTOMOBILES

Transportation-related projects afford architects opportunities to shape the future of our cities.

With the passage of the Intermodal Surface Transportation Efficiency Act of 1991, opportunities for transportation design have expanded for architects. The six-year, \$151 billion federal program not only funds roads, railways, and mass transit but “enhancement activities” related to transportation, such as the rehabilitation of historic train stations, the construction of new terminals, and even improvements to lighthouses.

Given this opportunity for new infrastructure, architects must develop ways of transforming transportation hubs into civic buildings that grace the urban fabric, symbolizing a community’s resources. They might begin by studying the examples in this issue.

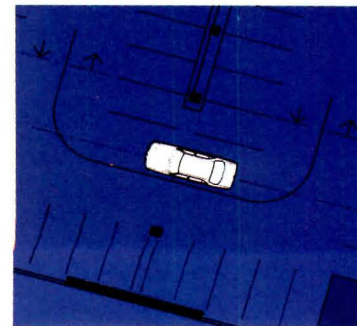
Our portfolio on airport design, for example, reveals how architects have transformed flight terminals from utilitarian ticket-and-baggage stations to public amenities,



combining indigenous materials and state-of-the-art technologies. Architects are similarly shaping light rail systems in cities across the United States, determining rail corridors, designing canopies and stops, and bringing mass transit and development to forgotten low-income neighborhoods. Architects are also applying their talents to mundane building types such as highway rest stops. Along the New York State Thruway, for example, a collection of

travel plazas showcases the state’s variety of regional architecture. Even the lowly parking garage has been elevated, turning a busy Oakland hospital into a good neighbor and supporting a 1.7-acre Boston park. And, if a wary public allows it to proceed, the unfettered scheme of a New York artist promises an expressionistic, cable-stayed bridge in downtown St. Paul, Minnesota.

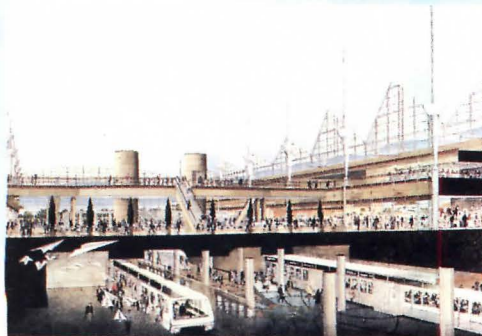
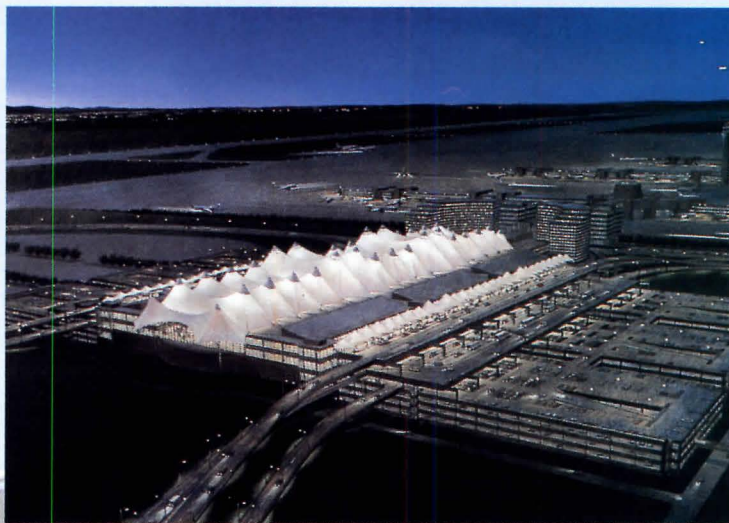
Moreover, a huge mass transit project in Los Angeles demonstrates how architects are working with community groups to give residents a voice in the development that mass transit will bring to their neighborhoods. By addressing the complex relationship between building form and transportation, architects are playing a pivotal role in shaping the future of American cities.



AIRPORT DEPARTURES

RIGHT: The new Denver International Airport's landside terminal was designed by C.W. Fentress J.H. Bradburn and Associates.

BELOW: Denver terminal interior, which will open in December, will be daylit by clerestories and fabric roof.



At a new suburban mall outside Pittsburgh, shoppers can browse in a British-owned bookstore, buy environmentally correct soap, entertain their kids at an indoor playground—or catch a plane. The new Pittsburgh International Airport is one example of a nationwide airport modernization boom that is changing air travel for the better. Accommodating larger planes and state-of-the-art technologies, airports are now competing for passengers with light-filled concession areas and expressive structures that reflect regional styles and attitudes. Transportation needs are being met by new highways, better subway access, and intra-airport trains. And in major cities and small communities, today's airports are increasingly being viewed as civic gateways that present a positive image to investors and travelers.

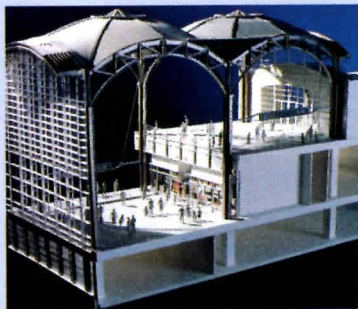
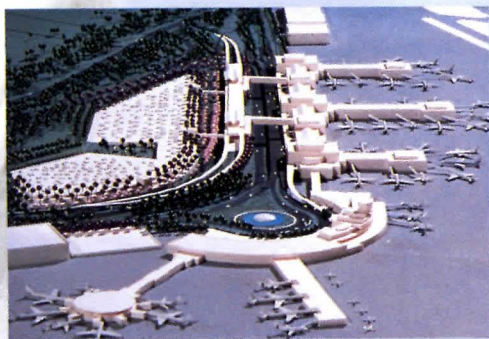
Conceived in the financially robust 1980s, Pittsburgh International may be one of the last new "hub" airports devoted largely to a single airline. Today, as airlines reckon with

financial losses, cities are diversifying new airports and expanding old ones, hoping to bring jobs and investments to their communities. A variety of federal support systems, such as a three-dollar-per-ticket airport tax, are funding these amenities and improvements.

More passengers, larger airports

With a few notable exceptions, including the TWA Terminal and Dulles International Airport by Eero Saarinen, most of America's early airport buildings, constructed in the 1930s through '60s, were conceived as functional Modern boxes. They were designed for maneuvering planes rather than passengers, housing ticket counters and baggage areas—the basic needs of departing or arriving travelers. Rectangular buildings with gates to the tarmac out back, early airports simply added piers as more gates were needed.

In 1978, deregulation led to the hub-and-spoke system, in which regional carriers feed into strategically located "hub" cities where



LEFT AND CENTER: Cesar Pelli & Associates' Washington National Airport evokes the capital's domed monuments. **BELOW AND BOTTOM:** Detroit Metropolitan Wayne County Airport, to be completed in 2000, is designed by Gensler and Associates; Bechtel Group; Rossetti Associates; Smith, Hinchman & Grylls; and Sims-Varner & Associates.



passengers swap flights to reach their destinations. Competition for passengers generated lower fares, enabling more people to fly. As more gates were required, pier configurations metamorphosed into Ys and Ts, shortening walking distances. Jetways were introduced, facilitating two-level terminals, and Ys and Ts gave way to satellite concourses that allowed large planes to be easily maneuvered and parked around the perimeter.

Air traffic boomed in the 1980s as a result of deregulation, and despite a 1991 downturn, continued growth is expected. The office of airport planning and programs of the Federal Aviation Administration (FAA) reports that last year, 429 million passengers flew within the United States; in 2004 the FAA estimates 647 million. The FAA also projects that 297 new airports will be built within the next 10 years (there are currently 500), and \$1 billion a year will be spent on airport expansions through 1998. Predictions by the Building Research Board of the Na-

tional Research Council indicate that large airports of the 21st century may routinely serve as many as 100 million passengers a year—more than double the number served by the nation's busiest airports in 1992.

The country's largest airport, scheduled to open in December, is Denver International, where new runways will facilitate faster connections to more than 100 other cities across the United States. Former Denver Mayor Frederico Peña (now U.S. Transportation Secretary) called for a memorable airport to give his city an economic boost into the 21st century. In response, Curtis Fentress of C.W. Fentress J.H. Bradburn and Associates designed a landside terminal with a peaked fabric roof. "When you see it," Fentress notes, "you know it's Colorado."

Anticipating 91 million international passengers yearly by 2004, international terminals will be expanding. At Chicago's O'Hare airport, Perkins & Will's recently opened international terminal for United Airlines is a

graceful structure designed to handle 6,500 passengers an hour. Turner Associates of Atlanta has also planned a new international concourse and expansion of Atlanta's Hartsfield International Airport. The concourse, at 1.4 million square feet, will be the largest in the U.S. when it is completed in 1995, serving 2.5 million passengers a year.

People movers and concessions

Separate terminals for landside and airside activities, connected by "people movers," or trains, will become common as concourses expand to accommodate larger planes. "A 757 requires 50 percent more parking area than a smaller plane," explains Marilyn Taylor of Skidmore Owings & Merrill, designers of the expansion of Dulles International Airport, which will replace Eero Saarinen's outmoded *mobile lounges* with *people movers*.

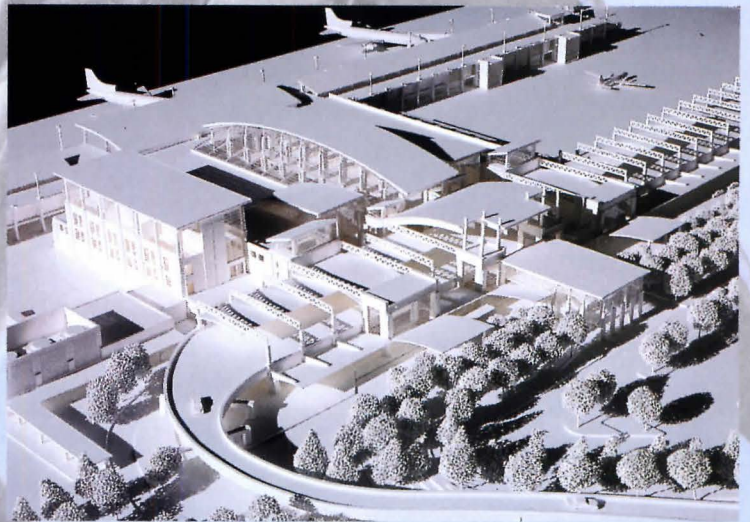
However, concourses for larger planes are long; Denver's, designed by Allred, Seracuse, Lawler Partnership/TRA, a joint venture, ap-



TOP AND ABOVE: Palm Springs Regional Airport by Gensler and Associates will be completed in 1995.

TOP RIGHT: Gensler and Associates' Amarillo International Airport was completed in July.

RIGHT: T.F. Green Airport in Warwick, Rhode Island, by HNTB Architects will be completed in 1996.



proach 4,000 feet. Future passengers transferring at Denver will zip along concourses by train. Similarly, Gensler and Associates' scheme for a futuristic airport in Detroit incorporates a monorail in the concourses.

Linking airports to cities by rail will become more common. Cesar Pelli & Associates' scheme for expanding National Airport in Washington, D.C., incorporates a subway station within the terminal. New York's Port Authority is also examining improved rail transport to La Guardia and Kennedy airports.

Parking revenues have always been airport money-makers, but the growth in transfer passengers means concessions are also good for business. Gensler Vice President Ron Steinert points out that the most effective location for concessions is "within psychological proximity to the gates. If you can see your plane, you'll spend more time shopping and go deeper into your pockets."

In short, passenger convenience and comfort help market airlines, a phenomenon un-

known to early designers, who crafted buildings mainly for efficient plane movement. "Airports are competing for international and long-distance trips," points out SOM's Marilyn Taylor. "They want to be remembered."

New technologies and business

Anticipating Boeing's proposed double-decker airplane that could seat as many as 750 passengers, Allred, Seracuse, Lawler/TRA has designed Denver's concourses with the potential for double-level boarding. Explains project manager James Suehiro, "The two-story hold rooms have a structure running through them to support a future floor; the roof is designed for additional floor loads if needed." New airports must also accommodate computerized baggage sorters, which laser-scan bar-coded baggage labels and send them to planes via space-consuming conveyors.

Airport specialist Lawrence Kiernan of the FAA's airport planning and programs office, points out that the hub system may be

changing: "Airlines may find it more economical to allow competitive regional carriers to serve small airports." Notes Gensler's Ron Steinert, "What that means to designers is that airport functions are becoming more generic." Common Use Ticketing Equipment, a universal computer, will replace the airline-specific ticketing systems now in operation, and nondedicated gates and ticket counters will be leased to airlines on a per-use basis. For architects, common usage means that passenger hold rooms must be flexible—to accommodate passengers and gates for, say, three 757s or four DC-10s.

As cities seek to attract new businesses to spark economies idled by the recession, airports are becoming part of local development strategies. "Cities have begun to realize that architects can take the functional aspects of an airport and transform them into a civic building that makes a good impression on investors," reasons Steven Reiss, executive vice president of HNTB's airport design office in



TOP AND BOTTOM LEFT: New international concourse for Atlanta's Hartsfield airport will be completed by Turner Associates in 1995.

BELOW AND BOTTOM RIGHT: Manchester, New Hampshire's new airport by HNTB with Lavelle, Brensinger Architects will open in December.



Alexandria, Virginia. The firm's scheme for a new airport for Manchester, New Hampshire, will give that city the chance to compete for New England-based flight passengers who currently drive to Boston.

Regional expression

To symbolize a region's assets, architects are designing airports to reflect the character of their surroundings. Seattle-based TRA supported the roof of the Eugene, Oregon, airport with laminated wood beams. Cesar Pelli's scheme for National Airport reflects the domed monuments of Washington, D.C.; Chattanooga's new terminal, designed by Gensler with Derthick, Henley & Wilkerson, recalls the city's railroad heritage. "We believe airports should be specific to the city they are located in," reasons Ron Steinert. "They should also instill people with the vitality and excitement of flying."

For the weary passenger for whom fast food and runway delays are the norm, that

last requirement may be the hardest to accomplish. And, like everything else in the free market, the airports of the future will be a gamble for depressed cities. If all the components—state-of-the-art runways, concessions, a strong economy, efficient airlines, and plenty of travelers—are in place, a new airport may be a gold mine. However, should the strategy or the airline fail, cities like Denver and Pittsburgh may be burdened with empty runways and huge debts.

Future airports may also be candidates for privatization. Los Angeles's new mayor, Richard Riordan, is already promising to lease LAX to generate money for improving the city's schools, and Lockheed reportedly offered to lease Baltimore Washington International from the state of Maryland last spring. What privatization would mean for the architects of airports is anybody's guess, but flexible structures that adapt to the vagaries of the nation's most mercurial industry will be in high demand. —Heidi Landecker

**International Terminal
O'Hare International Airport
Chicago, Illinois
Perkins & Will, Architect**



The transoceanic jet set now has a considerably more ennobling point of arrival and departure than the lower level of a parking garage, which, until this year, served as the makeshift international terminal at O'Hare. To no one's chagrin, United Airlines bulldozed the original facility, designed by C. F. Murphy Associates in 1959, to make way for its Murphy/Jahn-designed flagship hub. The new international terminal, designed by a joint venture of Chicago firms led by Perkins & Will, is the culmination of a \$2 billion, 12-year airport expansion that began in 1981. Now operating at half capacity, the new 1.1 million-square-foot building occupies O'Hare's most prominent site, a residual triangle that abuts the highway approach to the airport.

Perkins & Will designed the new terminal to emerge from the flat, gray expanse of highways and runways like a monumental gateway, a gossamer arch measuring 800 feet long and 50 feet high. Curvilinear con-

courses, containing a total of 21 gates, stretch out from either side in a long, horizontal sweep. The form was conceived by Ralph Johnson, principal design architect for Perkins & Will, who, in the expected Chicago tradition, poetically combines structural and architectural expression.

Inside, Johnson developed a clear procession of public spaces from the curb to the cabin, much more articulated and varied than those of the first buildings at O'Hare. The plan derives its clarity from the Ecole des Beaux-Arts: symmetrical, hierarchical, and obvious. In contrast, the building's plastic form emulates International Style Modernism, constructed of glass and steel, streamlined and stripped, all white and gray, and barely tinted blue by the reflected light of the sky. Johnson and his team initially struggled to contrive an asymmetrical plan but found that security requirements, the ease of movement for 6,500 passengers per hour, and the need to incorporate existing



WAYNE CABLE PHOTOS



taxiways and tracks for a new people mover made it nearly impossible. Located on an intermediate level, visible from the departures hall above and the arrivals hall below, the tracks link the international terminal to domestic terminals, long-term parking, and the subway to the downtown Loop.

Passengers arrive by car on the upper level, cross a footbridge over the tracks, and enter the ticketing hall. This narrow volume only measures 50 feet wide, with an air of grandeur that emulates the waiting rooms of 19th-century train stations. A broad corridor flanked with duty-free shops leads from the center of the main hall into an apsidal room, which houses concessions and a central security checkpoint. Passengers proceed left or right into the boarding concourses.

The three-level organization of the building accommodates the stringent regulations of the Federal Inspection Service, which requires "sterile" arrival concourses: unarticulated, windowless corridors below grade with

no place to hide or exchange signals with conspirators. Johnson and his team exaggerated the spy-movie quality of the spaces by coordinating the floor patterns and light fixtures into continuous horizontal bands; enhanced by a cold palette and a conveyor-belt walkway, it is easy to imagine Bruce Willis running down its length in the chase scene of another sequel to *Die Hard*. A rotunda along the path, cleverly adorned with a backlit mural of Chicago, mediates the transition into the immigration inspection area, where the architect incorporated state-of-the-art security systems to support the efforts of hired eavesdroppers and specially trained dogs. Above the baggage claim, an electronic sign warns in 17 languages: "Our dogs don't bite. They sniff for prohibited articles."

Whether coming or going, the terminal is the world's best international facility, an elegant progeny of Miesian restraint and a welcome contrast to the dark, heavy masonry of 19th-century Chicago. —*M. Lindsay Bierman*

PLAN: The triangular site and existing taxiways determined the configuration of terminal and concourses.

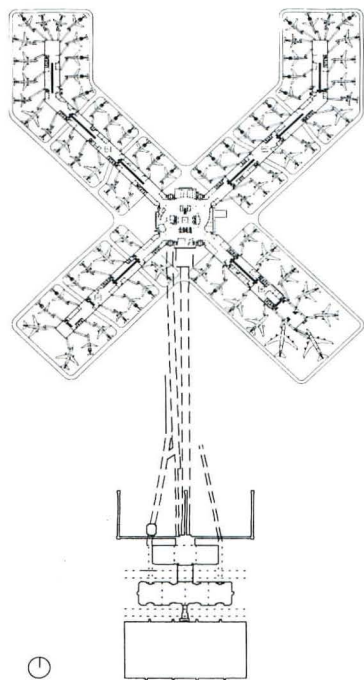
FACING PAGE, TOP: Departing passengers enter ticketing hall from upper-level roadway or mid-level transit station.

TOP LEFT: The ticketing hall combines the skeletal transparency of an airport hangar with the grandeur of a 19th-century train station.

TOP RIGHT: A canopy marks the threshold from the ticketing hall into the concessions corridor and security checkpoint beyond.

ABOVE LEFT: An 800-foot-long arch spans the ticketing hall, which forms a monumental gateway to O'Hare.

Pittsburgh International Airport
Pittsburgh, Pennsylvania
Tasso Katselas Associates



PLAN: Passengers arriving by car proceed from parking garage to landside terminal. People mover whisks travelers to X-shaped airside terminal.

TOP LEFT: Upper level of terminal is constructed of precast concrete with steel-framed vaults.

TOP RIGHT: Exposed steel trusses in main ticketing area evoke Pittsburgh's industrial heritage.

ABOVE RIGHT: Departing and arriving passengers are separated by levels; garage is linked via moving walkway.



TIMOTHY HURSBLEY PHOTOS

Pittsburgh International Airport, which opened last October, is one of the largest, most ambitious transportation projects constructed since Dallas-Ft. Worth airport was completed in 1974. The 12,000-acre project was built by Allegheny County but guided by USAir, which operates 50 of its 75 gates. Aiming for maximum passenger convenience, architects at Tasso Katselas Associates of Pittsburgh crafted separate landside and airside buildings—a practice that will become more common in large “hub” airports where a majority of travelers are transferring from one plane to another.

Access to the new landside terminal from Pittsburgh is so streamlined that commercial vehicles approach the building's east side and private automobiles drive up on the west. Arriving and departing vehicles are directed to different levels, virtually eliminating conventional airport traffic congestion.

Once inside the landside terminal—where a trio of barrel vaults spring across exposed

bowstring trusses—passengers proceed to ticketing; check baggage; pass through security; and board a train that, in 63 seconds, delivers them to the airside terminal. At 1.2 million square feet, the airside terminal is more than three times larger than the landside terminal and is designed to accommodate most of the estimated 22 million passengers that will visit the airport each year.

To avoid lengthy concourses and the need for electronic transit between or along them, Tasso Katselas Associates selected an unusual “X” configuration for the airside terminal, with the capacity for 25 gates along each wing. Travelers are funnelled into an atrium in the transept of the X, where they can visit as many as 60 boutiques and restaurants. The novel configuration means that passengers don't have to leave the building or change levels, and the X is projected to trim taxi time to runways, saving aircraft millions of dollars worth of fuel and, presumably, reducing runway delays.—*H.L.*



TIMOTHY HURSLEY PHOTOS

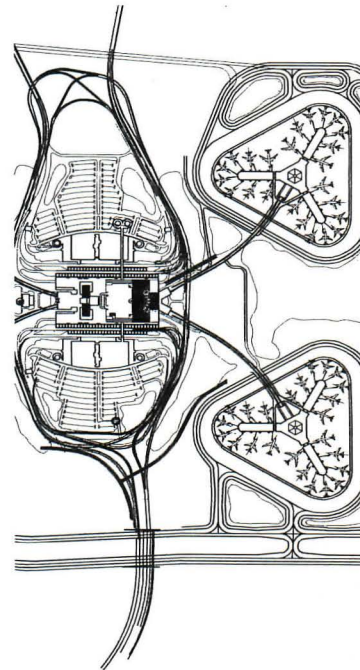
Over the past decade, the Orlando International Airport has doubled in size, a certain necessity if only to serve the ever-burgeoning world of Disney. This year, Jacksonville-based KBJ Architects completed the second stage of a three-phase airport master plan that encompasses four airside buildings, each with 24 gates, and an above-ground train that connects to a central hub. Walter Taylor, KBJ's chairman and CEO, has overseen the design of the project since its inception, from the completion of two gate terminals and a three-story hub in 1982, to the latest construction of a third gate terminal, parking for 2,500 cars, and eight additional floors atop the hub, which includes a 450-room hotel built around a vast atrium.

The Orlando airport remains one of the most convincing examples of the landside-airside concept, which eliminates the need for endless, fluorescent-lit corridors and long-distance walking by the location of ticketing, baggage claim, rental cars, and lodging in

one building and the boarding gates in another, with a people mover that shuttles passengers between the two. At Orlando International Airport, travelers deplane into a concourse that leads to a central skylit atrium; from there, the people mover races through a garden to the main landside terminal.

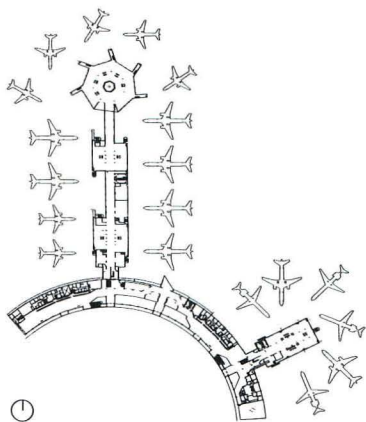
KBJ's expansion reflects what the architects call the "Florida look," which translates to a profusion of indoor plantlife and a color palette so subtle that it includes 13 shades of off-white. Though hardly redolent of early Florida architecture, the airport buildings temper the sun's brutality in effective ways. Fabric canopies shade the curb; giant louvers screen the windows; and an aluminum lattice extends over insulated reflective-glass skylights. Mercifully, the architect eschewed any Disney-esque architectural references. "This is not a Postmodern project," insists Taylor, who views the airport as a symphony. "I've completed three movements," he boasts. "I hope to do the fourth.—M.L.B.

Orlando International Airport
Orlando, Florida
KBJ Architects



⌚

- PLAN:** KBJ minimized the walking distance between gates with Y-shaped airside terminals (right).
- TOP LEFT:** KBJ improved vehicular circulation along the three-level roadway, which accommodates tour buses and the country's largest rental-car business.
- TOP RIGHT:** People mover shuttles between airside and landside terminals through the lush Florida landscape.
- ABOVE LEFT:** KBJ Architects designed a 450-room hotel and a parking garage atop the existing landside hub.



PLAN: Arc of existing plan remains unchanged. Additional gates, centralized baggage claim, and new two-level roadway improve efficiency.

TOP LEFT: Exterior metal canopy revitalizes facade of terminal.

TOP RIGHT: Barrel-vaulted skylights mark major circulation, daylighting formerly gloomy terminal interiors.

ABOVE RIGHT: Parking drum, which is enlarged by space for 1,200 cars, is refaced in new precast concrete skin.

Transformed during the mid-1970s from a steel town into a postindustrial medical and communications center, Birmingham, Alabama, has long remained chained to the past in its airport—an aging 1969 complex as cavernous and gloomy as the extinguished Sloss Furnace that fired the city's birth. In 1987, the airport authority hired KPS Group, a local firm, to bring an energetic new image to the Birmingham terminal. The charge to KPS Partner Gary Plosser was “functionally updating and radically altering the appearance” of an existing terminal that had become a liability to the community, all for \$75.00 per square foot.

Site constraints hampered Plosser's options. Although the city of 950,000 was growing, there was no demand for significantly increased airport capacity, so a totally new building was inappropriate. Consequently, the architect worked from the outside, in. A strict circular geometry had controlled the original planning. Automobiles,

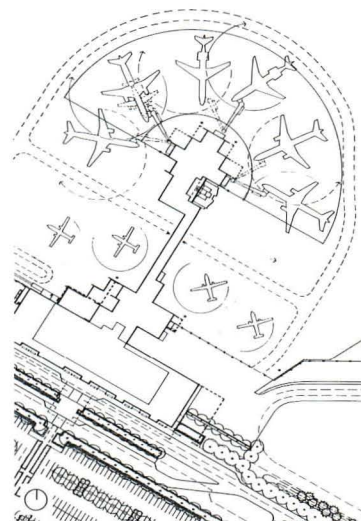
which circled the terminal around the parking drum, came first. Two seven-floor additions made space for 1,200 additional cars.

The architect's single strongest statement is a metal canopy, suspended and braced from pairs of circular columns, which bristles across the curving south elevation. The canopy both masks and enlivens the original facade without replacing it.

Inside, ticketing areas, moved from the ground floor to the second level, extend to the curb, increasing total floor area to 244,000 square feet, while covering what had been vacuous two-story space. Openings between floors allow views and light.

Detailing and appointments reinforce the new image. The steel channels of interior railings, punctuated with open circles, echo the exterior canopy and reflect the terminal's circular design. The expressive, high-tech language creates a fast-paced and urban image for a city no longer powered by smokestacks but by brainpower.—*Robert Ivy*

**Mahlon Sweet Airport
Eugene, Oregon
TRA Architects**



In an effort to attract new employers and investors to Eugene, the Department of Public Works for the City of Eugene commissioned Seattle-based TRA Architects to transform its municipal airport into a regional hub. The firm more than doubled the size of the existing facility, a one-story rectangular box designed by local architect Richard Clark in the early 1960s, by extending a six-gate, two-story airside facility to the west. The axial plan of the new addition provides a gate area just behind the ticketing lobby for smaller regional carriers, and an aircraft apron for national carriers beyond.

Passengers enter the main terminal from the parking lot into a vastly improved ticket lobby, past a new cafe, up the escalator, and into a 420-foot-long concourse that culminates in the gate lobbies. A jog at one end of the concourse path marks the location of a future garden or sculpture court.

As a boost to the local timber industry, TRA stripped the paint off the existing lami-

nated wood beams, which measure 55 inches deep and span as much as 90 feet, and extended the wood structural system outside to support the roofs of the new canopies and a central porte-cochere. Inside the terminal, TRA scrapped the existing low ceiling, raised the roof, and incorporated clerestory windows to light the main public spaces. The architect anticipates future expansion to the north and south of the original building, beyond the firm's addition of a new baggage claim and car-rental area at one end, and an additional ticket lobby at the other.

The airport's sinuous timbers recall Eugene's economic roots in forest products as much as they introduce the metaphor of flight; echo the forms of the nearby Cascade Mountains; and evoke such venerable local precedents as the nearby Central Lutheran Church by Pietro Belluschi, albeit in a subtle way. The result is neither high-tech nor cloyingly woody, but rather an articulate combination of the two.—*M.L.B.*

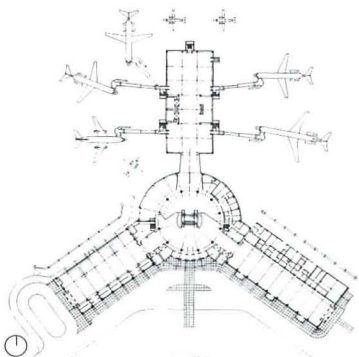
PLAN: A new aircraft apron terminates the axis that leads from the parking lot through the main terminal.

TOP: The new east facade comprises a central porte-cochere and new canopies to shelter the passenger drop-off lanes.

ABOVE LEFT: Cantilevered, laminated wood beams support the roofs of the canopies along the east facade.

ABOVE RIGHT: TRA restored timbers that held up roof of existing terminal but raised the ceiling and inserted clerestory windows in ticketing hall.

Chattanooga Municipal Airport
Chattanooga, Tennessee
Gensler and Associates



PLAN: Wheel-like terminal has wings radiating from central dome for baggage claim and rental cars, arrival and ticketing. Skylit promenade of main concourse intersects center of wheel.

TOP LEFT: Copper-roofed dome, reminiscent of Chattanooga's railway depot, anchors new airline terminal.

TOP RIGHT: Terminal concourse features vaulted ceiling with cove lighting.

ABOVE RIGHT: The 75-foot-high coffered dome is illuminated by clerestories.

Although Chattanooga, Tennessee, is small—350,000 residents in the metropolitan area—the city has ambitious plans to become a tourist magnet with a major new aquarium, a 25-mile riverfront park system, and downtown redevelopment. Flying in from throughout the country, tourists and business travelers arrive at an airport considered as a “destination” rather than a “hub”: For air travel, Chattanooga is one end of the line. For a small city, its airport is active, maintaining 300,000 annual enplanements, accommodating four major airlines as well as several regional carriers.

In 1985, the Chattanooga Metropolitan Airport Authority determined to build a new entrance to the city at the site of its existing air terminal. The agency commissioned principal architects Gensler and Associates and a local firm, Derthick, Henley, & Wilkerson. It determined that a new 126,000-square-foot building should replace the original terminal but that the runway apron was too valuable

to lose; as a result, new structures were built, while others were demolished at the same site. Ultimately, only the structural form of the present ticketing area remained; all other buildings were removed. “It was a complicated process,” according to Ron Steinert, Gensler’s project architect, who points out that Chattanooga is typical of most airport renovations, which involve piecemeal additions, and was further complicated by the demolition of an entire functioning terminal structure.

Outside, light-colored concrete, its surfaces scored and textured by aggregate, reflect the masonry construction of older commercial buildings, underscored by metal canopies, with metal turnbuckles and a copper roof. Additions to double the current 5-gate capacity to 10 should prove as simple as adding bays to the new passenger concourse. Baggage and ticketing areas can be added onto without disrupting operations. Thanks to its strong new airport, Chattanooga may be remembered for more than its trains in the future.—*R.I.*

RICH RIZZO/CREATIVE SOURCES PHOTOS

**Nantucket Memorial Airport
Nantucket, Massachusetts
HNTB Architects and Planners**



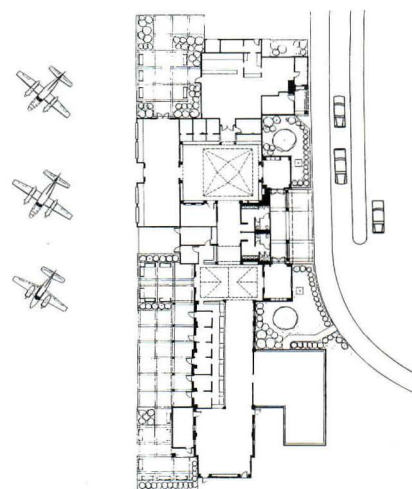
STEVE ROSENTHAL PHOTOS

Nantucket, an island 30 miles south of Cape Cod, is one of the most preserved places in America. Any new structure is subject to review by the Nantucket Historic District Commission (HDC), a five-man preservation police force that has ruled the architectural etiquette of the island since 1971. While aimed at preserving this former maritime community, the HDC's restrictions hardly seem realistic for an airport, especially Massachusetts' second busiest. Nevertheless, HNTB's renovation of the Nantucket Airport not only conforms to the HDC's preservation mandate with a cupola-topped addition, but also welcomes the 50,000 tourists who pass through the terminal each summer with an appropriate example of the island's shingled vernacular.

"We wanted better public spaces, circulation, and rest rooms," explains airport manager Fred Jaeger of the decision to upgrade the airport's trio of post-World War II sheds. The airport commissioned the Boston office

of HNTB and local designer D. Neil Parent to streamline the complex with a minimum of intrusions. The architects revamped the 1950s main terminal into a light-filled arrivals hall, extended a new entrance portico, and linked the terminal to a new departures lounge in the north wing.

Although extensively renovated, the airport maintains its tradition of informality. Arriving passengers walk across the tarmac to the terminal's gabled airside, where they are greeted by family and friends in outdoor waiting areas. Baggage is collected on carts and deposited on shelves in the skylit arrivals hall. While waiting for boarding calls, departing passengers gaze at paintings by local artists. "We tried to create the feeling of a town hall," explains HNTB Principal Stephen Smith, whose civic-minded design not only pleases Nantucket preservationists, but airport officials from nearby Martha's Vineyard as well, who are planning to renovate their own terminal.—*Deborah K. Dietsch*



PLAN: HNTB linked arrivals hall in main terminal (center) to departures lounge in north wing (top).

TOP: New airside elevation features paired gables. Baggage is passed through windows under awnings.

ABOVE LEFT: Punctuated by dormers, chimneys, and picket fence, airport echoes Nantucket's shingled houses.



STREETCARS OF DESIRE



Thirty years after trolleys disappeared from city streets, Americans are calling for their return to relieve traffic congestion and revitalize car-clogged downtowns. Not since the 1970s, when mass transit went underground, have the lines drawn by urban transit planners fingered out on so many new maps. Today, 14 cities across the country have light rail systems riding on the surface of their streets, and more are considering such transit for the future.

Eschewing the 1970s underground rail of Washington's Metro and San Francisco's Bay Area Rapid Transit (BART) for trolley lite, U.S. cities are now opting for flexible streetcar tracks. Lines in Los Angeles; Baltimore; St. Louis; San Diego; and Portland, Oregon, travel along the surface for one-tenth the investment and one-quarter the construction time of earlier subway systems.

More responsive to their surroundings, these streetcars glide along city streets, rise over highway median lanes, and slip through existing rail rights-of-way, picking from many paths for their commuter and commercial potential. Architects design light rail on both small and large scales, from canopies to transit-centered development. They shape the stations and the route and, in more enlightened cities, have the chance to draw the denser surroundings, pedestrian environments, and compact communities in a planned process that extends transit from a single line to a spider web of movement.

Light rail models

The romance with light rail and the sense of its link to denser design has evolved slowly. If the energy-conscious 1970s initiated federal support for some heavy rail lines, their cumbersome nature and high cost curtailed enthusiasm for constructing others. In the 1980s, new streetcars began to appear in cities such as San Diego (1981) and Portland (1986). The same distaste for congestion and sprawl beneath polluted skies led cities like Sacramento and San Jose to follow the next

year. Canada was a northern light; Europe, an ongoing inspiration. Together they became role models, showing that transit routes could revive "antiquated" downtowns and abet the quality of life everywhere.

Enthusiastic enough to go for a pay-and-plan-it-yourself system, San Diego citizens voted a municipal bond; Portlanders taxed themselves. The results in terms of urban salvation astounded even the initiators of the systems. Their picturebook trolleys charmed; word of how they buttressed downtown spread. So did expansion.

In this decade, congestion and imperatives from the 1990 Clean Air Act amendments have combined with aversion to auto-bred sprawl. Federal funds available through the newly enacted Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) could help rupture this country's long-standing affair with the automobile (pages 101-103, this issue). The vehicle romanced as "trolley," or "streetcar," and now given the semantic imprimatur of the high-tech "LRV" (light rail vehicle) has emerged as a genial, much-loved token of an urban past.

Environmental boosterism

"You can't be a really competitive city in the United States unless you have a modern transit system," maintains architect J. Steven Coffey of Kennedy Associates, project director for St. Louis's newly opened Metro Link. City boosterism blends with tourism elsewhere, too, to create a keeping-up-with-the-urban-Joneses mentality. In Texas, it's a city versus city competition as Houston and El Paso think of hopping on the traction wagon to vie with Dallas's \$841 million, 20-mile DART route. Sentimentality compounds the appeal—witness Portland's vintage trolley, a replica of the city's 1903 streetcar that connects the new Oregon Convention Center to various *stations downtown*.

Nostalgia and boosterism buoy supporters, but economic and environmental realities actually get lines off—or on—the ground.

Sprawling cities like Dallas and Denver, ravaged by roads and parking lots, now have light rail lines under construction, ironically, on the very routes where the old streetcars ran. San Francisco's East Bay Area would like to excavate and reuse its old system.

The very cities that dismantled their vast hubs of public transit are looking to reinstate them, such as Baltimore's Central Corridor, designed by local architects Cho, Wilks & Benn. Cleveland, Memphis, and Charlotte are also looking into light rail systems. The scant, 6 trolley-linked cities in 1973 could reach 30 by the year 2000.

Older cities have added to their mileage and carrying capacity, too. These worn urban systems built more perfunctory—or, as their designers put it, “functional”—stations: Chicago's new eight-stop line from Midway Airport, which opened this spring, is typically Spartan. Some older systems have new lines, extensions, or cars. Boston's proposed tunnel for a busline (with future streetcar potential) to waterside Fort Point Channel; New Jersey's planned \$525 million line along the Hudson River waterfront; and even the multibillion pipe dream of a New York City line to its airports attest to more mass transit musings. The track extensions and the need for ADA-generated accessibility will require still more construction on existing lines.

New system for Los Angeles

The quintessential auto-age dystopia of Los Angeles launched 4.4 miles of subway this year and will have 20 miles of new light rail by the end of the year to connect to the 22-mile-long Blue Line from Los Angeles to Long Beach that first proclaimed Southern California's trolley fever in 1991. Four hundred miles and \$78 billion are the figures that float in the once-blue sky of the city's transportation authority.

Car-addicted Angelenos overcame their aversion by marketing, by security, and—its builders insist—by architecture. “We say one ride makes a convert,” says Jessica Cusick, who heads the Art for Rail Transit program, which tries to infuse each of the city's 65 stations with its own personality.

The process has not been easy. The very grandeur of the stations overwhelms the architecture and diminishes the art. In some Metro Red Line stations, however, art and architecture make forceful allies: Artist Roberto Gil de Monte's tile murals above the steps resonate in Dworsky Associates' steely Seventh Street/Metro Center; and the lyrical abstraction of Cynthia Carlson's “City of An-



DAVID ZUMAYA





**San Diego Light Rail
San Diego, California
Metro Transit Development Board**

Former State Senator James R. Mills, dubbed “the father of light rail,” sits in the cafeteria at the transportation center that bears his name. One stop away from the Murphy/Jahn-designed America Plaza station, and minutes more from a downtown whose vitality pays tribute to the “Tijuana” trolley, Mills recalls the environmental impetus 30 years ago and his “end of the world” speech that helped launch the line.

San Diego’s first streetcar was installed in 1981—the first light rail success story. By the end of its first year running, the streetcar had carried 11,000 passengers. In the next decade, the light rail line tripled the number of riders on its initial route, while adding another 15,000 riders to its extensions. City architect Michael Stepner credits light rail for

his most successful downtown commercial project, Horton Plaza.

Builders of San Diego’s 12-year-old system are more likely to speak of future goals, however, than to recall the pioneering past. Metropolitan Transit Development Board (MTDB) officials exacted a land/plan process broad enough to include day care and holistic enough to unite transit and city planners.

The 1993 transit agency’s map is polka-dotted with many stippled lines for proposed light rail, and the city council’s new land-use ordinance of Transit Oriented District guidelines by architect Peter Calthorpe are a year old. The MTDB transit agency publications run to 491 items, including a paper on strategies to integrate the system’s architectural attractions—the Delawie/Bretton/Wilkes-designed Transportation Center and Murphy/Jahn’s America Plaza transit center. America Plaza’s erector-set style details transform a

troublesome spot into a knot of transit and architecture.

The same brightly colored, perforated-steel armature that sparks the firm’s United Terminal at O’Hare celebrates this space. Here, project architect Martin Wolf met the complications of fire codes and catenary wiring with a system of structural bays, transforming a dim public space into a splash of color and light. Though the tower above is an out-of-scale insertion, the base of the building houses the San Diego Museum of Contemporary Art, creating a streetscape on the ground floor.

Similarly, the transportation headquarters at the Imperial and 12th streets transfer station metamorphosed a service station into an appealing assemblage of a 10-story structure, garage, and clock tower. In this earlier public/private partnership, the architect made a lively statement with vivid red X-shaped cross-bracing lining the office exte-

FACING PAGE, TOP: San Diego’s transit headquarters designed by local firm Delawie/Bretton/Wilkes Associates.

FACING PAGE, CENTER: Light rail stops straddle convention center, designed by Erickson Associates with Loschky, Marquand and Newholm of Seattle.

FACING PAGE, BOTTOM: San Diego’s light rail system will extend from U.S./Mexico border to north of city. Map delineates existing systems (thin lines); systems under construction (heavy lines); and future expansion (dotted lines).

LEFT: Tracks plunge through the center of America Plaza. Architect Murphy/Jahn designed trolley station with steel canopy to invigorate waiting space.

rior and a grocery store and take-out restaurant enlivening the interior.

Unfortunately, the canopies and design elements sponsored by several different architects for the public agency don’t match these standards. The Martin Luther King greenway, once eulogized in halcyon terms, is sparsely dotted with barrier stops and is slow to receive landscaping.

If the recession has hit and the ideal is not always the reality, that should change, reasons Stepner. Since late 1992, daily ridership has crept up from 42,500 to over 46,000. The Mission Valley line to Santee, designed by the MTDB, heads toward the growing northeast. And plans for urban infill continue.

It is still a long haul from a car-oriented culture to a trolley-based policy, but anti-auto pioneer James Mills retains his zeal. “I think it’s possible to do away with the auto,” he maintains; and if it takes another 30 years, so be it.

gels" complements Christopher Sproat's solid benches at Union Station. The more successful designs better reflect the scale of the cavernous chambers: At Pershing Square, for example, architect Arthur Erickson incorporates artist Stephen Antonakos' neon against his glossy-columned station.

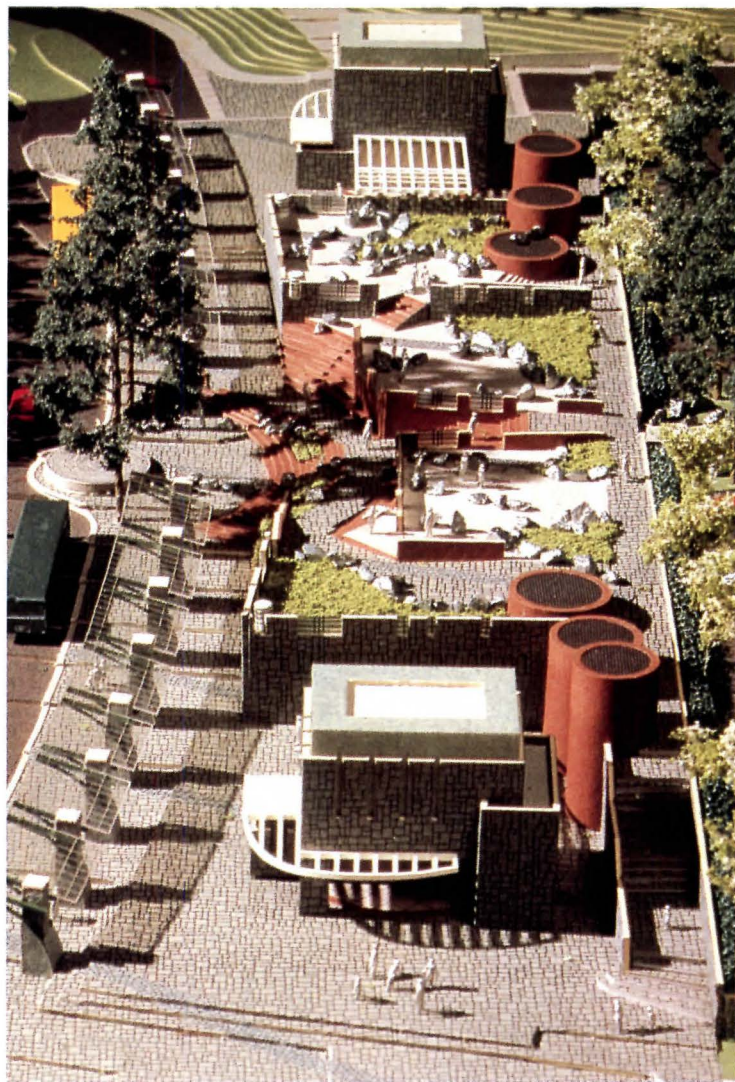
The number of guards and good-will guides during the opening week in Los Angeles matched the number of passengers in the five architect-designed underground stations of the Metro Red Line downtown. Nonetheless, both the Blue and Red lines have attracted ridership beyond expectations. The land of sprawl incarnate is also the land of smog and congestion rampant, and therefore the city's commitment is considerable. Such nationally known firms as Arthur Erickson Architects, Harry Weese Associates, and Gensler and Associates have designed monumental stations with 40-foot-high ceilings and 400-foot-long platforms.

Now under the direction of the newly formed Los Angeles Metropolitan Transportation Authority, the city is studying the areas around transit lines to determine the future of development that will surround stations when the new lines are completed (pages 93-99, this issue). If successful, such planning, which involves local architects and community groups, could serve as a model for other cities contemplating light rail.

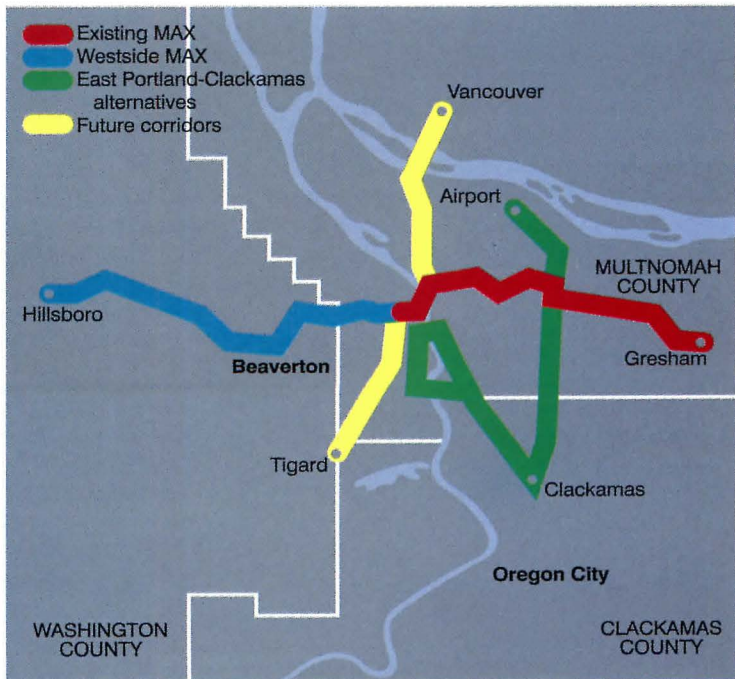
Light rail obstacles

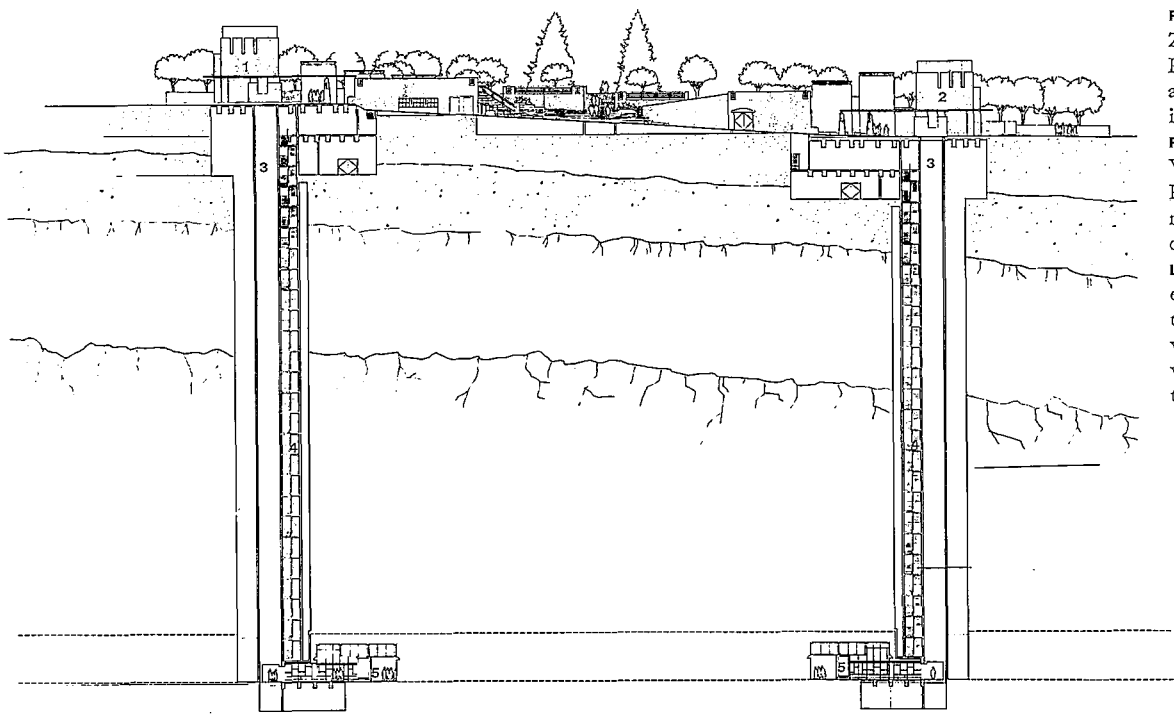
However well-designed, some new light rail systems are shortsighted in their urban scope. Features like "park 'n' ride" or "kiss 'n' ride" lots and dropoffs strike those who have them (Sacramento, for instance) as nonproductive and often no easier to reach and use than to drive 'n' drive right on to work. To transit commuters, the baby systems may look like trolley tunes. Compare Los Angeles's 27-mile route to New York's 250-mile octopus. Manhattan's 2.5 million daily transit-takers make the 23,000 to 24,000 a day riders on Portland's, Sacramento's, or San Jose's lines look as diminutive as the heritage trolleys that ply tourists on their way.

Chicago's 85 percent ridership downtown seems like bigger stakes, serious stuff; but its politics are as gusty as the Windy City. The city's \$750 million light rail Circulator Line, proposed to coil around the Loop and environs starting in 2010, has resulted in an all-too-lengthy design review process undertaken by local architect Ross Barney Jankowski and the Boston-based firm of Sasaki Associates (page 28, this issue).



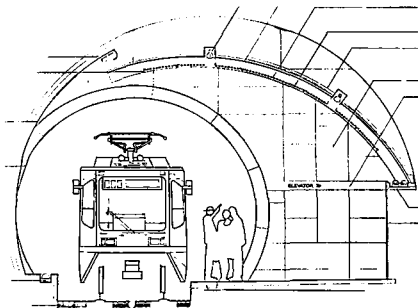
STRODE ECKERT PHOTOGRAPHIC





WASHINGTON PARK ZOO STATION SECTION

- 1 WEST ELEVATOR
- 2 EAST ELEVATOR
- 3 ELEVATOR SHAFT
- 4 STAIRS
- 5 PLATFORM



PLATFORM SECTION

Westside Corridor Expansion Portland, Oregon Zimmer Gunsul Frasca Partnership

Concerned not to "Californicate" the Northwest, as a bumper sticker describes the region's distaste for sprawl, citizens of Portland, Oregon, got their impetus for light rail from fear of a freeway. Almost two decades ago, the federal government agreed to transfer funds from a planned interstate along the Willamette River to a trolley line. A dozen years later, in 1988, the city opened the Metropolitan Area Express (MAX), a 15-mile light rail line from downtown to the small, eastern suburb of Gresham.

The stations and riders that followed created an example for the nation. So much so, it sometimes seems that architect Zimmer Gunsul Frasca Partnership (ZGF) won an equal number of awards for its design of a well-groomed, 30-station

system. More significantly, light rail spurred \$800 million in development. Downtown Portland was established as downtown.

But neither installing the light rail lines, nor maintaining a pace-setting standard of finishes and design, has done it alone. The anti-car classic tale enacted by Tri-Met, Portland's transit agency, with other planners entailed a ban on roads and parking spaces, and zoning for higher density around transit stations.

Today work continues. Standing at the ZGF-designed Oregon Convention Center, the latest facility hooked to rail, ZGF Partner Greg Baldwin recalls the derelict neighborhood made safe by the station. The same quality-of-life and "anti-slurb" sentiment—powered by a projection that anticipates half a million more residents by 2010—galvanizes the ongoing Westside expansion designed by the firm. To pursue the long-range plan on the western corri-

dor, three-quarters of the population voted for the region's new transportation plan. Tunneling under the west hills and paralleling the route of the car, through railroad rights-of-way, highway corridors, and more urban surfaces, the 11-mile, 12-station line will head out to the fastest growing suburbs of the city.

At the Washington Park Zoo station, ZGF aims to turn an asphalted parking entry into "a procession of giant sequences through which artists and architects tell a story," according to Partner Robert Packard. They hope it will evolve into a place where convention-goers and tourists can take a 20-minute ride from downtown and exit into a congenial environment.

Designs for other stations and communities emphasize giving identity to places lacking context and locating stations to stimulate development. Again, Portland is thinking more holistically than many start-up

FACING PAGE, TOP: Washington Park Zoo station by Zimmer Gunsul Frasca Partnership will feature two pavilions and improvements to an 800-car parking lot on a 42,000-square-foot site.

FACING PAGE, BOTTOM: The 11-mile Westside Corridor from downtown Portland to the western suburbs is now under construction, extending the city's 1986 light rail line.

LEFT: Burrowing 250 feet into the earth, the Washington Park Zoo station incorporates four high-speed elevators to send passengers to a plaza, which lies within walking distance of the area's cultural features.

systems. "How can you get involved?" the fact sheets put out by Tri-Met ask the community. From adding downtown density to slating compact neighborhood development at station nodes, they can address the problems with Tri-Met consultant architect Peter Calthorpe's transit oriented guidelines in their grip.

Can what a local civic group calls "a turnaround to walkability and better transit" spread beyond the center? Some observers look wistfully at the first wave of rail which transfigured downtown; they question whether today's plans match its standards: Can the luster of urban vitality really illuminate the sprawling fringe and shape the sprinkled settlements of American cities into townships? "Design is a tool that facilitates community," says Baldwin. *To Portland's credit, such attention to the specifics of city and suburb reaches beyond single-minded transit service.*

And unlike older urban subway systems, the streetcars coming to the highway-bound, mid-sized cities of America sometimes provoke a fear of urban, multiracial ridership. Builders install security systems that would satisfy Charles Bronson in the film *Death Wish*; and some light rail lines skirt powerful or affluent neighborhoods for political reasons.

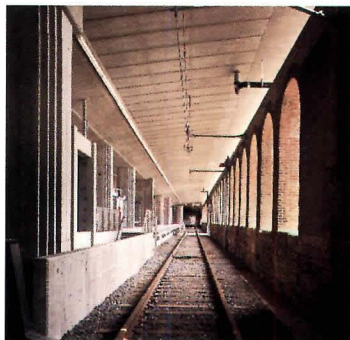
In St. Louis, for example, critics complain that the cost-saving decision to shoot the city's light rail Metro Link through an old railroad right-of-way was merely a trade-off for earmarked federal funds rather than an effort to implement sound urban planning. They point out that an earlier, loop-shaped path for the new system would have stopped closer to a university and would have avoided the controversial excavation of an historic African-American cemetery.

Despite drawbacks and lean design budgets, the architects of the light rail systems appearing on these pages pay careful attention to public safety—with a quest for light and visibility—and public amenities, from brick walks to brisk graphics, from benches to street lights. These efforts create congenial urban streetscapes designed to attract riders. Pedestrian surroundings invite the walk to the station and hence make the trip between work and home, between commercial and cultural life alluring.

Development around stations

"Mass transit works best where high densities are linearly aligned along corridors, much like pearls on a string," writes Berkeley professor Robert Cervero of the land-plan connection that eluded the last generation of rail builders. The more advanced systems now express that awareness. They plan for the "pearls," the life-sustaining nodes of vitality around the rail; they want to change the overall pattern of sprawl and scatter that doubled the vehicle miles traveled on highways and undermined construction of mass transit systems over the past decade.

Architects involved in light rail are enthralled by the potential to shape these "pearls" or clusters that prompt good urban design. "A catalyst," is the way Don Miles, of Portland's pioneering, transit-minded Zimmer Gunsul Frasca Partnership, describes the city's ever-expanding transit system. Each project generates stations; each station secures architects to plan the development that will create the "nodes" that finance the rail. "The quality issue that concerns communities means that many of these projects will be viewed as design solutions, not engineering



SAM FENTRESS PHOTOS





**Metro Link
St. Louis, Missouri
Kennedy Associates**

St. Louis's new streetcar line won't rival the song "Clang Clang Clang Went the Trolley" in popularity, but St. Louis-based Kennedy Associates has labored to give the light rail line amenities and a civic identity, working against the odds of a modest budget and a resistant city.

If the \$351 million system opened this summer by the Bi-State Development Agency is the youngest and most modest, its niche in the streetcar story is significant. In some respects, this 20-station project in the middle of the nation is a test of light rail's wider role.

More financially pressed, sprawling, and segregated than most, the city required "an act of courage," just to install light rail, maintains architect Tod Williams of New York-based Tod Williams, Billie Tsien and

Associates, consultant to Kennedy Associates. To compensate, these designers have tried to hook into the city's symbols. The arches of the Eads Bridge and Eero Saarinen's monumental structure became the metaphor for canopies, new stations, and related facilities. The Eads Bridge itself, a 119-year old monument at historic Laclede's Landing, has gone from defunct to functional; its tunnel system, a part of the idled railroad right-of-way, now serves the new light rail system.

St. Louis's 18-mile line laces a system that runs through the notorious wasteland of East St. Louis through downtown and, once the city relocates the cemetery in its path, to the airport, serving a convention center, university, park, and stadium en route. Williams/Tsien and Kennedy Associates eschew pseudo-historicism in favor of contemporary functionalism. The architects' recurring concrete shelter evokes the Parisian

Metro entrances of Hector Guimard in a way that is "appropriate for our time," as Williams puts it. A coalition of local and national artists worked with the architects to orchestrate their asymmetrical form, with concrete elevator shafts that serve as dignified light beacons.

Architect/engineer Charles Fleming of St. Louis's Fleming Corporation describes the shops and yards of the light rail maintenance facility as "the heart of the system," which exudes color and muscle.

The straightforward concrete form, enlivened by a free-standing red portal by Jody Pinto, one of the six artists enlisted in the coalition, animates its industrial site. The color scheme and the cleanup that make the entourage work were commanded by the Arts in Transit program directed by Ann Ruwitch.

Ruwitch surveyed the sites, integrated the artists and architects into a co-design process, and staged

FACING PAGE, TOP LEFT: Arches are opened at Laclede's Landing station to admit light and add security.

FACING PAGE, TOP RIGHT: Convention Center station features curved precast concrete-paneled roof.

FACING PAGE, CENTER: Forest Park, a typical suburban station, provides shuttle service to museums and zoo.

FACING PAGE, BOTTOM: Metro Link light rail system runs through old downtown railroad tunnel system and will eventually connect to the airport.

LEFT: Grand Avenue station serves as beacon to the community. Glazing increases security and lowers perception of risk. Metal-clad inverted pyramid (top) reflects interior light.

BELOW: Entrance and exit to 8th and Pine Tunnel station is composed of steel and laminated glass.



events to introduce and welcome the line throughout the city.

For all such labor, the fledgling St. Louis system has yet to deal with the urban design nuances that certify linkages and encourage car-free travel. The forthcoming Kiel Center Arena, by Ellerbe Becket, is a small hike away from a Metro Link stop, but has yet to plan a path to conduct walkers to their destination. It further perpetuates driving, with a 1,200 to 2,000-car garage.

If the St. Louis system lacks the vigor of Eastern transit cities or the trolley-jolly verve of the West Coast builders, it does possess the foundation for urban revival. The town-going Metro Link scoots into an historic district in a city still blessed with the infrastructure of public works and the institutions of an industrial era. With such a strong civic legacy, the launching of the new transit line could forge a contemporary standard of urbanity.

ones," asserts Miles. Officials concerned with urban design, ranging from proper siting to street furniture, are involving architects in shaping better surroundings.

Architects recognize the streetcar's form-giving, life-enhancing qualities. They try to plug rail lines into places that generate activity with attention to the particular qualities of a site and an eye to civic amenities and landmarks. Baltimore's rail brings riders to Oriole Park, its new baseball stadium by HOK at Camden Yards. Chicago's Circulator will offer a route to the Museum of Science and the Art Institute and add convenience to the commuter's city-going trip.

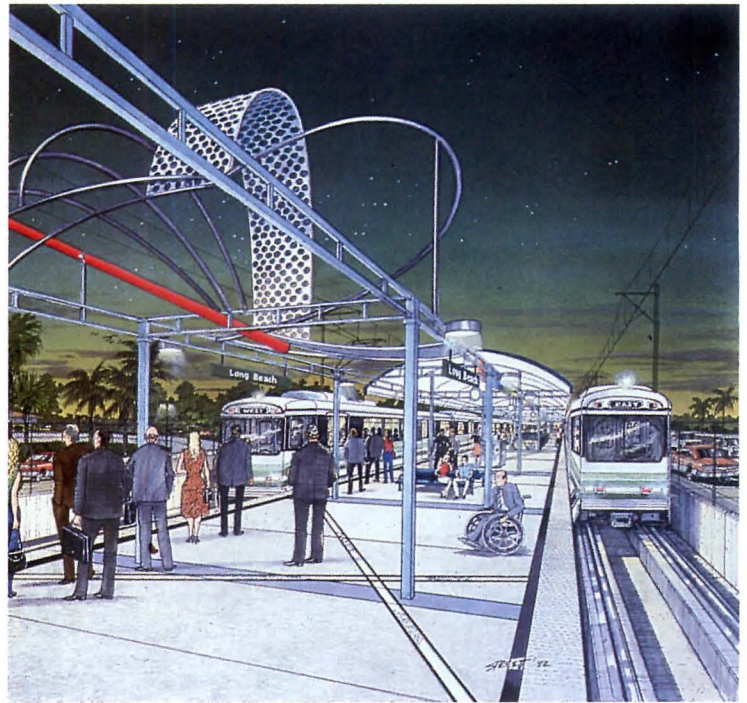
Convention-goers in San Diego, Chicago, Portland, and St. Louis have, or will have, new facilities connected to their rail systems. In St. Louis, Chicago, Los Angeles, and elsewhere, airports serve as a logical terminus and attraction for light rail lines.

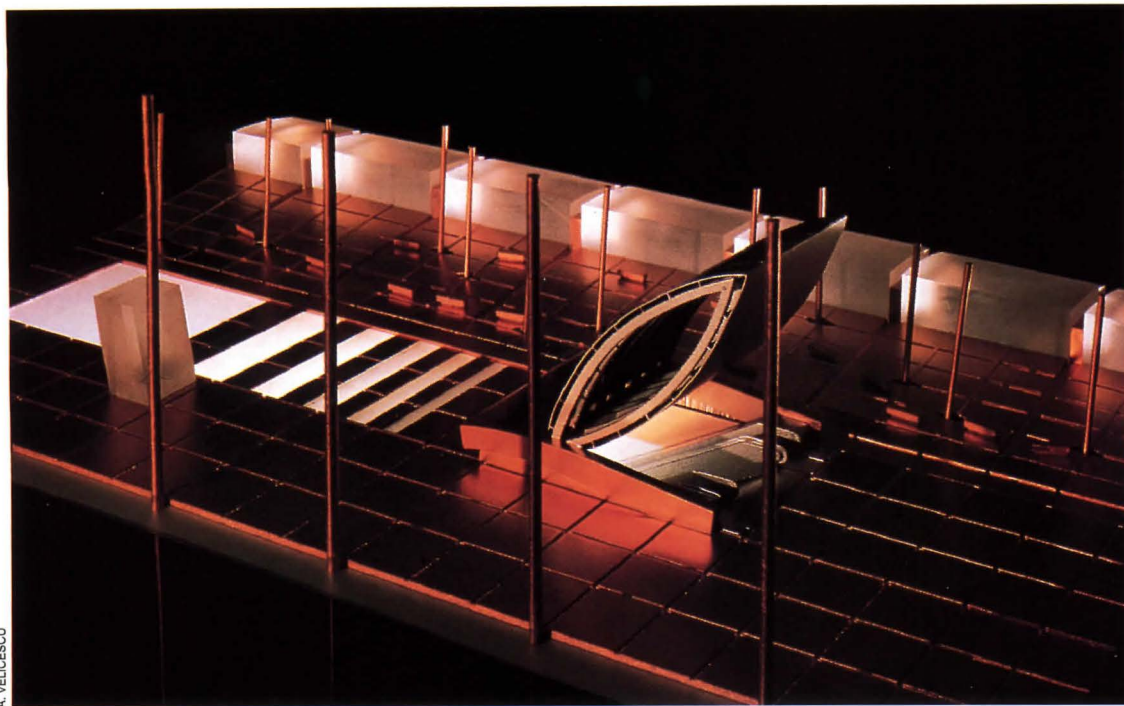
On a larger scale, the compact development demanded by the economics of public transit's passenger needs reinforces—if not requires—the current architectural fashion of Neo-Traditional design. The small scale communities drawn by Duany Plater-Zyberk (DPZ) and Peter Calthorpe are built for a walking, auto-free lifestyle; they stem from the grid which encourages people to become pedestrians again. Such New Age streetcar suburbs put a larger population within walking distance—7 to 10 minutes is the estimate—to make light rail and other public transit economically viable.

Transit oriented districts

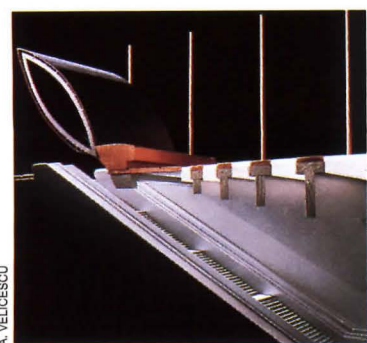
Thus, out of the sprawl of the 1980s and '90s that produced edge cities and exurban communities where the car is king and housing is too spread out to support mass transit, trolley fans and even highway bureaucrats bogged down by traffic have learned what would seem a truism: Transit ridership requires the bulk of nearby riders. They realize that pleasant cities and, indeed, urban revitalization can encourage such compact living and produce the densest, most lucrative portion of the transit route. They are also aware that the traditional walking cities, near what we now call "clustered housing," are most conducive to public transportation.

The name for such planning is Transit Oriented Districts (TODs)—design which reinforces transit. And transit officials sometimes understand it more than architects. While DPZ often appears myopic to the mass transit link, California-based Calthorpe has used *this approach to plan nodes and clus-*

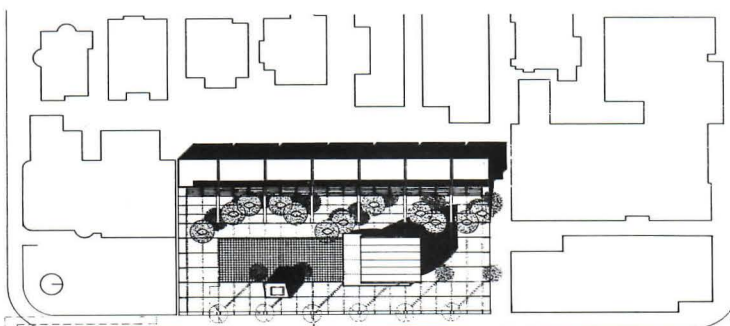




A. VELICESCU



A. VELICESCU



SITEPLAN

Metro Lines Los Angeles, California Metro Transportation Authority

Ridership on Los Angeles's new mass transit system exceeds expectations in a city designed for the automobile. The Engineering Management Consultants, a coalition of Los Angeles architecture and engineering firms led by Parsons, Brinckerhoff, Quade & Douglas and Daniel Mann Johnson & Mendenhall, drafted artists and architects to create some 65 stations for the \$78 billion system, which encompasses the new Metro Red Line downtown, the Blue Line from Los Angeles to Long Beach, the coming east-west Green Line, and the Metrolink commuter rail.

Everyday, 12,000 passengers ride the Metro Red Line, the first segment of which makes five stops along a 4.4-mile-long stretch downtown; 38,000 daily take the 22-mile-long, three-year-old Blue Line.

The Green Line will open in 1995 and cover 20 miles, and the 194-mile Metrolink commuter rail line will add a tally of 400 miles.

Above ground, the lack of street life and low density still undermine the premise of rail and the promise of ridership. The Civic Center's Spartan surroundings bely the rail station's "civic" title. The unwalkable environs of the splendidly refurbished Art Deco Amtrak Union Station—epitomized by a sidewalk sign poised at this walker's forehead height—are a pedestrian putoff; equally so is the plan for a Gateway headquarters development (page 98, this issue), bus plaza, and park 'n' ride. Tied to a whopping tower-in-a-plaza bromide developed by the Metropolitan Transportation Authority (MTA) itself, the melange negates the possibility of connecting Union Station to its neighborhood and calls to question the agency's commitment to the cause.

Notwithstanding such car-oriented conditions, Union Station is a rail hub for the expanding lines and will be more so. Elsewhere, too, some dozen stations have or will have master plans and projects to connect their station's portals to buildings. At Pershing Square, for instance, a private/public partnership will help convert and rehabilitate three historic buildings into a market and residences reconnected to "Angel's Flight," the 1903 funicular's revived 375-foot aerial tramway to Bunker Hill.

The success of the Blue Line, despite its no-frills MTA design, has produced more plans for adding art, architecture, and landscaping to its barren surroundings. A 1-acre park and greenway between the 103rd Street station at Watts and the arts center near Simon Rodia's Watts Tower will open this fall. Developers of the Willow station on the Long Beach line want to fill 22 acres be-

FACING PAGE, TOP: Platform of Long Beach Boulevard/105 station will feature sculpture by artist Sally Weber.

FACING PAGE, CENTER LEFT: Tile triptych by Roberto Gil de Monte at Seventh Street/Metro Center station designed by Dworsky Associates.

FACING PAGE, CENTER RIGHT: "La Luna" by artist Francisco Letelier fills wall of Westlake/MacArthur Park station by Gensler and Associates.

FACING PAGE, BOTTOM: Mass transit map shows light rail (Metro Blue Line, Metro Green Line), and underground line (Metro Red Line).

LEFT: Model of Vermont/Santa Monica Boulevard station of the Metro Red Line by Ellerbe Becket's Mehrdad Yazdani and artist Robert Millar.

BELOW LEFT: Stainless steel, boat-shaped canopy marks station entrance.

BELOW RIGHT: Plaza of the new station slots into pedestrian-oriented Vermont Boulevard neighborhood.

side its park 'n ride with a mix of shops and housing.

Running above and below grade, the \$796 million Green Line has also produced a heavy artist-to-architecture-to-community dialogue, according to LA AIA President Kate Diamond. At Baldwin Park, Siegel Diamond Architects and artist Judy Baca engaged the surrounding Latino community in the design of the station. "The station offered an opportunity to define their town, to give it identity," Diamond explains.

Los Angeles's transit system is expensive; but the cost of congestion, smog, and sprawl is greater. Can light rail drag Southern Californians from their cars and lace a city 150 miles across? However one assesses the struggle to transform a county where "rail transportation" was an oxymoron, and "sprawl" a synonym for development, an alternate to Los Angeles's drive-only, low-density development is underway.

tered communities around rail stations to solve the "crisis of place in suburbia." His TOD guidelines have served as workshops and model approaches in plans for San Diego, Portland, Sacramento, and elsewhere where they provide an alternative to sprawl.

For Calthorpe, as for many transit planners, light rail's success is "really a configuration as well as a pragmatic issue." Narrow streets that allow pedestrians to walk to streetcars; granny flats and smaller, affordable housing units that promote density; sidewalks that encourage people to walk to rail—all reduce auto-dependence and encourage more light rail lines.

Light rail's future

But are these appealing new light rail lines really getting Americans out of their automobiles? Enthusiasts say "Yes." Critics say "Maybe." Rail ridership increased 39 percent between 1975 and 1990, and the Portlands and San Diegos which started small have planned new extensions to existing lines. According to some observers, central cities survive by dint of their rail access; recognizing the vital land use/design link, they battle congestion, pollution, and sprawling auto-age landscapes by building more. Older urban centers like New York City, with its problems of aging public works and inner-city angst, also struggle to update ailing systems.

Streetcar saviors have yet to invest as much energy into curbing the car as creating its alternative, however. The need to control the automobile while releasing the trolley is vital, maintains Michael Meyer, professor at Georgia Tech. And, even if we draw streetcar lines on the streetscape, today's suburban landscape is far less transit-friendly than ever before; many well-placed commuter communities refuse to risk neighborhood security and property values with the development of nearby stations. On the one hand, the fiat forbidding the new Los Angeles Red Line from heading under Wilshire Boulevard, for instance, was the politics of affluence-as-power rather than reason as right-of-way. On the other hand, the new Watts station at 103rd Street has generated a greenway from the streetcar stop to the Watts Tower in this riot-bred symbol of impoverishment.

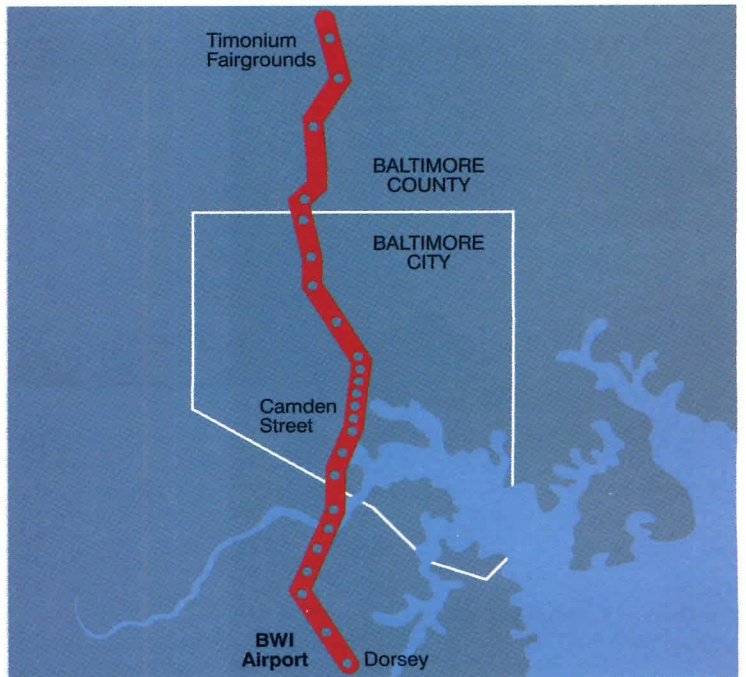
Despite these complications, the trolley is the comeback kid of transportation and architecture. Its designs are encouraging; its architects, enthusiastic. The cities, stations, and services surrounding these rail lines portend new life for urban America, and for architecture in the public realm. —Jane Holtz Kay



ERIK KVALLSVIK



J. BROUGH SCHAMP



J. BROUGH SCHAMP PHOTOS



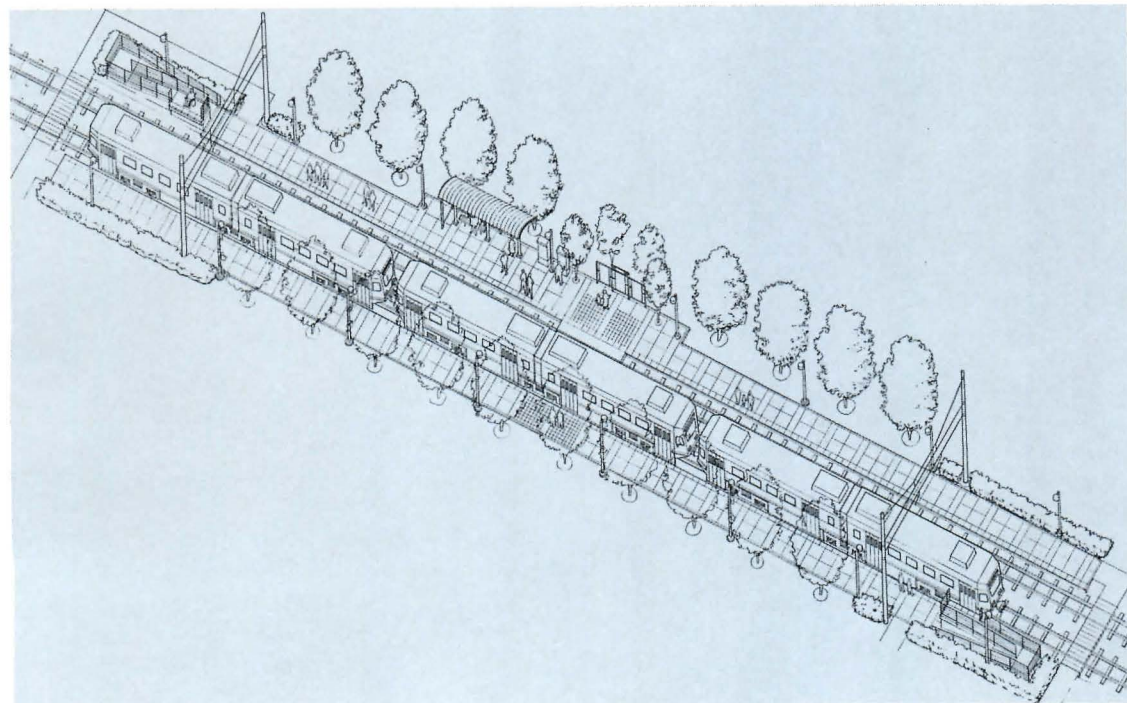
FACING PAGE, TOP: Cho, Wilks & Benn-designed maintenance facility.

FACING PAGE, CENTER: Pratt Street station in front of the historic, recently renovated Camden Station.

FACING PAGE, BOTTOM: Central Corridor light rail line is 27 miles long.

TOP LEFT AND TOP RIGHT: Shelter in 22 stations lining MTA light rail line.

BELOW LEFT: Stations include raised block for ADA-compliance, concrete platforms, halide light fixtures, and site-specific landscaping.



**MTA Central Light Rail Line
Baltimore, Maryland
Cho, Wilks & Benn**

Another chorus of “Take Me Out to the Ball Game” resounded this spring for Baltimore sports and trolley fans alike as Maryland Governor William D. Schaefer pushed delivery of the latest lap in Baltimore’s light rail line. Timed to celebrate the first baseball thrown for opening day, the system now encompasses 22.5 miles from the Timonium fairgrounds north of the city to the Dorsey station south of the city. The speed of the four-year, \$450 million project stemmed from the governor’s urge to make the MTA Central Light Rail Line a home-run away from Oriole Park at Camden Yards.

Local architect Cho, Wilks & Benn gave equal care to the details of the line itself, creating standard fixtures, steel-framed shelters, and concrete platforms adjustable to any

site. The setbacks and placement of kiosks, platforms, and ramps for the disabled vary according to neighborhood and to the slim corridor of land bought from Conrail. Like St. Louis, Baltimore’s alignment suffers drawbacks from adopting a right-of-way, plunging through the “backyards” of its neighborhoods. Remote from walkable nodes until it hits the city, the light rail system doesn’t penetrate so much as shuffle through urban/suburban edges.

The architect faced the cramped alignment, the engineering intricacies of bypassing the highway, and the grim environment of park ‘n’ ride lots. The line had to bypass upscale Ruxton to the north, and fear of the streetcar’s noise near the symphony hall shifted the “Cultural Center” stop, says project director James W. Walsh of Cho, Wilks & Benn. But the transit planners’ will to link transit to the rich Victorian architecture of the city that one

preservationist calls “the Boston of the South” still seems tenuous. For all the urban potential of Baltimore’s light rail system, commercial development projects proposed for non-urban areas—the mall and expressway in Hunt Valley or the parking garage at Amtrak—invite the driver, not the walker. And the surface line by Camden Yards has yet to loop the city to its harborfront. Despite a people mover down Pratt Street and the monorail from the station, such urban energy runs counter to too much competition from the suburbs, concedes Acting City Planning Director Rachel Edds.

Moreover, planners have yet to reinforce the transit oriented rail-land bond to the extent of Portland or other new West Coast rail builders. MTA planner Ken Goons acknowledges the competing urban and suburban agendas as “one of the real challenges” to the evolution of the light rail system. Fiscal concerns

threaten the esthetic standards of future work on the light rail, as design-build teams may be commissioned to cut costs.

More positively, lines under construction will further connect downtown shopping, historic sites, and the airport. Within two years, three spurs will be added, totalling 29 miles—one heading to the expanding airline terminal to the south, one to the Amtrak station, and a third north to Hunt Valley. Metro, the city’s older underground subway system, is also expanding eastward to connect to Johns Hopkins Hospital, the area’s largest employer.

Skirting the surface yet anchored to urban life, the scenic route from the northern reaches of Green Spring Valley to downtown on Baltimore’s light rail line is, as Goons notes, “a nice way to see the city.” This amenity means that in the future, light rail could return Baltimore to a streetcar city.

New York State Thruway Travel Plazas
Beyer Blinder Belle Architects & Planners

REGIONAL ROADSIDES



In every state across the country, the highway rest stop provides a place where weary road warriors can make a quick run for the rest room or phone, refuel the car, consult the map, or grab a snack for the long drive ahead. But with their overpriced fast food, crowded snack bars, and questionable sanitary standards, many of these gas-and-go emporiums are anything but restful. They can also leave visitors with a decidedly negative impression of the particular state or region where they've stopped.

Aware of the public relations pitfalls of unpalatable pit stops, a New York State agency has launched an ambitious campaign to replace its aging highway facilities with all-new "travel plazas," works of regional architecture designed to provide travelers with a more positive taste of the state. The New York State Thruway Authority, a self-financed transportation agency with responsibility for the nation's largest toll road and bridge system, is completing a \$170 million program to create 28 travel plazas along the 641-mile New York State Thruway from New York City to Niagara Falls.

Instead of crowding into generic brick boxes from the 1950s, thruway travelers are now stopping at rustic buildings that recall Adirondack lodges, Hudson River Valley train stations, Greek Revival barns, and Shaker meeting halls. Inside, they are served by national food service chains that are known for reliability and consistent quality. Many offer services that didn't exist 40 years

ago, from facsimile machines and automatic bank tellers to diaper-changing areas in both the women's and the men's rest rooms.

To create a coherent image for these new rest stops, the thruway authority turned to Beyer Blinder Belle Architects & Planners, a New York-based firm that has built a reputation for restoring and interpreting monuments. Its past projects include the Ellis Island Museum of Immigration and the restoration of Grand Central Terminal.

Working as design architect for the thruway authority and its joint venture partners, Marriott Corporation and McDonald's Corporation, Beyer Blinder Belle designed new buildings that celebrate the rich tradition of New York's architecture while addressing the needs of today's fast-paced thruway travelers. In the process, the architects elevated the rest stop from the lowly realm of commercial strip architecture to the proud domain of enduring public works for which New York State is so well-known. "The whole concept was to go back to the great heritage of New York State architecture—the Adirondacks being the most obvious example," explains Partner John Beyer. "The thruway authority's chairman, Peter Tufo, urged us to think of these buildings in the tradition of high civic design, such as the parkways built by Robert Moses."

Beyer Blinder Belle studied vacation spots and other places that are familiar to travelers in upstate New York: resort hotels and "great camps" in the Catskills and Adirondacks. In



- 1 PLATTEKILL
- 2 SLOATSBURG
- 3 ARDSLEY

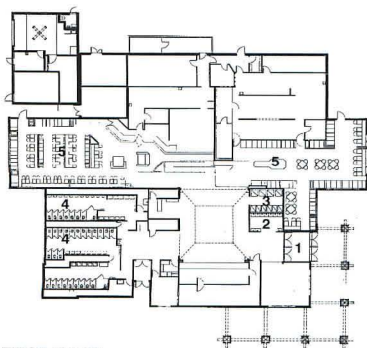
ABOVE: Beyer Blinder Belle was the design architect of 28 travel plazas along the New York State Thruway.

THESE PAGES: The Sloatsburg Travel Plaza, a two-story, 33,000-square-foot building connected to a 400-car garage, is billed as the nation's largest travel plaza. Seen from a distance, the building's stone and brick exterior evokes a mountain lodge.



BELOW AND RIGHT: Gabled roofs greet drivers approaching the Plattekill Travel Plaza, where river-washed stone columns, a brick wainscot, horizontal cedar siding, and a cedar shingled roof create a rustic appearance.

PLAN: Marriott is a joint venture partner with Beyer Blinder Belle in 16 of the 28 new travel plazas along the New York State Thruway. Visitors to the Plattekill Travel Plaza enter a large common space and then circulate to one of the many restaurants, each with its own seating area.



FIRST FLOOR

- | | |
|----------------|--------------|
| 1 ENTRANCE | 4 REST ROOM |
| 2 TELEPHONES | 5 RESTAURANT |
| 3 VENDING AREA | |

particular, the architect drew inspiration from the rustic, picturesque style associated with the 19th-century mountain resorts such as Tuxedo Park, Bear Mountain Inn, Mohonk Mountain House, and the Lake Placid Club. Providing additional inspiration to the designers were the architectural progenitors of the travel plaza—railroad stations—whose bold forms and straightforward plans evoke the romance of travel. “We felt that you should get a sense of being on vacation when you come to these places,” says Partner Frederick Bland. “Our idea was that a vacation starts on the New York State Thruway.”

The thruway authority solicited bids from companies that wanted to build and operate the 28 travel plazas and ended up awarding 16 sites to Marriott and 12 to McDonald’s. Standard items requested by the thruway authority included rest rooms, phones, travel information, and a minimum of two and a maximum of four fast-food restaurants in each building. Officials also wanted some 1990s amenities characteristic of most updated airports or train stations, such as barrier-free rest rooms for the disabled, automatic bank tellers, fax machines, and teleflorists. While they vary in their size, their combination of materials, and the way in which they are sited, all of the plazas evoke strong images of regional architecture.

Beyer Blinder Belle’s design task was complicated by the fact that the operators had different retailing ideas for the buildings’ interior layouts. Marriott wanted visitors to

enter a large common space and then move to one of the individual restaurants, each with its own seating area. The common area would provide access to the rest rooms, phones, and other services. McDonald’s, which has its own restaurants in each of the travel plazas, wanted the interior space to be designed more like the food court of a shopping mall, with multiple service counters and one “great hall” that would serve as a common dining area. In its buildings, this dining hall became a more pronounced feature than the central circulation space, a signature of sorts that could be seen from the roadway and that could be varied in size and shape. McDonald’s also wanted outdoor seating areas and lobbied to build more of its plazas parallel to the road instead of setting them at a 45 degree angle, as Marriott did in most cases.

Beyer Blinder Belle began working first on the 16 Marriott travel plazas and conceived of them as variations on the theme of the 19th-century mountain lodge. A strong visual presence is established by a hipped roof topped by a cupola that acts as a beacon for travelers. River-washed stone, slate roofs, cedar shingles, and heavy timber trusses reinforce the mountain resort imagery, while giving the sense that each building is in harmony with its setting. Even though floor plans follow a similar sequence, exterior materials are changed for variety.

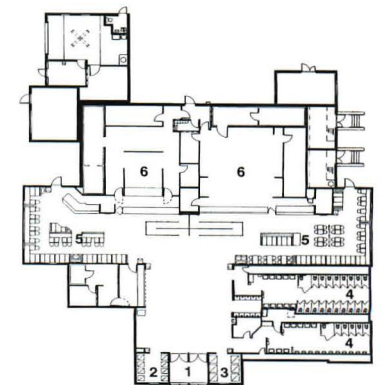
The sense of visiting a rustic lodge is further reinforced inside the central lobbies, where vaulted ceilings express the full vol-



LEFT: A stone base and columns, cedar shingle siding, and gabled slate roof imbue the Ardsley Travel Plaza with a mountain lodgelike character.

BOTTOM LEFT: Wagon wheel chandelier and clerestories illuminate the Ardsley Travel Plaza's entrance lobby, which is framed by pine paneling and log trusses.

PLAN: Phones, rest rooms, restaurants, and service wing surround central lobby of the Ardsley Travel Plaza.



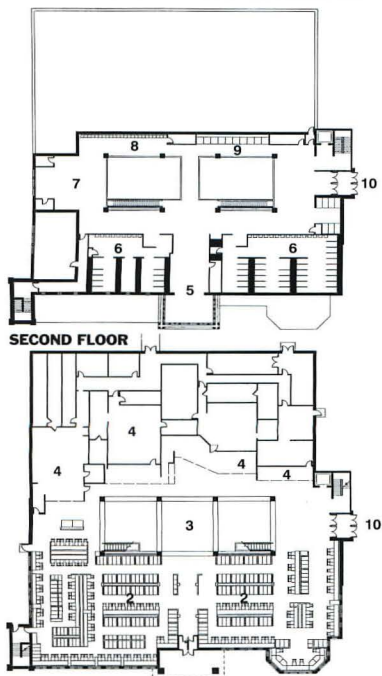
FIRST FLOOR

- | | |
|----------------|--------------|
| 1 ENTRANCE | 4 REST ROOM |
| 2 TELEPHONES | 5 RESTAURANT |
| 3 VENDING AREA | 6 SERVICE |

RIGHT AND BELOW: Alcove bluestone, handmade decorative brick, terne roof, and copper ornaments enliven Sloatsburg Travel Plaza, flagship of the 28 travel plazas on the 641-mile thruway.

FACING PAGE: Rising 53 feet to a star-stenciled ceiling, the Sloatsburg Travel Plaza's "great hall" features wagon wheel chandeliers, lumber trusses, and tiles depicting state fish and flower.

PLANS: Two-story Sloatsburg plaza concentrates food services on first floor and travelers' services on second.



- | | |
|--------------------|------------------------|
| FIRST FLOOR | |
| 1 ENTRANCE | 7 TRAVELER INFORMATION |
| 2 DINING ROOM | 8 TELEPHONES |
| 3 FOOD HALL | 9 VENDING AREA |
| 4 RESTAURANT | 10 PARKING GARAGE |
| 5 GIFT SHOP | |
| 6 REST ROOM | |

ume of the steeply pitched roofs. Natural wood finishes on the walls and ceilings continue the warmth of the exterior, while providing spaces that are relatively easy to maintain. Rustic touches include two-tiered wagon wheel chandeliers and engaged log columns and beams joined with wooden pegs. The historical imagery evoked by these public spaces provides a counterpoint to the modern efficiency of the food and service facilities. In the two-story Sloatsburg plaza—the largest in the system—a second-floor balcony overlooks a 53-foot-high “great hall” that serves as the central lobby.

Beyer Blinder Belle employed the same design strategy for the McDonald's travel plazas, creating three prototypes and then varying them further with different materials and finishes. A strong Adirondack flavor remains evident indoors, with elements such as heavy timber columns, wood ceilings, quarry tile floors, and pine wainscoting.

In response to McDonald's desire to play up the dining spaces as signatures for each building, the architect developed three distinct forms for them: abstracted versions of the barn, the Shaker meeting hall, and the horse stable. In some cases, they added deep porches with ornate fretwork that continues the lodge theme and, when possible, drew on regional influences to add variety.

One irony of the new travel plazas is the discrepancy between the architect's intentionally regional architecture and the uniformity of the food served by the national chains.

If the operators provided food the same way they designed their buildings, they would have rented space to Mom and Pop restaurants, featuring home cooking at every stop. New York State Thruway officials maintain that individual restaurateurs would have been an operational nightmare. This way, they explain, the food is at least a known quantity and served at competitive prices.

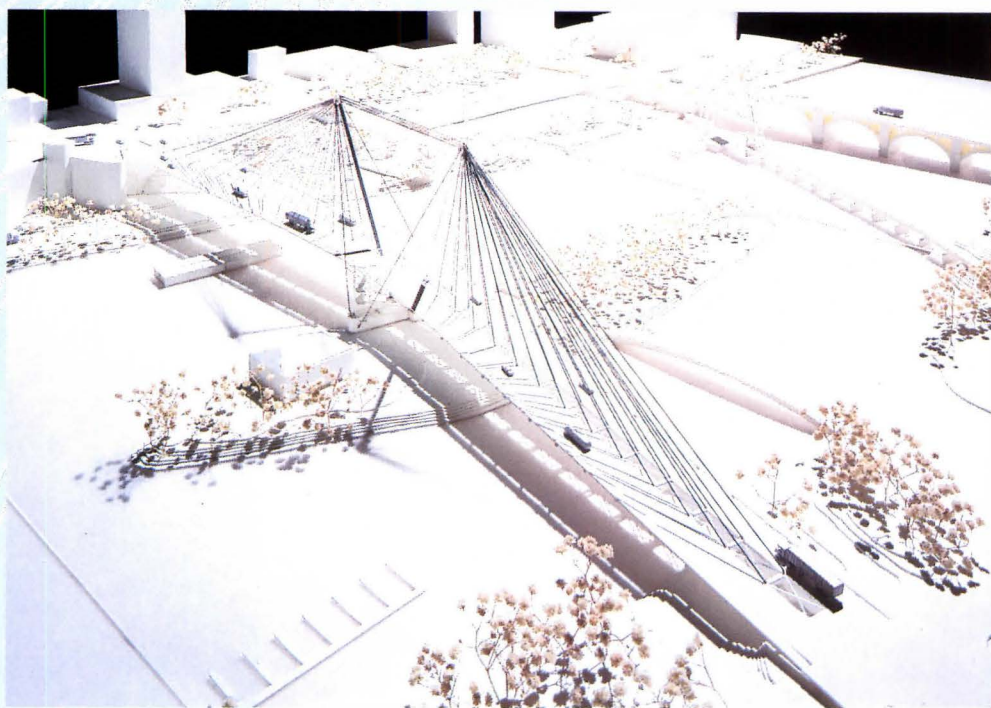
To make up for the limited variety among the commercial tenants, the architect and operators have taken whatever steps they could to add more local flavor. At the New Baltimore plaza, they worked with the local historical society to display vintage photos of Hudson River steamboats. At Guilderland, they mounted large murals of upstate scenery by photographer Nathan Farb. At Sloatsburg, they commissioned local artist Stacey Farley to create tiles of the New York State flower, fish, bird, and tree. Many of the plazas include areas for outdoor farmers' markets or arts-and-crafts fairs.

After Ellis Island and Grand Central Terminal, Beyer Blinder Belle's work for Marriott and McDonald's might seem like a comedown. But the architect did not take the commission lightly. “We were laughing about it,” Bland admits, “but then we realized that more people visit the New York State Thruway than visit Ellis Island. This public architecture is an opportunity to put New York State in the best possible light for the millions and millions of people who stop at these travel plazas.” —Edward Guntz



Wabasha Street Bridge
St. Paul, Minnesota
James Carpenter, Designer

MISSISSIPPI LANDMARK



RIGHT: Masts of Carpenter's design signal presence of Mississippi River; cable-stayed bridge continues major axis from St. Paul's street grid.

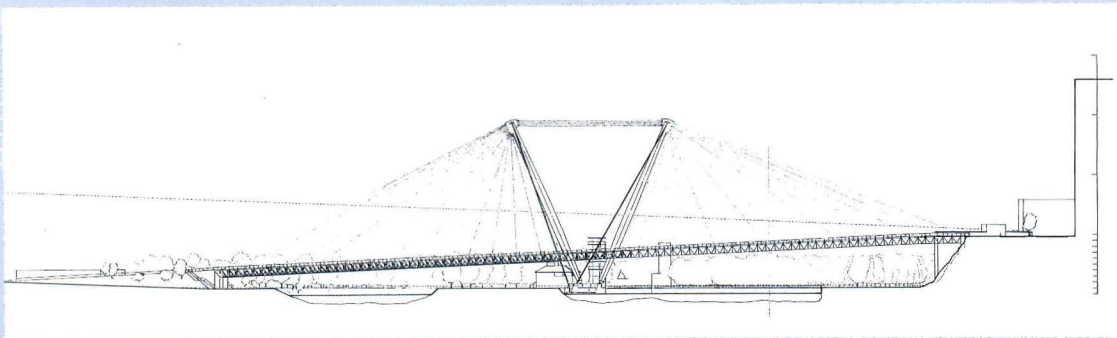
In 1989, the city fathers of St. Paul, Minnesota, realized it was time to replace the 140-year-old Wabasha Street Bridge, a deteriorating, cantilevered suspension structure linking downtown to the floodplain on the southern shore. Eager to secure an "instant landmark," the city fathers created the Wabasha Street Bridge Task Force, which chose a team headed by New York City artist James Carpenter to design the new bridge.

Carpenter, in collaboration with TKDA Associates and Sverdrup, responded with a V-masted, cable-stayed bridge in steel and concrete. Rising 270 feet from Navy Island in the Mississippi River headwaters, the twin masts of Carpenter's scheme mirror the island's dividing role in the river. The bridge shoots over 100-foot bluffs at the edge of downtown St. Paul and descends over a 1,200-foot-long span. It also curves at a 14 degree angle as it passes over Navy Island.

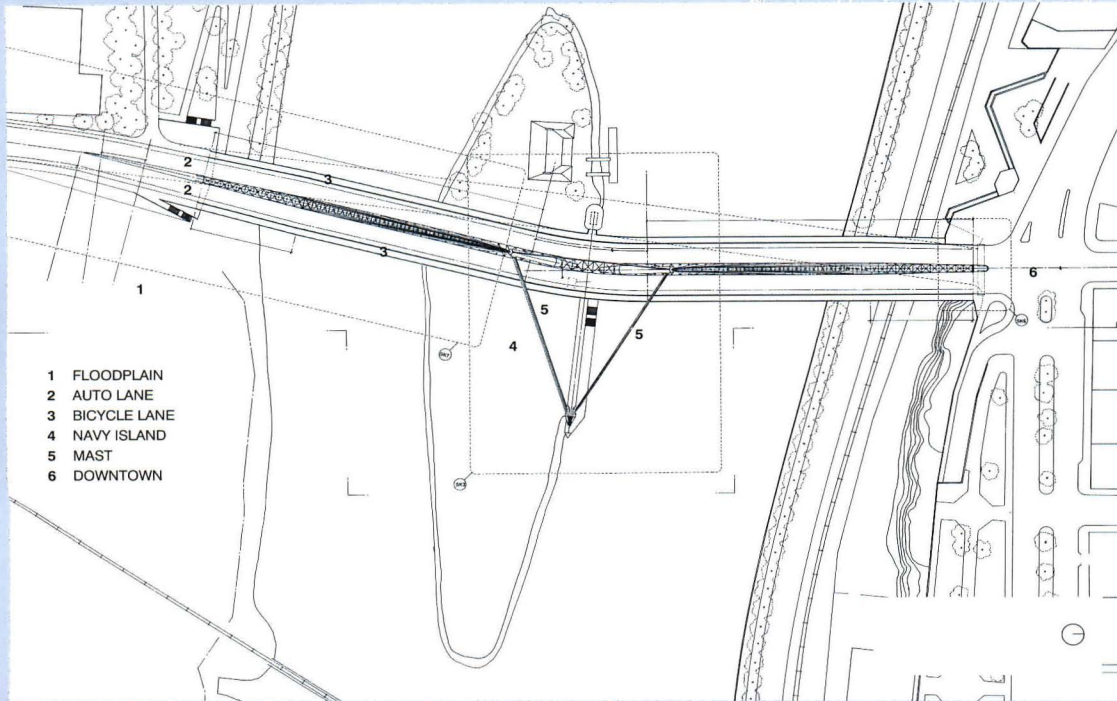
Carpenter solved the challenge of building a curved structure on an inclined plane by

grounding the V-masted supports in the island and by splitting what are essentially two straight roadways—each supported by a single mast—along their spines, allowing cable to pass through the roadway to a steel torsion box beneath the decking.

But it is the bridge's strong expression and its visibility that have some citizens up in arms, not to mention its \$41 million price tag. They argue that Carpenter's scheme goes against the conservative grain of St. Paul. To qualify for federal dollars, Carpenter had to develop three schemes: a twin-arched bridge, resembling other St. Paul precedents, and a basic steel girder bridge. The task force is currently mounting an exhibition of the designs and plans to tabulate responses from the public before reaching a final decision later this summer. At present, the diverging masts and the bridge's divided spine symbolize the polarized opinions of residents, who could urge the task force to opt for a more conventional design. —Peter Slatin



EAST ELEVATION



- 1 FLOODPLAIN
- 2 AUTO LANE
- 3 BICYCLE LANE
- 4 NAVY ISLAND
- 5 MAST
- 6 DOWNTOWN

SITE PLAN

EAST ELEVATION: Mississippi River's opposing shores serve as resting plates for the steeply inclined bridge.

SITE PLAN: Floodplain on the south bank (left), a former shipping base, is now part of a national park system.

BELOW LEFT: Separate masts and split spine mark the bridge's curve.

BELOW CENTER AND RIGHT: Access to island is provided by a spiral stair and elevator shaft on west side of bridge. Split deck allows light to penetrate through the bridge to the island.

**WABASHA STREET BRIDGE
ST. PAUL, MINNESOTA**

DESIGNERS: James Carpenter Design Associates, New York City—James Carpenter, Luke Lowings, Richard Kress, Janet Fink (design team); Schlaich + Bergermann & Partners—Jörg Schlaich (design engineer)

ENGINEERS: Toltz, King, Duvall and Anderson (mechanical/electrical); Sverdrup Corp. (subcontractor)

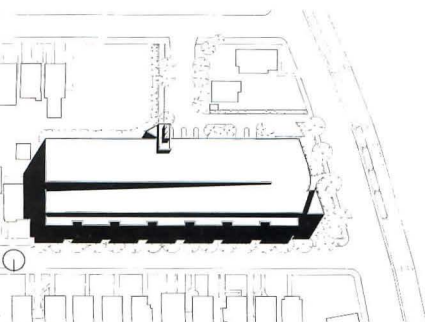
COST: \$41 million

PHOTOGRAPHER: David Sundberg



Parking Structure
Children's Hospital
Oakland, California
The Ratcliff Architects

NEIGHBORHOOD SCALE



SITE PLAN



TYPICAL PARKING LEVEL

TOP LEFT: Perforated steel panels reveal garage's structural system.

TOP RIGHT: Floor slabs unite geometries of stair tower and curved wall.

SITE PLAN: Garage separates hospital (top) and neighborhood (bottom).

FACING PAGE: Suggestion of openness adds to users' perception of security.

As a building type, the parking garage has not advanced much beyond a concrete box with ventilation ducts and sloping floors. On those rare occasions when design is applied to the problem, the results tend to be strictly decorative. But these gestures are not enough to integrate the parking garage into a neighborhood amenity.

In the design of a parking structure for the Children's Hospital Oakland, The Ratcliff Architects addressed the building type as a problem of urban planning, with powerful results that transform a necessity into an urban landmark. Working in collaboration, project designer Kava Massih and project architect Jerry Mastora produced a parking structure that challenges architects to rethink the garage as a design opportunity.

Children's Hospital Oakland is one of the most profitable hospitals and the only pediatric trauma center in Northern California. Success has led to expansion, a difficult task since the hospital is wedged between High-

way 24 and a major artery, which accommodates the elevated high-speed rail tracks of the Bay Area Rapid Transit (BART).

Hemmed in on two sides, Children's Hospital gradually crept into the adjacent residential area, much to the dismay of its neighbors. Inserting a five-story parking structure into a neighborhood of bungalows required keen attention to community relations. The architect and hospital representatives held workshops to hear residents' concerns and explain the design. Some questions were naive, but there was no doubt that everyone wanted to retain a residential sense of place.

The parking structure marks the northern edge of the hospital campus and acts as a 320-foot-long wall between the community and the hospital. To ensure a compatible fit into the neighborhood, the architect stepped the parking structure from five stories facing the hospital to two stories along the street.

To reduce the perceived length of the structure, the wall was broken into seven bays



BELOW: Perforated steel screen runs behind columns at corners to create transition between facades.

NEAR LEFT AND FAR RIGHT: Steel panels are bolted to facing at column breaks.

BELOW RIGHT: Perforated metal sculpture marks hospital along light rail route.

FACING PAGE: North facade is articulated as seven bays and decorated with metal "trees"—made from steel pipe "trunks" and steel fin "leaves." Precast panels are scored and dotted with concrete cubes bolted to structure.



**PARKING STRUCTURE
CHILDREN'S HOSPITAL
OAKLAND, CALIFORNIA**

ARCHITECT: The Ratcliff Architects, Emeryville, California—Don Kasamoto (project principal); Jerry Mastora (project architect/manager); Kava Massih (project designer); Chris Kelly, Mark Schlientz (design team)

LANDSCAPE ARCHITECT: Dillingham Associates

ENGINEERS: Paul F. Fratessa Associates (structural); Ajmani & Associates (mechanical); Toft Wolff Farrow Associates (electrical); Bissell & Karn (civil)

CONSULTANT: Robert S. Engle (parking)

CONTRACTOR: C. Overaa & Co.

COST: \$6.2 million

PHOTOGRAPHER: Richard Barnes

at intervals that replicate the size of adjacent residential lots. Central to each bay is a recess of 2.5 feet, which gives a strong vertical element to the horizontal facade.

Rather than mimic the charming Craftsman bungalows, Massih introduced a contemporary vocabulary to enliven the wall: precast concrete panels and columns, perforated metal panels, exposed concrete slab, metal grille work, orange poles offset with teal-painted metal chevrons, and a metal-work trellis. Under the guidance of Dillingham Associates, landscape architect, the north facade will become a garden wall.

Since security is a concern in the high-crime neighborhood surrounding Children's Hospital, materials were chosen with an eye to protecting those using the parking structure. Eight-inch-thick steel plates were perforated to form impenetrable panels and used as structural walls throughout the garage. The suggestion of openness within the garage adds to the user's perception of security.

The architect was determined to avoid the diagonal ramps and sloping floors associated with the parking garage. A continuous rising ramp was designed so that the ascent to each floor occurs at the east and west ends of the structure. The east end is a simple structural wall, since an ambulatory service building will be added along that side. At the west end, a curved shear wall masks the interior ramps from public view and replicates the shape of the adjacent boulevard and BART tracks. Concrete floor slabs were extended to tie together the curved and rectilinear geometries of the west facade. While meeting the functional parking needs of Children's Hospital, the garage helps to upgrade the visual identity of its surroundings. At the final community meeting, a homeowner expressed the hope that the trees planted in front of the garage would not grow too high and block his view of the building.

—Janice Fillip

Janice Fillip is a Sacramento, California-based writer.



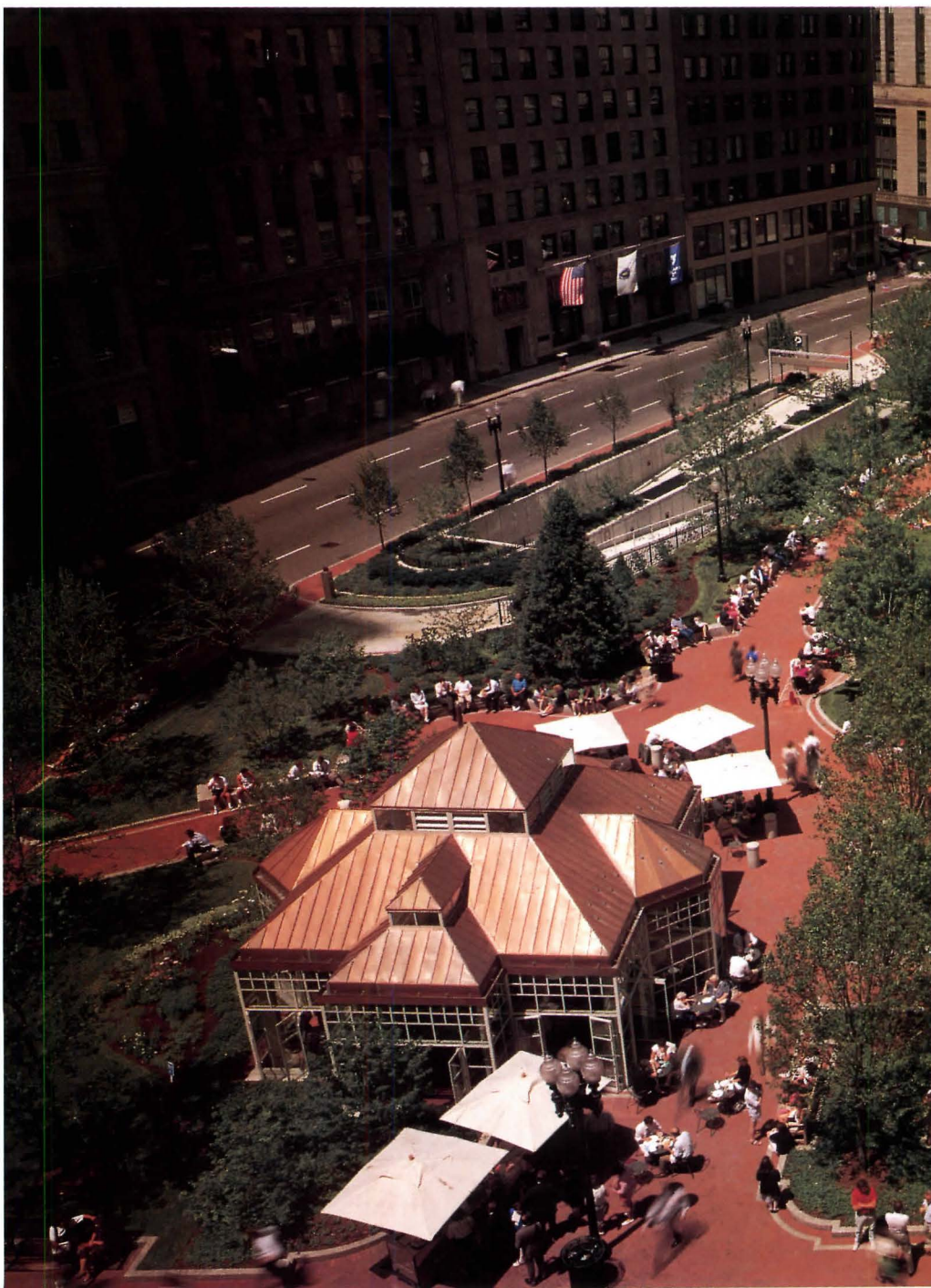
Post Office Square
Boston, Massachusetts
Ellenzweig Associates, Architect

GARDEN MASQUERADE

Boston's Post Office Square is a feat of architectural illusionism: a seven-level underground garage for 1,400 cars that virtually disappears beneath a leafy urban park. A 1.7-acre arcadia in the city's cavernous financial core, Post Office Square seems as public as the Boston Commons. But that, too, proves to be an illusion, because in today's underfinanced municipalities, this remarkable \$50 million civic amenity could only be realized through a partnership between the City of Boston and a neighborhood group called Friends of Post Office Square.

The idea of transforming an ugly, concrete garage into a pastoral oasis originated in 1982 with a group of businessmen and civic leaders led by Norman Leventhal, chairman of the Beacon Companies. Five mega-negotiated years later, the Friends purchased the Post Office Square property from the city, razed the old municipal garage, and paid for the design and construction of the new project. The engineering firm of Parsons, Brinckerhoff, Quade & Douglas led a design team that included Ellenzweig Associates, architect of the garage and park structures, and the Halvorson Company, landscape architect. This public/private arrangement guarantees the city all profits from the garage's operation, with 20 percent of the proceeds earmarked to maintain city parks.

"We had to move people, cars, and air," architect Harry Ellenzweig explains with a bluntness that belies his design's subtle grace. Ellenzweig, whose office specializes in parking garages, subway stations, and laboratories, paid unusual design attention to Post Office Square's garage to match the park's high esthetic standard. Ellenzweig located the garage's main public lobby on the first level below grade, reducing its footprint on the park to a pair of small entry pavilions. One houses an elevator; the other contains escalators and a stair. Terrazzo floors and granite-tile walls in the main and parking-level lobbies elevate the garage's functional purpose. Well-illuminated parking levels



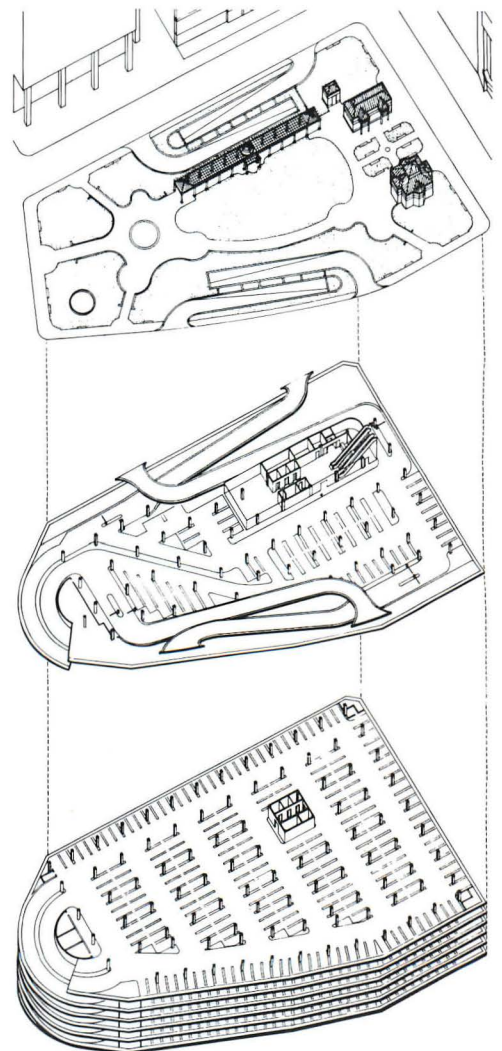
THESE PAGES: Post Office Square integrates landscape, architecture, and mechanical and circulation systems.

BELOW: Central lawn evokes pastoral charm of New England commons.

TOP PLAN: Fresh-air intake occurs at one source, represented by circle at lower left. Rectangular openings between ramps indicate exhaust-air grilles.

CENTER PLAN: Lobby, cashiers, offices, and elevators are located below grade.

BOTTOM PLAN: Rectangular grid and elevator core facilitate circulation.



BELOW: Trellised walkway provides direct pedestrian access through park.
CENTER: Solid granite columns support a trellis of stained Douglas fir.
BOTTOM: Halvorson's landscape palette includes dogwoods, crab apples, maples, pears, lindens, and six large specimen trees on permanent loan from Harvard's arboretum.
FACING PAGE: Park orients itself toward Moderne New England Telephone Building. Symmetrical siting of entry and cafe pavilions forms gateway.



PETER VANDERWARKER

**POST OFFICE SQUARE
 BOSTON, MASSACHUSETTS**

ARCHITECT: Ellenzweig Associates, Cambridge, Massachusetts—Harry Ellenzweig (design principal); Gary Gwon, Randall Imai, Leng Woo, Stephen Mahler, Edwin Hargrave, John McDermott (design team)

LANDSCAPE ARCHITECT: Halvorson Company

ENGINEERS: Parsons, Brinckerhoff, Quade & Douglas (prime consultant/civil engineer); LeMessurier Consultants (structural); Cosentini Associates (mechanical/electrical)

CONSULTANTS: Howard Ben Tre (fountain sculpture); Richard Duca (ornamental fence/grates); Ross Miller (trellis lighting); Simon Design (graphics)

CONTRACTORS: J.F. White Contracting (general); Schumacher Landscaping (landscape)

COST: \$50 million

PHOTOGRAPHER: Steve Rosenthal, except as noted



PETER VANDERWARKER

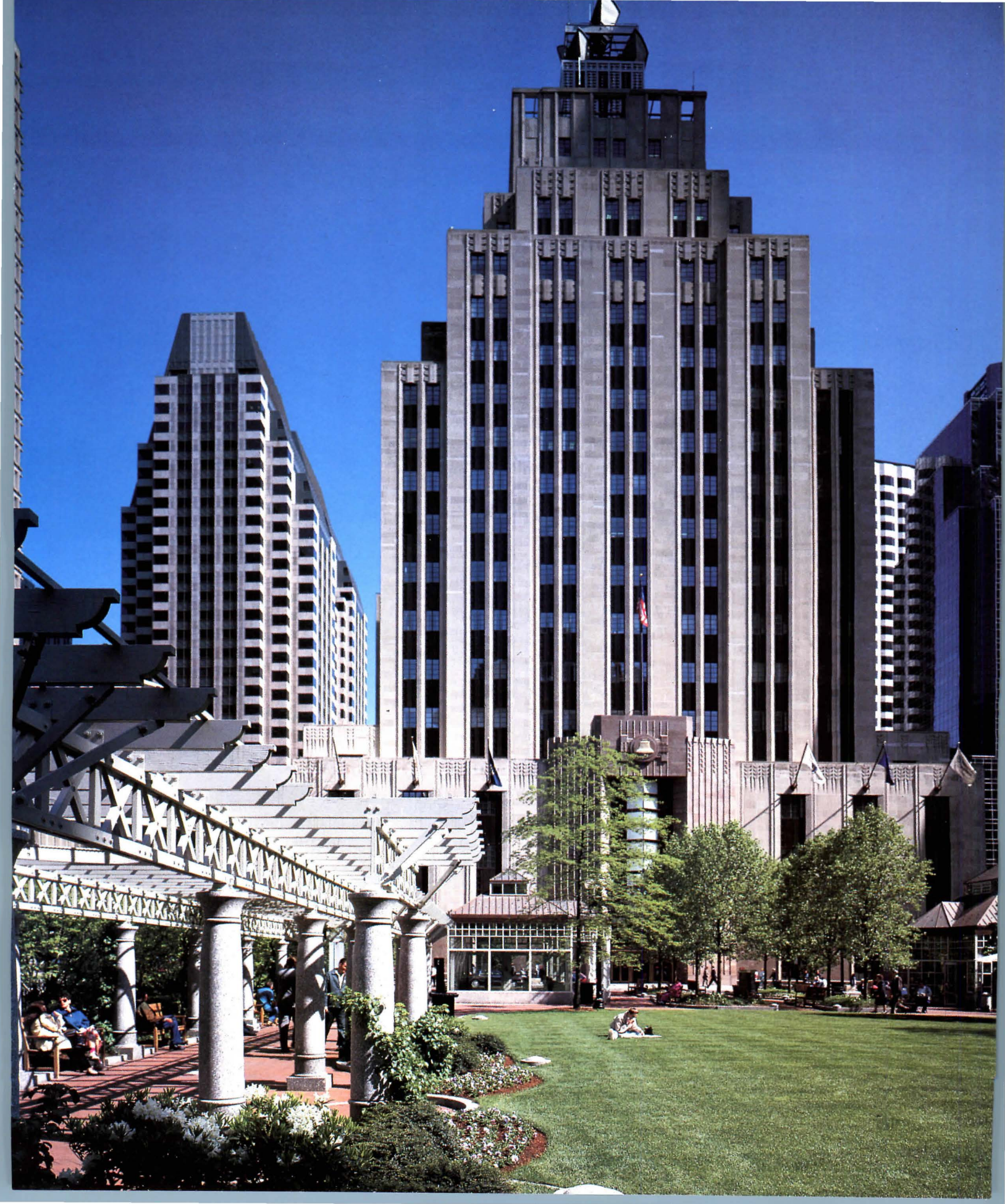
don't have sloped floors, which are often disorienting. Pedestrian circulation on these levels is organized around a single elevator core, boldly marked by decorative neon tubes.

The garage was built 80 feet below grade, using the top/down technique to streamline below-ground construction and minimize traffic disruptions. The system required a 1,500-foot perimeter concrete slurry wall and concrete column caissons before each floor was excavated and constructed.

Above ground, Halvorson's design for the park centers on an ovoid-shaped lawn surrounded by landscaped islands featuring 125 species of trees, shrubs, and flowers. Brick-paved paths encourage pedestrians to enter the park through corners and side streets. This strategy assures that pedestrians remain unaware of the garage's vehicular ramps, located along the site's main avenues. Planting further masks the ramps. Future changes to the landscape will be easy because 4 feet of topsoil have been spread across the entire site, and the garage has been uniformly structured to support the heaviest of trees.

The small cafe at Post Office Square contrasts happily with overmalled Faneuil Hall and Quincy Market nearby. But like its predecessors, Post Office Square suffers from an excess of historicism in its neo-English trellised promenade, granite curbs with decorative corners, and ornamental fences and grates.

Despite these sentimental touches, Post Office Square successfully rejuvenates its neighborhood, easing traffic jams and gracing Boston's financial district with a new civic center. Surrounding buildings have been cleaned and renovated and have reportedly increased in value. The new square proves that outstanding urban amenities are still possible when architects, engineers, artists, and business people work together. Projects like Post Office Square reconcile the need for public space with the demand for the private automobile. They prove as well that the ability to balance public welfare and private profit is not an illusion. —Donald Albrecht



When it comes to teaching youngsters how to read, General Foods has never been at a loss for words. Or at a loss for inspired literacy programs.

Their Reading Rocket workshop, for example, has been instrumental in instilling a real fondness and desire for reading in primary school children.

In addition, their Partners in Change, Jello Jigglers program, Star Serve, Maxwell House Learning Center, and involvement with Literacy Volunteers of Westchester County have greatly impacted the literacy problem

as a whole. Recognizing the importance of community service in the workplace, General Foods has supported programs like these since 1958.

This is the kind of corporate activism that the Points of Light Foundation hopes to promote. The Foundation is an independent, non-profit organization founded in 1990 to encourage community service. Like General Foods and other businesses that promote public service, we are committed to

solving serious social problems on a local level, with innovative solutions.

And even though employees are often required to give time to these social programs during working hours, companies have reported only positive effects on their businesses, such

as enhanced employee self-esteem and morale, and improved leadership and teamwork.

With the participation and support of our nation's businesses, we know that real progress

can be made in solving local social problems (as General Foods has demonstrated).

To learn more about corporate involvement in community service, please call the Points of Light Foundation at 1-800-888-7700. You're probably well aware of how desperately your community needs your help. There's no need to spell it out for you.

**TEACHING PEOPLE
TO READ CAME
NATURALLY TO
GENERAL FOODS.
THEY'VE BEEN
DOING IT FOR YEARS.**



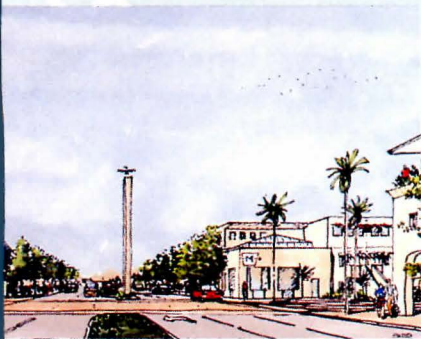
Technology & Practice

- 93 Los Angeles Transit
- 101 ISTEA Opportunities
- 105 South Pole Prototype
- 109 Flexible Workstations
- 115 Cool Storage

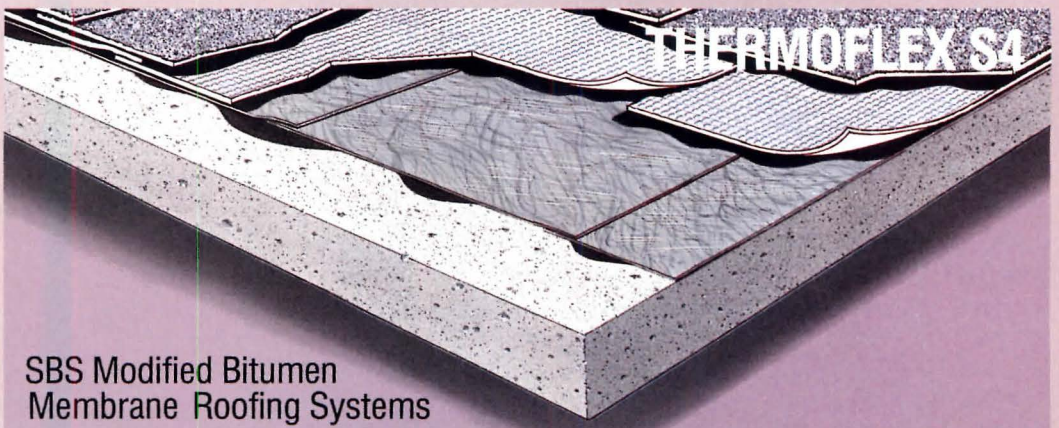
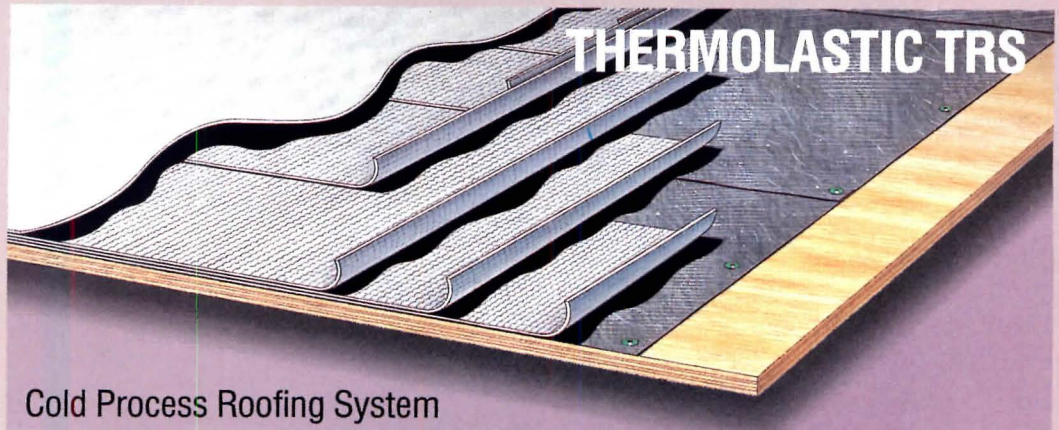
From mass transportation to electrical, mechanical, and computer systems, this month's Technology & Practice section focuses on infrastructure that supplies cities and buildings with essential circuitry. Two features this month assess the urban design implications of transportation, from the wide-ranging effects of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) to the urban renewal augured by new public transit for Los Angeles.

At the building scale, both mechanical systems and CAD workstations have seen major innovation since our last updates. As peak-hour energy costs soar, cool storage systems freeze water overnight when rates are lowest, then dispense their store as needed during the day. CAD workstations now allow designers to move from program to program instantaneously through multitasking platforms, and a Macintosh- and IBM-compatible system for architectural firms appears close at hand.

A very different order of workstation continues to thrive in Antarctica, as our report on energy-efficient planning of McMurdo Station attests. Under the direction of a team sponsored by the National Science Foundation and the American Institute of Architecture Students, a study of this South Pole outpost has implications for environmentally sound design in more northerly exposures.



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Computer Show Stars System Integration

Reflecting an upswing in the economy, the Architecture, Engineering, and Construction (A/E/C) Systems Show attracted an estimated 26,000 architects, engineers, and contractors from all over the world to the Anaheim, California, Convention Center in June. Hundreds of new and upgraded computer-related products were introduced, many featuring a move to the Microsoft Windows graphical user interface. For example, Archibus, maker of facility management software, and Primavera, known for its project management tools, have taken advantage of Windows' ability to link graphic and nongraphic data easily. Architects will now be able to connect numeric data and other information to symbols on CAD drawings.

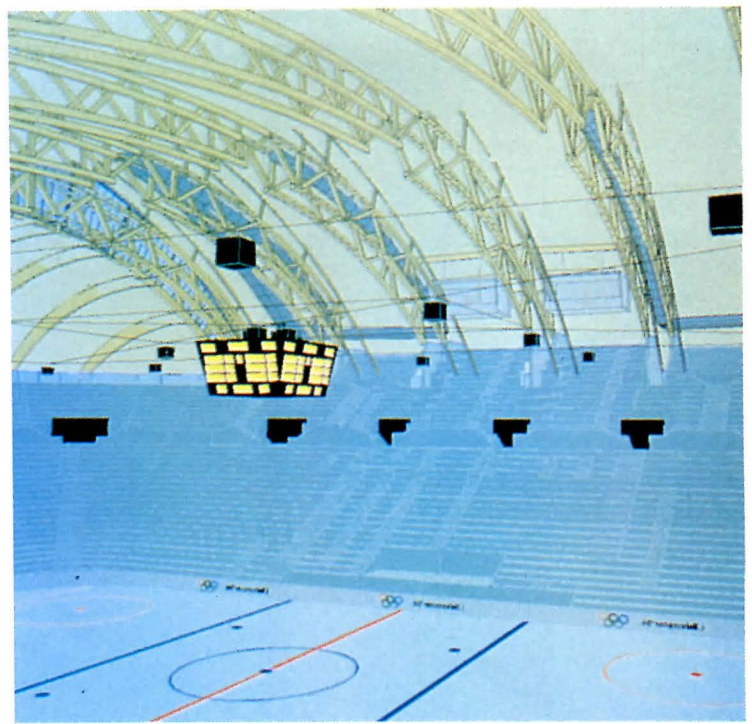
The new Windows NT operating system, which promises networked Unix workstation performance on PCs, has been embraced by Intergraph, Autodesk, and others. Intergraph predicts that NT will bring about the long-awaited compatibility between low-cost PCs and high-powered workstations. The company demonstrated MicroStation and the MasterWorks series of applications on Windows NT.

As also announced at the show, Softdesk and ASG, the two biggest sellers of architectural and engineering applications for AutoCAD, have merged, creating Autodesk's largest third-party developer. With the release of AutoCAD 13, new CAD software will be available from Softdesk/ASG that combines the best features from each and offers customers smooth upgrades.

Autodesk announced a new technology, called "Anaheim," which allows concurrent access to multiple AutoCAD drawings and brings the database power of geographic information systems to AutoCAD users. For example, with the graphic symbols on a site plan indexed to external databases, an architect could retrieve data by selecting the symbol, without knowing where on a network the database was stored.

During the exposition week, the AIA held a day-long conference on how electronic tools influence creativity. A recurring theme among speakers was the potential for teleconferencing in design communications. William Mitchell, dean of the School of Architecture at MIT, de-

A/E/C Systems Show reveals software mergers, robotics, and long-distance linkups.



IBM AES: Design software for the 1994 Winter Olympics.



MEGAMERGER: Softdesk and ASG.



AXAMA DIGIPLLOT: It plots while you draft.

scribed an experiment in which students from the United States, Canada, and Hong Kong collaborated in a "virtual design studio," exchanging CAD files over an international computer network and receiving critics' comments through telephone conferences.

Steve Harrison, of the Xerox Palo Alto Research Center, described experiments involving complex long-distance connections with video cameras and telephones, allowing architects to see each other and work on the same drawing, while discussing design issues on conference calls. With collaborations imminent between phone and cable companies, long-distance linkups promise to be an exciting area to watch over the next few years.

A conference sponsored by the Society for Computer Integrated Building Sciences featured interna-

tional developments exchanging electronic information between the design and construction processes (ARCHITECTURE, April 1993, pages 97-99). The most dramatic results have been produced by Japanese construction companies, which have translated CAD information into construction robotics. Obayashi Corporation is building a mid-rise dormitory in Tokyo, employing automated equipment and robots, all in a factorylike construction site eerily devoid of human participation.

It is questionable whether this technology will transfer readily to Western cultures, where more emphasis is given to idiosyncratic design and where trained workers are abundant. But this automation, like many of the other new developments at the A/E/C Systems Show, is an emerging technology to watch in coming years.—*B.J. Novitski*

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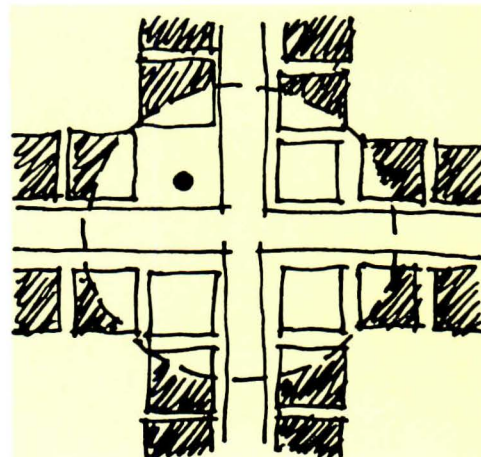
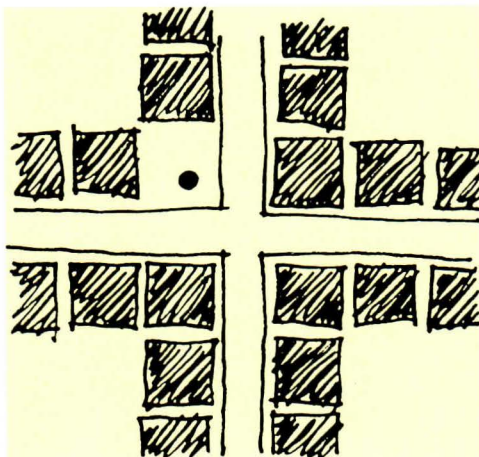
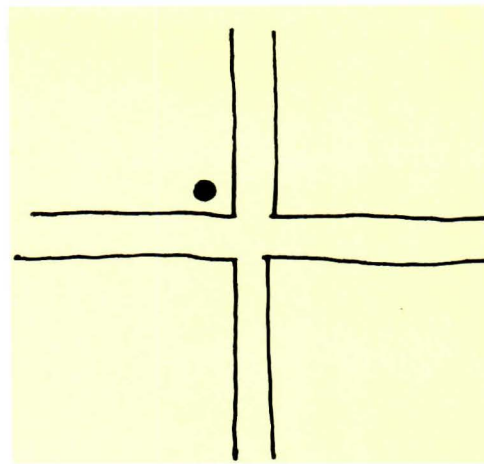
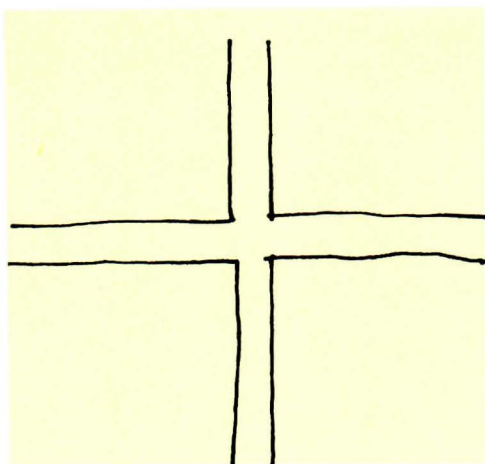
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Los Angeles Builds on Transportation

Southern California plans its vast public transit system with community development in mind.

RIGHT: Sketches by Koning Eizenberg Architecture reveal the process by which a new Metro Rail station can transform an intersection into the center of a pedestrian-focused neighborhood.



The days of Robert Moses are over: No centralized authority can impose huge public works projects on a powerless public these days. Moses may have had his way with New York, but in 1993, Los Angeles community groups are actively involved in nearly every public and private proposal affecting their neighborhood.

The largest public works project now underway in Los Angeles—and in the entire country—is the 30-year, \$183 billion mass transit plan being implemented by the newly formed Los Angeles County Metropolitan Transportation Authority (MTA).

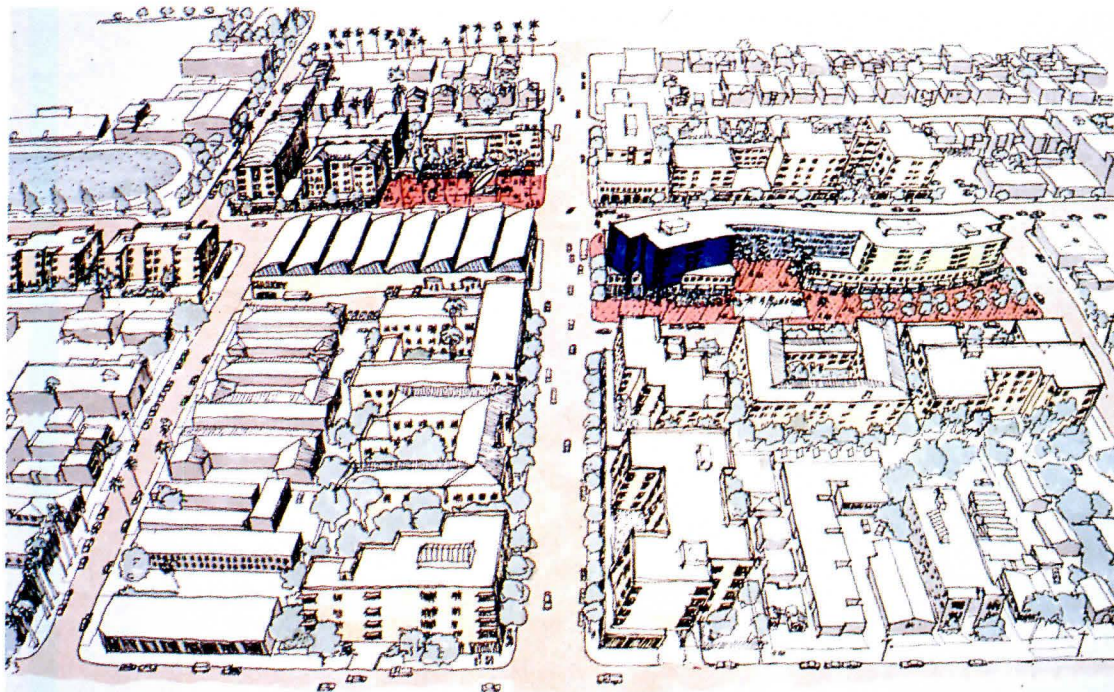
The county's new transit plan—largely funded by a voter-approved sales tax—raises questions about the public benefits of this investment, beyond relieving traffic congestion. Urban design and related architectural issues are being examined in the study and implementation of new Transit Oriented Districts (TODs), which encourage higher density, mixed-use, pedestrian- and transit-related development and are proposed in a new draft policy authored by the City of Los Angeles Planning Department and the MTA.

In the land of single-family houses and single-occupancy cars, such alliances and discussions seem remarkable. Despite romantic memories of the early electric railway in LA, this system never acted as a major commuter line and can hardly be compared to LA's new mass transit network, which is planned to stretch along 400 miles of rail. At present, 4-to-5 percent of the LA population ride mass transit, and the goal of the new system is 20 percent ridership by 2010. Although the new plans call for an expansion of the bus system, the majority of public funds are being funneled into rail; and the Metro Rail system, a combination of underground, at grade, and elevated lines, is slowly taking shape.

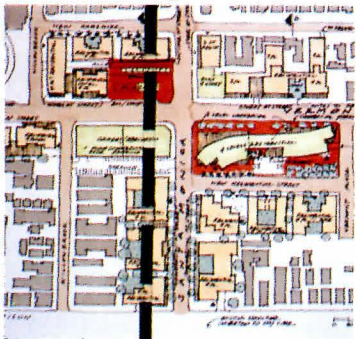
A light rail line, the Blue Line, stretching from downtown Los Angeles south to Long Beach, has been running since July 1990; Metrolink, a heavy rail commuter line to widely dispersed suburbs, began operation in October 1992 and is expanding rapidly; and the first Red Line segment, a heavy rail subway, running 4.4 miles from downtown Union Station west to Westlake/MacArthur Park, opened early this year. Plans are under-



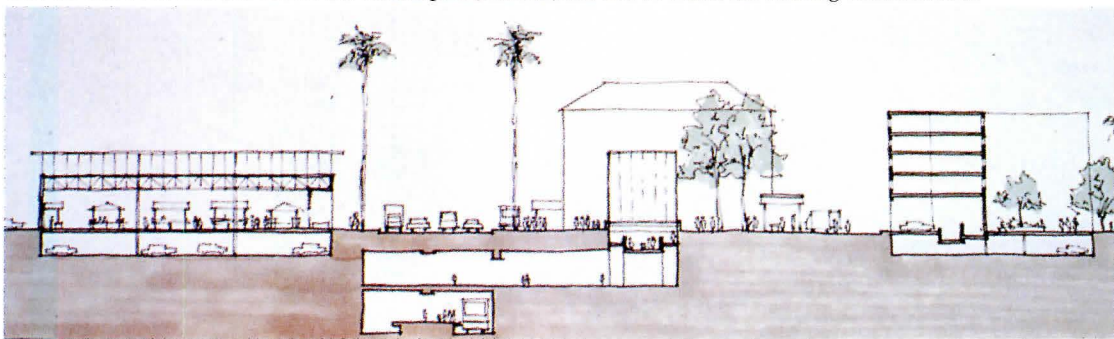
AERIAL VIEW: Existing conditions.



VERMONT AND SANTA MONICA BOULEVARDS: Station plaza, market, and curved mixed-use building at intersection.



SITE PLAN: Location of Red Line station.



SITE SECTION: Market (left) focuses activity around station portal, surrounded by housing over retail.

Vermont/Santa Monica Station Metro Rail Red Line Koning Eizenberg Architecture

The most urban of the three case-study sites for the MTA's transit-based housing symposium held in April is located on the extension of the Red Line projected to open in 1998. The area around the station, designed by Ellerbe Beckett with artist Robert Millar, is densely populated, with 42.5 persons per acre citywide. A first stop for many recent immigrants, particularly from Central America, the housing in this neighborhood is severely overcrowded. Twenty-five percent of the population live below poverty level; 27 percent have no access to cars; and 91 percent rent housing.

The neighborhood contains both existing strip commercial buildings and some mixed-use structures. Sur-

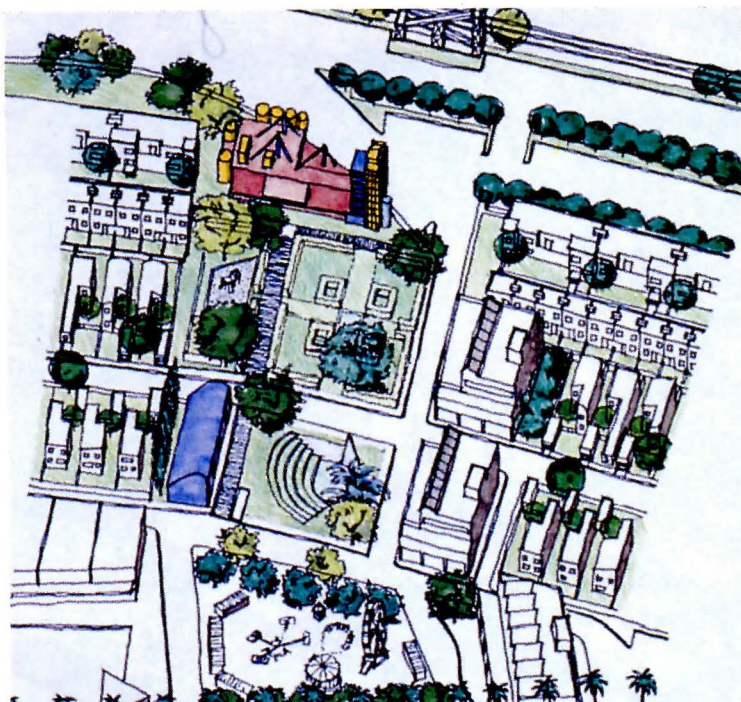
rounding housing includes single-family houses and small-scale multi-family units. Los Angeles Community College (LACC), which has an enrollment of 15,000 students, is a block from the station, and the MTA has proposed construction of another station portal on the campus.

The Koning Eizenberg team, which included planner Carol Goldstein, viewed the station as a "context modifier," changing the neighborhood from car-focused to pedestrian-oriented. The most compelling aspect of this scheme was maintaining the small scale of the existing residential blocks by limiting the size of parcels for development to three standard lots, encouraging 3- to 4-story courtyard buildings incorporating both parking and open space. This would result both in continuity of the pedestrian-oriented scale and realistic opportunities for small developers.

The Koning Eizenberg team also saw a potential to establish a neighborhood identity by clustering neighborhood-specific uses and forms around the station. At the northeast corner, they proposed adding small market stalls to the station plaza and building an adjacent single-room-occupancy hotel, four floors over commercial space. A large mercado with underground parking was proposed for the northwest corner; and on the southwest corner, plans call for a large mixed-use building with four stories of housing over two stories of retail and commercial space, with underground parking. The fourth corner is occupied by an historic building, which would be retained with active commercial uses. Along both Vermont and Santa Monica boulevards, the team recommended that ground-floor residential space be replaced by commercial and retail

space. They also advised against constructing the second station portal at LACC, preferring to concentrate neighborhood activity at the major intersection.

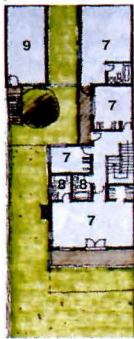
The other teams chosen for case studies on the site at Vermont and Santa Monica boulevards were Barton Myers Associates, whose proposal included mixed-use buildings and a range of housing types, and the Los Angeles Community Design Center with Cavaedium, whose scheme emphasized commercial and social services particular to the neighborhood's needs. All three schemes were clearly urban in character, particularly convincing in this Los Angeles district. The Koning Eizenberg team, however, not only addressed the future form of the district, but also sensitively considered how to maintain the inherent character of the existing neighborhood, without gentrification.



EL MONTE: Low-density housing and community-oriented spaces.



FIRST FLOOR



SECOND FLOOR

- 1 ENTRANCE
- 2 LIVING ROOM
- 3 DINING ROOM
- 4 KITCHEN
- 5 GARAGE
- 6 CARPORT
- 7 BEDROOM
- 8 BATHROOM
- 9 STUDIO

El Monte Station
Metrolink
Frederick Fisher, Architect

A Metrolink station in the City of El Monte, east of Los Angeles, was the third site chosen for a case study in the MTA-sponsored transit-based housing symposium. The station opened last October, and in March, service extended further east to Montclair. El Monte is a commuter rail station, in a suburban town of low-density, single-family housing, near the Valley Mall business district. The MTA suggested the architects propose housing and study the linkages between the station and the town center. The teams of Goodell Associates and the La Canada Design Group with Kenneth Beck, and Van Meter Williams Pollack proposed medium-density housing (35-40 units per acre), with commercial plazas adjacent to the station and

mixed-use buildings linked to the shopping mall. Architect Frederick Fisher, however, in collaboration with the Cordoba Corporation and Burton and Spitz, landscape architect, developed an alternative, emphasizing a slightly lower density of housing and public open space. Responding sensitively to the context, the Fisher team extended existing streets into new ones, lined with small single-family houses and townhouses. These would be buffered from parking and rail by landscaped berms. Instead of adding new commercial and retail space, which would have competed with the mall, the team designed a network of community-oriented spaces, including soccer fields, gardens, and market spaces. The link between the station and mall was made by some of these outdoor public spaces and a new community room and an old mill recycled as a night school.

way for two more phases of the Red Line, continuing west to mid-Wilshire, and northwest to the San Fernando Valley.

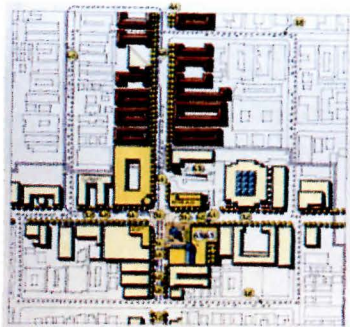
Planning for development

Five years ago, comprehensive planning for areas surrounding future stations was not a part of the planning process for light rail and subways. But in April, the state legislature merged the Rapid Transit District (RTD), which focused on operating existing systems, and the Los Angeles County Transportation Commission (LACTC), which planned new systems, into the development-minded Los Angeles County Metropolitan Transportation Authority (MTA). The lion's share of credit for the change in direction goes to failed mayoral candidate Nick Patsouras, who served as head of the RTD, where he lobbied to bring Metro Rail to LA, and, most recently, as chair of LACTC, from 1991 through 1992. Patsouras envisioned a revitalization of LA sparked by new pedestrian-oriented communities developed around the transit stations.

This vision of pedestrian-oriented urban and suburban communities is not new. But implementation on a large scale by a collaboration of powerful government agencies is new. Under Patsouras's stewardship, the LACTC began to study development opportunities around existing and proposed station areas. First, a 500- to 1,000-foot-radius area centered on the station is analyzed to determine the best location for the station portal and to provide a master plan for future development. From this plan, a primary joint public/private development opportunity is identified.

After feasibility studies, a master report on environmental effects, and even site-specific plans, a developer is selected through a request for proposals process for a station area or for a specific project within the area.

Given this process, the opportunity to reshape the city and, in particular, to introduce affordable housing seems compelling. LA County is now the country's most expensive place for poor people to live; neither private development nor public investment is coming close to meeting demands. By building on land in rights-of-way purchased for transit use or building housing over park-and-ride lots, the MTA, in joint public/private ventures, can effectively offer subsidies to developers to build affordable housing. To highlight these potentials, the MTA held a transit-based housing symposium, "Emerging Designs for Transit-Based Communities: Case Studies of Three Metro Stations," on April 8 in downtown Los Angeles. Attended by nearly 300 architects,



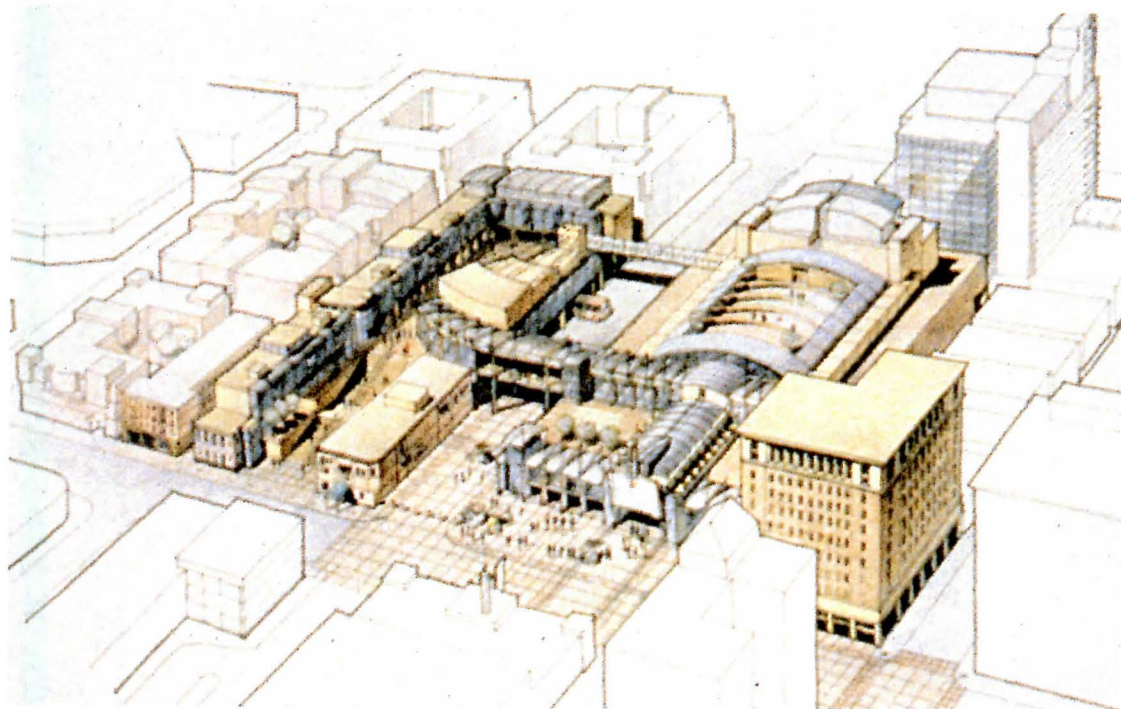
HOLLYWOOD/WESTERN: Site plan.



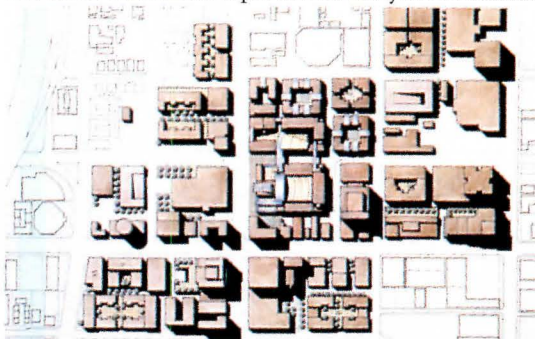
STATION PLAZA: New portal.

**Hollywood/Western Master Plan
Metro Rail Red Line
Meyer and Allen Associates**

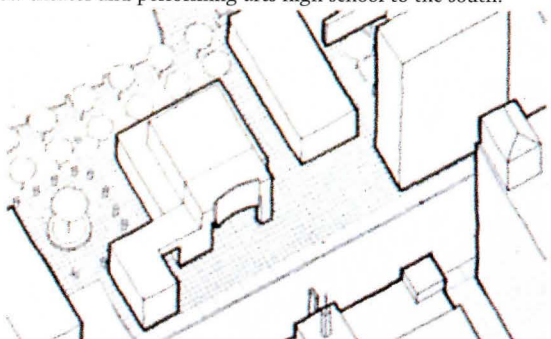
This study focuses on a crime-ridden site that is densely populated, largely by recent immigrants. The architects proposed transforming the station at the intersection of Hollywood and Western boulevards into a pedestrian-oriented neighborhood with recreational facilities. The Meyer and Allen team developed a strategy focused on preservation of neighborhood scale and rehabilitation of existing buildings, centered on the Metro Rail portal. The team called for a smaller plaza than the LACTC had envisioned, surrounded by a mixed-use building. The architect proposed two alternatives for the building: one with recreational and community services, and a second program with ground-floor retail below *affordable housing*.



HOLLYWOOD AND VINE: New portal faces Hollywood Boulevard; new theater and performing arts high school to the south.



SITE PLAN: New live/work community at Hollywood and Vine.



STATION PLAZA: Incorporates Metro Rail portal.

**Hollywood/Vine Master Plan
Metro Rail Red Line
Urban Innovations Group**

Hollywood and Vine may stir up memories of Lana Turner being discovered at Schwab's counter, but this famous intersection, like the rest of Hollywood, has seen better days. Homeless teenagers and gangs are at least as prominent as the Capitol Records Tower and the struggling theater district. The Community Re-development Agency's Hollywood Boulevard District Plan calls for developing this well-known intersection, along with Hollywood and Highland, into a high-density entertainment district.

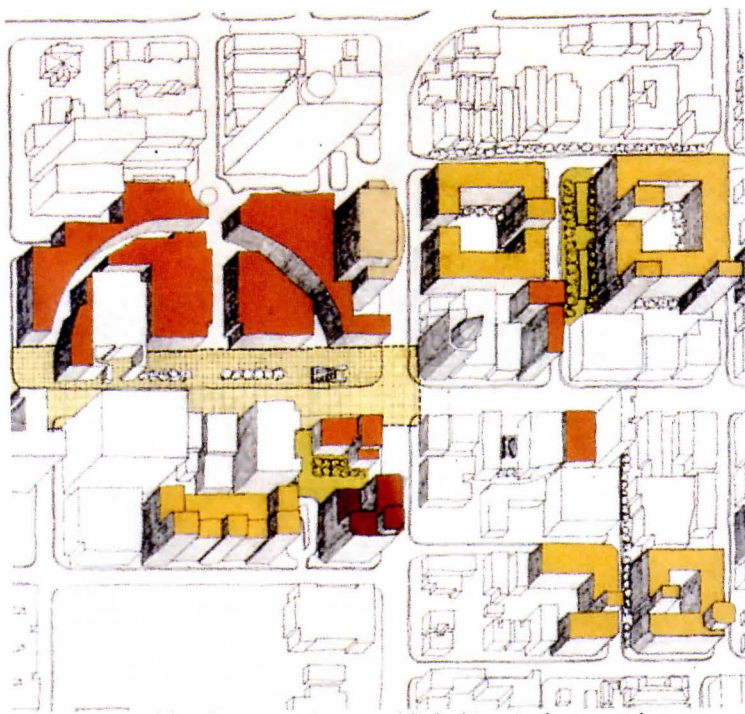
The Urban Innovations Group (UIG) with Levin & Associates, Gensler and Associates, and Kaku Associates interpreted this master plan as a live/work community, with theaters, housing for people in the

entertainment industry, office and postproduction space, a performing arts high school, a day-care center, and support services.

The centerpiece of the proposal is a redesigned Metro Rail portal and plaza, as well as a relocated bus facility southeast of the intersection. Because of tight requirements to meet Metro deadlines, the architect recommended that the new station portal and plaza design be completed first, along with the relocation of the bus facility and the acquisition of properties to ensure future development potential.

The UIG team proposed reorienting the station portal so that it faces onto Hollywood Boulevard opposite the Pantages Theater. The portal plaza would be populated with pavilions containing cafes, newsstands, florists, and a half-price ticket booth for district venues. The bus facility planned just south of the

portal would be moved to the east side of Argyle Avenue, where it would have more space to operate, as well as allow a large new theater to be built immediately south of the portal. Utilizing the air rights over the bus center, a new performing arts high school would share facilities with the new theater as well as the existing West Coast Ensemble Theater on Hollywood Boulevard. A proposed mixed-use office tower south of the theater, along with new live/work space in several new buildings located to the east and south of the bus facility, as well as additional parking are also part of this master-planned development. The half-price ticket booth and the performing arts school may sound like New York ideas, but the concentration of mass transit, live entertainment, and increased density in this location makes sense in this historic Los Angeles locale.



SCHEME TWO: Public plaza at station portal links historic theater and tower.



SCHEME ONE: Plaza eliminated.



SCHEME THREE: Redeveloped corner.

**Hollywood/Highland Station
Metro Rail Red Line
Barton Myers Associates**

At the center of the Hollywood movie theater district, a new station portal is surrounded by historic landmarks, among them are Graumann's—now Mann's—Chinese Theater; the El Capitan Theater, recently renovated by Disney; and the prominent Security Pacific Tower. The intersection must accommodate cars, tourist buses, and the new mass transit system.

The master plan by Barton Myers Associates, Metcalfe Associates, and Anil Verma Associates presented three alternatives, creating pedestrian open space for tourists and neighborhood residents, adding medium- and high-density residential units, integrating community and tourist uses, and maintaining the existing medium-rise scale of

Hollywood. Myers' alternatives vary in their articulation of the northwest quadrant, where the principal station portal is located.

The first two schemes accept the Hollywood Promenade development by Melvin Simon & Associates, a large, internally oriented retail and entertainment complex. The first scheme incorporates limited pedestrian space in the northwest quadrant. In the second, the Hollywood Promenade is set back 100 feet from Hollywood Boulevard, and the Lee Building, at the northwest corner of the Hollywood and Vine intersection, is removed to create a large public room linking Mann's Chinese Theater and the historic Security Pacific Tower. In the third scheme, Myers redesigned the northwest quadrant, substituting a mixed-use development with a large public plaza around the portal for the Hollywood Promenade project.

planners, developers, and community group and government representatives, the housing conference allowed attendees to gain familiarity with the new joint plans of the MTA and the city's planning department.

Transit-based communities

The three stations picked for the case studies represent some of the diverse areas served by the system. The first site, at the intersection of Vermont and Santa Monica boulevards, a stop on the next phase of the Metro Rail Red Line subway, was the most urban in character, and all three teams—Koning Eizenberg Architecture with Carol Goldstein, Planner; Barton Myers Associates; and the Los Angeles Community Design Center with Cavaedium—approached the design as an urban infill problem. The second site, at the Willow Station in Long Beach on the light rail Blue Line, is more suburban, adjacent to a school and a hospital. All three teams—Michael Metcalfe and John Mutlow; Johannes Van Tilburg and Partners; and KDG Architecture and Planning—proposed large-scale developments, including housing over parking and a supermarket with surface parking, in three different configurations.

The third case study is in El Monte, at a Metrolink stop in a suburban city east of Los Angeles. Two teams—Goodell Associates and the La Canada Design Group with Kenneth Beck, and Van Meter Williams Pollack—proposed medium-density housing plus mixed uses, linking the station to an existing commercial street, while Frederick Fisher proposed lower density housing and public open space. The two-week design charrette produced impressive work. It met conference coordinator John Given's goal of "demonstrating that transit-based communities are a sensible outgrowth of transit development."

Planning studies undertaken in 1992 and '93 by the Joint Development Department of the LACTC are numerous. They provide a "framework we can use to influence city agencies and developers," according to project manager Given, and should, ideally, lead to projects which generate income, promote ridership, and build community. Given, a planner by training who is sensitive to urban design issues, has worked with architects on three sites in Hollywood, an area also being targeted by the City of LA Community Redevelopment Agency. They are located on the Metro Rail Red Line, and all the station designs were 80 percent complete before this process started. Hollywood Boulevard and Western Avenue, and Hollywood and Vine



MACARTHUR PARK: New plaza.



PARK STATION: Mixed-use development.

**Westlake/MacArthur Park Station
Metro Rail Red Line
McLarand, Vasquez & Partners**

Now in schematics, this project is in a high crime district near downtown LA, populated by Central American immigrants living in very overcrowded conditions. In 1992, the Rapid Transit District solicited proposals from developers for this station area, but as none of the responses proposed a pedestrian-oriented development, architect Kaplan McLaughlin Diaz was commissioned to design a mixed-use complex focused on retail and housing. Based on this plan, a proposal by McLarand Vasquez with Forest City Developers was accepted. The development includes ground-floor retail and a police substation, with more retail and restaurant space on the second floor. The top two stories comprise 204 low-income housing units.



GATEWAY PROJECT: New complex built around Union Station (left) is located to the northeast of downtown Los Angeles.



NEW PORTAL BUILDING: Public room for transit riders.



BUS PIAZZA: Framed by portal (center) and new MTA HQ.

**Union Station Gateway Project
Metrolink
Ehrenkrantz & Eckstut Architects**

For a region as decentralized as Southern California, it's surprising that the rail lines become so centralized at Union Station in downtown Los Angeles. Here, the Metro Rail Red and Blue lines, Metrolink, Amtrak, and many bus lines intersect. Designed in 1991 and now partially under construction, the Gateway is a massive, complex project that incorporates Union Station under joint development by the MTA with Hanna/Olin, landscape architect, and Catallus Development Corporation, with partial financing from Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) funds.

The development will transform a bus station and some Metro Rail portals into a 50-acre pedestrian-oriented, mixed-use project to in-

clude 7 million square feet of buildings. Ehrenkrantz & Eckstut Architects was commissioned to design a master plan. The project extends from the old Union Station at the eastern edge of the site to the bus plaza at the west, which is surrounded by office towers, including the new headquarters for MTA, and a portal building that will serve as a gateway for the mass transit systems. Currently, the plaza, the portal, and the new MTA headquarters are under construction.

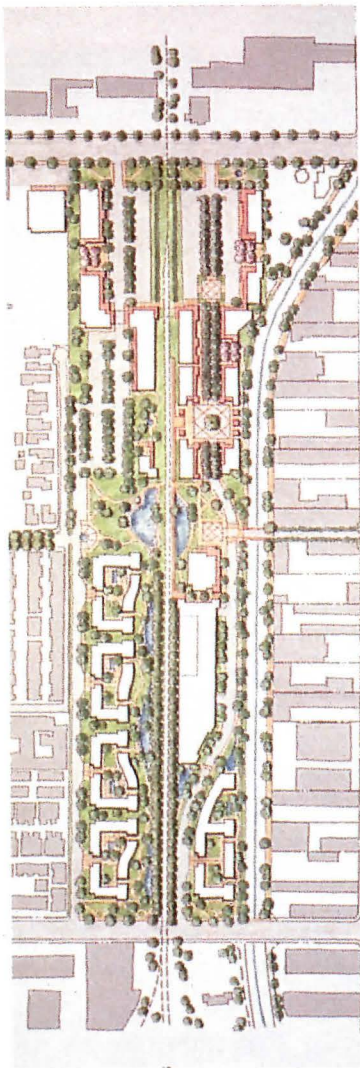
Principal Allen Terry compares the new portal building to Grand Central Station in New York, a large formal public room surrounded by a very dense office district. Hanna/Olin turned the bus plaza, which will be surrounded by a continuous pedestrian arcade, into a public piazza, the center of which slopes gently to an underground portal, and is landscaped with a vari-

ety of native plants. It will be punctuated with decorative bus shelters, part of the Gateway Center Arts Program, which includes fencing, paving materials, and sculptures designed by selected artists.

In a limited competition for the design of the headquarters building, originally for the Rapid Transit District, now merged into the MTA, McLarand, Vasquez & Partners was awarded the commission over heavy-hitters like Frank Gehry, Cesar Pelli, and Johnson Fain and Pereira. The grand piazza, terminated at its north end by the new MTA headquarters building, opens at the south to the service road and the Santa Ana Freeway, rather than directly to the downtown civic center. The current recession and oversupply of office space in downtown Los Angeles, however, could curtail the progress of development, so the new MTA headquarters may be lonely.



CHATSWORTH: Rails run along open land.



SITE PLAN: Mixed use surrounds station.

Chatsworth Station
Metrolink
Johnson Fain and Pereira Associates

The site for this project is located in the northwest corner of the San Fernando Valley, in a prosperous suburban community. The LACTC already owned the 14.6 acres around the new Metrolink station; a local developer, the owner of an adjacent 16.75-acre parcel, expressed interest in having the LACTC study the two parcels together. With train service in operation since last October, the community was prepared for this study, having formed a Chatsworth Station Master Plan Task Force, spearheaded by the local Chamber of Commerce president.

After holding a series of public workshops, Johnson Fain and Pereira developed a master plan that included public spaces. Community representatives were not interested

in residential development and needed to be convinced that housing over retail would both activate the area and generate revenue to finance other site improvements.

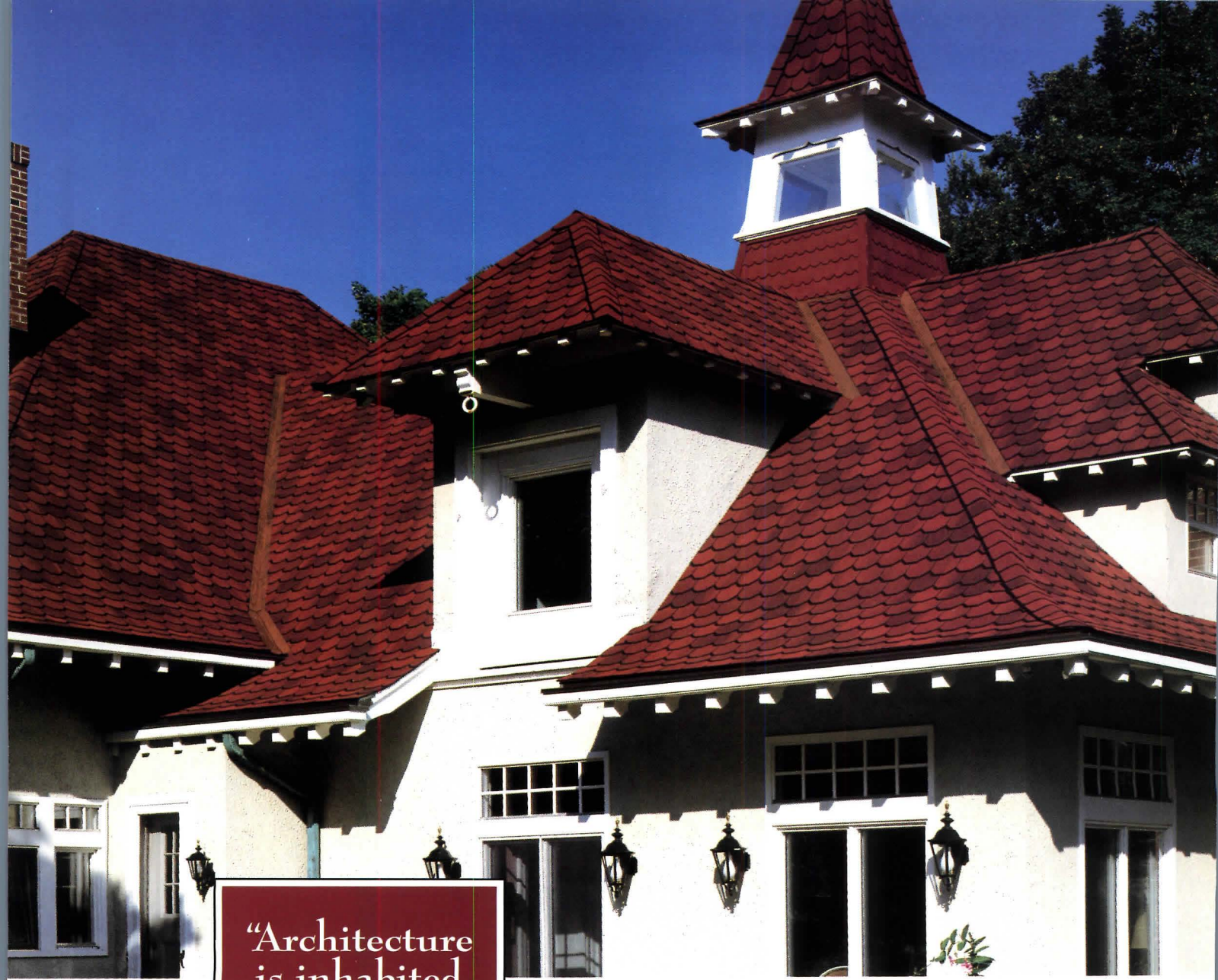
The master plan calls for a parking court surrounded by retail at the north end, with a new commercial street leading from the court to a "station square." Here, a replica of the historic Chatsworth station is planned, adjacent to the new station platform, with a child-care center opposite. Johnson Fain and Pereira Associates planned public open space to the south of the station with housing beyond. The architect also suggested improving Brown's Creek, at the eastern edge of the site, with paths for bikes, pedestrians, and equestrians. The MTA is preparing to request proposals from developers for the station replica and for the child-care center; the fate of the remainder of the site remains uncertain.

are set to open in 1998, and were planned by Meyer and Allen Associates and the Urban Innovations Group, respectively. Another site, at Hollywood and Highland, was analyzed by Barton Myers Associates. The three-month-long studies resulted in master plans for future development and some changes in station design. Other studies are being conducted for Red Line stations at Universal City and North Hollywood in the San Fernando Valley and at Pico/San Vicente and Wilshire/Western in the mid-Wilshire district. On other lines, master plans are being studied for the Chatsworth Metrolink station area, in a suburban community in the northwest San Fernando Valley, by Johnson Fain and Pereira Associates.

Development realities

The RTD also initiated projects around transit stations leading to mixed results. At the very center of this system, where the Metro Rail Red Line, Metrolink, bus lines, and Amtrak all come together, the Union Station Gateway project, which calls for 7 million square feet of mixed-use space, is partially under construction. Master-planned by Ehrenkrantz & Eckstut Architects, it includes a bus plaza as piazza, a large transit collector portal, and the new MTA headquarters, as well as plans for other office buildings. Westlake/MacArthur Park, at the last stop on the Red Line, Segment 1, is pedestrian-oriented with retail and housing and is in design schematics.

As promising as these projects appear, the future of both the Los Angeles transit system and the associated joint development efforts remain in some jeopardy; the deep California recession has led to lower sales tax revenues and reduced funding for the MTA. Meanwhile, Nick Patsouras was appointed to the transition team for Richard Riordan, the first new mayor of the City of Los Angeles in 20 years. Patsouras has vowed to support plans for transit oriented districts and joint development, although his influence on Riordan remains to be seen. But the profession's involvement in affecting transit policy and implementation promises to continue, with significant opportunities opening up for women and minority architects, as these studies are commissioned by a public agency with accountability for affirmative action. Certainly, the interaction of city and county agencies, community groups, and architects is unprecedented for a region the size of Los Angeles. *This effort and its results could set a precedent for other regions to follow in planning for growth in the last decade of the 20th century and beyond.*—Judith Sheine



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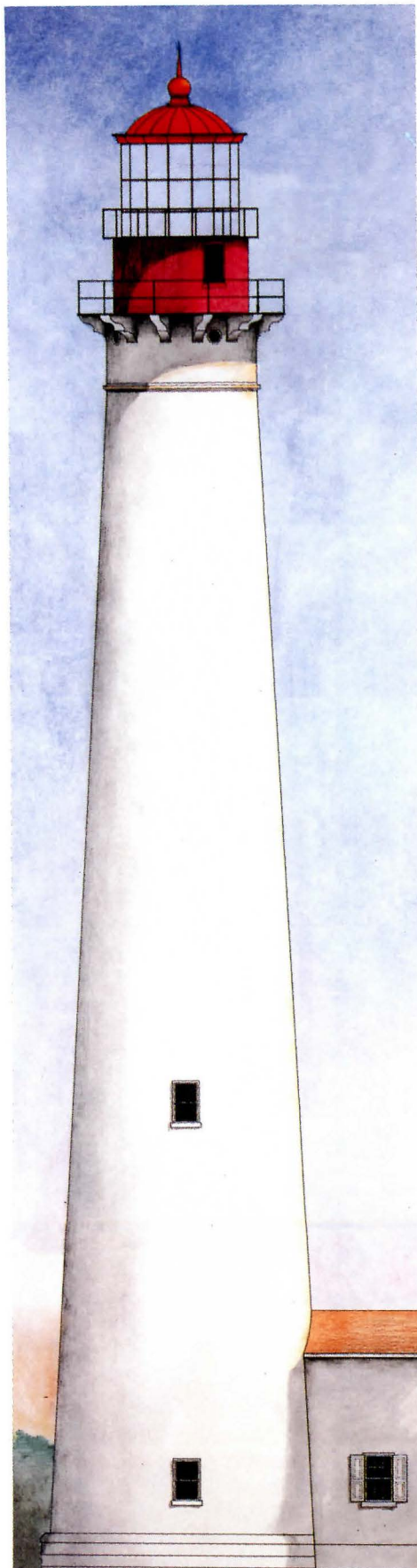
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ISTEA Opportunities

A federal law expands transportation-related markets for architects.

**Cape May Point Lighthouse
Cape May, New Jersey
Watson and Henry Associates**

The restoration of a 134-year-old lighthouse is not the kind of project usually associated with the phrase, "Your highway taxes at work." But when directors of the Mid-Atlantic Center for the Arts wanted to restore the historic Cape May Point Lighthouse in southern New Jersey (right), they solicited \$316,000 in federal transportation funds. The restored lighthouse is just one example of a wide range of projects now being funded under ISTEA. "The reasoning behind the lighthouse funding is that ferries between Cape May and Lewes, Delaware, help take cars off the road. The lighthouse is needed to operate the ferries," explains Robert Peck, AIA group vice president for external affairs. "It's a little Rube Goldberg. But it's generating work for architects."



From lighthouses to bike paths, a new market for architects is opening up, thanks to a federal transportation law. Signed on December 18, 1991, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) provides \$151 billion in federal funds from 1992 to 1997 for surface transportation spending. It is now the federal government's largest program for infrastructure.

What makes ISTEA more than just a reauthorized highway bill is that it amends Titles 23 and 49 of the United States Code—the Highways Act and the Transit Act, respectively—to diversify the federal role in surface transportation policy. The new law is intended to better respond to national priorities for environmental protection and energy efficiency. Projects that now qualify for ISTEA funding not only include roads and bridges, but greenways, nature trails, archaeological digs, and historic preservation as well.

Legislation particulars

Representing a fundamental shift in the way federal funds are allocated for transportation planning, the legislation is creating opportunities for architects around the nation to work on projects that for many years have been the sole province of transportation engineers. Key features of ISTEA are:

■ **Flexible funding:** The legislation departs from traditional reauthorizations by giving state and local governments unprecedented flexibility to determine how federal transportation funds are used.

■ **Revised formulas:** ISTEA alters funding formulas so that federal and state funds are distributed in the same percentages to both highway and mass transit projects: an 80 percent federal share and a 20 percent state share. Previously, highway projects received a higher percentage of federal funds.

■ **Strategic planning:** The new transportation law promotes sound planning by requiring that each project fit into a comprehensive long-range plan approved on the state and regional levels. It also requires that citizens be involved early in the planning stages.

The law requires funding recommendations for most areas to come from a local Metropolitan Planning Organization, the designated regional planning agency for any urban area with a population of 50,000 or more. In rural areas, local officials with jurisdiction over transportation must be consulted by the state in carrying out its plan. Each state's department of transportation is the designated agency for state planning. The governor also has the responsibility to involve citizens in de-

veloping the state's "Transportation Improvement Program," from which projects are selected at the state level.

The ISTEA funds include \$31.5 billion for mass transit and \$119 billion for highway programs. Within the highway category, one of the largest sources of money for architecture-related projects is the \$36 billion Surface Transportation Program (STP). It requires that no less than 10 percent of each state's share of STP funds, or \$3.6 billion, be devoted to "enhancements" that improve the community by increasing the environmental, historic, or esthetic value of a project.

These include pedestrian or bicycle facilities; acquisition of scenic easements and scenic or historic sites; landscaping and other beautification; historic preservation; rehabilitation and operation of historic transportation buildings, structures, or facilities, including railroad stations and canals; preservation of abandoned railway corridors for use as bicycle or pedestrian trails; control and removal of outdoor advertising; archaeological research; and mitigation of pollution due to runoff.

Each state can develop its own customized version of the enhancement program by prioritizing activities and determining how funds are to be dispersed. But the enhancement category is not the only area where money is available for architecture-related activities, and AIA officials encourage architects not to focus on enhancement money alone.

"There was a time when architects designed bridges and roads and underpasses and other projects that seem now to have been ceded to engineers," contends Robert Peck, AIA group vice president. "Our goal is to get architects back in the game. There is \$151 billion in this program that can all be used for good design and livable communities. If you don't focus narrowly on the enhancement money, it's a huge opportunity."

Architects' participation

Although the ISTEA legislation has been on the books for nearly two years, many states are still just coming to grips with the new funding regulations. A few have been progressive in establishing priorities and moving ahead with allocation of funds. Others are still feeling their way, waiting for more federal regulations to guide their spending.

Like state governments, architects around the country are at various stages of figuring out how to take advantage of the new regulations. Firms that already design transportation-related projects are in a good position to benefit from their proven expertise. Others

are finding ways to get involved for the first time—and even to make transportation-related design a specialty in the office.

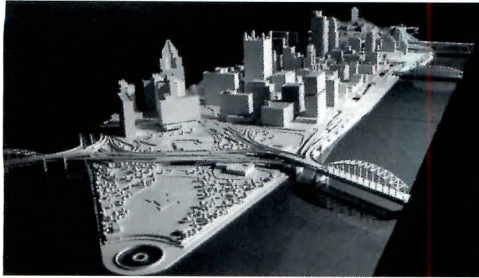
One firm that is well poised to take advantage of the ISTEA program is Zimmer Gunsul Frasca Partnership (ZGF), the Portland, Oregon-based firm that garnered widespread praise for its design of Portland's light rail system. The firm is now working on station design and other aspects of a 17-mile second phase linking Portland and Hillsboro, including a 3-mile tunnel under Washington Park. In this second phase, ZGF is working not only on the above-ground stations but on the architectural features of the tunnel, such as the portals and a station 250 feet below street level (page 59, this issue).

Citizen groups

To learn more about the ISTEA legislation, architects may obtain a copy by contacting their U.S. representatives or senators. It is known as House Rule 2950 or Public Law 102-240. A summary booklet on the law is available from the U.S. Department of Transportation at (202) 366-0660.

Peck recommends that architects who want to become involved in ISTEA projects should determine who is overseeing the ISTEA planning effort in their area to identify projects in the works. He also suggests that architects bring their design ideas to the attention of local transportation officials. The AIA also has an eight-minute video, "Shifting Gears," which is available for distribution and can be presented to elected officials and others to demonstrate how well-designed transportation projects can enhance their communities. Another valuable resource is the Surface Transportation Policy Project in Washington—(202) 939-3470—a nonprofit group documenting case studies of ISTEA projects.

Architects are also joining citizens groups that are forming around the country to ensure that ISTEA funds are spent the way Congress intends. In the nation's capital, for example, a coalition of architects, planners, and environmentalists has formed the Washington Regional Network for Livable Communities. Member Neal Payton, a Washington architect and associate professor at The Catholic University of America, points out that ISTEA encourages new ways of combining urban design and transportation planning. "President Clinton can spend all the money he wants for infrastructure," Payton argues, "but it isn't going to make a difference unless we reconnect the disciplines of transportation and urban planning."—Edward Gums



PITTSBURGH PARKWAY: Merging urbanism and transit.



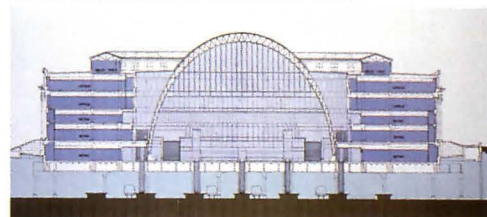
BRIDGE SKETCH: One proposal from AIA charette.

Parkway East Reconstruction Pittsburgh, Pennsylvania Pittsburgh Department of City Planning

ISTEA funds are being earmarked for a plan to build a new bridge across the Monongahela River and construct new roadways. Developed by the Pittsburgh City Planning Department in conjunction with the local AIA chapter, the plan includes a renovation of the Fort Pitt Bridge and a relocation of Fort Pitt Boulevard to allow construction of a greenway. Also included in the plan are construction of a new bridge (above), a buses-only roadway, and the conversion of an abandoned bus tunnel into a high occupancy vehicle lane for automobiles. L.D. Astorino Associates of Pittsburgh was commissioned to develop models (top) showing how the relocation of Fort Pitt Boulevard would create a public park along the Monongahela River's edge.



FARLEY BUILDING: New Amtrak terminal.



SECTION: Vaulted arches enclose concourse.

**Amtrak Passenger Terminal
New York City
Hellmuth, Obata & Kassabaum**

One of the largest design commissions to be funded by ISTE A is the proposed \$315 million conversion of New York's James A. Farley Building, a 1918 McKim, Mead and White landmark, into a new passenger terminal for Amtrak (top). The New York office of Hellmuth, Obata & Kassabaum (HOK) is the lead architect for the restoration, which anticipates \$80 million in ISTE A funds. HOK will transform the courtyard of the Farley Building into a waiting room framed by sweeping steel parabolic arches (above and left). The 120-foot-high public space is intended to recall the original Pennsylvania Station. Meanwhile, the current Penn Station will be renovated with new passenger accommodations. Improvements will include upgraded mechanical systems and new retail areas.

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South Pole Prototype

A study of an Antarctic outpost sets an example for resource-efficient transit.

ABOVE: McMurdo Station can be reached by sea only two months out of the year. Thirty-seven years after settling the Antarctic enclave, the American science community is reevaluating transportation and development.



WM. R. CURTSINGER

Scattered ramshackle for more than 40 years on the barren and frozen Antarctic coast, McMurdo Station has always been a difficult place to reach. Traversing the tundra-borne, 160-acre U.S. research community is a challenge, given the site's cold air, unpredictable terrain, and frequent bitter and biting winds.

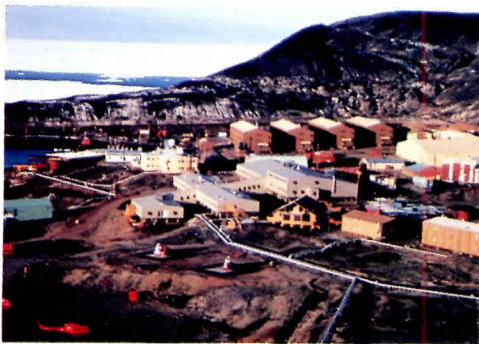
To plan better living and traveling conditions for scientists at this outpost, a multidisciplinary team of architecture professionals and students visited the site earlier this year. Their report contains suggestions for creating a new town center at McMurdo, as well as guidelines to curb pollution and waste; to boost energy efficiency; and to implement a sensible transportation plan. If the team can raise environmental consciousness and develop an energy-efficient transportation plan in Antarctica, where the challenges are so great, then the ideas promoted in this project could inspire similar ecologically oriented efforts across the United States.

Supported by a grant from the National Science Foundation (NSF), eight design professionals and four students, winners in last year's "Environment 2," a design competition sponsored by the American Institute of Architecture Students (AIAS), spent 16 days "on the ice" in January. Environment 2 is the second of three AIAS-sponsored student competitions to focus attention on sustainable design based in Antarctica. The group followed much the same format as an AIA Regional/Urban Design Assistance Team

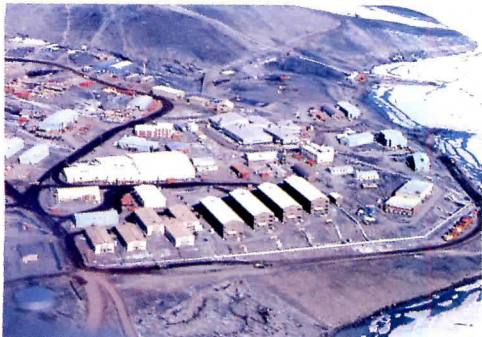
(R/UDAT), meeting with McMurdo's administrators, scientists, and other residents and drawing up a master plan based on their needs. "We wanted to draw up an ecologically sound plan," says James R. Franklin, AIA Resident Fellow and team facilitator, noting that a major goal of the study was to streamline chronic transportation inefficiencies. Winners of the third AIAS competition include co-first-place winners Kurt A. Micheels of the University of South Florida and Paul Gelbach of the University of Southern California, and second-place winners Richard Cooper of the University of Houston and Daniel M. Maas of Washington University. The winners will not get to journey to McMurdo, but the National Science Foundation will be requesting funding for a formal master planning effort. Preparation of the requests for proposals will begin in 1994 if funding is approved, and the master planners hired by the NSF will make use of the students' reports as well as a number of other assessments undertaken since the 1970s.

Communal core

The team's suggestions responded to McMurdo Station's ad hoc grant-by-grant, project-by-project development since its first settlement was established in 1956 on the western edge of the Ross Ice Shelf, located on the 80th Parallel south of New Zealand. The group sought to carve out a new circulation system and create a sense of community for McMurdo's transient population of 1,200



MCMURDO STATION: View from south (ocean).



AERIAL VIEW: Sheds contain living quarters.

scientists and support staff, who carry out research in biology, earth sciences, and atmospheric sciences, by eliminating deteriorating structures and concentrating development around a newly focused town center. Greater building density and a system of pedestrian walkways were developed to reduce the necessity for vehicles, powered by imported fuel, that damage the once-pristine Antarctic landscape.

The design team's efforts concentrated on proposing a new town center that would add a hydroponic greenhouse; an orientation center and museum; and a new education facility, which would provide access to computers and books, as well as self-enrichment courses. With a bowling alley and reconstructed social clubs, these new buildings would form a tightly knit communal core that McMurdo residents pleaded for in focus groups. Clustering these community buildings together would further lighten the transportation burden.

The AIAS team also devised creative solutions to the chronic problem of sufficient energy supplies, because energy is routinely squandered at McMurdo Station. Fuel to operate McMurdo's trucks, fork lifts, and generators, for instance, arrives on C-130 cargo planes, which consume 5 gallons for every 3 gallons they deliver. The planners suggested a single, managed distribution center, rather than the haphazard existing storage systems, as a way to better plan for fuel allocation, along with a shift from planes to ships as the predominant transportation. Central distribution would also cut the 14 trips involved in stocking, storing, and distributing materials to about 5 trips on average. In a place where a fork lift ride to lunch is not uncommon, simply using minimum vehicles for transportation offers significant energy savings.

Sustainable construction

But transportation planning must take place over a longer schedule in Antarctica than is usual in more temperate locales. Each year, the seaway to McMurdo Station is clear of ice only in December and January, during the height of the summer. "At McMurdo you get used to planning this year for a shipment next year to be used the following year," says Guy G. Guthridge of the National Science Foundation. This hardship makes the use of planes more understandable, but the central distribution system suggested by the NSF/AIAS team would allow greater control over usage and make possible

reasonable projections of future fuel, food, and materials needs. With these projections in hand, McMurdo's administrators could make best use of each summer shipment.

In addition to personnel and resource issues, the team examined construction practices. Like most American cities today, McMurdo Station has sprawled across its available territory. To reduce this footprint, planners suggested that old buildings be replaced by new, more central structures, zoned according to function and energy need. In this and other construction, the central distribution of building materials would cut down on waste, as would recycling of as many materials as possible, including crates and other shipping containers.

Space station on Earth

The AIAS team's report provides the framework for a more systematic, formal approach to rebuilding the town center. If officials adhere to the master plan, McMurdo Station should become less damaging to the Antarctic environment and more energy efficient, resulting in more opportunities for research and greater return on the investments made by the NSF, universities, and other participating research organizations.

The team included two caveats in its report, however. First, all "stakeholders" should be involved in development plans, including personnel at all levels at McMurdo and a proposed multidisciplinary Antarctic Advisory Panel in the United States. The team also challenged the federal project procurement process's lack of sensitivity to site specifics, which fails to address the special circumstances of Antarctica and misses opportunities to foster innovative design that expands construction knowledge.

"McMurdo has the potential to be a powerful symbol," maintains Kansas City architect Robert Berkebile. "If we can live intelligently and sustainably at McMurdo, then we can do it anywhere. Success in sustainable design at McMurdo could be more important than the research that goes on there because of its global potential."

The team's greatest hope is that Antarctica—isolated, barren, technologically demanding—can serve as something of a space station on Earth, focusing national attention on its more extreme examples of the environmental conservation issues being faced everywhere, if to a lesser degree.

But applying transportation and sustainability lessons learned at McMurdo to the

U.S. mainland is not easy. First, part of McMurdo's challenge is its novelty. No other place is quite like it, with its thermal and geographic extremes and its physical isolation from the rest of the world. A basic underpinning of sustainable design is that distant regions that share similar climates should share similar building and transportation solutions. But this philosophy has no relevance at McMurdo. The station is a specialized community, not a diverse modern urban landscape or even a decent-size rural town. The tidy zoning, clear circulation hierarchy, and limited list of building uses make McMurdo a site more easily categorized and integrated in many ways than a town of ordinary diversity in the United States.

The lessons learned at McMurdo may be more applicable to another specialized, harsh environment: space. In fact, students at the University of Houston's space architecture program have been studying just such a relationship between Antarctica and space habitation since the 1970s, under the direction of Larry Bell and Guillermo Trotti. Their studies have contributed directly to plans for Space Station Freedom and possible lunar and Martian colonies in the distant future. What the Environment 2 team found for McMurdo, then, may say more about life on Mars or the moon—an exciting proposition—than life in the United States.

Nevertheless, the planning team uncovered important problems and achieved creative solutions not unlike those of a typical Regional/Urban Design Assistance Team (R/UDAT). The plan differs from an R/UDAT, however, in that no follow-through mechanism has been established. Absent any follow-up, McMurdo Station will continue to ramble along in boomtown mining-shack fashion. But the NSF's three-year program that generated this site visit will be followed by a formal procurement for architecture/engineering services to pull together the architects' efforts, according to NSF official and team guide Guy G. Guthridge.

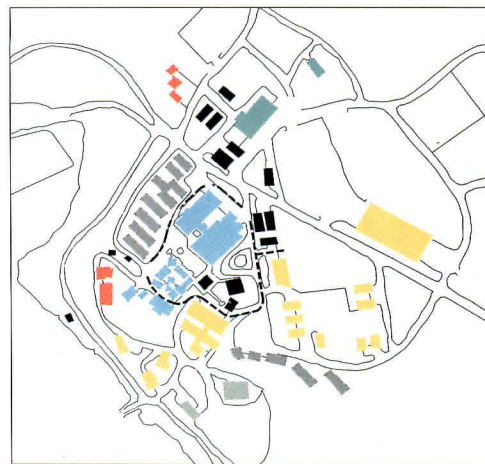
"The goal is to rebuild McMurdo in the coming years, focusing on efficiency, economy, and livability," says Guthridge.

Should the National Science Foundation's formal planning phase succeed, architects and planners will gain an insight through the Antarctic condition into environmental problems on the other six continents. The example set by McMurdo Station can provide a valuable lesson in sustainable design and sensible transportation solutions for cultures around the world.—Ray Don Tilley



EXISTING BUILDING USE

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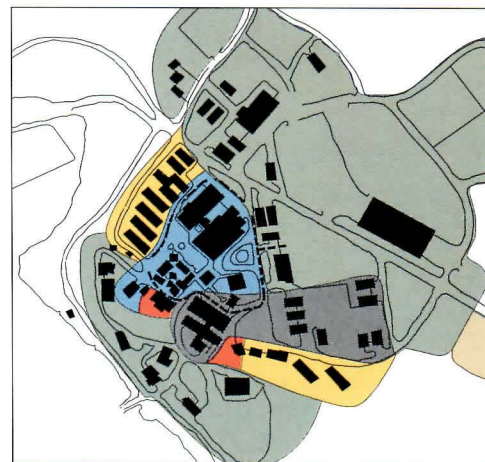
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- UTILITIES
- TRANSPORTATION



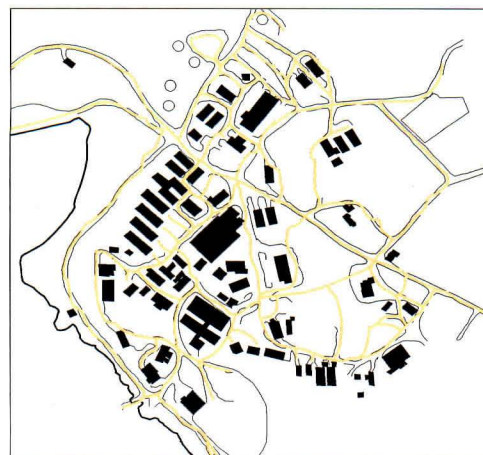
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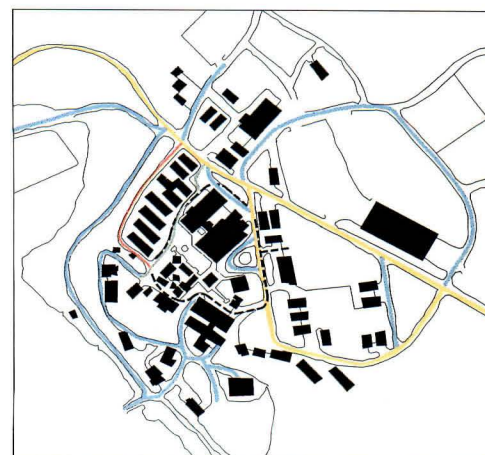
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- ADMINISTRATION
- STORAGE: GOODS
- STORAGE: FUEL



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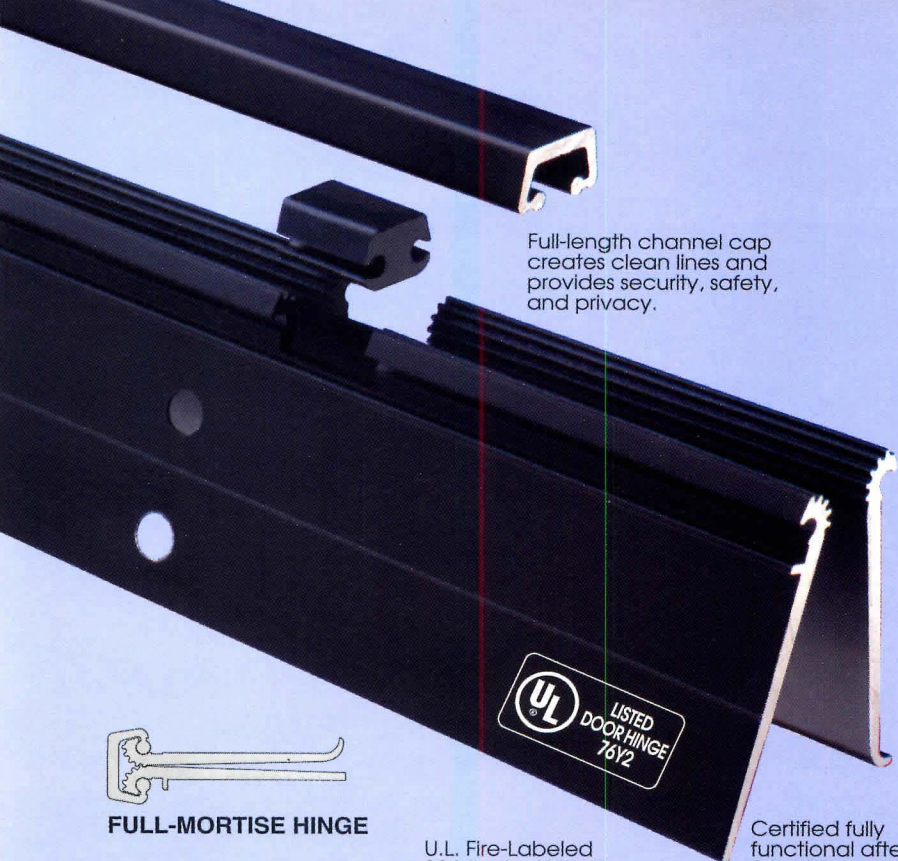
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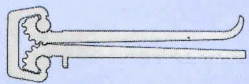
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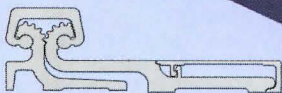
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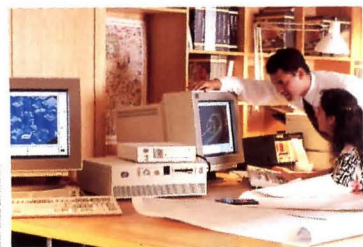


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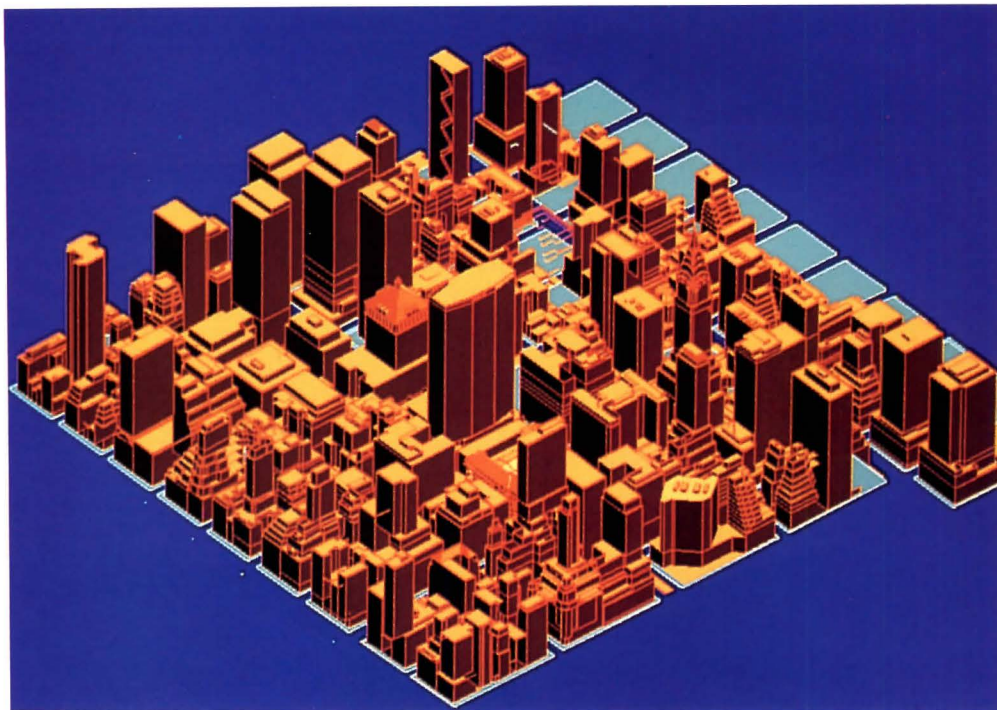
Flexible Workstations

Architects can take advantage of more powerful systems as workstation costs decline.



ED LEIDERMAN

ABOVE AND RIGHT: IBM RS/6000 series workstations with IBM's AES software provide a powerful platform. The Environment Simulation Center at the New School in New York works on the system to create 3D models of New York City neighborhoods.



Smart architectural firms that have relied on personal computers (PCs) are now shifting toward more sophisticated computer workstations—computer terminals that are connected to a network, as opposed to stand-alone units. These powerful workstations are becoming more affordable and flexible, presenting greater choices to both IBM-compatible and Macintosh users.

For an architect, computers should not get in the way of the creative process, but should respond as quickly as the operator can think. Architect Antoine Predock, whose firm designs on Macintosh Quadra 900s, describes this interaction as an “instant dialogue between the computer and the user that allows for direct engagement with a project.” Other architects report that newly affordable UNIX-based workstations and accelerated IBM-compatible computers now offer the kind of performance that elevates CAD and other architectural software to a more accessible and efficient level. With the incredible improvements in both speed and performance, and the substantially lower costs of sophisticated workstations, architects now have a greater choice of state-of-the-art CAD platforms. While IBM-compatible PCs are becoming faster and more capable, the traditionally more expensive UNIX and Macintosh systems are becoming cheaper to the point where they are cost competitive with PCs.

Today's PCs easily surpass those workstations of a decade ago in terms of speed and graphical capabilities. But workstations, with

their greater speed and higher computing power, are ideal platforms for networking and running several applications at once (multitasking). They also offer superior graphics performance. Top-of-the-line Macintosh systems fit somewhere in the middle. They provide strong graphic capabilities with the advantages of workstations, while offering the ease of the Macintosh platform.

Lower prices, compatible formats

When architects started to adopt CAD more than a decade ago, large firms typically operated CAD on UNIX-based workstations that were prohibitively expensive to smaller practices. High-end CAD systems for architects, such as Intergraph and Sigma Design's Arris, ran exclusively on UNIX-based platforms. Until recently, it was not uncommon for a firm to spend \$50,000 or more for a single graphics workstation that was fully configured for CAD. Today, the price of these high-level systems has dropped to unprecedented lows. Systems that cost \$30,000 a few years ago are available for \$10,000 or less. Some vendors have recently announced single workstations at prices below \$5,000.

In addition to high cost, workstations were impractical for architectural practices because they were difficult to learn, incompatible with other office systems, and lacked many applications sought by architects. But new graphical user interfaces make new machines as easy to understand as the Macintosh, so it is no longer necessary to learn



INTERGRAPH WORKSTATION: Integrates disciplines.

Intergraph

For more than a decade, the architects and engineers at Heery International in Atlanta have been taking advantage of the power of Intergraph workstations for every phase of their work. According to CAD manager Roger Poole, the strength of Intergraph networking and layering systems enables the firm to pass work between different professional disciplines easily. For instance, by creating 3D models of complex projects, such as the Georgia Dome, the interdisciplinary team can check for possible conflicts in the design before changes become costly.



GEORGIA DOME: Heery International analyzes complex projects using Intergraph 3D models.

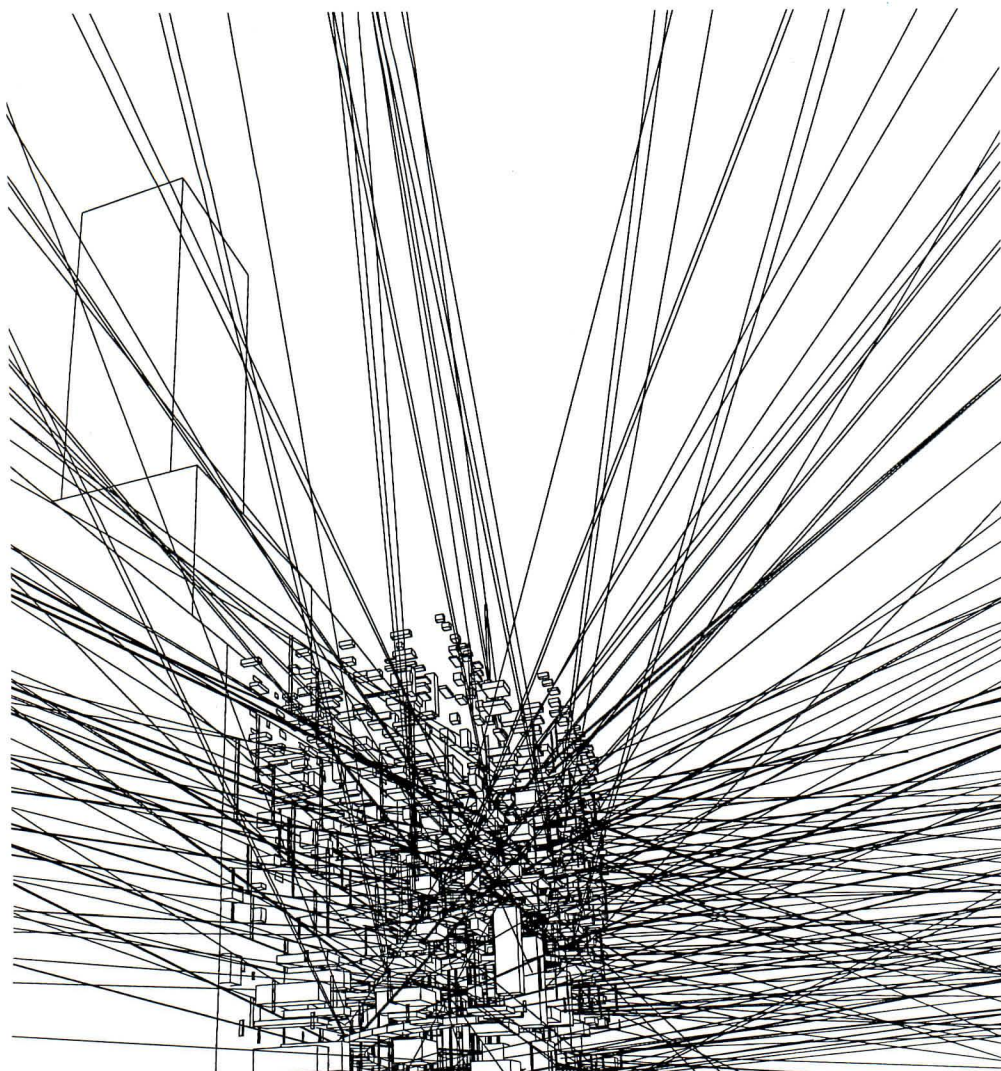
UNIX to run a workstation—although it helps. Today, most workstation platforms support software such as AutoCAD, Lotus 1-2-3, and WordPerfect that look like, and share compatible file formats with, the same programs running on PC or Macintosh platforms. Also, Adobe Illustrator and Photoshop now run on Silicon Graphics workstations.

Some software emulates a PC or Mac system in a window on a UNIX workstation. For instance, SoftPC allows DOS and Windows applications to operate on UNIX stations, and Quorum software provides a product that allows Macintosh software to run on Sun and Silicon Graphics workstations. The reverse is also true, as high-end PCs can take advantage of UNIX, XENIX, or IBM's OS/2 operating systems. MacX allows X Windows applications to work on Macs. Some high-end CAD applications such as Sigma Design's Arris, Alias Sonata, and Accugraph's MountainTop System operate best on workstations.

The role of computers in architectural practice is moving away from simple 2D drafting to 3D design, visualization and rendering, and the management of large databases for facilities management or expert systems. Workstations that are now marketed for CAD were originally designed for engineering and medical imaging. Since these sophisticated workstations are ideally suited for CAD and graphics applications, architects can take advantage of the technologies developed in these other fields. In addition, the raw power of the newer systems is opening the door for innovative applications, such as pen-based computing, real-time graphics, and networks that can link architects with clients on opposite sides of the globe.

System differences

Architects should not have to worry about the technical distinctions among various systems, but these issues will inevitably arise as



ST. JOHN THE DIVINE: Antoine Predock explores spatial configurations for the transept using Architrone.

they begin to explore their options. Software vendors can provide users with recommendations and guidelines for the ideal hardware and software setups for their systems.

The primary difference between workstations and PCs has been the processors: IBM-compatible machines have Intel-based chips. Macintoshes employ a chip from Motorola, the fastest of which, the 68040, runs the Quadra. Both the Intel and the Motorola chips are Complex Instruction Set Computing (CISC) chips, which means that the processor recognizes up to 100 instructions for each calculation it makes. UNIX-based workstations, on the other hand, have chips based on Reduced Instruction Set Computing (RISC). RISC-based systems require far fewer instructions per computation and can run up to 75 percent faster than CISC systems. Because of this power, RISC systems are well suited for computer-intensive graphics applications. Soon the boundaries between these two com-

puting worlds will blur when Macintoshes and PCs incorporating the new RISC-based PowerPC chips debut later this year.

Operating systems

Whether a system can run a particular software package depends largely on its operating system, as software is coded to work with particular systems. Microsoft DOS and Windows are the most popular PC operating systems. UNIX is generally the operating system for most RISC-based systems. Unlike IBM-PCs and their clones that all operate more or less compatible versions of DOS, there are many different versions of UNIX, and each workstation manufacturer provides its own version: IRIX runs on Silicon Graphics machines; HP/UX, on Hewlett-Packard; and Ultrix, on DEC. IBM's OS/2 runs on PCs or workstations, and on Sun Microsystems's UNIX. This is why software that operates on a Silicon Graphics workstation does not necessarily run on a



QUADRA WORKSTATION: Quick reaction; valuable asset.

Macintosh Quadra

When Antoine Predock's firm used a Macintosh Quadra 900 to explore the design possibilities of sacred number series for a competition for New York's St. John the Divine, Predock discovered that the computer can be a tremendous asset when it reacts as quickly as the designer can think. Although Predock argues that his practice will always have "one foot in the 19th century," completing sketches and models by hand, CAD manager Mark Donahue says the firm has replaced "red lining," revising drawings on paper, with a practice called "red chair," where the designers solve problems interactively at a workstation.



SUN SPARCSTATION: Typical workstation setup.

Sun SPARCstation

Architects at Kaplan McLaughlin Diaz rely on Arris for Sun workstations and AutoCAD on 486 IBM-compatible PCs. Although satisfied with their Sun SPARCstations, which helped create 3D models of a city-planning scheme (above right), they recently upgraded their systems with more PCs instead of workstations. Citing the recent advances of Autodesk's 3D Studio, and the lower cost of PC clones, CAD manager Fred Schreck adds that for much of their work, PCs are adequate. As Schreck notes, "SPARCstations have superior displays and make excellent file servers for our PC network."



CITY-PLANNING SCHEME: KMD uses Arris 3D modeling to produce urban design schemes and presentations.

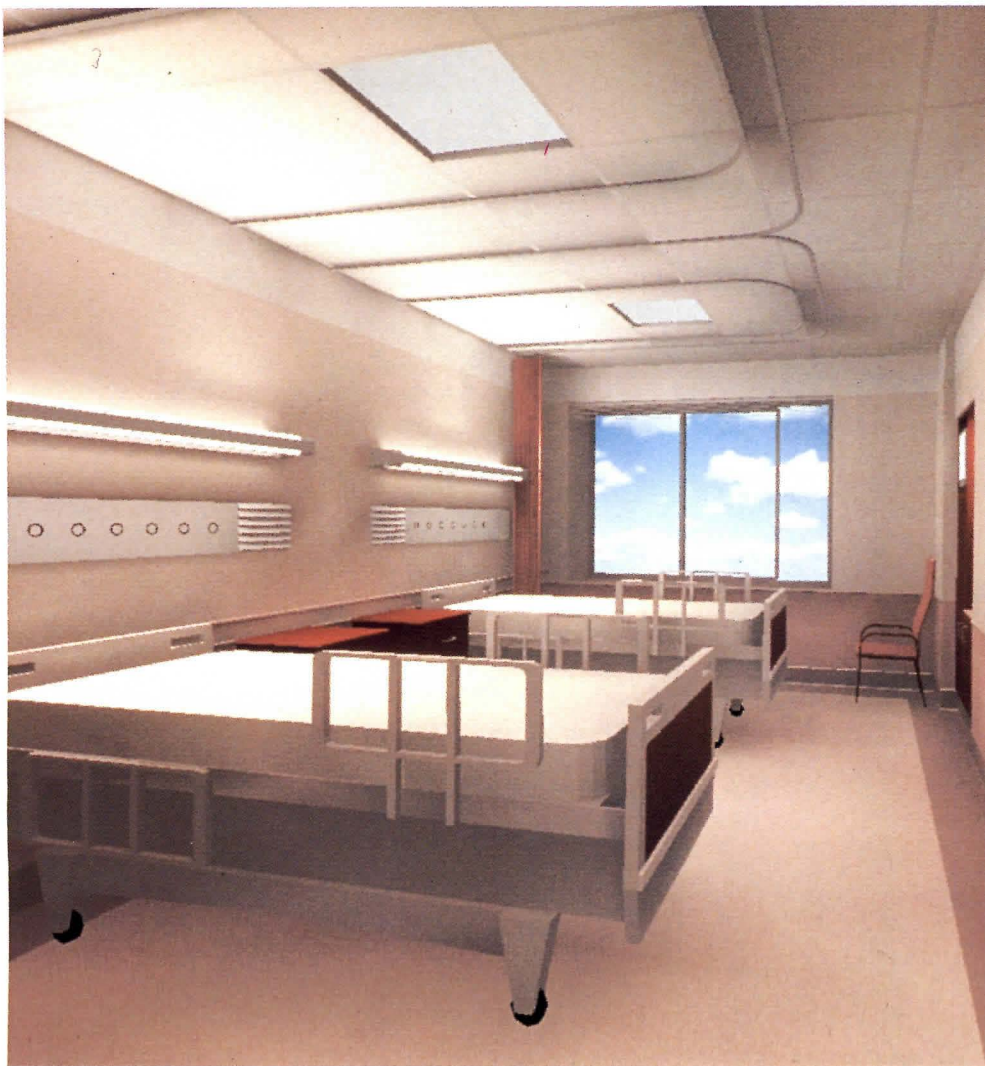
Hewlett-Packard workstation. However, the ability to communicate among different platforms has improved over the last year.

Workstations versus PCs

According to architects who use both workstations and PCs, the primary differences between the two kinds of systems are the quality of the workstation systems and the simplicity of setup. According to Roger Poole, a longtime Intergraph user at Heery in Atlanta, "Workstations are much better built, and they come installed with graphic acceleration and Ethernet networking capability built right in." Upgrading a PC to similar performance standards requires accelerators and networking extensions, which means adding components from a number of different vendors that may not be compatible with selected software. Industry experts point out that adding these extras ultimately makes PCs more expensive to own and operate.

Other advantages of workstations are noted by CAD manager John Ryter of CityDesign in Boston: "Installing software on our Hewlett-Packard workstation is a snap, taking minutes instead of all day as it does on our PC systems. The workstations are built to higher quality standards than machines intended for personal use—while our PCs are inevitably in and out of the repair shop, our UNIX-based systems are virtually trouble-free." Designers also note that many workstations, such as the system from Silicon Graphics Indigo, are also beautifully designed and look as good as they perform.

Because UNIX-based workstations are inherently designed to be part of a network system, architects who work on them claim that networking is effortless and invisible to those who use the system. At CityDesign, architects can sit at any one of the office's Hewlett-Packard workstations and have access to the files that they are working on.



NEW YORK HOSPITAL: HOK guides a client through design using sophisticated animation.

The abilities of high-end systems to perform several tasks at once eases bottlenecks by allowing additional functions, such as plotting, to continue while all stations are tied up with other CAD work. Networking systems gives designers the advantage of "virtual memory," the ability to take advantage of the system resources on other networked workstations that are not being used at the time, and "parallel processing," the ability to put all the workstations to work on one high-resolution rendering overnight. If a firm is large enough, pooling office resources can simulate the power of a supercomputer.

Combining systems

New technologies make it possible, and almost simple, to combine several platforms into a single system. CityDesign, Kaplan McLaughlin Diaz (KMD), and HOK, like many firms, find it necessary to combine systems that include running AutoCAD or

Autodesk's 3D Studio alongside their UNIX-based systems. Although moving CAD drawings from AutoCAD to a system like Arris requires some translation, the files can be translated across the network, and system resources such as plotters and back-up drives can be shared. Fred Schreck, CAD manager at KMD in San Francisco, explains that the firm has recently switched from Sun SPARCstations used as CAD stations to file servers for a network of 486 PCs.

Availability of new PCs and workstations is apt to occur quickly as developers rush to invest in lower cost RISC-based technologies and users push manufacturers for more friendly and compatible systems. But the greatest CAD advances will take place when architects don't have to think about SPECmarks, MIPS, or Megs and can just think about their buildings.—*Julie M. Trelstad*

Julie M. Trelstad is a Connecticut-based writer.



SILICON GRAPHICS: HOK Animation Lab workstations.

Silicon Graphics

At HOK, state-of-the-art Silicon Graphics workstations are used to create computer animations of projects created on the firm's DEC, Vax, and PC systems that are networked across the country to the firm's computer graphics department in St. Louis. There, HOK has high-end Silicon Graphics workstations to create rendered 3D models. Once the models are built, architects can offer clients a tour of proposed schemes, such as this one for a patient room at New York Hospital, in "real time" or on videos produced in-house with the system's video output capability and built-in audio dubbing.



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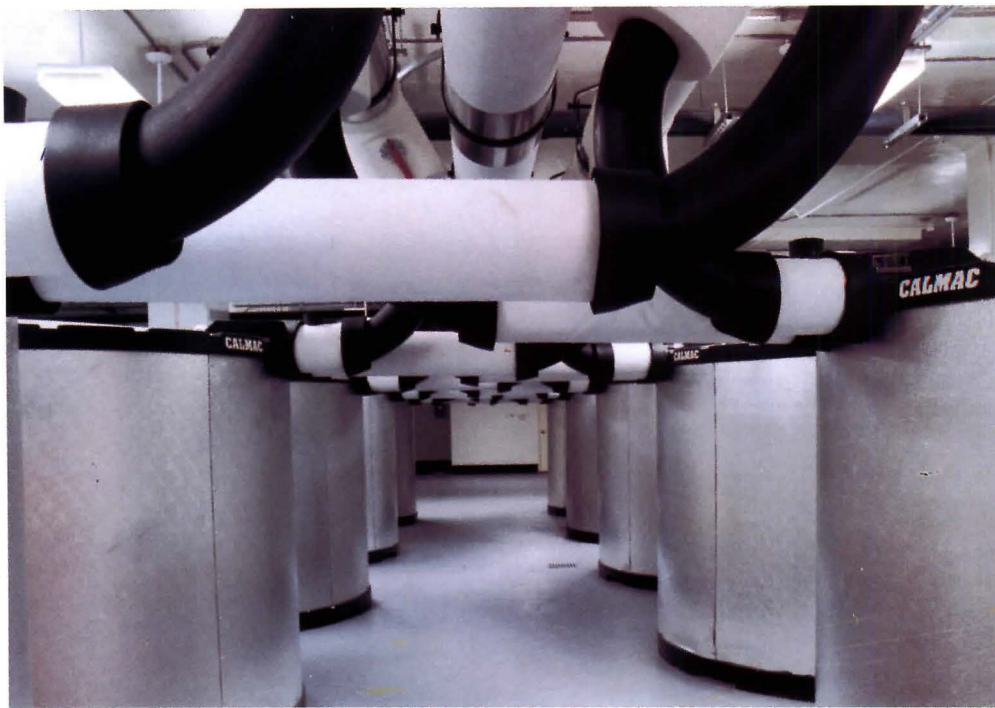
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Cool Storage

Air conditioning that relies on ice, water, or salt takes advantage of low utility rates.

ABOVE RIGHT: Some brine systems, such as that at Southern Bell Telephone Company in West Palm Beach, Florida, consist of numerous small tanks located in a mechanical room.



Back in the 1930s, fashionable theaters advertised “refrigerated air” on their marquees. The cooling systems were humble: Water was pulled from basement tanks full of melting ice and circulated past large fans—a system not much different from sitting an ice cube in front of a fan. But on a hot summer evening in a crowded theater, that thin stream of cool air felt wonderful.

Cooling with ice

The idea behind cool storage is not very different from those early air-cooling systems. Reserves of ice, chilled water, or eutectic salt are built up at night and stored in tanks. The reserves are then drawn on as needed during the day to provide air conditioning, dehumidification, or process cooling.

“It’s an air-conditioning system with a bulge in it. That bulge is the tank,” explains David Knebel, an engineer and associate director of the Thermal Storage Applications Research Center at the University of Wisconsin in Madison. The tanks, which can be fabricated from concrete, plastic, or steel, may be located in the basement; on the roof, if it will support the weight; or outside the building, either buried or on-grade. The tanks are normally insulated to maintain the temperature of the thermal medium, and they may be built on-site or premanufactured.

The three basic classifications of cool-storage systems—ice, chilled water, and eutectic salt—are available in different variations, depending upon the manufacturer.

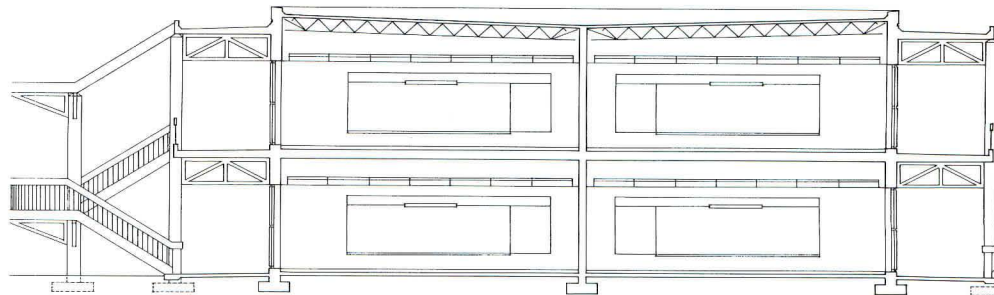
Ice-producing systems consist of either brine or ice harvesting. The first comprises a string of tanks (several dozen if the load is significant) filled with water. During the evening, a glycol solution cycles from the chiller, where it is cooled to below freezing, into tubing coiled inside each tank. A layer of ice builds, slowly encrusting the tubing.

The process is timed so that the tubes are encased in ice and the remaining water measures close to 32 degrees Fahrenheit by the time utility rates begin to climb. Then a pump circulates the water or the glycol solution from the storage tanks to the space that needs to be cooled; and the warm, return liquid is recooled by the ice in the tank.

The J.C. Penney Corporate Headquarters, in Plano, Texas, boasts one of the largest brine systems in the world, with 177 tanks generating 27,000 ton-hours of cooling. The tanks, located on the ground floor of the nearly 2 million-square-foot building, take up about 14,000 square feet of space.

All those tanks meant a lot of connections, says Michael E. Menefee, vice president of Dallas, Texas-based HKS. However, if one tank goes down, the cool-storage system continues to function, since the system does not depend on one huge tank, notes Menefee.

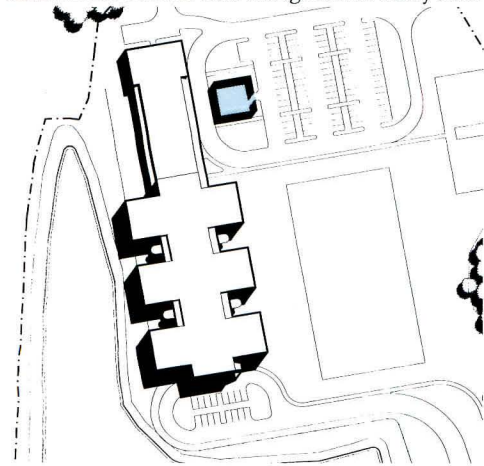
Penney requested a partial storage system since full storage is significantly more expensive to install, requiring more tanks and a greater chiller capacity. “They’re very knowledgeable and were aware of the cost savings associated with cool storage,” Menefee adds.



SCHOOL SECTION: Ice-harvesting system allows reduction of ductwork and plenums.



SCHWARZKOPF SCHOOL: Cool storage lowers utility bills.



SITE PLAN: Tanks buried west of school (shaded area).

Ice-harvesting systems generally rely on a single tank with refrigeration equipment, in a self-contained unit, on top of the tank. Circulating water, sprayed onto an evaporator surface, turns into ice. When the ice reaches a certain density, it is released from the plates (by shooting hot discharge gases through them), into the tank. The process is repeated until the tank is filled with slushy water.

Water and salt

Water used for chilled-water systems is cycled through the chillers, like conventional daytime production, but the chilled water is stored in one tank. Water is pumped to the building from the bottom of the tank, where it is coolest, and returned to the top of the tank.

Eutectic salt systems are basically chilled-water systems with containers of salt, primarily sodium sulfate, stacked in the tank. The salt freezes at a higher temperature than water—47 degrees Fahrenheit—which makes it a more efficient storage medium.

Cool storage, also called thermal energy storage, was first reexamined in the late 1970s when electric rates started to climb and utilities introduced off-peak discounts. Early systems often produced disastrous results with leaky tanks, huge installation costs, and poor energy efficiency. Even now, while there are at least 2,000 commercial systems in use, cool storage is not quite accepted as a norm.

“The HVAC industry is notoriously slow to adopt change. And those early systems gave the technology a bad name,” maintains Knebel, of the University of Wisconsin’s Thermal Storage Applications Research Center. Until recently, only a few engineering firms possessed sufficient expertise to design a system, and only a handful of subcontractors were both experienced and knowledgeable enough to install cool-storage systems.

But the situation is changing as more manufacturers and utilities offer training courses in the details of cool storage. Most architects who have designed projects with

cool storage recommend choosing a subcontractor with experience in installing the systems. Lower prices are also proving more attractive to specifying the systems: First costs, which had been prohibitively high in the past, are now dropping and becoming more competitive with nonstorage equipment.

Technically, cool storage is not an energy-saving system, although it does offer some conservation advantages. For instance, because the chiller is operating at night, when ambient temperatures are lower, operation is 5 percent to 10 percent more efficient.

Furthermore, because the air is coming off a very cold medium, it can be distributed through the building at a lower temperature—usually between 45 degrees Fahrenheit and 50 degrees Fahrenheit. By taking advantage of this low-temperature air distribution, not only is less air needed to cool the space, but the humidity is lower as well.

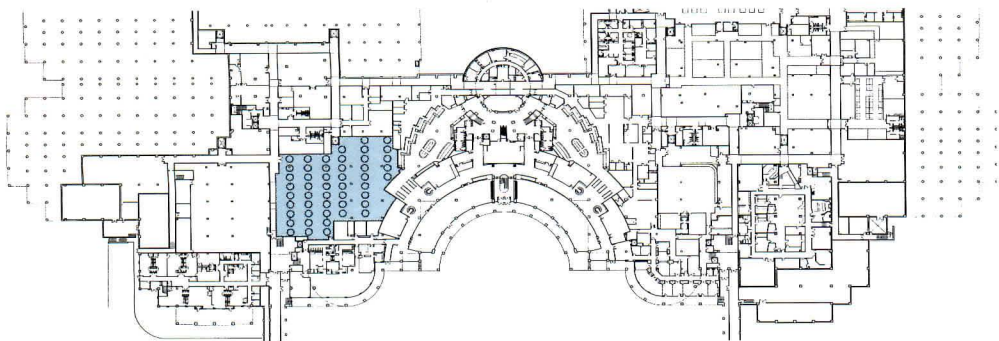
The resulting lower air volume offers design advantages, chiefly, smaller ducts and pipes. In addition, the number and size of the fans needed to push the air through the building are reduced, creating more usable square footage and saving space between floors.

System advantages

Cool-storage technology is appropriate for all climates, although the system’s payback period is likely to be shorter in hot, humid regions or in manufacturing facilities which operate heat-generating equipment.

The primary reason for specifying cool storage is to allow building owners to shift demand to the evening hours, when most utilities offer rates up to 50 percent lower.

“You have to decide whether the owner will save enough on electric bills to justify the cost of the system,” says Craig G. Covey, principal of Hening-Vest-Covey Architectural Corporation in Richmond, Virginia. “The best applications are in office buildings, schools, or single-shift manufacturing facilities—any place there’s a daytime spike in demand.”



PENNEY HEADQUARTERS: 177 ice-storage tanks are housed in 14,000-square-foot mechanical room (shaded area).

Full-storage systems

Covey specified brine cool storage in a 140,000-square-foot office building he designed for the Virginia Department of Forestry in Charlottesville. It is the first time he's worked with the technology, which is one of the first systems installed in a state building. "I'm convinced of its effectiveness, both in saving money and providing design advantages," he notes, pointing out that the state, however, is "somewhat skeptical."

Covey is also working with state officials and the project engineer, Lanna, Dunlap & Spriggs of Richmond, to plan a demonstration project for next summer. The experiment will compare the cost of running the Department of Forestry building's cooling system, on days with similar weather conditions, with and without thermal storage. "We think the numbers, and the savings, will be significant," maintains project engineer John Dunlap.

The project incorporates a full-storage system: The chillers are cut off by 10 a.m., when electric rates go up, and the cooling system runs completely on ice stored in 18 insulated, high-density polyethylene tanks. Other systems use partial storage, meaning the thermal storage works in tandem with the chillers during peak hours. Full-storage systems have a larger capacity and are more expensive to install. But because cool-storage systems shift all cooling power demand to the evening, they generate greater savings in the long run.

For the new Norman Schwarzkopf Elementary School, the Hillsborough County, Florida, School Board required Tampa architect Dwight E. Holmes to specify a partial storage, ice-harvesting system. "This is the district's third cool-storage system," Holmes says. "The board is aware that the savings potential is significant in this muggy climate."

Not only are electric bills lower, but construction costs were reduced, and building space was gained as a consequence of low-temperature air distribution. Those savings, including lower material costs, translated to

between 2 percent and 3 percent of the total building cost of \$52.48 per square foot.

"Because we're distributing air at somewhere between 40 degrees and 45 degrees Fahrenheit, we're able to use a single air handler to cool an 88,000-square-foot building," the architect points out. Air temperatures below 40 degrees can lead to inadequate ventilation and indoor air quality problems.

Holmes also shrunk the space between floors from 4 feet to 3 feet, as a result of the smaller ductwork. He notes, "We still have the same number of Btus of cooling, but because the air is so much colder, we have a lower cfm. That made the mechanical design more compact and minimized the amount of space carved out for it."

Low-temperature air doesn't circulate the same way 55 degree air does, so special diffusers are required. "Cold air plunges downward, making it uncomfortable for whoever is sitting in its path. It can also condense at the diffuser if it isn't mixed properly," says Ron McIlveen, of Architectural Engineering of Palm Harbor Florida, the Schwarzkopf School project engineer. The school's diffusers incorporate high-velocity jets to quickly entrain the cold air into the room air.

Ducts must be carefully installed to prevent condensation. "The installers must be fastidious. Any uninsulated areas will become problems very quickly," notes Holmes.

Retrofitting with cool storage

Because of the design advantages offered by low-temperature air, cool storage is especially suited to a building that is undergoing rehabilitation. For example, Edward L. Eichman, Jr., principal of Browne, Eichman, Dalgliesh, Gilpin & Paxton in Charlottesville, Virginia, was able to squeeze three floors into a retrofit building that would have only allowed space for two with conventional ductwork.

Since the building, an old theater converted into a church community center, is in an historic area of Fredericksburg, Virginia,



PENNEY HQ: One of the largest brine-cooled structures.

the city's architectural review board prevented Eichman from designing the building any taller. "Using smaller ductwork helped make it possible to put in that extra floor," he says.

Finding a space for the three storage tanks, however, posed a problem. They had to be out of sight, due to the review board's requirements, but there was no place to excavate on the site and no room in the building. Eichman ended up placing them on the far corner of the roof of an adjacent church administrative building. Because the neighboring structure was designed to support a second-story addition that was never built, the

roof was strong enough to hold the tanks.

Most older buildings have uninsulated ducts, so it's not always possible to introduce low-temperature air. That was the case at the Yorktowne Hotel, a 70-year-old building in York, Pennsylvania. Engineer Douglas J. Tyger, a principal of CSI Services in York, was not only limited by the building's old ductwork, but he also had to recycle the existing diffusers. These were actually integrated into the old light fixtures that hang in each room. So the cold air generated by the building's brine system is warmed before it's distributed.

The hotel's brine system consists of a

7,500-gallon tank, located in an old laundry room in the basement. Building the tank was an engineering feat in itself. There was no elevator large enough to get the plate steel forms into the basement, so they were built out of wood. To pump the concrete, a hose was snaked from the parking area, down the elevator shaft, and into the basement.

The tank is filled with 4-inch-diameter spheres that are slightly dimpled. When the de-ionized water that fills each of the spheres freezes, it expands to fill out the dimple in each sphere. The balls float in glycol solution that is cooled during off-peak hours by cycling it through the chiller. The antifreeze is then used to cool the building.

New technologies

Research is underway to develop methods that will make cool-storage technology more energy efficient. "Cool storage has been criticized by environmentalists for simply shifting demand and doing nothing to save power," says Ronald D. Wendland, manager of thermal storage technology for the Electric Power Research Institute (EPRI).

But that accusation is not entirely true. By shifting demand to off-peak hours, cool storage capitalizes on underutilized power generated by more efficient, baseload generating plants. To meet peak demands, utilities must rely on older plants. Cool storage helps delay the need to build new generating facilities.

One energy-saving technology, called slippery ice, a variation on ice harvesting, is now being tested at two locations. In existing systems, the coating of ice, as it builds on the surface of the plates, acts as insulation, reducing efficiency. Loosening the ice layer with a hot gas defrost cycle is also an energy drain.

But research sponsored by EPRI shows that combining the water with calcium magnesium acetate, a chemical similar to that used for de-icing aircraft, makes the ice slip away from the plates as soon as it's formed. The tank below is filled with watery slush that is pumped directly to the space that needs to be cooled. Because the slush is both ice and water, it has greater cooling capacity than a system using only chilled water. So less slush would be required to accomplish the same amount of cooling. Wendland estimates that pipe size and pumping energy could be a quarter of other thermal energy systems—a significant advantage to architects in saving space and money.—*Wendy Talarico*

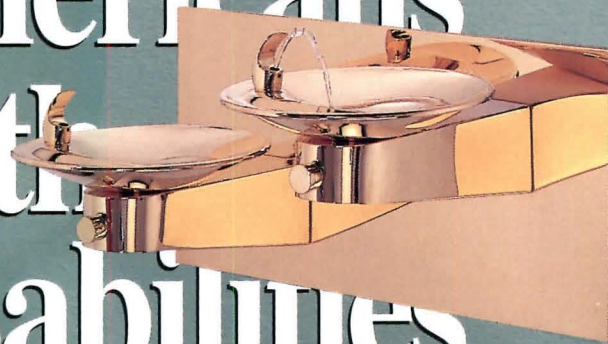
Wendy Talarico is a Fredericksburg, Virginia-based freelance writer.

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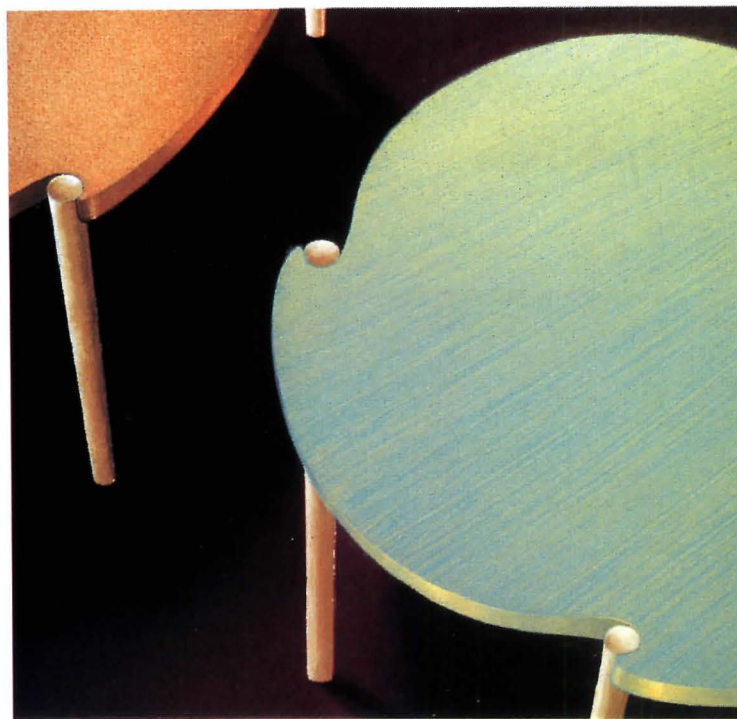
Circle 55 on information card

Products

Finely crafted details enhance new furniture designs at NeoCon.



TOP: International Contract Furnishings (ICF) has built its reputation for Modern European imports. At NeoCon, ICF unveiled its first line of manufactured furniture, which includes the Layered Wood chair by Timothy deFiebre, ICF's new vice president of design. The Layered Wood design is an armless stacking chair featuring a seat and back constructed of 1/8-inch machined maple plywood. Three layers of wood are pressed together at alternating 90 degree angles to compose a strong grid pattern, which complements ICF's line of Alvar Aalto furniture. Priced moderately and geared to gathering areas, the chair is available with an upholstered seat; its colors are natural (shown), black, or custom-stained. To complement his Layered Wood model, deFiebre designed ICF's new Ronchamp chair, a spare design whose curved back springs directly off the front legs. *Circle 401 on information card.*



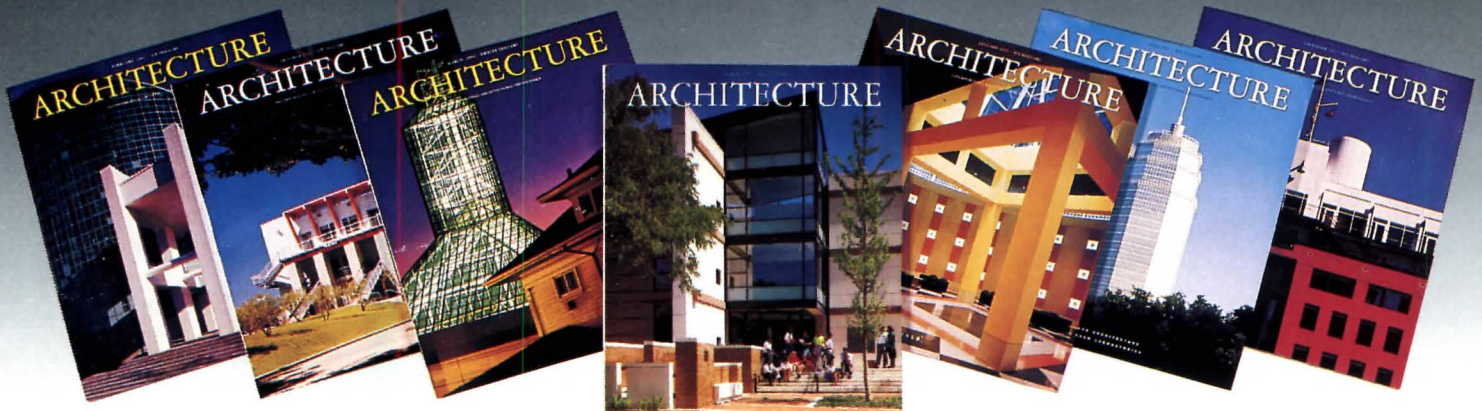
ABOVE LEFT: Extending its Manhattan Collection of seating and tables by designer Brian Kane, Metropolitan Furniture introduces the new Manhattan line of furniture for the library. Kane's designs uphold the solidity of traditional library furniture while adding contemporary details. The series includes side and lounge seating, study carrels, computer stations, stands for magazines and books, and shelving. These units are geared to swift changes in technology within corporate, academic, and government libraries. The Manhattan line is available in a variety of wood finishes, and work surfaces can be ordered in several standard plastic laminates. *Circle 402 on information card.*

TOP: Atelier International (AI) introduces Topspin, a table designed by Italian architect Emanuela Frattini, who has completed interior projects in Europe and New York and collected several awards for her furniture designs. Topspin's curved wood surface

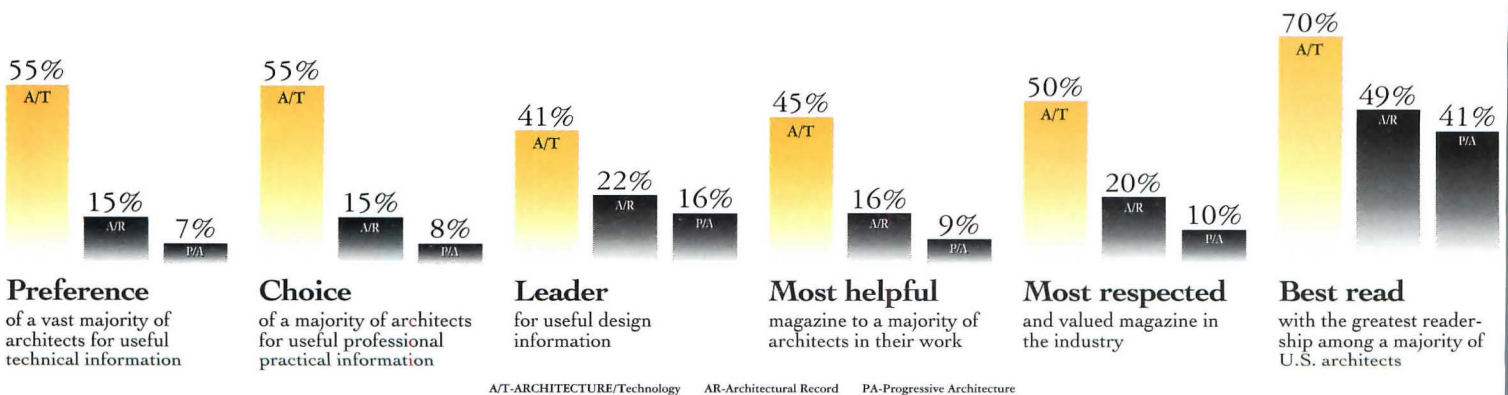
wraps itself rhythmically around each leg. Its table top is stained in pastels that allow the wood grain to show through; colors include orange-yellow, orange, purple, and aqua. The Topspin series comprises round and elliptical tables and etageres; all feature the intricate detailing for which Frattini is known. AI manufactures the furniture line through computer-guided milling to ensure consistency and strength. *Circle 403 on information card.*

ABOVE: Brueton offers the Malaga credenza by Chicago-based architect Victor Dziekiewicz, principal of Design-Bridge, an interdisciplinary design firm. Dziekiewicz's credenza merges rich facets of wood in perpendicular patterns. Architects can specify ribbon mahogany among Brueton's farm-grown hardwoods; or lacewood, French walnut, oak, rosewood, or 14 other standard woods. *Circle 404 on information card.*

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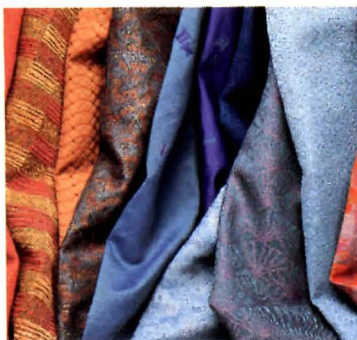
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Casegoods collection

Herman Miller's new Geneva casegoods collection (above) combines fine detailing with moderate prices. Geneva's design and manufacturing processes were conceived simultaneously for speedy production and delivery. Orders will ship within 10 working days from order date. The collection consists of desks, cabinets, credenzas, lateral files, and bookcases. Wiring slots support computer use. The configurations of the workstations denote the changing balance of activity in today's offices, which involves more spontaneous interaction among co-workers, especially in teams. Knee space for



guests is full at the desk's front, and an optional round-end peninsula invites small group discussions. Rich hardwoods carry a fine finish underscored by sculpted details.

Circle 405 on information card.

Fabric designs

Schumacher unfurls its 3 by 5 collection (above), which brings together three fabric designs by each of five prominent American interior designers of diverse backgrounds. Bianca Quantrell, based in Atlanta, combines polyester and cotton to create complex stripes, impressionistic diamond patterns, and shaded-leaf motifs. Debra Lehman-Smith of Wash-

ington, D.C., designs precise grids within grids of cotton and wool. Greg Landahl of Chicago works in worsted wool, chenille, and cotton for soft, light, irregular patterns and dimensions. James Northcutt, who is based in Los Angeles, uses silk to evoke precious Asian documents. Scott Strasser, who is based in Houston, paints strong colors in cotton, polyester, and rayon, creating lustrous damask fields, reversible paisleys, and random patterns bouncing off a grid, for both traditional and contemporary interiors.

Circle 406 on information card.

Door protection

Memphis, Tennessee-based Dover Elevator Systems has introduced its new door protection system, which beams an invisible curtain of infrared light across an elevator's entrance. The device meets ADA requirements and works with new construction or retrofit installations. Dover also offers a brochure on its Helplink communications system, which includes the company's 24-hour emergency monitoring service for elevators.

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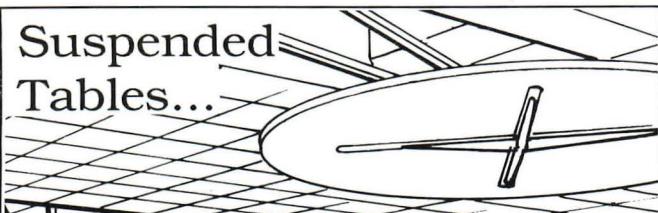


Conference table

Vecta's new Derby table (above) is designed for large assembly areas such as cafeterias or for smaller meeting rooms. Derby is the first product for Vecta designed by Boston-based freelance designer Michael Walsh. Derby tables are named for their 4-inch-wide, flat-base foot, shaped like a racetrack, with radiused edges. The bases have a low, smooth appearance. The optional toe pad (shown above), which consists of a rounded casting, reinforces the theme with a half ellipse. The base design comes in a single color or a combination of colors.

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Advertisers Index

Circle number		Page number
59	Advance Lifts, Inc.	123
—	ALA Mastersystems	39
1	Andersen Windows	4-5
—	Apple Computer/Domestic	26-27, 29
3	Armstrong World Industries	C2, p.1
7	Armstrong World Industries	6
15	ASC Pacific (West reg.)	9
13	Belden Brick Co. (East, midwest reg.)	9
21	Bell Atlantic (East reg.)	16
33	Bobrick Washroom Equipment	34
—	Brick Institute of America	32A-H
29	Calcomp Inc.	30-31
69	Calcomp Inc.	114
49	Certainteed Corp.	100
41	Chicago Faucet Co.	40
27	CYRO Industries	22
47	Dover Elevator Systems, Inc.	92
51	Forbo Industries	104
67	Georgia-Pacific	C4
55	Haws Drinking Faucet	118
25	Hewlett Packard	18-21
45	Hurd Millwork Co.	14
43	Intergraph Corporation	83-88
9	Kim Lighting	7
61	LCN Closers	125
35	Louisiana-Pacific	36
39	Ludowici Celadon	38
37	Manville Roofing Systems, — Schuller International, Inc.	37
63	Monsanto Chemical Co.	121
63	Monsanto Chemical Co.	123
63	Monsanto Chemical Co.	125
63	Monsanto Chemical Co.	127
53	Neste/Thermo	90
5	OSRAM SYLVANIA	2-3
—	Pacific Data Products	10
23	Pemko	108
31	Schlage Lock Co.	32
11	Sloan Valve Co.	8
65	SPI Lighting Inc.	C3
57	Spiros Industries, Inc.	121
76	Technical Glass Products	16A-B
—	University of Maryland	126
17	Weather Shield Mfg., Inc.	12-13

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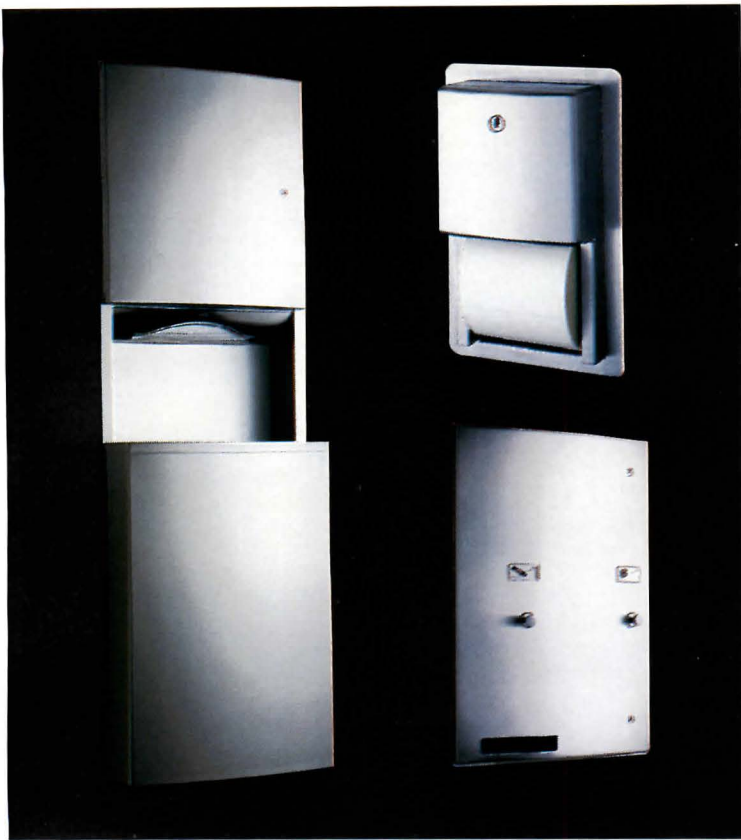
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Washroom accessories

Bobrick Washroom Equipment's latest line of accessories (left) meets ADA requirements for accessibility in public accommodations. Bobrick's Contura series is detailed with barrier-free elements, such as no-twist pull knobs for dispensers and easily pressed valves on soap pumps. Its distinguishing feature is a 27 degree arc on each unit's stainless steel front panel, which was researched for functionality and styling. Bobrick consulted several industrial design firms and previewed a number of prototypes at meetings with architects. Unanimously, architects chose the arc construction and the particular radius of Contura's flanges.

Once models were developed in wood and stainless steel, Bobrick called on building owners, developers, and contractors for ideas. Their suggestions originated such features as interior clips in waste bins to conceal disposable bags, and recessed finger-grips beneath the surface-mounted waste bin. Tumbler locks are mounted flush to their surfaces and placed according to users' suggestions for maintaining the equipment. "The people who have to live

with our products told us where to put the lock," notes Alan Gettelman, Bobrick's marketing director.

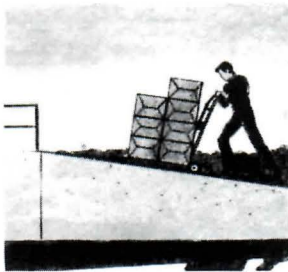
Likewise, Bobrick softened the hard edges which outline Contura's heavy-gauge stainless steel with a type-304 finish and seamless construction. The bowed fronts of the accessories lend strength to doors and cabinet surfaces. Flanges are constructed as a single, seamless, drawn piece. Cabinets are all welded.

Most units can be ordered either for recessed or surface mounting and, in some cases, partition mounting, ensuring compatibility with tight areas, or those with limited traffic. The Contura line makes it practically possible to select any or all washroom fixtures from the same family: paper-towel dispenser with waste bin (together or separate); recessed or surface mounted; a napkin/tampon vendor; napkin disposal; toilet-tissue dispenser, toilet-seat-cover dispenser; and a variety of soap fixtures.

To help architects design ADA-sensitive rest rooms, Bobrick recently developed a planning guide for specifying and mounting its products to ensure barrier-free environments. *Circle 412 on information card.*

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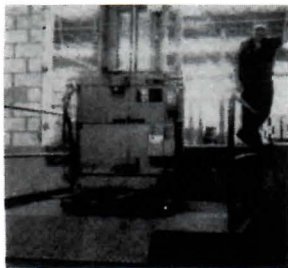
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MAHLON SWEET AIRPORT EUGENE, OREGON

ARCHITECT: TRA Architects, Seattle, Washington—Frank Silkwood (project director); Gerald Ginader (project designer); Vern Cooley (project architect); Sandy Campbell (interior design)
ASSOCIATE ARCHITECT: Brockmeyer McDonnell Architects; Shiels & Obletz (project manager)
LANDSCAPE ARCHITECT: City of Eugene
ENGINEER: John Herrick Consulting Structural Engineers (structural)
GENERAL CONTRACTOR: Wildich Building Co.

CHATTANOOGA MUNICIPAL AIRPORT CHATTANOOGA, TENNESSEE

ARCHITECT: Gensler and Associates, Santa Monica, California—Ronald L. Steinert (project designer); Andrew P. Cohen (design director); Imre Takacs (job captain)
ASSOCIATE ARCHITECT: Derthick, Henley & Wilkerson
ENGINEERS: Bennett + Pless (structural); Derthick, Henley & Wilkerson (mechanical); Campbell & Associates (electrical)
GENERAL CONTRACTOR: Ray Bell Construction Company

Airports

INTERNATIONAL TERMINAL O'HARE INTERNATIONAL AIRPORT CHICAGO, ILLINOIS

ARCHITECT: Group One Design—Perkins & Will, Heard & Associates, Consoer Townsend & Associates—James M. Stevenson (project director); Thomas A. Kamis, Jr. (director of construction administration); Ralph Johnson (design principal); August Battaglia (project designer); James N. Economos (project manager); Mark Romack (project architect); Larry D. Robertson (technical coordinator); Fred Antonelli (airside/landside terminal building technical coordinator); Joe Pullara (terminal building technical coordinator)
ENGINEERS: Restrepo Group (civil); Wells Engineering (structural); Guignan-Woods (fire protection/plumbing); Harco Technologies

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**NANTUCKET MEMORIAL AIRPORT
NANTUCKET, MASSACHUSETTS**

ARCHITECT: HNTB Architects and Planners, Boston, Massachusetts—Gordon H. Slaney (principal); Steven M. Reiss (director of terminal design); Stephen A. Smith (principal architect); Alex Sanchez (senior aviation architect); Timothy D. Mansfield (project architect); Gordon H. Schirmer, Robert Vigeant, Joe Sirkovich, Edward Benner, Joanne O'Connell-Foster, Hana Kolton-Patsouris, Lisa Freed (design team)
LANDSCAPE ARCHITECT: Gordon E. Turow
ENGINEERS: Robert Leichter (structural); Richard D. Kimball Company (mechanical/electrical); Certified Engineering and Testing (environmental)
CONSULTANTS: Daedalus Projects (cost estimating); Solutions Engineering (code consulting); D. Neil Parent (design)
GENERAL CONTRACTOR: J.K. Scanlan Co.

Light Rail

**SAN DIEGO LIGHT RAIL
SAN DIEGO, CALIFORNIA**

PROJECT: Mills Transportation Center
ARCHITECT: Delawie Wilkes Rodrigues Barker & Bretton—Homer Delawie (principal); Michael B. Wilkes, M. Andrew Rodrigues (project designers); M. Andrew Rodrigues (project manager); John Bretton, Larry Rose (design team)
LANDSCAPE ARCHITECT: WYA
ENGINEERS: George R. Saunders Associates (structural); Tom Gilbertson & Associates (mechanical); Lighting Consultants of San

Diego (electrical/lighting)
GENERAL CONTRACTOR: Centex Golden Construction Company
CONSULTANT: Marshall Brown (interiors)

PROJECT: America Plaza
ARCHITECT: Murphy/Jahn—Helmut Jahn (principal); Martin Wolf (project architect)
ASSOCIATE ARCHITECT: Krommenhoek/McKeown & Associates
LANDSCAPE ARCHITECT: The Architects Collaborative
ENGINEERS: Skilling Ward Magnusson Barkshire (structural); Flack & Kurtz (mechanical/electrical)
GENERAL CONTRACTOR: M.H. Golden
CONSULTANTS: Sylvan Shemitz Associates (lighting); Shen, Milsom & Wilke (acoustics)

**WESTSIDE CORRIDOR EXPANSION
PORTLAND, OREGON**

ARCHITECT: Zimmer Gunsul Frasca Partnership, Portland, Oregon—Robert Packard (principal); Gregory Baldwin (design partner); Brainard Joy Gannett (project manager); Max DeRungs, Lloyd Lindley, Mark Foster, Gary Hartnett (project architects); Bob Easton, Harold Lee Kerns, Jim Cox, Cindy Cox, Bob Hastings, Joan Jasper, Ted George, Brent Denhart, Bob Fisher, Bart Guthrie, Chris Chin, Logan Cravens, Jon Campbell, Charles Kelley, Jr., Ron Gronowski, Ernest Grigsby, Carl Freeze, Lee Kilbourn (design team)
LANDSCAPE ARCHITECT: Murase Associates
ENGINEERS: Parsons, Brinckerhoff, Quade & Douglas, BRW, ZGF Partnership (civil); Louis T. Klauder & Associates (systems)

**METRO LINK
ST. LOUIS, MISSOURI**

ARCHITECT: Kennedy Associates, St. Louis, Missouri—Michael E. Kennedy (principal); J. Steven Coffey (project director); Robert St. John, Tomas Yanko (project managers); Mark W. Randall, Tod Williams, Paul Wilhelms (project designers)
ASSOCIATE ARCHITECTS: Tod Williams, Billie Tsien Associates; The Christner Partnership; Claybour Architects
LANDSCAPE ARCHITECT: Austin Tao Associates
ENGINEERS: Booker Associates; Kuhlmann Design Group (structural/mechanical/electrical/civil)
GENERAL CONTRACTOR: BSI Constructors

**METRO LINES
LOS ANGELES, CALIFORNIA**

PROJECT: Westlake/McArthur Park Station
ARCHITECT: Gensler and Associates
ENGINEERS: Sverdrup & Parcel and Associates

PROJECT: 7th and Flower Street Station
ARCHITECT: Dworsky Associates
ASSOCIATE ARCHITECT: Gannett Fleming West
ENGINEER: Hayakawa Associates (mechanical/electrical)
GENERAL CONTRACTORS: Granite Construction; Tutor-Saliba

PROJECT: Norwalk/El Segundo Station
ARCHITECT: Caltrans—Alan Anderson (principal)
ASSOCIATE ARCHITECT: Stan Moifeld
ENGINEERS: O.H. Hutchinson (structural); V.N. Squire (mechanical); R.J. Williams (civil)

GENERAL CONTRACTOR: Morrison Knudson
CONSULTANT: Sally Weber (artist)

PROJECT: Vermont/Santa Monica Station
ARCHITECT: Ellerbe Becket, Los Angeles—Mehrdad Yazdani (project designer); Vernon Pounds (project architect); T. Goffigan (project manager)
LANDSCAPE ARCHITECT: Lynn Capouya
ENGINEERS: Martin & Huang International (structural); STV, Seelye, Stevenson, Value & Knecht (mechanical); Frazar Engineers (civil)
CONSULTANT: Horton-Lee

**MTA CENTRAL LIGHT RAIL LINE
BALTIMORE, MARYLAND**

ARCHITECT: Cho, Wilks & Benn Architects, Baltimore, Maryland—Barbara Wilks (principal); Klaus Philipsen (project manager); Don Farmer, Jim Walsh (project architects); Rima Namek, John Finney (design team)
LANDSCAPE ARCHITECT: Catherine Mahan
ENGINEERS: Parsons, Brinckerhoff/Morrison Knudson (structural-shop/station); LPJ (structural-station); Smith & Fass (mechanical/electrical-shop); Kibart (electrical-station)
CONSULTANT: 212 Associates (signage)
GENERAL CONTRACTOR: Corman Construction

DESIGN COMPETITION

The University of Maryland at College Park plans to build a 283,000 gross square foot performing arts center, estimated at a construction cost of \$69 million. The center will house music, theater and dance education programs and a performing arts library.

The University is soliciting a single page letter of interest from qualified architects by September 20, 1993. All interested firms must submit Statements of Qualifications in early October. Selected architects will be invited for interview. At the end of October, the University will select the final design competitors who will submit entries in January for review by a jury. The winner will be announced in February. Final competitors will receive compensation.

Send the letter of interest to William Davis, Maryland Department of General Services, 300 West Preston Street, Room 403, Baltimore, Maryland, 21201 (410-225-4296)

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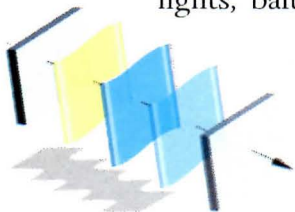
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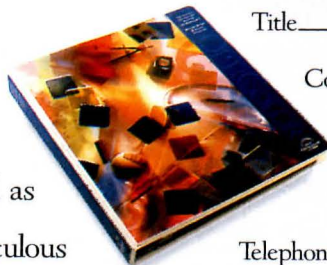
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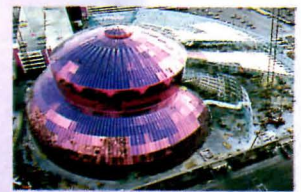
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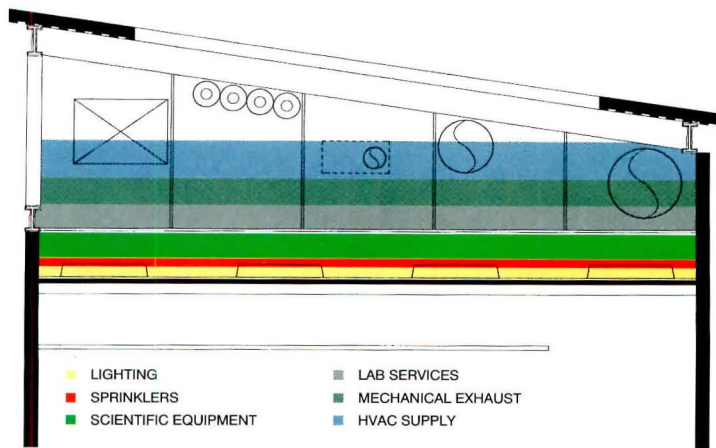
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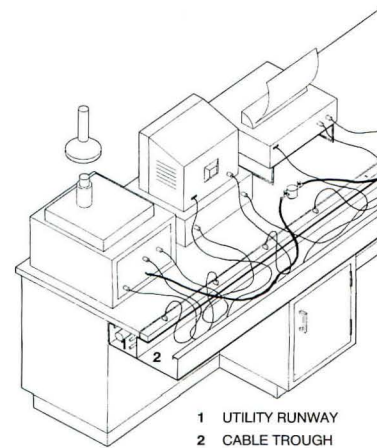
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SCIENCES LAB SECTION: Plenum zoned for services and equipment.



LAB BENCH: Trough organizes services.

Mechanical Systems

CSI Section 15000

Laboratory Zoning

Careful programming of functional and spatial requirements is paramount to successful laboratory planning. In designing an environmental and molecular sciences laboratory for the U.S. Department of Energy, we considered how the building's functions could be horizontally and vertically zoned to organize the complex systems required by the scientists.

To horizontally organize a program that called for 90 flexible lab modules, each measuring 20 by 30 feet, all on one level, we grouped 8 lab modules as a linear spine on each side of a service zone, flanked by public corridors.

Such a coordinated systems approach was necessary due to the complexity of the services to be located above a 12-foot ceiling: HVAC, plumbing, electrical, communications, exhaust, sprinklers, lab gases, and scientists' apparatus.

Early in the design process, we collaborated with the client and with the mechanical, electrical, plumbing, and laboratory consultants in order to establish vertical zones for each discipline's systems.

Within a 10-foot, 8-inch ceiling plenum, which slopes to 6 feet, 8 inches (top left), we allocated 7 inches for light fixtures, 5 inches for sprinkler piping, 12 inches for equipment accessible by the scientists, 18 inches for various lab services (gas, water, electrical), 18 inches for mechanical exhaust ducts, and 18 inches for supply ducts.

A 2-by-2-inch tube steel, "interstitial" grid (5 feet, 6 inches by 6 feet in plan) provides a uniform plane of support for the systems above the

ceiling. The grid supports mobile cranes and allows for modifications to scientific equipment without disturbing other lab services, fireproofing, or structural beams.

This zoning of services will not only assist in system coordination during construction, but will also simplify future modifications.

*David Gonrowski, AIA
Zimmer Gunsul Frasca Partnership
Portland, Oregon*

Laboratory Equipment

CSI Section 11600

Service Line Trough

Because of the highly sensitive instruments and linear functional arrangements required in most analytic laboratories, electrical and service connections must be readily accessible along the back of service benches, without countertop confusion.

Our solution (top right) relegates the maze of wiring and service lines to a trough, leaving the counter and floor clear of obstruction. The trough runs flush with one side of the bench top and includes an electrical wire-mold along its inside edge for convenient electrical connections. A utility services cabinet installed at the bench center point contains sources for water and gas, which are then distributed through a piping runway.

We located benches back to back, providing a 30-inch service aisle between them. From the service aisle, researchers may access the trough and reach the back of equipment for service connections. This arrangement results in improved equipment operation and greater laboratory safety.

*Robert E. Gregory
RUST Environment & Infrastructure
Schaumburg, Illinois*

Integrated Ceilings

CSI Section 13025

Ductwork and Ceiling Systems

In most buildings, there is adequate space above the ceiling in which to install ductwork. Barring this opportunity, many architects elect to expose mechanical ducts. Within a law enforcement facility that we are currently designing in Los Angeles, neither option is available: We have limited headroom and a small, 11-inch-deep plenum in the entry vestibule. In order to air condition a group of rooms north of the vestibule, we decided to integrate the ducts into the ceiling system.

First, we recessed half the depth of the ducts in the canopy and then encased the exposed half in perforated stainless steel paneling. Next, we installed downlights between the ducts and continued the stainless panel system across the ceiling to wall panels at either end of the lobby. By approaching a challenging mechanical problem as a design issue, we arrived at a solution that improved our original scheme.

*Shawn Sullivan
Meyer & Allen Associates
Architects and Planners
Los Angeles, California*

Architects are encouraged to contribute their practical suggestions about specifications and detailing, including drawings, for publication. Send submissions to:

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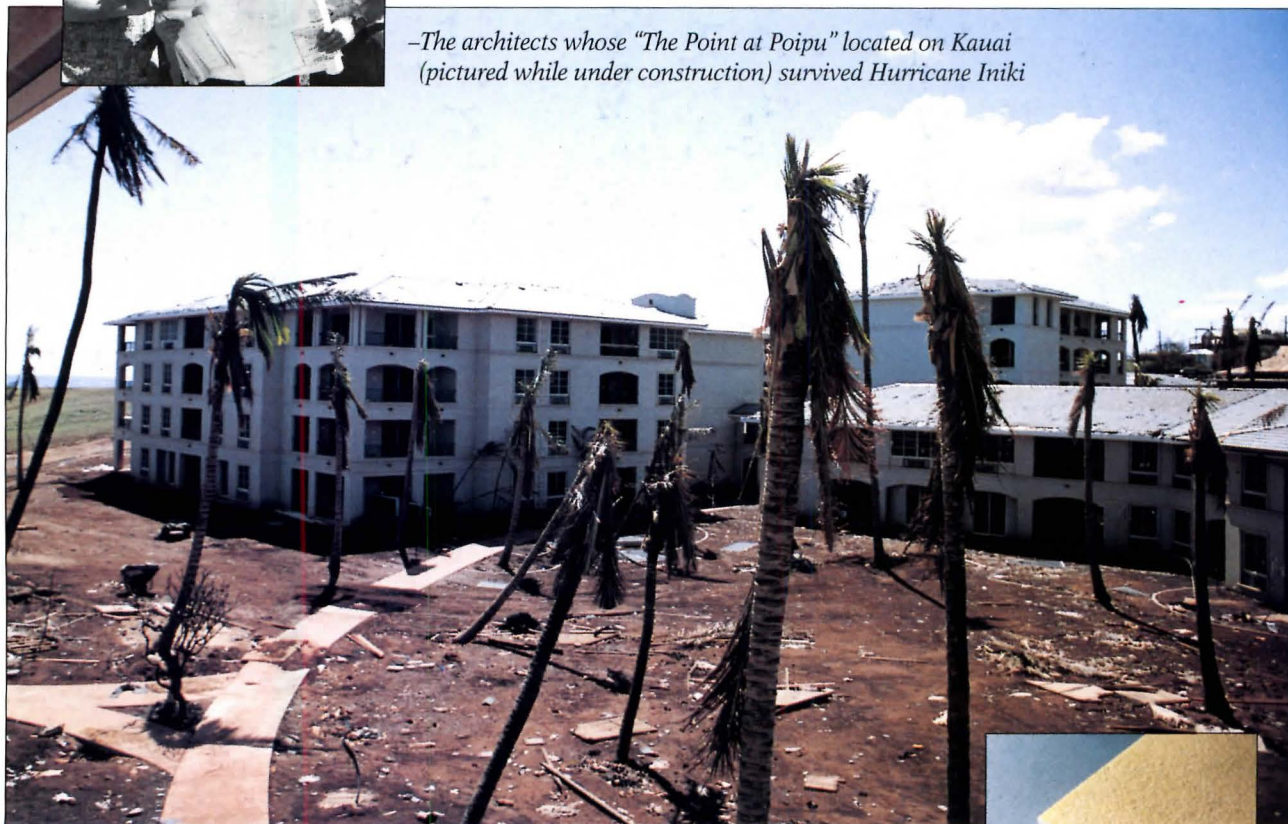
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-The architects whose "The Point at Poipu" located on Kauai (pictured while under construction) survived Hurricane Iniki



Architect: Group 70 International, Inc./General Contractor: Fletcher Pacific Construction Company

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G-P: You counted on Dens-Glass Gold for protection from sea spray, right?

ARCH: Yeah, constant sea spray riding in on lovely breezes up to 42 knots. That was a key reason we specified Dens-Glass Gold—paper-face can't touch it for moisture protection.

G-P: So when Iniki arrived, the condos survived the winds and the rain.

ARCH: Frankly, we were astonished. You know, over 85% of the buildings on the island were damaged. No one would have expected Dens-Glass Gold to withstand that kind of storm. But it is made for high performance. Its construction is totally unique. Silicone and fiberglass, right?

G-P: Silicone-treated core and embedded fiberglass mats front and back, with the gold-colored alkali-resistant coating.

ARCH: And it's those fiberglass mats that make it more stable than paper-face.



G-P: By the way, G-P backs Dens-Glass Gold with a six-month limited warranty against moisture deterioration when it's fully exposed to the weather. It's also warranted for 5 years against manufacturer defects.*

G-P: So, you're a pretty satisfied customer?

ARCH: And you're a master of understatement.

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