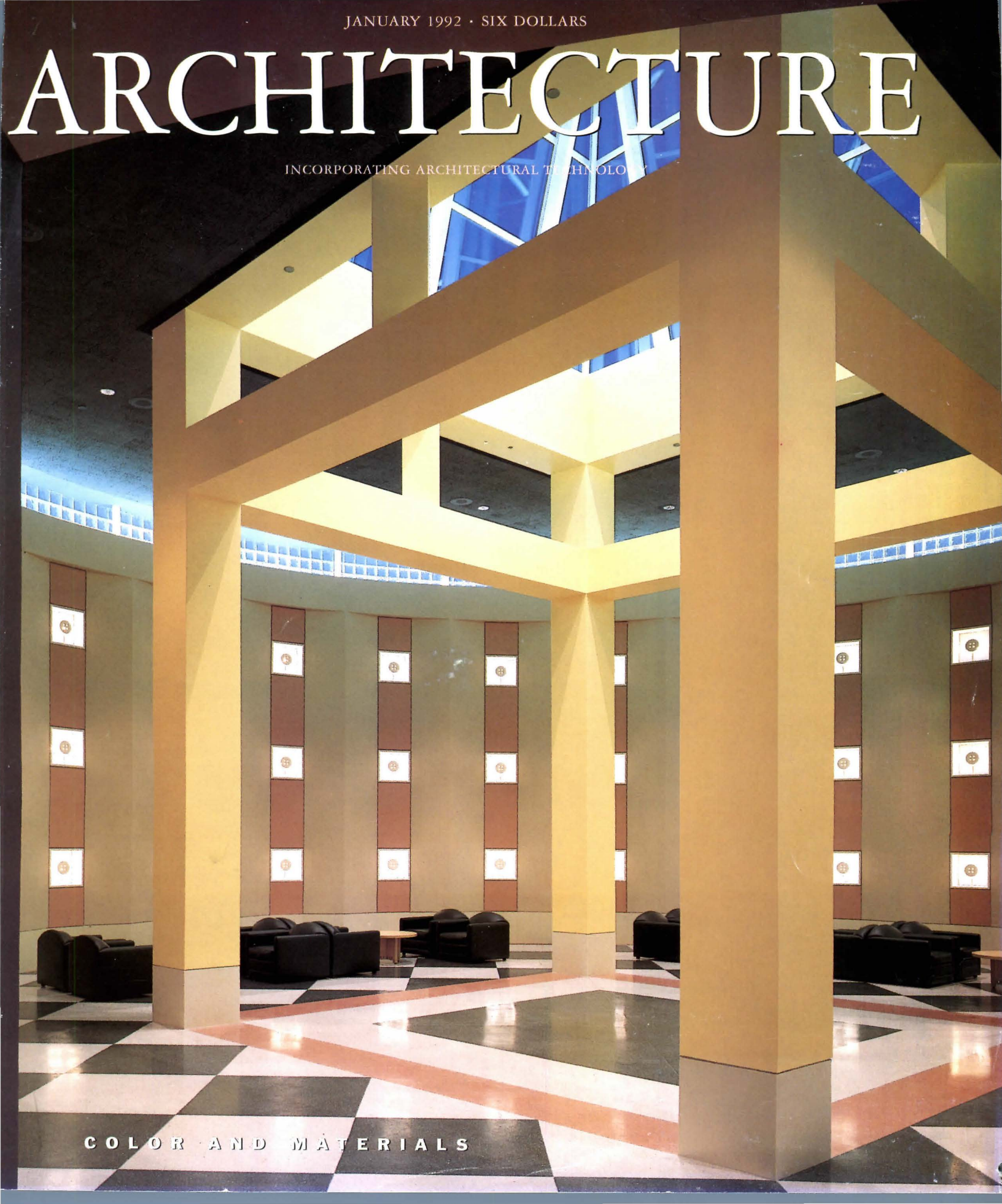


JANUARY 1992 • SIX DOLLARS

# ARCHITECTURE

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COLOR AND MATERIALS



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# ARCHITECTURE

JANUARY 1992

## DESIGN

### 31 COLOR AND MATERIALS

Today's minimalism is softened by colorful palettes and sensuous textures, by architects who incorporate inexpensive materials.

### 32 MATERIAL WORLD

Portfolio of four projects by Franklin D. Israel Design Associates:

32 Divine Design Boutique  
Santa Monica, California

34 Tisch/Avnet Production Studios  
Venice, California

38 Speedway Cafe  
Venice, California

40 Limelight Productions  
Hollywood, California

BY FRANCES ANDERTON

### 44 OF THE LAND

Wildlife Interpretive Center  
Minneapolis, Minnesota  
Ellerbe Becket, Architects

BY LYNN NESMITH

### 50 SEAWORTHY SPIRIT

The Leviathan Building  
Oakland, California  
Ace Architects

BY SHARON LEE RYDER

### 56 CORPORATE MOVES

Side 1 and i.e. Headquarters  
Portland, Oregon  
SERA Architects

BY DEBORAH K. DIETSCH

### 62 BEYOND CONVENTION

Disney Contemporary Resort Meeting Facility  
Lake Buena Vista, Florida

Gwathmey Siegel & Associates, Architects

BY VERNON MAYS

#### COVER:

Disney Contemporary Resort Meeting Facility,  
Lake Buena Vista, Florida, designed by  
Gwathmey Siegel & Associates (page 62).  
Photography by Jeff Goldberg/Esto.



PAGE 62



PAGE 56



PAGE 32

## TECHNOLOGY & PRACTICE

### 79 WORKING WITH COLOR CONSULTANTS

Experts trained in the art and science of pigments and hues aid architects in selecting paints and other finishes.

BY NANCY B. SOLOMON

### 87 PLASTER RENAISSANCE

A traditional material is revived by architects across the country for its durability, economy, and textural possibilities.

BY DONALD LONDON

### 93 GLASS ARTISTRY

A Louisville, Kentucky, artisan collaborates with architects to integrate the latest glass technology into their projects.

BY MICHAEL J. CROSBIE

### 99 TOWARD A GREENER ARCHITECTURE

The first issue of the AIA's Environmental Resource Guide helps architects assess the impact of building materials and systems.

BY MICHAEL J. CROSBIE

### 103 NEW FRONTIERS IN CAD

Expert systems, napkin software, and virtual reality are improving architects' ability to simulate the design process electronically.

BY B.J. NOVITSKI

## DEPARTMENTS

- 13 EDITOR'S PAGE
- 14 LETTERS & EVENTS
- 17 NEWS
- 25 ON THE BOARDS
- 28 AWARDS
- 73 INFO
- 106 PRODUCTS
- 112 NEAT FILE

#### NEXT MONTH:

- Houses
- Roofing
- ADA update
- Small-firm management

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# ARCHITECTURE

FEBRUARY 1992

## DESIGN

### 43 HOUSES: MULTIPLE CHOICES

Paired or assembled from discrete volumes, today's houses depart from a singular profile.

### 44 MODERN ALLEGORY

Fein House  
Princeton, New Jersey  
Peter Waldman, Architect  
BY EDWARD GUNTS

### 50 COUNTRY PAIR

Moseley House and Studio  
Canaan, New York  
Architrope, Architects  
BY LYNN NESMITH

### 54 BACK ROAD RETREAT

Cook House  
Oxford, Mississippi  
Mockbee-Coker Architects  
BY ROBERT A. IVY, JR.

### 60 FAMILY AFFAIR

Ou House  
Hillsborough, California  
Kobeou Associates, Architects  
BY SHARON LEE RYDER

### 64 STEEPED IN TRADITION

DeVito & Wedlick House  
Kinderhook, New York  
Dennis Wedlick, Architect  
BY LYNN NESMITH

### 68 ROW HOUSE REDUX

Portfolio of three houses in Seaside, Florida,  
by Walter F. Chatham, Architect.

70 Pugin House  
74 Goodnough House  
75 Forsythe House

BY EDWARD GUNTS

### 76 REGIONAL ROOTS

Conanicut Island House  
Rhode Island  
Bausman-Gill Associates, Architects  
BY MICHAEL J. CROSBIE

#### COVER:

Pugin House and Goodnough House,  
Seaside, Florida, designed by  
Walter F. Chatham, Architect (page 68).  
Photograph by Michael Moran.



TIMOTHY HURSELEY

PAGE 54



JEFF GOLDBERG / ESTO

PAGE 76



JEFF GOLDBERG / ESTO

PAGE 44

## TECHNOLOGY & PRACTICE

### 85 STAYING ON TOP

Improving the design and detailing of roofing ensures that single-ply, built-up, and modified bitumen systems resist water and wind.

BY THOMAS LEE SMITH

### 93 BREATHING ROOM

Properly venting cathedral ceilings and attics provides energy savings and prolongs the life of roofing tile and shingles.

BY ALEX WILSON

### 101 ROOFING SYSTEMS SOFTWARE

Computer programs facilitate the analysis of existing roofs, determine maintenance schedules, and help architects choose new systems.

BY B.J. NOVITSKI

### 105 ACCESSIBILITY TAKES EFFECT

What architects can do to meet the Americans with Disabilities Act's new regulations for accessible design, and related liability issues.

BY ROBERT A. IVY, JR.

### 112 MANAGING CHANGE IN A SMALL FIRM

How offices around the country adjust to changes in staff, management, or projects and make smooth transitions with careful planning.

BY NORMAN KADERLAN

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 23 NEWS
- 31 ON THE BOARDS
- 41 AWARDS
- 83 INFO
- 115 PRODUCTS
- 120 NEAT FILE

#### NEXT MONTH:

AIA awards  
Planning for AIDS-related facilities  
Metal systems and finishes  
DOS vs. Macintosh computer update

# Attila



While the engineering and architectural disciplines have always prized the elegant solution, there are times when brute strength is imperative. Introducing the Apple® Macintosh® Quadra™ 700 and Quadra 900 computers.

*So much power in so little space. The Quadra 900 is just 18.6" high and fits comfortably next to your desk. The Quadra 700 fits comfortably on top of it.*

Ferociously fast. Awesomely powerful. But each is still very much a Macintosh.

Up to twice as swift as any of their forebears, they're the first Macintosh computers to be built around the Motorola 68040, rated at 20 MIPS and running at 25 MHz.

A highly integrated design, the 040 combines the processor, math coprocessor, memory controller, and cache memory all onto one chip.

More important than merely technical measurements, the Macintosh Quadra computers are totally harmonized systems. The hardware architecture, operating system, interface, peripherals, and networking were all designed from the start to optimize the 040's power and work together smoothly as a single integrated system.

Anyone using compute-intensive applications—like 3-D modeling and stress analysis—will immediately appreciate the difference.

Popular software packages like MicroStation Mac, Virtus WalkThrough, and Infini-D perform more nimbly and responsively than they ever did before.

*Big just got bigger. The new Macintosh 21" Color Display gives you a lot more drawing board to work on. Colors are vivid, focus is crisp, brightness and contrast are high.*



# ARCHITECTURE

MARCH 1992

## DESIGN

### 47 ARCHITECTURE FOR PEOPLE

The 1992 American Institute of Architects Awards recognize architecture's public profile.

### 48 CONTEXT AND CRAFT

Ten Honor Award projects demonstrate how the historicist appliqué of the 1980s has given way to the contextual restraint of the 1990s.

BY DAVID DILLON

### 56 POWER OF JOY

Gold Medalist Benjamin C. Thompson's buildings and urban marketplaces celebrate social interaction and human exchange.

BY MILDRED F. SCHMERTZ

### 62 PRIDE OF PLACE

Benjamin Thompson & Associates' Broward Center for the Performing Arts commands an urban renaissance along a South Florida river.

BY MILDRED F. SCHMERTZ

### 68 ARCHITECTURAL ETHICS

Firm Award winner James Stewart Polshek and Partners respects social principles and urban diversity through a variety of buildings.

BY SUZANNE STEPHENS

70 MANDEL SCHOOL OF SOCIAL SCIENCE  
Case Western Reserve University  
Cleveland, Ohio

72 BARD COLLEGE ALUMNI HOUSES  
Annandale-on-Hudson, New York

74 CARNEGIE HALL MUSEUM  
AND PATRON SPACES  
New York City

76 CENTER FOR THE ARTS THEATER  
San Francisco, California

77 SKIRBALL INSTITUTE  
New York City

78 NATIONAL INVENTORS HALL OF FAME  
Akron, Ohio

79 AKRON CONVENTION CENTER  
Akron, Ohio

## COVER:

Mandel School of Social Science,  
Case Western Reserve University, Cleveland, Ohio,  
by James Stewart Polshek and Partners (page 68).  
Photography by Jeff Goldberg / Esto.



PAGE 48

RICHARD BRYANT/ARCAID



PAGE 62

STEVEN BROOKE



PAGE 72

JEFF GOLDBERG/ESTO PHOTOS

## TECHNOLOGY & PRACTICE

### 85 DESIGNING FOR AIDS

Architects and sponsors around the U.S. are uniting to create prototypical environments that defy conventional healthcare settings.

BY KARIN TETLOW

### 97 BRANCHING OUT TO NEW GENERATIONS

Making the transition from a firm's founders to a younger cohort of partners requires skillful management and long-range planning.

BY ANDREA OPPENHEIMER DEAN

### 103 FULL METAL JACKET

Technological advances for fabricating curved panels enable architects to take advantage of metal's durability and strength.

BY MARC S. HARRIMAN

### 111 METAL PROTECTION

A variety of coatings, including paint, coil-coating, and anodizing, shield metal from the elements and add to the material's luster.

BY MICHAEL J. CROSBIE

### 115 DOS-MAC DEBATE CONTINUES

Chicago architects evaluate Microsoft's Windows and Macintosh's System 7—the two latest upgrades to major operating systems.

BY OLIVER WITTE

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 23 NEWS
- 34 AWARDS
- 83 INFO
- 123 PRODUCTS
- 136 NEAT FILE

## NEXT MONTH:

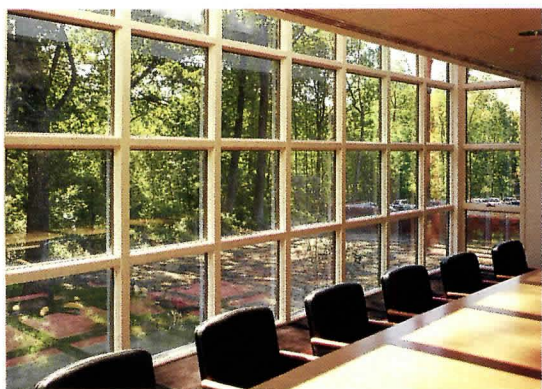
Projects by Boston architects  
Window technology and restoration  
Advances in glazing  
Database management

# WITH ANDERSEN, AN ARCHITECT'S CURTAIN

A corporate office building on a 12-acre nature preserve seems to call for a lot of windows. So architect Frank Tomaino called on Andersen.

Fenestration was handled with curtain walls that overlooked the preserve. Said Tomaino: "The Andersen distributor was there for us from the shop drawings to the field installation."

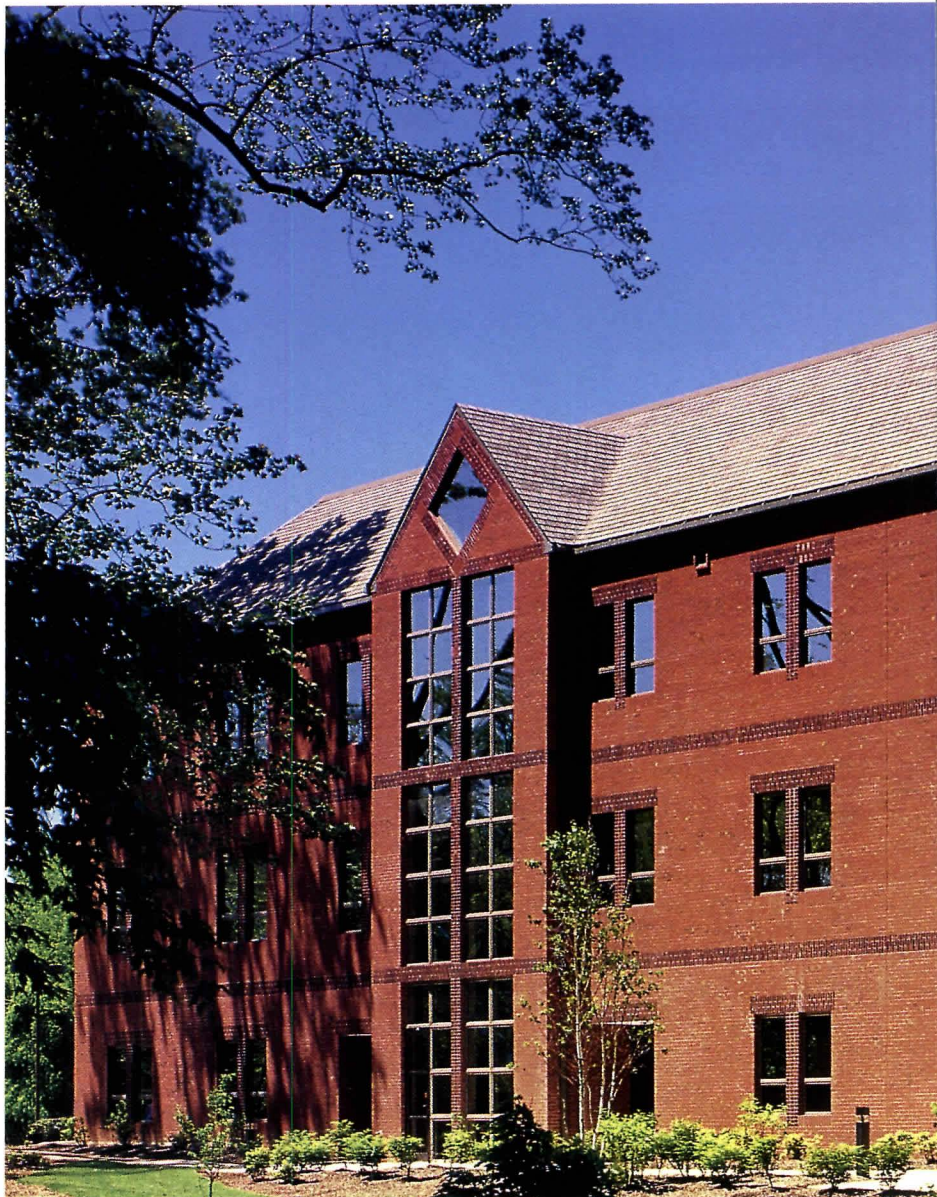
"These windows also needed to be steel reinforced at the mullions, and the Andersen dealer made sure those details were worked out."



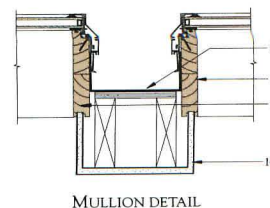
Better still, Andersen assembled the windows, including spandrel panels and tempered glass, then shipped them in groups of window units.

With that kind of service, no wonder everything went smoothly.

For the name of your Andersen representative, call 1-800-426-7691. Or write Andersen Commercial Group<sup>SM</sup>, Box 12, Bayport, MN 55003.



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OPTIONAL



# ARCHITECTURE

APRIL 1992

## DESIGN

### 43 BOSTON EXPORTS

Architects based in this year's AIA convention host city are surviving by designing buildings across the country.

### 44 ACADEMIC CALM

Library and Science Center  
Albuquerque Academy  
Albuquerque, New Mexico  
Shepley Bulfinch Richardson and Abbott  
BY DAVID DILLON

### 52 SCULPTURAL RETREAT

Lazarus House  
Copake, New York  
Schwartz/Silver Architects  
BY MICHAEL J. CROSBIE

### 58 STAMP OF APPROVAL

U.S. Postal Service General Mail Facility  
North Reading, Massachusetts  
Perry Dean Rogers & Partners, Architects  
BY MICHAEL J. CROSBIE

### 62 MORTARED LOGIC

George R. Brown Hall  
Rice University  
Houston, Texas  
Cambridge Seven Associates, Architects  
BY RAY DON TILLEY

### 68 MODERN VIEWPOINT

Luchetti House  
Sausalito, California  
Robert Luchetti Associates, Architects  
BY HEIDI LANDECKER

### 74 CAPITAL GAINS

The Lansburgh  
Washington, D.C.  
Graham Gund Architects  
BY LYNN NESMITH

#### COVER:

Lazarus House, Copake, New York,  
designed by Schwartz/Silver Architects (page 52).  
Photograph by Peter Aaron/Esto



PAGE 52

PETER AARON/ESTO



PAGE 74

JEFF GOLDBERG/ESTO



PAGE 58

STEVE ROSENTHAL

## TECHNOLOGY & PRACTICE

### 85 BRACING HISTORY

Transforming a city block into a mixed-use complex, Graham Gund Architects supports old construction with new strategies.

BY LYNN NESMITH

### 90 PRESERVING HISTORIC WINDOWS

Manufacturers now offer better replacement assemblies, but national guidelines urge architects to save original fenestration.

BY ROBERT A. IVY, JR.

### 98 NEW GLAZING SYSTEMS

Layered with plastics, gels, and liquid crystals, sophisticated products improve the look, security, and comfort of glass.

BY MARC S. HARRIMAN

### 105 EVALUATING WINDOW PERFORMANCE

Like major household appliances, windows are now labeled for thermal efficiency by the National Fenestration Rating Council.

BY ALEX WILSON

### 109 MANAGING ELECTRONIC DRAWINGS

Software add-ons to basic CADD programs allow project managers to easily view, redline, and track computerized documents.

BY B.J. NOVITSKI

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 23 NEWS
- 38 AWARDS
- 81 INFO
- 113 PRODUCTS
- 120 NEAT FILE

#### NEXT MONTH:

Practice alternatives  
Roundtable on project delivery  
Niche markets



# ARCHITECTURE

MAY 1992

## DESIGN

### 37 PRACTICE ALTERNATIVES

Architects explore professional options beyond the roles of traditional practice.

### 38 CITY CATALYST

Michael A. Dobbins, Director of Urban Planning, City of Birmingham, Alabama

BY LYNN NESMITH

### 42 STATE ASSET

Neal P. Stowe, Utah State Architect

BY ROBERT A. IVY, JR.

### 44 GUARDIAN OF JUSTICE

William Scott Higgins, Office of Design and Construction, Federal Bureau of Prisons

BY LYNN NESMITH

### 48 PUBLIC SERVANT

Arthur Rosenblatt, Vice President, Grand Central Partnership

BY MILDRED F. SCHMERTZ

### 50 DISNEY DEVELOPER

Wing Chao, Senior Vice President, Disney Development Corporation

BY MICHAEL J. CROSBIE

### 56 URBAN ADVOCATE

Douglas Gardner, Project Architect, Maguire Thomas Partners

BY MICHAEL J. CROSBIE

### 58 BACKWOODS CRAFT

Bass Pro Shops Corporate Architects

BY EDWARD GUNTS

### 62 CAMPUS STEWARD

Frank Zwart, Campus Architect, University of California, Santa Cruz

BY HEIDI LANDECKER

### 66 COLLEGE UNIFIER

M. Boone Hellmann, Campus Architect, University of California, San Diego

BY HEIDI LANDECKER

### 70 MASTER PLANNER

Charles W. Oakley, Campus Architect, University of California, Los Angeles

BY HEIDI LANDECKER

COVER:

Illustration by Guy Billout



ELLIOTT KAUFMAN

PAGE 50



DAVID HEWITT/ANNE GARRISON

PAGE 66



MATT WARGO

PAGE 70

## TECHNOLOGY & PRACTICE

### 80 FRAGMENTED DREAMS, FLEXIBLE PRACTICES

Due to new economies and technologies, architectural practice promises significant changes throughout the coming decade.

BY DANA CUFF

### 87 NEW DIRECTIONS IN PROJECT DELIVERY

Practitioners and educators discuss various methods of designing and constructing buildings in the 1990s.

BY NANCY B. SOLOMON

### 95 CARVING A NICHE FOR THE '90S

To help survive the recession, architects are honing their talents to specific skills and turning to specialty markets.

BY VERNON MAYS AND MARC S. HARRIMAN

### 103 TOTAL QUALITY MANAGEMENT

Borrowing organizational strategies from other industries, architects are learning to speak the language of their clients.

BY NANCY B. SOLOMON

### 109 CADD CONSEQUENCES

How computers have changed the practice of architecture—for better or worse—over the past decade.

BY B.J. NOVITSKI

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 23 NEWS
- 32 AWARDS
- 79 INFO
- 115 PRODUCTS
- 120 PROJECT CREDITS
- 128 NEAT FILE

NEXT MONTH:

New design talent  
Lighting portfolio  
Starting your own firm

# A Macintosh v preserve the

"No house should ever be *on* any hill," Frank Lloyd Wright once wrote. "It should be *of* the hill, belonging to it, so hill and house could live together, each the happier for the other."

## The Apple Macintosh Quadra.

The notion of integrating into an environment rather than overwhelming it, of complementing what already exists rather than eliminating it, is as relevant to the architecture of computers as it is to the architecture of buildings.



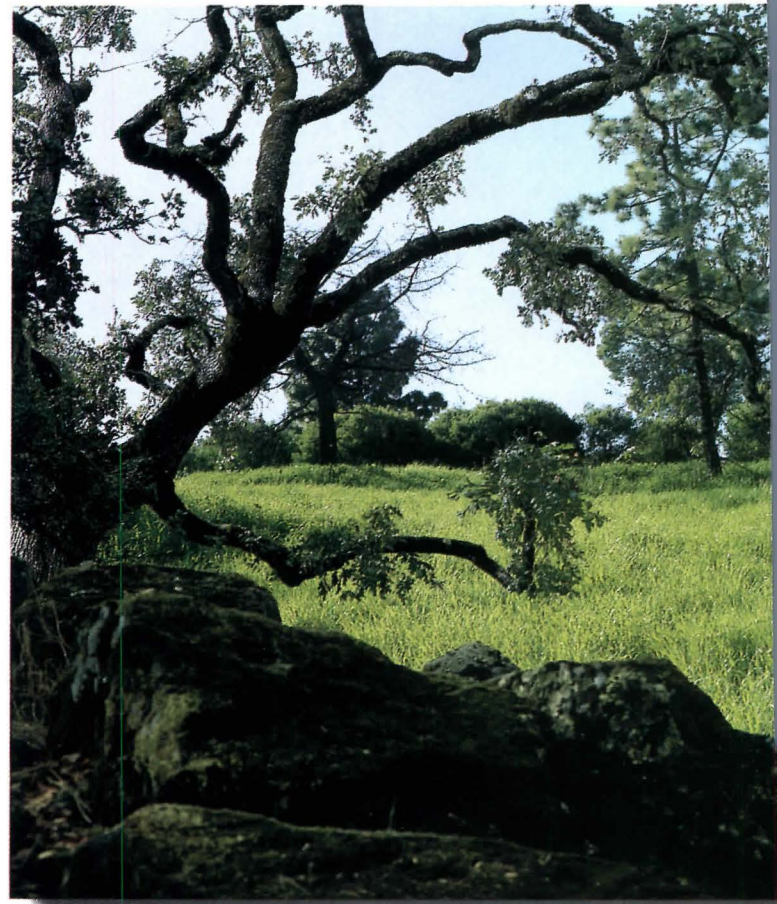
Macintosh Quadra runs all the most powerful design and architecture software.

Yet, to this day, the Apple® Macintosh® remains the only kind of computer designed from the very first chip to work the way people work, instead of forcing people to work like a computer. Indeed, the most powerful expressions of this idea yet are the Macintosh Quadra™ 700 and 900 personal computers.

Both computers combine the simple, commonsense virtues of every Mac® with a whole new level of speed, storage, expansion and networking capabilities.

They're as easy to set up, learn and use as any Macintosh. And since they're significantly faster than 486 computers from Dell, IBM and Compaq,\* they let you do everything you do now faster than you've ever done it before—from whipping out proposals, estimates and presentations to revising construction drawings and creating newly rendered 3-D perspectives at remarkable speeds.

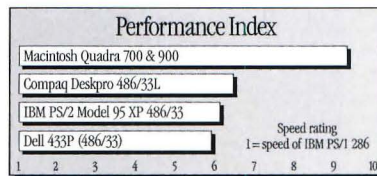
Both have the extraordinary processing power you need to run all the most popular architecture and



design software, including programs such as AutoCAD, ArchiCAD, MicroStation Mac, Architrion and Alias Upfront.

That's because both Macintosh Quadra models are powered by the awesome Motorola 68040 microprocessor. The 68040 integrates a 25 MHz processor, a math coprocessor and a memory cache on a single superchip.

All this power means that you can now u



Macintosh Quadra significantly outperforms 486 PCs from IBM, Compaq and Dell running Windows 3.0.

\*Comparisons are based on a 1991 independent research study conducted by Ingram Laboratories that tested a variety of personal computers running applications available for both the Macintosh and Microsoft Windows 3.0 environments. \*\*24-bit video support for up to a 16" monitor—also available for 21" monitors. Neither an endorsement nor a recommendation. All product specifications and descriptions were supplied by the respective vendor or supplier. ©1992 Frank Lloyd Wright Foundation, Curtis Management. ©1992 Apple Computer, Inc. Apple, the Apple logo, Mac, Macintosh and "The power to be your best" are registered trademarks or registered trademarks of Lotus Development Corp. MicroStation is a registered trademark of Bentley Systems, Inc., an affiliate of Intergraph Corp. VersaCAD is a registered trademark of Versacal Corp. Virtus WalkThrough is a trademark of Virtus.

# ARCHITECTURE

JUNE 1992

## DESIGN

### 47 EMERGING TALENT

The results of ARCHITECTURE's design competition reveal a new bare-bones esthetic created by diverse firms.

### 48 POETIC POTENTIAL

Inner Harbor Penthouse  
Baltimore, Maryland  
Ziger, Hoopes & Snead, Architects  
BY EDWARD GUNTS

### 52 FLORIDA ROOTS

State Regional Services Center  
Fort Myers, Florida  
Rowe Rados Hammer Russell Architects  
BY HEIDI LANDECKER

### 58 URBAN RESOLUTION

Wroxton Road Row Houses  
Houston, Texas  
Pope Sherman Architects  
BY RAY DON TILLEY

### 62 RICHNESS AND RESTRAINT

Norman Park Senior Citizens Center  
Chula Vista, California  
Richard Friedson/The Visions Studio  
BY LEON WHITESON

### 66 SACRED TRADITIONS

St. Stephen's Roman Catholic Church  
Warwick, New York  
Bentel & Bentel Architects/Planners  
BY MICHAEL J. CROSBIE

### 70 DEVELOPING METAPHOR

1611 Electric Avenue  
Venice, California  
Mulder-Katkov Architects  
BY JUDITH SHEINE

### 74 ELEVATED SIMPLICITY

Camp Madron House  
Buchanan Township, Michigan  
Wheeler Kearns Architects  
BY LYNN NESMITH

### 76 SCHOOL OF THOUGHTS

Seven Hills Middle School  
Cincinnati, Ohio  
Pellecchia Olson Architects  
BY LYNN NESMITH

#### COVER:

Norman Park Senior Citizens Center, Chula Vista, California, designed by Richard Friedson/The Visions Studio (page 62). Photograph by Sandra Williams.



GEORGE COTT

PAGE 52



EDUARD HUEBER

PAGE 66



RON FORTH

PAGE 76

## TECHNOLOGY & PRACTICE

### 87 STARTING YOUR OWN FIRM

Founding and nurturing a new practice requires preparation and a sound business strategy.  
BY NANCY B. SOLOMON

### 93 MOVING DESIGNS

With new systems and advance planning, architects are creating more space-efficient circulation.  
BY MICHAEL J. CROSBIE

### 99 ALTERNATIVE DISPUTE RESOLUTION

New legal tactics prevent and resolve construction contract conflicts before going to court.  
BY DAVID MOFFAT

## LIGHTING PORTFOLIO

### 104 ARCHITECT-DESIGNED LIGHTING

Custom fixtures apply new lighting technologies and underscore spatial intentions.  
BY MARC S. HARRIMAN

### 110 CONTROLLING DIRECT SUNLIGHT

Architects are brightening offices through new methods of natural, indirect illumination.  
BY B.J. NOVITSKI

### 114 LIGHTING DESIGN SOFTWARE

Computer software integrates lighting calculations with drawings to enhance lighting strategies.  
BY B.J. NOVITSKI

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 25 NEWS
- 33 ON THE BOARDS
- 41 AWARDS
- 85 INFO
- 119 PRODUCTS
- 128 NEAT FILE

#### NEXT MONTH:

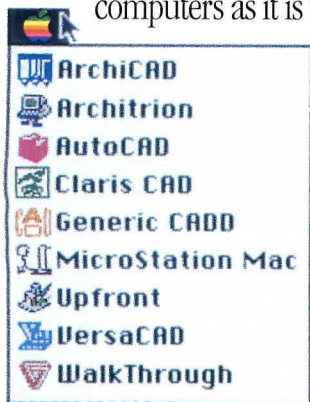
Euro Disney  
Expo '92  
Sports Architecture  
Masonry Portfolio

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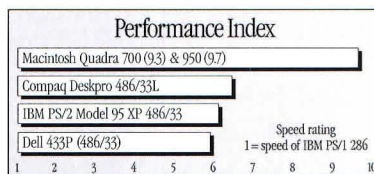
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# ARCHITECTURE

JULY 1992

## DESIGN

### 41 EURO DISNEY PORTFOLIO

#### 41 MICKEY GOES TO PARIS

Disney's latest theme park and hotel complex showcases Americana in France.  
BY DEBORAH K. DIETSCH

#### 43 THE FRENCH REACTION

How Parisians view Disney's billion-dollar cultural invasion.  
BY MILDRED F. SCHMERTZ

#### 44 ELECTRIC AVENUE

Festival Disney  
Frank O. Gehry & Associates, Architect

#### 48 DESERT TRAILS

Hotel Santa Fe  
Antoine Predock Architect

#### 52 NEW FRONTIER

Hotel Cheyenne  
Robert A.M. Stern Architects

#### 54 YANKEE NOSTALGIA

Newport Bay Club  
Robert A.M. Stern Architects

#### 58 RUSTIC REDUX

Sequoia Lodge  
Antoine Grumbach, Architect

#### 60 CITY LITE

Hotel New York  
Michael Graves, Architect

#### 64 GRAND STAND

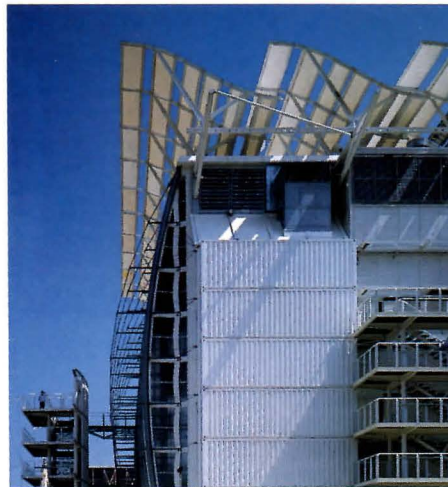
Oriole Park at Camden Yards  
Baltimore, Maryland  
Hellmuth, Obata & Kassabaum Sports  
Facilities Group  
BY EDWARD GUNTS

#### 72 SPANISH TREASURES

Portfolio of projects at Expo '92  
Seville, Spain  
BY BENJAMIN FORGEY

#### COVER:

Espace Euro Disney, designed by  
Robert A.M. Stern Architects (pages 41-63).  
Photography by Peter Aaron/Esto.



RICHARD BRYANT/ARCAID

PAGE 72



PETER AARON/ESTO

PAGE 44



JEFF GOLDBERG/ESTO

PAGE 64

## TECHNOLOGY & PRACTICE

### 87 SPORTS ARCHITECTURE FIRMS

Profiles of three practices specializing in sports design reveal the changing role of arenas and stadiums within cities.

BY EDWARD GUNTS

### 97 MASONRY PORTFOLIO

#### 98 CONCRETE BLOCK PROTOTYPES

Designed to expand structural and finish options, two buildings demonstrate newly developed concrete masonry block systems.

BY MARC S. HARRIMAN

#### 102 MASONRY CLEANING

Removing stains and dirt to restore the appearance of original stone and brick depends on conservation techniques.

BY VERA STEINER

#### 108 DETAILING CONCRETE BLOCK

Single-wythe masonry exterior walls require careful detailing of reinforcement and flashing to prevent moisture infiltration.

BY CHRISTINE BEALL

#### 112 RESOURCE GUIDE

Industry listings and references for further information on masonry.

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 25 NEWS
- 34 AWARDS
- 85 INFO
- 113 PRODUCTS
- 120 NEAT FILE

#### NEXT MONTH:

*Architecture for the arts*  
Flexible theater design  
Electronic acoustics  
Frank Gehry's CADD





# ARCHITECTURE

AUGUST 1992

## DESIGN

### 33 ARCHITECTURE FOR THE ARTS

New museums and performing arts centers are reaching larger audiences and revitalizing their downtowns in the process.

### 34 WRIGHT REVAMPED

Solomon R. Guggenheim Museum  
Renovation and Expansion  
New York City  
Gwathmey Siegel & Associates Architects

BY MILDRED F. SCHMERTZ

### 42 LOCAL COLOR

Addison Theatre and Conference Centre  
Addison, Texas  
Cunningham Architects

BY DAVID DILLON

### 50 STAGE PRESENCE

Temple Hoyne Buell Theatre  
Denver, Colorado  
Beyer Blinder Belle/van Dijk, Pace,  
Westlake & Partners, Architects

BY LYNN NESMITH

### 56 NORTHWEST PASSAGE

Seattle Art Museum  
Seattle, Washington  
Venturi, Scott Brown and Associates, Architects

BY SUZANNE STEPHENS

## MONTREAL MUSEUM PORTFOLIO

### 66 CULTURAL QUARTET

Four new museums elevate the architectural  
profile of Quebec's largest city.

BY HEIDI LANDECKER

### 68 UNQUIET UNION

Montreal Museum of Fine Arts  
Montreal, Canada  
Moshe Safdie & Associates, Architects

### 74 MAKING HISTORY

McCord Museum of Canadian History  
Montreal, Canada  
LeMoyne Lapointe Magne Architects



PAGE 34



PAGE 68



PAGE 42

## TECHNOLOGY & PRACTICE

### 85 WIRED FOR SOUND

For improving reverberation quality, electronic acoustical systems offer alternatives to structural changes in both new and existing concert halls and theaters.

BY VIRGINIA KENT DORRIS

### 95 FLEXIBLE THEATERS

Theatre Projects, a British consulting firm with offices in three North American cities, is collaborating with architects to devise innovative performance spaces.

BY NANCY B. SOLOMON

### 105 GEHRY FORGES NEW COMPUTER LINKS

Frank O. Gehry & Associates is taking advantage of sophisticated computer software to translate sculptural forms into drawings, models, and construction.

BY B.J. NOVITSKI

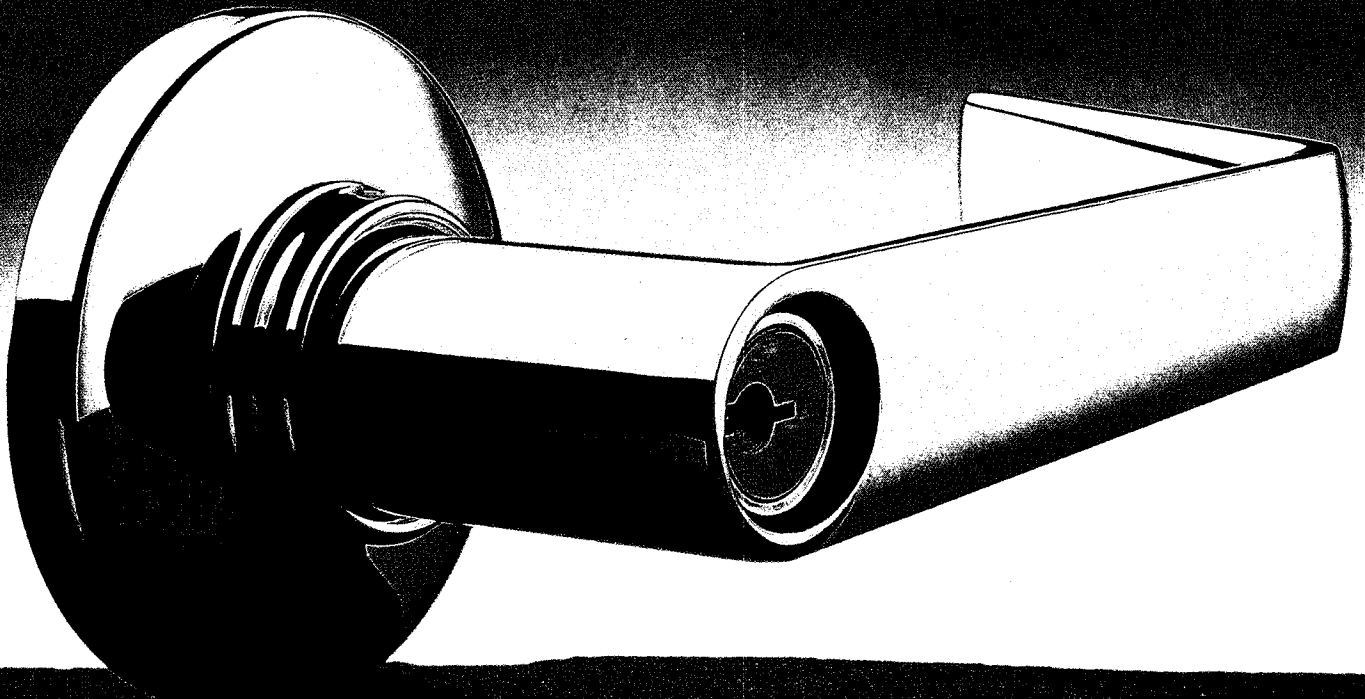
## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 24 NEWS
- 28 AWARDS
- 81 INFO
- 113 PRODUCTS
- 120 NEAT FILE

NEXT MONTH:  
Waterfront architecture  
Pro bono practice  
How architects learn

COVER:  
Seattle Art Museum, Seattle, Washington, designed by Venturi, Scott Brown and Associates (page 56).  
Photography by Strode Eckert Photographics.

# NEW AND



*The new S Series from Schlage*

# ARCHITECTURE

SEPTEMBER 1992

## DESIGN

### 43 ON THE WATERFRONT

New facilities combine education and entertainment to draw tourism, anchor urban development, and boost local economies.

### 44 HAMPTON TAKES FLIGHT

Virginia Air & Space Center  
Hampton Roads History Center  
Hampton, Virginia  
Mitchell/Giurgola Architects

BY HEIDI LANDECKER

### 52 HARBOR ENCORE

Pier Six Concert Pavilion  
Baltimore, Maryland  
FTL Architects

BY LYNN NESMITH

### 58 AGE OF AQUARIUMS

A resurgence of the building type breaks with conventional formulas to rejuvenate regional waterfronts.

BY EDWARD GUNTS

### 64 CATHEDRAL OF CONSERVATION

Tennessee Aquarium  
Chattanooga, Tennessee  
Cambridge Seven Associates, Architect

BY EDWARD GUNTS

### 72 COASTAL EDUCATION

Oregon Coast Aquarium  
Newport, Oregon  
SRG Partnership, Architect

BY DEBORAH K. DIETSCH

### 76 AQUATIC ANCHOR

Thomas H. Kean New Jersey State Aquarium  
Camden, New Jersey  
The Hillier Group, Architect

BY NANCY B. SOLOMON



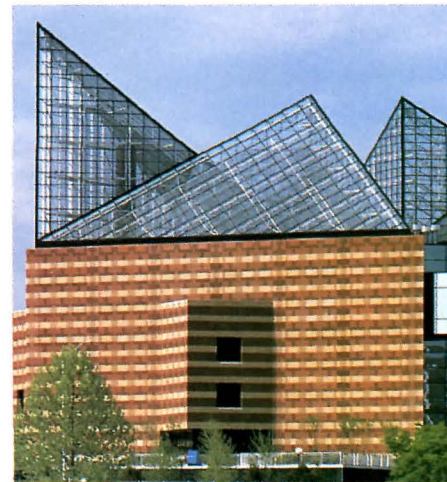
PAGE 52

ROBERT DAVIS



PAGE 76

MATT WARGO



PAGE 64

NICK WHEELER

## TECHNOLOGY & PRACTICE

### 91 PRO BONO ARCHITECTURE

How architects donate their services to a diverse group of clients, benefiting the public and their practices in the process.

BY MICHAEL J. CROSBIE

### 99 CONTINUING EDUCATION FOR ARCHITECTS

A study of architects' current learning practices reveals their readiness to meet the AIA's new mandate for professional development.

BY MARC S. HARRIMAN, JOSEPH BILELLO,  
AND CYNTHIA WOODWARD

### 109 PLANNING FIRE-SAFE DESIGN

After the devastating Oakland/Berkeley fire in 1991, architects and residents are learning hard lessons about rebuilding houses.

BY DAVID MOFFAT

### 117 MOVING TO METRIC

The federal government now requires metric documents where feasible, forcing architects to reexamine current measurement practices.

BY MICHAEL J. CROSBIE

### 121 COST-ESTIMATING SOFTWARE

Computer programs integrated with CADD reduce time and errors in calculating the quantity and price of labor and materials.

BY B.J. NOVITSKI

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 23 NEWS
- 34 ON THE BOARDS
- 87 INFO
- 127 PRODUCTS
- 136 NEAT FILE

### NEXT MONTH:

Structure and light  
Daylighting  
Concrete portfolio

### COVER:

Virginia Air & Space Center/Hampton Roads History Center, Hampton, Virginia, designed by Mitchell/Giurgola Architects (page 44). Photograph by Jeff Goldberg/Esto.

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# ARCHITECTURE

OCTOBER 1992

## DESIGN

### 45 STRUCTURE AND LIGHT

The essential elements of architecture are interwoven to emphasize daylighting strategies and structurally derived imagery.

### 46 LOCAL ECOLOGY

Boulder Public Library  
Boulder, Colorado  
Midyette/Seieroe/Hartronnft, Architects  
BY MICHAEL J. CROSBIE

### 54 POISED FOR FLIGHT

Weesner Family Amphitheater  
Apple Valley, Minnesota  
Hammel Green and Abrahamson, Architects  
BY LYNN NESMITH

### 58 BASIC GEOMETRY

Alliance International Airport Control Tower  
Forth Worth, Texas  
Aubry Architects/PGAL Architects  
BY DAVID DILLON

### 62 NEW WAVELENGTH

Auburn Transmitter Building  
Wake County, North Carolina  
Bartholomew Associates  
BY HEIDI LANDECKER

### 66 STONE REVIVAL

Cistercian Abbey Church  
Irving, Texas  
Cunningham Architects  
BY RAY DON TILLEY

### 72 NORTHERN LIGHT

Boeing Cafeteria 9-12  
Tukwila, Washington  
Miller/Hull Partnership  
BY JUSTIN HENDERSON

### 76 REGIONALIST POWER

Austin Convention Center  
Austin, Texas  
The Austin Collaborative Venture  
BY RAY DON TILLEY

### COVER:

Alliance International Airport Control Tower, Fort Worth, Texas, designed by Aubry Architects/PGAL Architects (page 58). Photography by Timothy Hursley/The Arkansas Office.



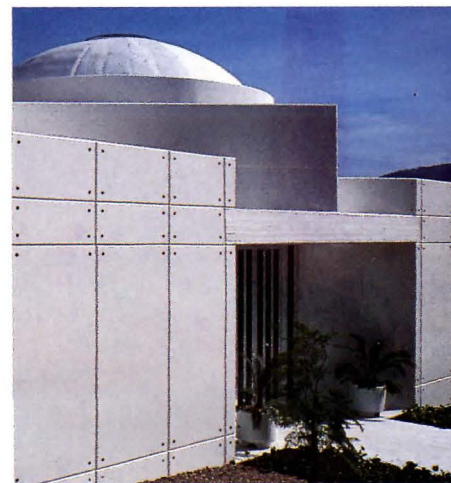
JAMES WILSON

PAGE 66



ROBERT LAUTMAN

PAGE 46



ANDREW KRAMER

PAGE 100

## TECHNOLOGY & PRACTICE

### 89 DESIGNING FOR DAYLIGHT

Architect's decisions about building form determine the visual effectiveness and energy efficiency of naturally lit interiors.

BY MARC S. HARRIMAN

### 99 CONCRETE PORTFOLIO

#### 100 PRECISION POURS

Exposed concrete forms and finishes require careful attention to on-site formwork and supervision of fabrication.

BY NANCY B. SOLOMON

#### 106 AUTOCLAVED CELLULAR CONCRETE

A European manufacturing process about to be introduced to the United States expands concrete construction options.

BY VIRGINIA KENT DORRIS

#### 110 CONCRETE IMPROVEMENTS

Recent improvements in additives enhance concrete's project-specific performance and long-term durability.

BY MICHAEL J. CROSBIE

### 115 COMPUTER-ASSISTED MODEL-BUILDING

Advances in automatically cutting and molding traditional materials to create three-dimensional models from CADD drawings.

BY B. J. NOVITSKI

## DEPARTMENTS

15 EDITOR'S PAGE

18 LETTERS & EVENTS

23 NEWS

31 ON THE BOARDS

87 INFO

125 PRODUCTS

136 NEAT FILE

### NEXT MONTH:

Renovating Modernism  
Seismic retrofits  
Firm mergers



# ARCHITECTURE

NOVEMBER 1992

## DESIGN

### 61 PRESERVING MODERNISM

Architects renovate and expand Modern landmarks with respect for their original character.

### 62 STAGING A COMEBACK

Stage Center  
Oklahoma City, Oklahoma  
Elliott & Associates, Architects

BY DAVID DILLON

### 70 COLLEGIATE PROGENY

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

BY MICHAEL J. CROSBIE

### 76 MODERN HOMECOMING

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

BY LYNN NESMITH

### 84 EDUCATING COLUMBUS

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

BY LYNN NESMITH

### 92 HARBOR MODEL

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

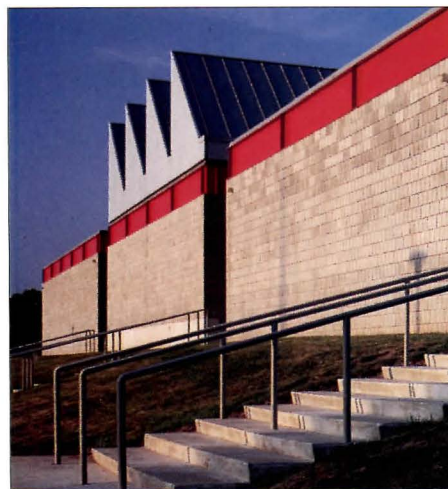
BY HEIDI LANDECKER

#### COVER:

Stage Center, Oklahoma City, Oklahoma, designed by Elliott & Associates, Architects (page 62). Photograph by Bob Shimer, Hedrich-Blessing.



PAGE 76



PAGE 84



PAGE 92

## TECHNOLOGY & PRACTICE

### 105 TOWERING IMPROVEMENTS

Architects are enhancing a generation of aging 20- to 30-year-old office high rises to meet contemporary market demands.

BY MARC S. HARRIMAN

### 113 STRATIFIED RESTORATION

Boston's Old State House exemplifies current restoration methods and attitudes about preserving layers of architectural history.

BY NANCY B. SOLOMON

### 119 QUAKEPROOFING LANDMARKS

Buildings at seismic risk are upgraded without destroying their historic fabric through base isolation and other techniques.

BY MICHAEL J. CROSBIE

### 125 PRODUCT MANUFACTURER SOFTWARE

Wider standardization of computer data from commercial vendors assists architects in specifying and detailing building products.

BY B. J. NOVITSKI

### 133 MERGING FIRMS

The mutual benefits to both seller and buyer should be carefully calculated before making a transition in firm ownership.

BY NORMAN KADERLAN

## DEPARTMENTS

- 15 EDITOR'S PAGE
- 18 LETTERS & EVENTS
- 25 NEWS
- 51 ON THE BOARDS
- 103 INFO
- 153 PRODUCTS
- 168 NEAT FILE

#### NEXT MONTH:

Pacific Northwest  
Staff productivity  
Stainless steel

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# ARCHITECTURE

DECEMBER 1992

## DESIGN

### 31 NORTHERN EXPOSURE

Shunning regionalist clichés, architects in Oregon and Washington exploit their natural surroundings and explore new design territory.

### 32 SPIRITUAL VIEWPOINT

Marilyn Moyer Meditation Chapel  
Portland, Oregon  
Thompson Vaivoda & Associates

BY JUDITH SHEINE

### 36 NEW CHAPTER

AIA Chapter Offices  
Portland, Oregon  
Fine Young Constructivists

BY LYNN NESMITH

### 42 ISLAND UTOPIA

Winslow Cohousing  
Bainbridge Island, Washington  
Edward Weinstein Associates

BY JUSTIN HENDERSON

### 46 LOCAL COLORS

Central Washington Hospital  
Wenatchee, Washington  
NBBJ Architects

BY HEIDI LANDECKER

### 54 DEPRESSION MODERN

Everett Public Library  
Everett, Washington  
Cardwell/Thomas & Associates

BY HEIDI LANDECKER

### 58 CAMPUS ORDER

Biomedical Information Communication Center  
School of Nursing  
Oregon Health Sciences University  
Portland, Oregon  
GHA Architects

BY DEBORAH K. DIETSCH

#### COVER:

Marilyn Moyer Meditation Chapel, Portland, Oregon, designed by Thompson Vaivoda & Associates (page 32). Photography by Strode Eckert Photographic.



PAUL WARCHOL

PAGE 46



MICHAEL MATHERS

PAGE 36



STRODE ECKERT PHOTOGRAPHIC

PAGE 58

## TECHNOLOGY & PRACTICE

### 73 HIGH WIRE ACT

Three Atlanta firms join forces to design the Georgia Dome, a multipurpose arena that pushes stadium technology to new limits.

BY MARC S. HARRIMAN

### 79 DOME FOR DESIGN

Chrysler's new styling dome for the study of auto models incorporates innovative lighting systems and high-tech acoustics.

BY MICHAEL J. CROSBIE

### 85 STEEL REFLECTIONS

Cesar Pelli & Associates capitalizes on the versatility of stainless steel in the exterior cladding of three office towers.

BY MICHAEL J. CROSBIE

### 91 ENHANCING FIRM PRODUCTIVITY

Architecture firms are drawing upon proven management techniques to measure the productivity and efficiency of their practices.

BY NORMAN KADERLAN

### 95 SCANNING SOFTWARE

New techniques for converting paper drawings into electronic CADD images allow more efficient storage and retrieval.

BY B. J. NOVITSKI

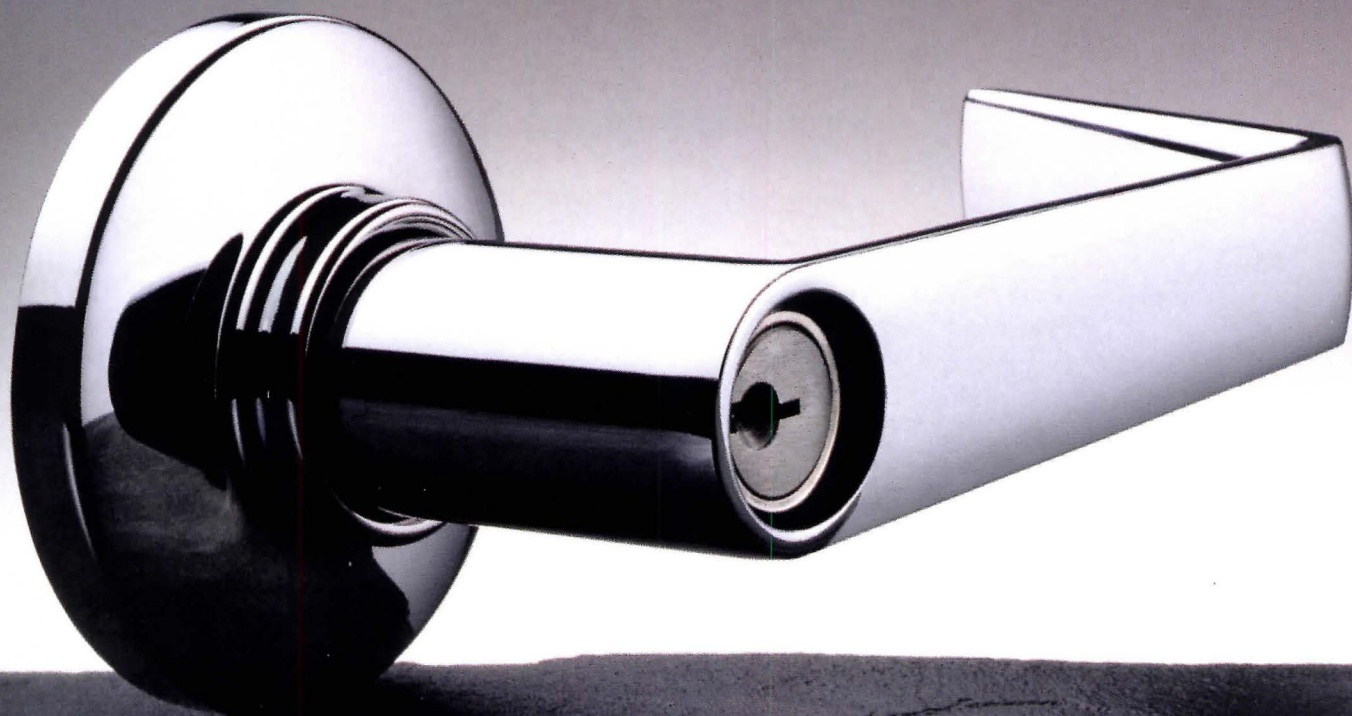
## DEPARTMENTS

- 13 EDITOR'S PAGE
- 14 LETTERS & EVENTS
- 19 NEWS
- 25 ON THE BOARDS
- 71 INFO
- 99 PRODUCTS
- 112 NEAT FILE


#### NEXT MONTH:

Housing alternatives  
Log construction  
Large firm roundtable

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# Transportation Act Offers Job Opportunities

FOR ARCHITECTS HURT BY THE CURRENT recession, help may be on the way in the form of a new transportation bill passed by Congress last November and signed into law by President Bush. Intended to overhaul the nation's highways and mass transit systems, the \$151 billion, six-year Surface Transportation Efficiency Act of 1991 incorporates several AIA-supported "Livable Communities" measures aimed at involving architects in planning and designing transit-related projects around the country.

In transferring decision-making from the federal level to states and cities, the legislation marks a major shift in this country's transportation policy. The last landmark transportation law, the Federal Aid Highway Act of 1956, dictated the building of major interstates, and, in the process, destroyed urban neighborhoods and encouraged suburban sprawl. The new transportation act, on the other hand, will allow state and city officials to devise transportation systems tailored to their communities. It sets aside \$31.5 billion for mass transit, twice the funds recommended by the Bush administration, and offers potential work for architects in designing new rail and bus stations. The act also legislates the same federal matching funds for highway and transit projects, and local and interregional systems. Flexibility is provided within the act to allow state officials to shift highway funds to mass transit. Under a \$3 billion transportation-enhancement provision, cities and states will be able to restore existing facilities and build new ones, including walkways and bicycle paths. Money is also allocated for the purchase of scenic and historic easements, land-

scaping, and the removal of all billboards on scenic highways. These enhancement provisions will also spawn construction projects that directly involve architects.

In addition to allocating funds for beautification, the law requires states and localities to incorporate stringent planning measures into each transportation project, and it sets aside \$1.5 billion for this purpose. By forcing transportation authorities to consider land use and energy plans, historic preservation guidelines, and pollution levels, the legislation attempts to ensure that new facilities are sensitively integrated into their surroundings. In the past, transportation officials attempted to solve gridlock, for example, by widening streets at the expense of neighboring buildings and air quality. The newly enacted legislation prohibits road construction where exhaust levels exceed limits established by the Clean Air Act and sets aside \$6 billion for reducing urban congestion and air pollution.

The AIA estimates that millions of dollars will potentially become available to architects willing to help states and cities take advantage of improvements under the act, develop creative approaches to transportation planning, and, in the process, foster more environmentally sensitive communities. The Institute is now beginning to work with federal agencies in developing regulations to implement the new policy. In the meantime, architects can begin paving the way for future projects by educating government officials about policy changes and encouraging them to carry out the public spirit of the law. ■

—DEBORAH K. DIETSCH

## LETTERS & EVENTS

### Women (and Men) in Architecture

Bravo! Bravo! A refreshing and rewarding issue on the accomplishments of women architects (October 1991). I am delighted to see this issue and to read the facts.

*Eva L. Maddox  
Eva Maddox Associates  
Chicago, Illinois*

Women architects are to be celebrated, but Howard Roark's style of practice died at least thirty years ago. "Collaboration to meet the increasingly complex challenges of practice today" was born with Bill Caudill and others—some of them women—who birthed a team approach to architecture. If we are to have inclusive design, editors should be careful in drafting editorials; they may create new divisions in a profession that is already embarrassingly divided.

*William O. Neubauss  
W.O. Neubauss Associates  
Houston, Texas*

Congratulations on the Women in Architecture issue. It is bound to be influential. I liked the fact that it introduced new faces and new issues. During the past decade I felt we could never go beyond those questions and issues already outlined in the 1977 exhibition at the Brooklyn Museum. Thank you for expanding our knowledge.

The only dissonant note is the claim in the news article (October 1991, page 21) that the AIA's exhibition "That Exceptional One: Women in American Architecture 1888-1988" is the first to tell the story of American women architects in the profession. Such short memories! Your readers should be aware of the book, *Women in American Architecture: A Historic and Contemporary Perspective* (New York: Whitney Library of Design, 1977), which still remains the key text on the subject.

*Susana Torre  
Chair, Environmental Design  
Parsons School of Design  
New York City*

### Haunting Challenge

While your news article on the recent convention of the National Organization of Minority Architects (November 1991, pages 42-43) caught the spirit of the gathering, it failed to mention one of its more eloquent moments. At the awards banquet, keynote speaker Harvey Gantt, FAIA, (former mayor of Charlotte, North Carolina, who ran for the Senate in 1990) delivered a haunting challenge to the NOMA audience. He urged us to get involved with our communities' young people, citing the numerous times he has looked into eyes that have lost their light—youths who are without hope or a sense of future. Whether it be through scouting, school, church, or community groups, he encouraged the group of architects to participate, something he has done for his community, state, and nation during his entire professional career.

*Frank C. Blanton, AIA  
BWA Architecture  
Atlanta, Georgia*

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### Modern Contrivance

No amount of words, either by Michael Crosbie or by Charles Gwathmey, can convince me that Werner Otto Hall mediates between the Carpenter Center and the Fogg (November 1991, pages 52-59). Otto Hall does work well with the Carpenter, but does not mediate with the old Fogg. Your comparison of windows, muntins, grids, solids, voids between the two is contrived.

*Andrew Ruppel  
University of Virginia  
Charlottesville, Virginia*

### Corrections

S. Kahn Sons Company has owned the Homer Building ("Spanning History" November 1991, pages 107-113) since 1911, and did not file for bankruptcy in 1926. Several participants in the Tower City Center project were omitted, including Cannon (architects and engineers), Whitley & Whitley (architects), and ARJO (mechanical engineers).

**January 15:** Proposals due for presentations at "Making Cities Livable" conference in San Francisco in March. Contact: Suzanne Crowhurst Lennard (408) 626-9080.

**January 17:** "William Turnbull, Jr.: A Regional Perspective," at the Cincinnati Contemporary Arts Center. Contact: Stacey Simms (513) 721-0390.

**January 19-23:** Grass Roots leadership training program at the AIA in Washington, D.C. Contact: Melissa Downey (202) 626-7377.

**January 22-March 11:** "Halftime: A Celebration of 75 Years of Chicago Architecture," curated by Stanley Tigerman, at the Arts Club of Chicago. Contact: (312) 787-3997.

**January 22:** AIA's Accent on Architecture, celebrating the 200th anniversary of the White House, at the Kennedy Center, Washington, D.C. Contact: Jan Thomas Johnson (202) 626-7572.

**January 22:** "The White House: Image in Architecture 1792-1992," exhibition at the Octagon, Washington, D.C. Contact: (202) 626-7572.

**January 23-24:** "Environmental Protection: Planning Law and Guidelines," workshop in Los Angeles. Contact: Kristen Pridgeon (312) 955-9100.

**January 26:** National Association of Home Builders convention at the Las Vegas convention center. Contact: (800) 368-5242.

**January 27:** Deadline for AIA Urban Design Awards of Excellence. Contact: (202) 626-7586.

**Through February 1:** "Held in Common: Historic Architecture in America's National Parks," exhibition at the National Building Museum in Washington, D.C. Contact: Kathy Keyes (202) 272-7872.

**February 5-7:** "Engineering for Extreme Winds: 1992," at Texas Tech University in Lubbock, Texas. Contact: Kisher C. Mehta, director (806) 742-3476.

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**ARCHITECTURE**

# NEWS

AIA Presidential Inauguration • AIA International Committee Meeting • Contemporary Slovenian Architecture

## Benjamin Thompson Wins Gold Medal



ON DECEMBER 6, 1991, THE 35-member AIA Board of Directors selected Benjamin C. Thompson of Cambridge, Massachusetts, as the 50th recipient of the Gold Medal,

AIA's most prestigious honor. In announcing the award, AIA President W. Cecil Steward said, "Benjamin Thompson creates places for people. From Miami to San Francisco, his marketplaces and music halls have without exception become jeweled linchpins for urban rebirth." Thompson will be awarded the Medal on January 22 at Accent on Architecture, AIA's annual celebration of excellence.

Thompson is best known for his transformation of Boston's Faneuil Hall and Quincy Market into a prototype for a new kind of urban magnet, created in 1978 with the Rouse Company as developer. Called a "festival marketplace," the collection of stores and restaurants lured people back to the city and served as a catalyst for reclaiming Boston's neglected waterfront. During the 1980s, this formula was repeated at Baltimore's Harborplace, South Street Seaport in New York City, Jacksonville Landing in Jacksonville, Florida, Bayside in Miami, and Union Station in Washington, D.C. The 73-year-old architect is currently working on a mixed-use develop-

**Thompson's Pier 17 was completed in 1986 as part of Manhattan's South Street Seaport (below, left). A new office building (below center) is the first phase of his Custom House Docks master plan, a mixed-use project in Dublin, Ireland. Faneuil Hall marketplace was completed in 1978 (below right).**

ment scheme for Chicago's Navy Pier.

After graduating from Yale University in 1941, Thompson served as a U.S. Navy lieutenant before Walter Gropius invited him to help form The Architects Collaborative (TAC) in 1946. He was one of seven young architects Gropius selected, and he stayed for 19 years before establishing Benjamin Thompson & Associates.

In addition to their long association in practice, Thompson succeeded Gropius as chairman of architecture at Harvard's Graduate School of Design in 1963. During his five-year tenure as chairman, he fostered stronger ties between education and practice.

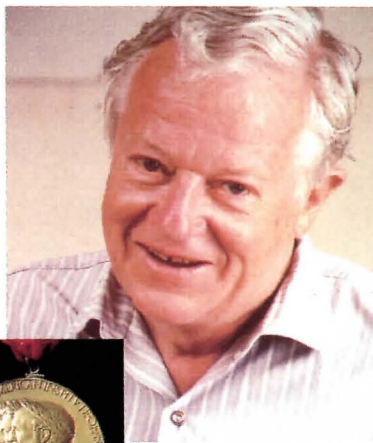
A dedicated Modernist, Thompson was also an early pioneer of adaptive use, but he never adhered to purist preservation principles. In the late 1950s, in association with TAC, Thompson restored eight of the original Harvard Yard dormitories and converted the century-old Boylston Hall into a university language center. In these early projects, he juxtaposed glass and steel with historic details, a harbinger of his marketplaces.

Indicative of his interest in all aspects of design, Thompson in 1953 founded Design Research, an innovative boutique on Harvard Square that sold affordable European-de-

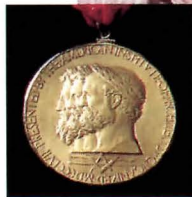
signed furnishings for the home. In 1969, he completed a multi-story glass building in Cambridge to house a larger store.

Recipient of numerous national awards, Benjamin Thompson & Associates was honored as the AIA Firm of the Year in 1987 and won national honor awards for dormitories at Colby College in 1968; the Design Research building in 1971; and Faneuil Hall marketplace in 1978. Other notable Thompson projects include the Ordway Music Theater in his native St. Paul (ARCHITECTURE, May 1985, pages 188-191) and the recently completed Broward Center for the Performing Arts in Fort Lauderdale, Florida.

Like the two previous gold medalists, E. Fay Jones (1990) and Charles W. Moore (1991), Thompson is an architect who designs buildings that are appreciated by the general public. His selection reflects AIA's commitment to broadening public awareness of the importance of quality design. By honoring Thompson with its highest award, AIA also recognizes a long-time proponent of accessible architecture. Twenty-five years ago Thompson wrote, "In practice, we must stop designing for ourselves and the critics and instead begin to identify with the joys and terrors of the man who will spend his life in what we build. That means we must design for people."  
—LYNN NESMITH



JON GOELL



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## DETAILS

The city of Lausanne, Switzerland, has selected **Bernard Tschumi Architects** of New York over **Mario Botta** to design 1.5 million square feet of offices, hotels, housing, and civic buildings. Tschumi also won a competition in Chartres, France, for a 450-acre, mixed-use development. Finalists included **Norman Foster**, **Massimiliano Fuksas**, and **Adrien Fainsilber**. Planners for a \$164 million marine research and exhibition center in Baltimore have dismissed the London firm **Richard Rogers Partnership** due to contractual differences, and have begun negotiating with the **Zeidler Roberts Partnership** of Toronto. In Gebze, east of Istanbul, Turkey, the **Hillier Group** has been selected to design a 180,000-square-foot education facility for gifted children. **Perkins & Will** of Chicago has joined Frankfurt-based JSK International to form JSK/Perkins & Will International. In Seattle, the 450-member firm **NBBJ** acquired **Wyatt Architects**. **Cesar Pelli & Associates** won two design competitions in Fukuoka, Japan: the master plan of Twin Dome City, a 40-acre, mixed-use development including a baseball stadium; and a 1,000-room resort hotel on the same site. **Spiro Kostof**, professor of architectural history at the University of California at Berkeley and host of the five-part television series "America by Design," died in December at age 55. The New York firm **Cicognani Kalla Architects** has been selected to design the Heinz Architectural Center at the Carnegie Institute in Pittsburgh. Finalists included **Machado-Silvetti** of Boston and **Tony Atkin** of Philadelphia. After reciting an excerpt from his play *The Crucible*, Arthur Miller unveiled a scheme by **James Cutler** and **Maggie Smith** of Winslow, Washington, for the Salem Witch Trials Memorial (below).



## W. Cecil Steward Inaugurated as AIA President

**AIA UPDATE** IN 1973, W. CECIL STEWARD gave up an associate deanship at his alma mater, Texas A&M, closed his Texas-based practice, and moved to Lincoln, Nebraska. As the new dean of the University of Nebraska's architecture school, the Texas native began cultivating ties with local architects, hoping to raise the stature of architectural education and, in turn, promote design excellence in the state capital. Nineteen years later, the dean's contribution to Lincoln's architecture is visible on many levels: from the creation of a capitol environs district, founded to preserve the area surrounding Bertram Goodhue's 1932 State Capitol, to strong partnerships between local practitioners and the University of Nebraska's faculty and students.

Inaugurated last month as the AIA's 68th president and its first educator in 100 years, Steward plans to translate his community-based approach to architecture into new opportunities for the Institute, both in this country and abroad. Decrying the gulf separating the profession from the universities, Steward feels it is time for the AIA to bridge practice and education. "If architects and academics were working together, architecture could better influence the quality of life within local communities," he contends. Over the last two years, AIA components in different parts of the United States have held colloquiums bringing academics and practitioners to the table. But, as Steward asserts, "discussion is not enough." In addition to founding a strong internship program at the college of architecture, Steward counsels students to elect business and management courses in preparation for the profession. At the same time, he retains practitioners as part-time instructors and promotes continuing education programs through the Nebraska Society of Architects, housed in the university's Architecture Hall.

Operating according to his belief that "good intentions are not enough," Steward launched an AIA civil rights and cultural diversity task force upon taking office to target ways of increasing the number of minority architects in Institute leadership positions. He notes his own frustrated efforts to attract professors of color to the University of Nebraska's architecture school, where the minority student population is only 6 percent



**W. Cecil Steward (right), the AIA's 68th president, examines student work at the University of Nebraska's College of Architecture, where he has been dean for 19 years.**

and the faculty has no minority members.

While rallying to diversify the AIA at home, Steward will look for ways of opening new chapters abroad. He believes that American architects should take the lead in strengthening international ties, particularly in a climate of political and economic flux. Currently, the AIA is negotiating licensing reciprocity with Mexico, to accompany a recently secured agreement with Canada. "Architects should not think of architecture as a building art, but as a social art," maintains Steward, who has established ties of his own with colleagues abroad. He has lectured in China and helped devise the academic program and campus plan for a new university in Imo, Nigeria. With Steward's help, the department of architecture at Imo State University was established and constructed first to serve the surrounding community. As president, Steward plans to draw upon his international experience and promote American architects overseas.

Steward will spend much of 1992 traveling throughout the U.S. and abroad, seeking opportunities that will help American architects despite economic hardship. "I envision architects sitting at the table of corporate enterprise, I envision architects sitting at the head of government... I envision architects helping this country through some very difficult times with vision and leadership," Steward maintains. "At the same time, we will continue to design the high quality of buildings that we have always produced." —K.S.



## AIA International Committee Meets in San Francisco

### AIA UPDATE

THE AIA'S INTERNATIONAL Committee was formed more than a year ago to consider issues related to design and construction overseas. That it has already grown into the Institute's third-largest committee indicates how international affairs have become "one of the leading interests of our constituents," asserts Committee Chair Don Hackl of Chicago's Loeb Schlossman & Hackl. Considerable insight into the current prospects for international practice emerged from the committee's third conference, held November 8-9 in San Francisco. The group of roughly 90 attendees included principals from medium and large firms already involved in foreign work and wondering how to get more, educators interested in expanding their programs, and individuals and representatives of smaller West Coast firms who sought tips on entering the international market.

According to Walter Hoadley, a senior economist at Stanford University's Hoover Institution, global forces now affect nearly every business. Hoadley pointed to a new diversity in the movement of capital around the world, but added that economic opportunity is also threatened by a flat worldwide economic outlook, continuing nationalism and protectionism, and a shortage of long-term capital. International strategies, Hoadley concluded, should be based on careful alliances.

Erik Sueberkrop of San Francisco-based Studios maintained that American firms can offer a "sense of the new" for foreign clients. But his firm's experience abroad has revealed considerable logistical difficulty and high costs. Sueberkrop contends that collaborating with an overseas partner can help American architects steer through difficulties and safeguard a firm's reputation.

Arthur Gensler, Jr., of San Francisco's Gensler and Associates, explained

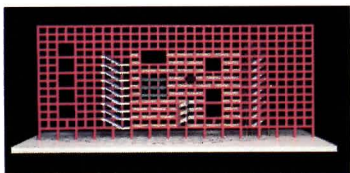
how overseas work demands a "world-class standard of performance," including a passion for design excellence and corporate ethics. It also requires an understanding of local conditions and sensitivity to cultural differences. Most profitable international client relationships, he explained, are begun at home and carried overseas.

A good portion of the conference was set aside for work in subgroups dealing with such issues as practice, marketing, education, and government affairs. Among the products and services that may eventually emerge from the subgroups are a database of government information sources, a matrix showing the different responsibilities of design and construction team members in various countries, cultural and educational exchanges, a new contract document for international practice, and profiles of architectural practice in select countries.

Regional differences were also apparent at the meeting. The committee's last conference in Washington, D.C., had a primarily European focus, while the San Francisco event was more concerned with the Pacific Rim. The next meeting, scheduled for May in Miami or San Antonio, will give equal time to opportunities in Latin America.

The high attendance at this conference indicates that some architects believe new work is only a foreign marketing strategy away. Yet if one lesson stood out from this committee meeting, it was that there is no inside track to securing work abroad. For those architects able to invest the time and money in foreign practice now, however, the results may be significant over the next decade. In these recessionary times, foreign commissions remain one of the few opportunities for growth. —DAVID MOFFAT

*David Moffat is associate editor of San Francisco-based Traditional Dwellings and Settlements Review.*



**Studios' interiors for the Trade Mart in Osaka, Japan (above) will be completed in 1994.**



DAMJAN GALE

**Janez Kozelj's sinuously outlined mixed-use building (above) echoes the curved Ljubljana street and attempts to interpret the architectural themes of surrounding structures.**

## Slovenian Architecture on View in New York

ALTHOUGH SLOVENIA ONLY DECLARED ITS independence from the troubled Yugoslav federation last June, this northernmost republic is the first to make a cultural foray as an independent state. "Contemporary Architecture in Slovenia" at New York's National Institute for Architectural Education (NIAE) reveals a rich variety of architectural forms from the roughly 8,000-square-mile republic, proving false the typical perception of East European architecture as undifferentiated rows of Modern buildings. Slovenia's capital, Ljubljana, originated as a Roman city and retains architecture from many historical periods; in plan it resembles a medieval town with a dense center and tight streetwall.

The exhibition, which was on view through January 3, was initiated by Galerija DESSA/Ljubljana with the NIAE, the Yugoslav Press and Cultural Center of New York, and Friends of DESSA, a New York organization of American architects that includes Elizabeth Thompson of Skidmore, Owings & Merrill and Gerard Vasisko of Gruzen Sampton Steinglass. DESSA (which, in Slovene, stands for Association of Free-lance Architects) was founded as an architectural cooperative in 1982 so that "free-lance" architects could secure large government commissions. The democratic movement that began in 1990 and the subsequent quest for independence

*continued on page 23*

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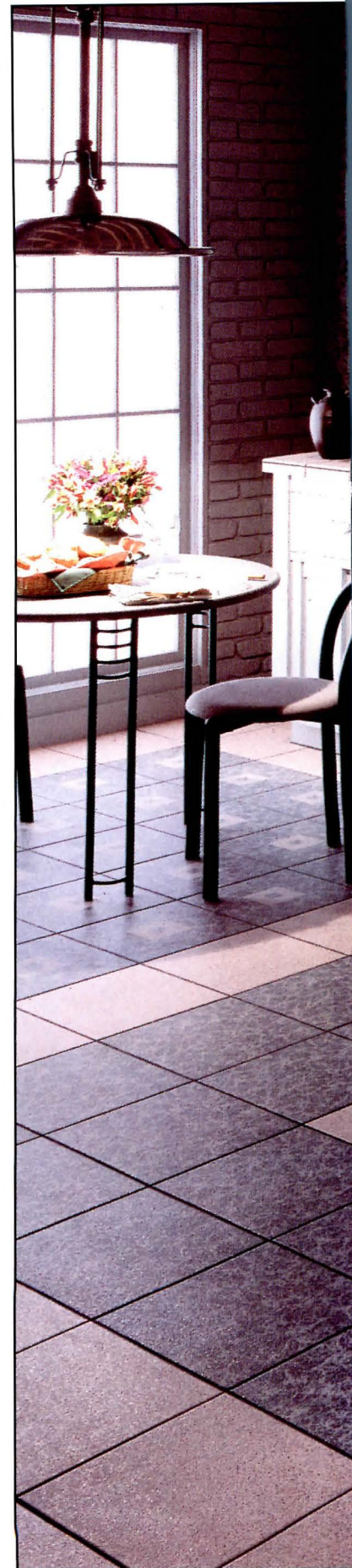
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Slovenian Architecture in New York *continued from page 19*

have changed architectural practice somewhat: new, small companies and individual entrepreneurs are now the main clients. DESSA director Anarej Hrausky claims that "being a state and not being recognized is a catastrophe for us," especially because foreigners will not invest in Slovenia. DESSA, with 130 members (10 percent of Slovenia's architects) is involved in professional, cultural, and social endeavors, offers gallery and work spaces, and acts as a legal representative for its members.

Slovenia has always had its own historical, cultural, and architectural identity, apart from Yugoslavia. Certainly one reason for this fact is Slovenia's geographic isolation, bordered by the Hungarian plain, the Dinaric Alps, and the Adriatic Sea. Hrausky characterizes its relationship with the rest of Yugoslavia as a forced marriage; Yugoslavia, and especially Belgrade, have "another mentality and another culture with which we cannot identify." He claims influences urbanistically from Vienna and Venice, internationally from Adolf Loos and Otto Wagner, and locally from favorite son Joze Plecnik and Slovenia's Baroque architecture. For another DESSA architect, Ales Vodopivec, history is an inspiration, but not a resource for historicist eclecticism, and Hrausky concurs. "What we copy are the principles or ideas," he asserts, "but not the form. The architecture is derived from what is there, but you will never see a direct copy."

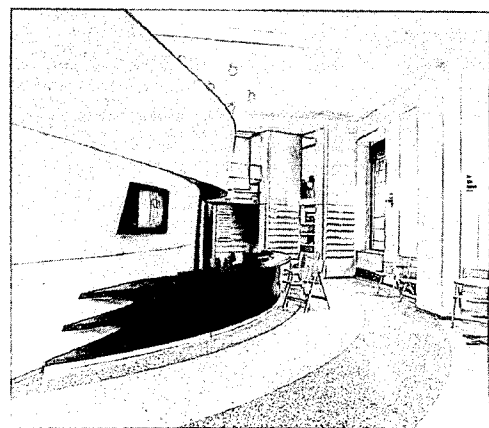
Plecnik's work—both his built projects and his master plan for Ljubljana—is set up as definitive of Slovenian contextualism: the exhibit opens with 12 photographs of his quirky, Classicist capitals. But a surprising number of additional styles fit under the contextualism rubric. An office building designed by Vojteh Ravnihar and the Hotel Bogatin by Jurij Kobe and Ales Vodopivec are examples of early European Modernism with their pilotis, expansive windows, and crisp white walls. Vernacular adaptation shaped a hotel annex by Vodopivec as a traditional alpine shed constructed from modern materials. A travel agency by Kobe, and the Pavius Boutique by Metoa Prijatelj and Peter Vezjak feature sleekly elegant interiors with contrasting materials and careful details. Anton Lesnik applies just a few muted Deconstructivist elements to transform a drab, unoccu-

ried building into a contemporary office. Two fine examples of historic building renovation are Vodopivec's Festival Hall, with an interior retrofit that never quite touches the 1960s shell, and Kobe's Museum of Recent History, which adds services to a Rococo villa without changing its original form.

Most of the projects exhibited are simple, contemporary interpretations of Modernism, as in a residential building by Janez Kozelj. Taken together, the images are an embodiment of Slovenia's strong national identity, fitting neither typical Eastern Communist architecture nor extreme Western theory. Although statehood was not at issue when DESSA first planned the show, the quality of the work supports Slovenia's independence in strong architectural and urbanistic terms. ■

—ANDREA MONFRIED

*Andrea Monfried is deputy editor of Oculus.*



DAMJAN GALE

The irregular space of the Globtour travel agency (above) in Ljubljana is unified by Jurij Kobe's interior planning; the curved wall, reinforced by the counter and floor pattern, and the staggered cubicles maximize the space of the small office.

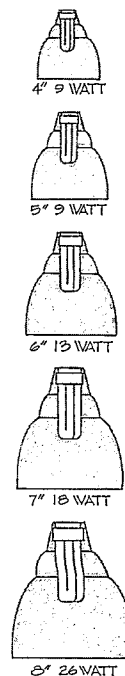
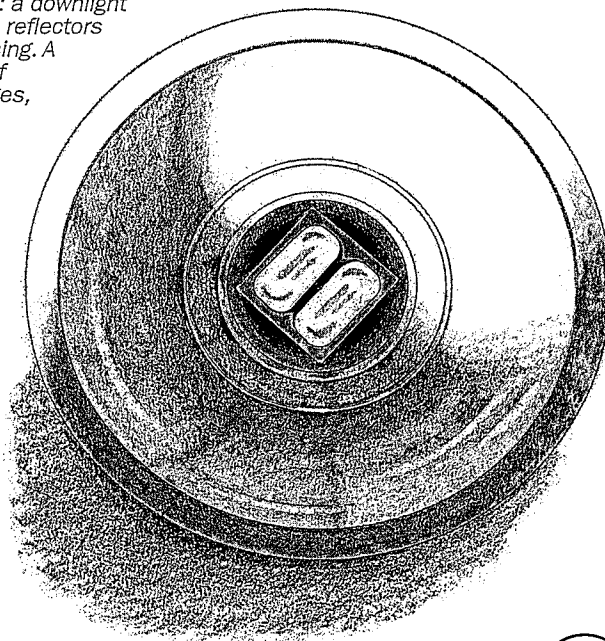
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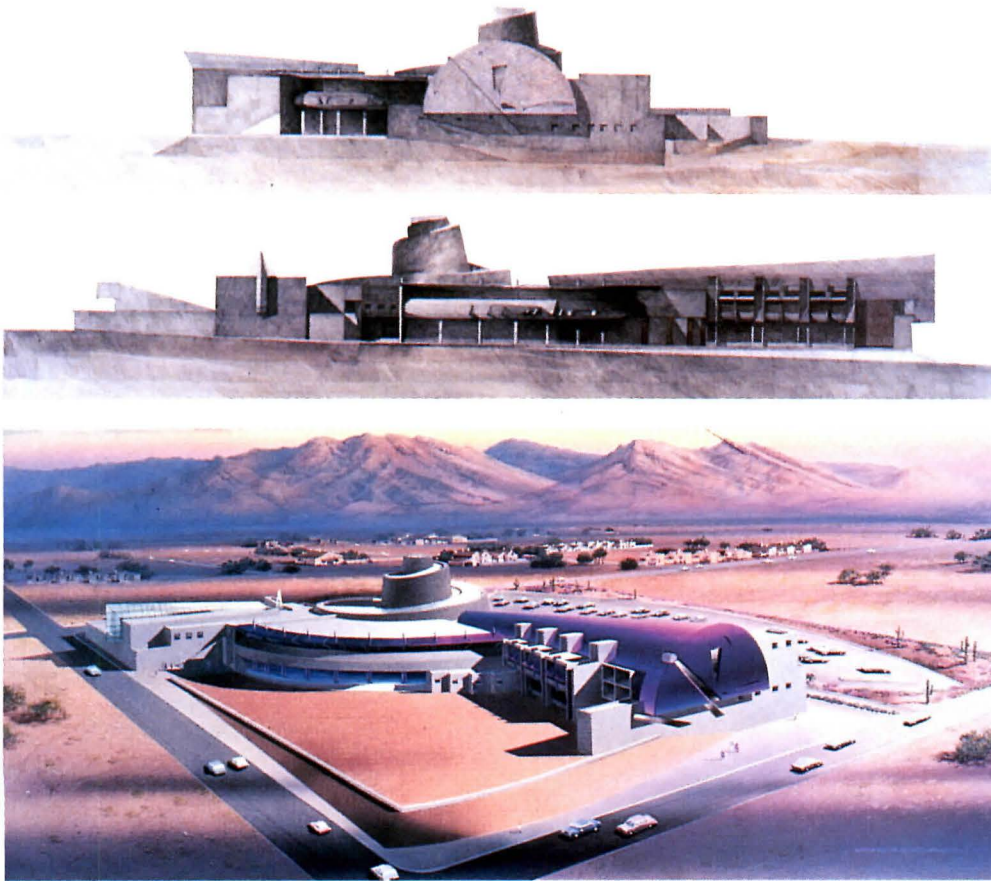
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# ON THE BOARDS

## Two Libraries by Meyer, Scherer & Rockcastle

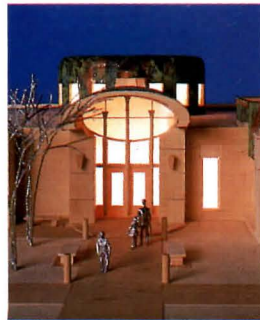


### Sahara West Library and Museum Las Vegas, Nevada

FIVE YEARS AGO, NEVADA'S CLARK COUNTY began an ambitious building program to improve cultural facilities and public services. The first component, a public library and children's museum by Antoine Predock, opened in 1990 to rave reviews. Now Minneapolis-based Meyer, Scherer & Rockcastle has designed a second major civic building, a contemporary art museum and library. Scheduled for completion in 1994, the 120,000-square-foot facility will house a public lending library within a stainless-steel-clad, barrel-vaulted form (top section and perspective); a museum with permanent and temporary exhibition space (center section); lecture halls; and a studio to accommodate an artist-in-residence program. The \$14 million complex also includes an atrium/botanical garden featuring indigenous vegetation in a stucco-clad spiral volume that connects the building's two main wings.

### Merriam Park Public Library St. Paul, Minnesota

WHEN THE CITY OF ST. PAUL DETERMINED IT was not economically feasible to renovate a 70-year-old brick and limestone branch library, Meyer, Scherer & Rockcastle proposed a new 14,500-square-foot facility on the same site that recalls the predecessor's scale and detailing. The new structure is designed predominantly in brick with new cast-stone accents and limestone ornament salvaged from the original library. To break down the boxlike form of the building, the architects defined the entrance (center left) with a copper-clad, barrel-vaulted roof and crowned the facility with an elliptical rotunda (bottom right) that houses the main reference area. Study rooms and a children's reading room along the side elevation (center right) are expressed with bold copper roof lines and changes in fenestration. The \$2.4 million facility is scheduled to begin construction next month. ■



*The \$40 million 312 Walnut Building overlooks the Ohio River in downtown Cincinnati.*

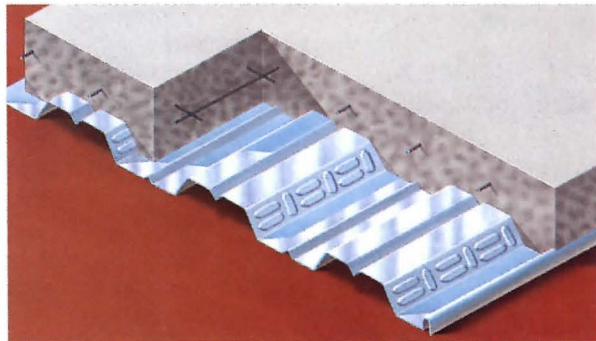


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# AWARDS

## Georgia AIA Honors Atlanta Firms

THE GEORGIA ASSOCIATION'S 1991 AIA DESIGN AWARDS JURY HONORED ARCHITECTS THAT CREATIVELY RESOLVED PROGRAMMATIC REQUIREMENTS AND CAREFULLY CONSIDERED THEIR INHABITANTS, ACCORDING TO JURY CHAIRMAN SAM MOCKBEE OF CANTON, MISSISSIPPI. LAST AUGUST, MOCKBEE WAS JOINED BY ARCHITECT RICHARD PIGFORD OF BIRMINGHAM, ALABAMA, ROBERT CRAYCROFT, PROFESSOR OF ARCHITECTURE AT MISSISSIPPI STATE UNIVERSITY IN JACKSON, AUTHOR ELLEN DOUGLAS, AND WOODWORKER FLETCHER COX TO REVIEW 84 SUBMISSIONS. THEIR HIGHEST HONOR WENT TO THE MT. CARMEL ELEMENTARY SCHOOL, DESIGNED BY THE ATLANTA FIRM LORD, AECK & SARGENT, WHICH JOINS A RENOVATED 1930S CLASSROOM BUILDING TO A 31,000-SQUARE-FOOT ADDITION, AND INCORPORATES BRIGHTLY PAINTED STRUCTURAL MEMBERS AND TEXTURED STONE FINISHES TO ENCOURAGE CHILDREN TO TOUCH AND UNDERSTAND THEIR ENVIRONMENT. JURY MEMBERS PRAISED THE SCHOOL'S BUS CANOPY—PEAKED METAL ROOFS SHADING BOULDERS THAT SERVE AS BENCHES (BOTTOM, LEFT)—AND THE BUILDING'S "RATIONAL, CONSIDERATE DETAILING."

THE JURY HONORED SEVEN ADDITIONAL PROJECTS, INCLUDING LORD, AECK & SARGENT'S WINEMAN CABIN AND ATLANTA-BASED ARCHITECT ROBERT M. CAIN'S GARDEN PAVILION, CITED FOR THEIR SUCCESSFUL INTEGRATION INTO THE LANDSCAPE. JURORS ADMIRING THE CABIN'S UNDERSTATED PRESENCE ON THE HILLSIDE, AND THE UNSELF-CONSCIOUS

WAY IN WHICH CAIN'S CONTEMPORARY PAVILION TAKES ADVANTAGE OF LANDSCAPE ELEMENTS.

THE JURY APPLAUDED LORD, AECK & SARGENT'S ATTEMPT TO HUMANIZE LABORATORIES IN NEW YORK CITY'S AARON DIAMOND AIDS RESEARCH CENTER. THE JURY ALSO RECOGNIZED A HOSPITAL AND A SCHOOL ADDITION FOR THEIR CLEAN LINES AND DISCRETE VOLUMES. NIX MANN & ASSOCIATES' WOMEN'S PAVILION, A 54,000-SQUARE-FOOT ADDITION TO THE GWINNETT MEDICAL CENTER, SEPARATES AN EDUCATION FACILITY AND CLINICAL FUNCTIONS INTO A WEDGE-SHAPED SPACE AND CLUSTERED ORTHOGONAL BUILDINGS. THE ATLANTA INTERNATIONAL SCHOOL, BY NIX MANN VIEHMAN ARCHITECTS, HOUSES THE PRINCIPAL'S OFFICE IN A SEMICIRCULAR FORM, ESTABLISHES CIRCULATION IN AN ELONGATED GLASS BOX, AND CREATES A STUDENT AREA IN A TRIANGULAR BALCONY.

FOR ITS SUCCESS AT MAKING LEARNING ABOUT SCIENCE AN ADVENTURE, ATLANTA'S SCITREK MUSEUM, BY ROSSER FABRAP INTERNATIONAL, RECEIVED A MERIT AWARD, WHILE SMITH DALIA ARCHITECTS EARNED RECOGNITION FOR ITS MINIMALIST CONVERSION OF A MASONRY WAREHOUSE INTO A RESIDENCE. THE JURY ALSO HONORED ATLANTA ARCHITECTS JOSEPH AMISANO AND JEFFREY WIERENGA IN THE ARCHITECT AS ARTIST CATEGORY, AND HEERY INTERNATIONAL FOR ITS 1996 OLYMPIC GAMES FACILITY PLANNING.

—K.S.



**Aaron Diamond AIDS Research Center  
New York City  
Lord, Aeck & Sargent, Architects**



**Wineman Cabin  
Jasper, Georgia  
Lord, Aeck & Sargent, Architects**

**Award for Excellence in Architecture (below, left and right)  
Mt. Carmel Elementary School  
Douglas County, Georgia  
Lord, Aeck & Sargent, Architects**

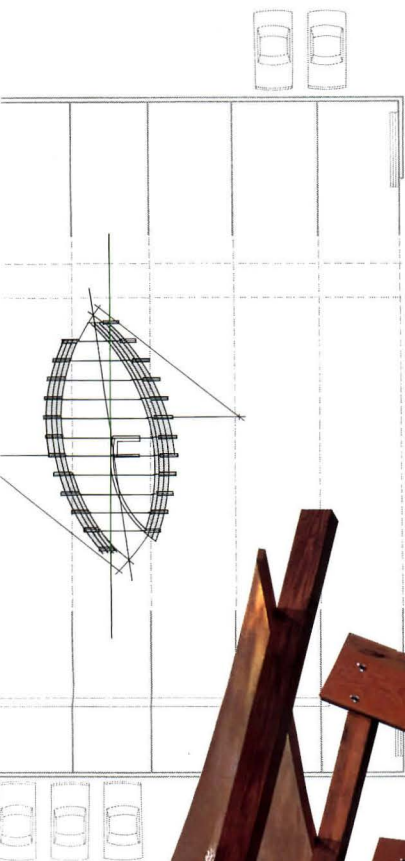




# ARCHITECTURE

## C O L O R   A N D   M A T E R I A L S

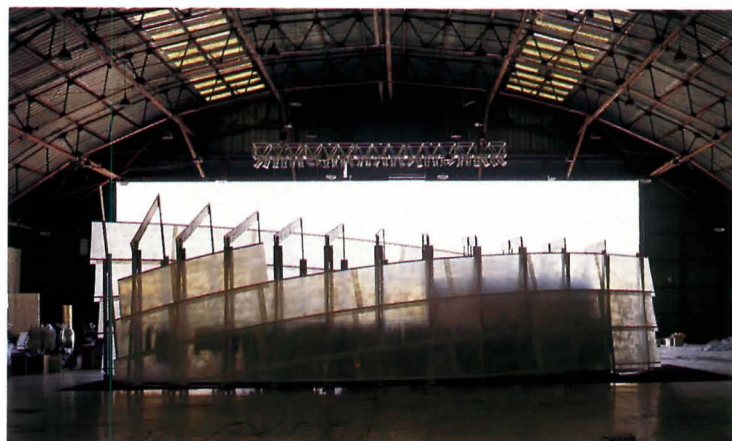
MODERNISM IS BACK. BUT ARCHITECTS HAVEN'T QUITE FORSAKEN Postmodernism's more colorful side. Today's minimalism is a kinder, gentler abstraction than that of decades past, softened by polychromatic palettes and sensuous textures. The projects highlighted in this issue reflect this peculiarly '90s sensibility—an attention to detail and quality without the budgetary and material excesses of the previous decade. This approach, claims Los Angeles designer Franklin D. Israel, is particularly appropriate in today's grim economic climate. Israel and the other architects featured in this issue take advantage of the inherent texture and color of inexpensive materials, proving that shoestring budgets and high design are not mutually exclusive. One example is Israel's temporary showroom crafted of timber and fiberglass (left and below), and a trio of the designer's more substantial projects illustrates his diverse material palette (right). Architects capitalizing on this new materiality reflect a geographical variety as pluralistic as today's architectural climate—evident in our collection of projects from Orlando, Florida, to Portland, Oregon. For those looking to enrich their designs through materials and colors, we offer advice on working with color consultants, specifying plaster finishes, and collaborating with a craftsman to create architectural glass. ■



# Material World

"OUR PROJECTS COME TO US AS UNWANTED orphans," says Frank Israel, perhaps disingenuously, of the four cheap-but-chic projects he recently completed in Los Angeles. "But we work inventively with low-cost materials to give our clients something more." Tight budgets, spatial constraints, and high design demands are common among commissions in the glamorous and moneyed design/film-production world of Hollywood and Beverly Hills. Such conditions are familiar to Israel, who, after a stint designing sets for Paramount, has worked mainly for members of the Los Angeles film community since the early 1980s. Israel, who trained in architecture at the University of Pennsylvania, Yale, and Columbia, apprenticed in several New York architectural offices, and won a Rome Prize in 1973, has mastered the art of fabricating a silk purse from a sow's ear. Inexpensive materials, combined with an inventive use of texture, color, and detail, give a surprising impression of luxury and have become the trademarks of Israel's work.

One of Israel's most recent designs—a temporary boutique of timber and fiberglass built in the Santa Monica airport for an AIDS benefit (these pages)—best encapsulates the prevailing themes in Israel's work: a clearly expressed, constructivist approach to structure; a formality in planning; and an assiduous, lavish attention to surface, joint, and junction. In this diaphanous little pavilion, Israel's pearlized fiberglass evinces the same feel for texture and color that he first achieved in the sensuously plastered Gillette Studio, a New York loft renovation completed in 1982. His constructivist approach to structure and his emphasis on linkage of parts—clearly apparent in his stuccoed 1988 addition to the Lamy/Newton Residence in Hancock Park—are evoked again in the timber of the Santa Monica structure. He first paid homage to the construction possibilities of this material in the four pavilions he designed, also in 1988, to open the "Architecture Tomorrow" series at the Walker Art



## Divine Design Boutique Santa Monica, California

**For the Divine Design AIDS Benefit held at a hangar of the Santa Monica Airport last September, Israel designed a temporary clothing showroom at a cost of \$8,000. Recalling the fish designs of Frank Gehry, the structure is based upon the formal relationship of the pavilion to its hangar host. Curved panels of sandblasted fiberglass with the diaphanous quality of a moth's wing are attached to a clearly-defined, exposed timber structure. The vertical struts of this sculptural form in turn support shelving for displaying clothing donated by noted designers.**

**ARCHITECT:** Franklin D. Israel Design Associates, Beverly Hills, California—Franklin D. Israel (principal-in-charge); Danny Kaplan (project architects); Lindy Roy (drawings)  
**GENERAL CONTRACTOR:** On Stage  
**COST:** \$8,000  
**PHOTOGRAPHER:** Grant Mudford



Center in Minneapolis. And the controlled plan and form of the temporary boutique were similarly expressed in Israel's 1990 rehabilitation of the Charles Eames studio in Venice for its current occupants, the design consultant firm of Bright & Associates.

The temporary pavilion in the Santa Monica airport harnesses these themes—constructivism, attention to detail, formality of plan—into a single entity without environmental or site constraints: a tight and satisfying architectural object. Israel's larger and more permanent projects, usually renovations, embody similar qualities, often in tension with an existing building shell. The Tisch/Avnet Production Studios, completed last year, is an example of the latter; its new entry shatters any links with its Postmodern host and draws the visitor into a cacophony of unusual architectural compositions.

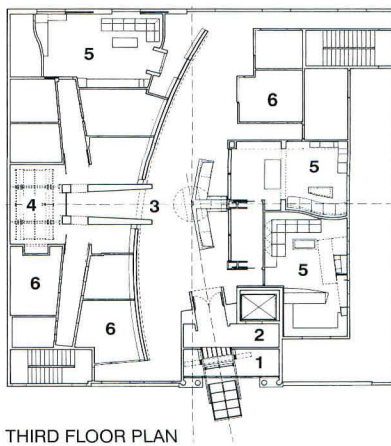
In a stuccoed office building on a side street off busy Venice Boulevard, steel beams thrust through a glass facade to support a canopy that is slightly off-kilter with the street, subtly reorienting the entrance of the building toward the main boulevard. This detail is more than merely iconoclastic gesture; it literally and visually draws the visitor into a formal architectural progression that ends dramatically under an oculus in Tisch/Avnet's third-floor reception area.

Inside the building, the canopy's steel supports become part of a 37-foot-high structure that resembles an upturned draw-bridge (photos, facing page). Projecting vertically from the first to the third floor, the bridge forms the back of a polished plywood bench that juts off a third-floor balcony. The elements of this dramatic entry appear to blast through the space, yet each is wrought with infinite care. A terra-cotta-colored steel frame, of which every joint and bolt is extruded for heightened effect, collides with a yellow, freestanding, stuccoed partition. The steel frame eventually connects to the solid plywood of the bench, which, in turn, meets a frosted glass floor panel (photos, right).

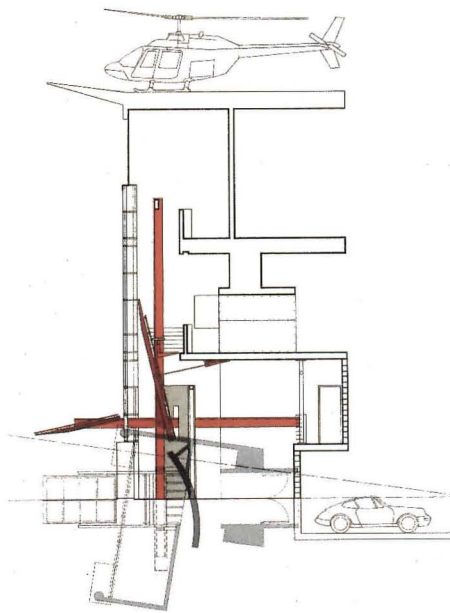
This theatrical sense of arrival leads to the reception area of the film production company's newly converted offices. The deep, curving space with lilac plastered wall, off-white ceiling, and starlike spotlights, stretches the depth of the building. But its focus is its center, where circulation axes, reception desk, and daylight from a circular skylight dramatically converge.

When discussing his work, Israel emphasizes the clearly defined connections among discordant elements. "Unlike the work of my

**A steel canopy at the entrance to the Tisch/Avnet offices (facing page, top left) pierces the glass-walled entrance as it extends inside. In the lobby (facing page, bottom), the beams form a hinge for a lifted draw-bridge, which extends to the third floor to form the back of a plywood bench (top). View from lobby looking up at third-level glass floor (center right) reveals colliding textures and forms. Reception area represents a culmination of circulation axes (plan).**



- 1 ENTRANCE
- 2 FOYER
- 3 RECEPTION
- 4 CONFERENCE ROOM
- 5 EXECUTIVE SUITE
- 6 OFFICE



**Tisch/Avnet Production Studios  
Venice, California**

The trademark colors and materials of Frank Israel's work are fully evident in the Tisch/Avnet film production headquarters in Venice, housed in a four-story Postmodern office building. Redirecting attention from the host building's arched window, Israel—who is fond of clearly separating old from new—created a strident glass-and-steel canopy (top left) that penetrates the glass facade and pulls the visitor into a progression of dramatic architectural events. Israel employed terra-cotta red and mustard yellow to great effect in his 1990 renovation of the Eames studios for Bright & Associates design consultants. At Tisch/Avnet, these colors, reminiscent of Italy, where Israel has studied, ornament an abstract structure comprising a steel frame, freestanding plaster wall, and upturned "drawbridge" that extends to the third story (section). The wood-and-steel bridge both supports and defines a polished wood seat extending from a balcony outside the client's third-floor offices (facing page, top). At the foot of the bench is a translucent floor composed of panels of frosted glass. The open, piazzalike reception area is defined by a plastered, curved wall, behind which are executive offices (plan, facing page). This "Main Street" creates a microcosm of urban activity, where every glance captures some lovingly wrought, carefully detailed, and highly personalized event. To create rich-looking panels that ornament doorways, the designer stacked layers of ordinary glass in a steel casing to create a muted, greenish glow. Israel, who likes his materials to compete for attention, conjured a rich brew of lustrous plasters, diaphanous panes of frosted glass and fiberglass, sturdy Douglas fir furniture, cherrywood cabinets, and burnished steel walls for the production company.

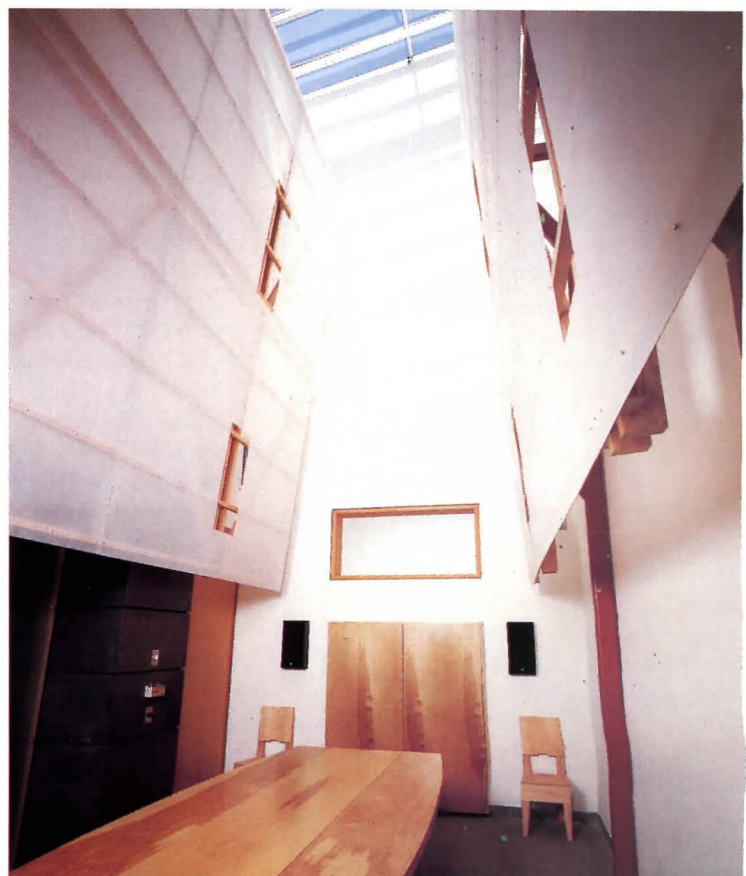


**ARCHITECT:** Franklin D. Israel Design Associates, Beverly Hills, California—Franklin D. Israel (principal-in-charge); Thomas Rael (project architect); H. Seth Rosenthal, Steven S. Shortridge, James Simeo (design team); Lindy Roy (drawings)  
**ENGINEERS:** Davis Design Group (structural); Mel Bilow & Associates (mechanical); Silver Engineering (electrical)  
**CONSULTANTS:** Cameron McNall (lighting); Dullweber (cabinetry); Steve Foster (plaster artist)  
**GENERAL CONTRACTOR:** Woods Construction  
**COST:** Withheld at owner's request  
**PHOTOGRAPHER:** Tom Bonner



**A pair of walls wrapped in steel juts from stucco curved wall in the reception area (top). Circulation axes, an oculus, and reception desk converge in the center of the third-floor suite (right). Office cabinet (facing page, top) is detailed in cherry to resemble masonry. Between door surround and frame, layers of stacked glass emit a green translucence (facing page, bottom left). In conference room, fiberglass "fin" walls slant inwards toward an all-glass ceiling (facing page, bottom right).**





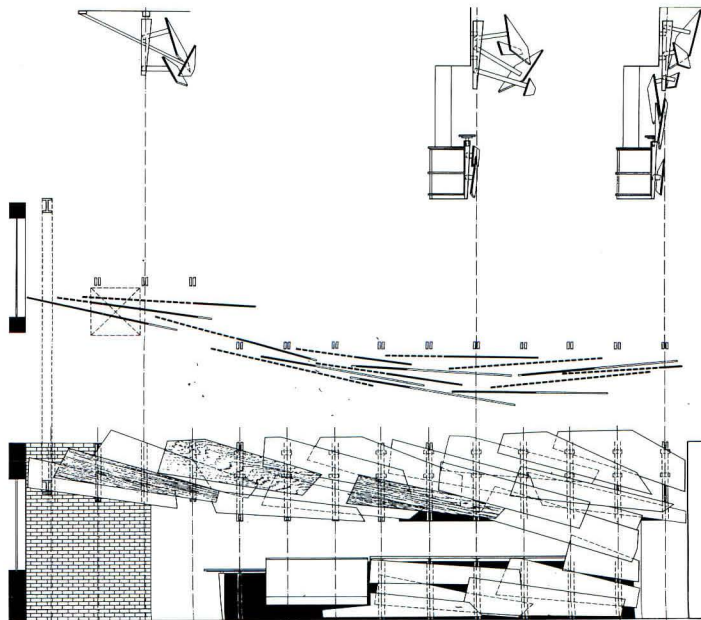
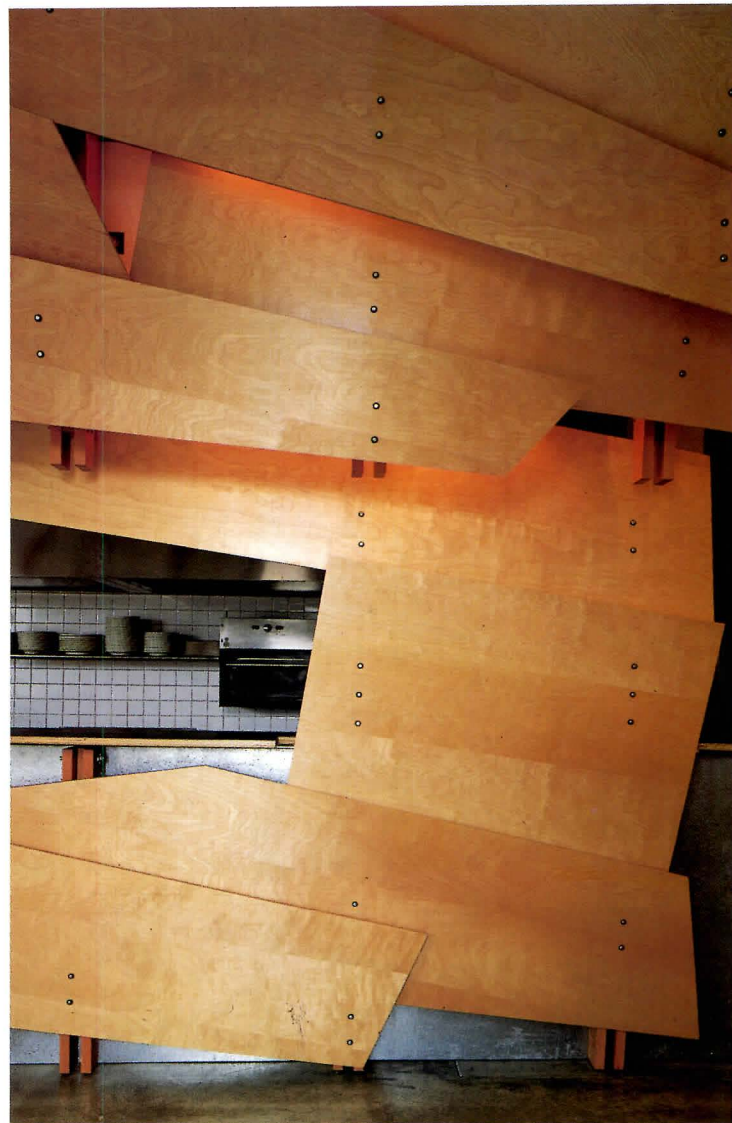
Los Angeles colleagues, juxtaposition of elements occurs not through the collision of forms, but linkages in details." An example of his approach is Tisch/Avnet's reception area; a wall of glass panels hung on clearly-expressed studs that face a curving, truncated, pigmented, plastered wall. In turn, this wall is ruptured by a pair of thick walls that look like granite, but are actually simple framing wrapped in stacked steel panels. These walls, separated from the curved wall by a vertical slot of sandblasted, backlit glass, plunge the visitor into the heart of the complex. Each director's office is individualized by colored plastered walls, custom-designed light fittings, and, in certain instances, a special Israel detail: a panel composed of 1/4-inch strips of ordinary glass stacked in a steel casing, which magically appears a watery sea-green.

In the conference room with its glass ceiling, walls of sandblasted fiberglass with the texture and lightness of Japanese rice paper funnel upward, directing the eye toward the blue sky above. "The light in the conference room," Israel explains, "comes from above through a newly constructed skylight. The fiberglass 'fin' walls on each side of this room pinch into one another, modulating the light and toning the walls of the room with a greenish glow."

In Israel's recently completed renovation of the Speedway Cafe in Venice, a similar juxtaposition of color and materials creates the appearance of quality on a shoestring budget. Sheet metal is literally wrapped like giftwrap around windows, door frames, and baseboards; the concrete floor is polished to a luster; existing steel frame, joints, and bolts are painted terra-cotta red; and the original brick wall is exposed. Israel's textural side-show juxtaposes the archaeology of the original building with new yellow stucco and industrial materials. And, in one dramatic splash, tension is added to the essentially simple, latter-day diner: a dynamically layered assembly of Douglas fir panels runs the length of the counter and tapers to the back of the room in a breathless evocation of a motor speedway.

All this attention to lovingly crafted detail, all this juxtaposition of elements, almost (but not quite) distracts from the pleasingly clear and direct plans of Israel's projects. The temporary boutique and the Speedway restaurant direct customers through a clear processional. In the Tisch/Avnet office, the reception area is essentially a "piazza," an open communal space which gives way, in a manner similar to Israel's 1990 rearrangement of the

**Israel's bare-bones approach to design is evident in the extruded screws that attach the layered plywood assemblage screening the grill in his Speedway Cafe (top). The building, one of the oldest in the Los Angeles area, reveals the designer's appreciation for textures in its smooth metal walls (facing page, top), unfinished original brick, and polished concrete floor (facing page, bottom). Drawing (right) reveals spatial tension through layering of simple materials.**





**Speedway Cafe**  
Venice, California

Recently opened near the boardwalk in Venice, Speedway Cafe is the first vernacular Los Angeles building that Israel has tackled. Despite obvious allusions to the much-loved Los Angeles diner, the simplicity and sophistication in this very low-budget project reveal the designer's continuing source of inspiration—Carlo Scarpa's insertion of new into old. Israel left a patch of the brick shell of the existing building bare on one wall of the interior, providing both an archaeological reference and a fortuitous textural effect, which contrasts sharply with the plain white walls and galvanized-metal sheeting that boldly delineates windows, door frames, and baseboards. An original poured-in-place concrete window was also left standing, affording an opening to a patio. Spartan purity is carried through to the burnished concrete floors and the furniture, a combination of stacking Eames chairs and custom-designed tables. A certain logic underlies Israel's color palette; he has highlighted the old—the building's seismic steel structural frame and bolts—with terracotta red, to sympathize with the exposed brick. The new—a stuccoed exterior—is rendered in mustard yellow with galvanized metal around the windows. The California-style building-as-sign imagery and clean European lines give way to one dramatic gesture: an abstract sculptural sheath of layered, angled birch-veneer plywood panels suspended above the room. Though constructed with a clear rationale—each panel is clearly bolted to Douglas fir supports at 3-foot intervals—the piece is dynamic and unsettling. Concealing the kitchen grill from view, the assembly tapers toward the back of the quiet little cafe in a headlong rush that clearly evokes the imagery of a motor speedway. In its combination of rawness, sophistication, and eclecticism, this restaurant renovation is an architectural equivalent of California cuisine.

**ARCHITECT:** Franklin D. Israel Design Associates, Beverly Hills, California—Franklin D. Israel (principal-in-charge); Steven S. Shortridge (project manager); Danny Kaplan (project architect); Christian Lynch (project team); Lindy Roy (drawings)  
**ENGINEERS:** Joseph Perazelli (structural)  
**CONSULTANT:** Phil Garner (automobile art)  
**GENERAL CONTRACTOR:** KT Furniture  
**COST:** Withheld at owner's request  
**PHOTOGRAPHER:** Grant Mudford



Eames studio, onto narrower “streets” with vistas. “I perceive the work space as a city within,” he explains. Through this concept, I try to capture the feeling that Los Angeles is not a discernable whole. Like London, it is a composite of separate cities.”

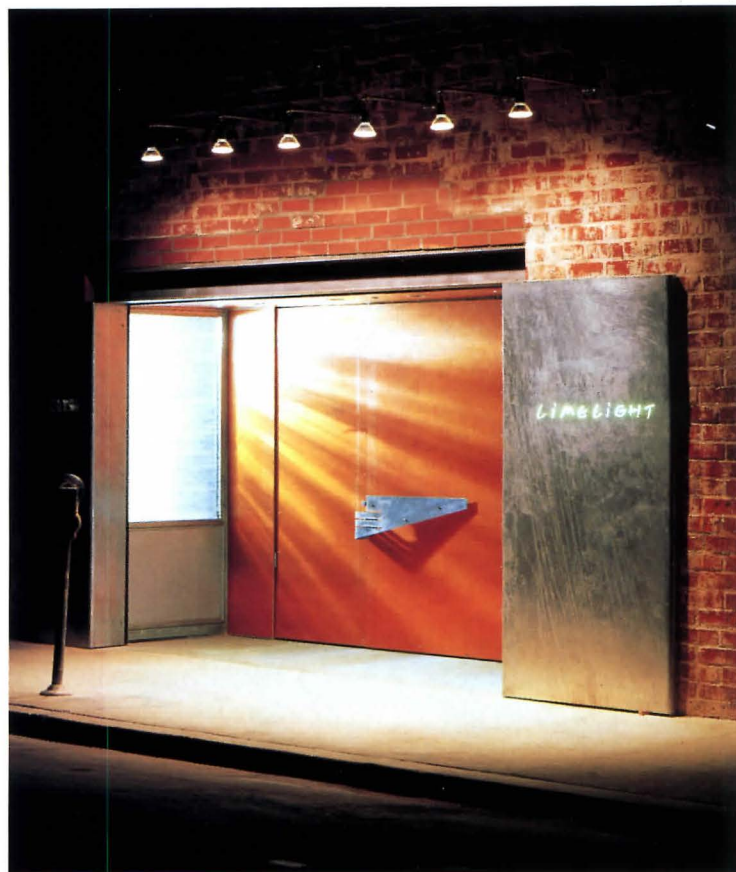
Israel most recently applied this notion of the office as microcity to the headquarters for Limelight Productions, a TV and video production company that has traded in its bungalow court location for a new “village” of offices within an old warehouse in Hollywood. A “main street” entrance with “streetside” reception, kitchen, and offices opens onto a large open “piazza” of workstations—reminiscent of Frank Lloyd Wright’s office arrangements for the Johnson Wax headquarters in Wisconsin. Drawing from his palette of textures and details, Israel adds a series of urban incidents to Limelight’s colorful plan. A shaft of blue plaster along the main corridor focuses attention down the “street,” while a cascade of light radiates from a sculptured wall of fiberglass panels. “I think about what’s inside a wall,” notes Israel. “The color and texture of the surface gives the viewer clues as to what’s within it.” Lights and workstations are custom-designed, some robustly sculptural, some capturing the filigree lightness of insects’ wings. Stainless steel baseboards and Israel’s ubiquitous dyes, stains, and paints are applied to inexpensive concrete, plaster, gypsum wallboards, and steel to create a rich, if somber, range of blues, yellows, and pale greens.

Israel claims that his approach is particularly appropriate in today’s recession, and his attention to craft and material is indeed edifying in this era of renewed concern for quality—which he identifies as a ’90s sensibility. But his inventive use of low-budget materials and exuberant color clearly evolve from his 1980s projects. In addition to architectural references—Frank Gehry’s fish forms in the AIDS benefit structure, Luis Barragan’s planar walls in the Gillette Studio, Carlo Scarpa’s crafted metal details in the Altman residence—Israel manages to combine the formal discipline of his Ivy League/Rome Academy training with an Angeleno’s taste for the ad hoc and bizarre. The results are an intriguing blend of qualities: dynamic and robust, bold and subtle, comfortable and unsettling, formal and frivolous, in work that invariably carries the stamp of a designer who is master of many media. ■

—FRANCES ANDERTON

*Frances Anderton is the editor of LA Architect.*

**Limelight’s logo appears to be hand-cut into the heavy steel doors at the production studio’s entrance (top). Layers of sandblasted glass (right) admit muted light into lobby and conference area. The layout of the office is based on a city plan, with connecting streets, shops, squares, and alleys. Kitchen is off “Main Street” (facing page, top), which is demarcated by a wall of fiberglass-filtered light. Leather and wood banquette (facing page, bottom) is positioned nearby in waiting area.**



**Limelight Productions**  
Hollywood, California

Despite budgetary constraints, frequent difficulties with clients, contractors, and planners, many Los Angeles architects are designing every aspect of an environment down to the smallest screw. Israel and several others working in this manner are renewing respect for materials, craftsmanship, and the sheer joy of building. "Limelight," the logo of this newly renovated production studio, appears to be hand-carved (it's actually cut by laser) into the heavy, burnished-steel door of a warehouse in Hollywood. As in the Tisch/Avnet offices, Israel designed a spectacular sea-green panel of glass, composed of layers of ordinary 1/4-inch glass in a steel frame to cast a delicate glow to the left of the doorway. Inside, in a manner tried and tested in his 1988 Propaganda Film Studios in Hollywood and in his 1990 renovation of the Eames studio for Bright & Associates, Israel clearly defined a microcosm of "streets," "shops" (offices and other ancillary facilities), "squares" (communal work space), and "alleys" (hallways) leading to private offices. The studio is also a gallery of unique architectural moments, achieved through an inventive but judicious use of inexpensive lumber and plywood, concrete, steel, other industrial materials, and color. The visitor is greeted by a long entrance arcade, canopied by a startling blue plastered structure along which the designer placed conference rooms and public spaces. The procession continues past the reception desk, a slash of timber clad in steel; to the kitchen, where a stud wall becomes a bench, upholstered in terra-cotta red; past a wall of light, filtered through carved and bent panels of fiberglass; into an open space where custom-designed wooden workstations stand as sculptures in a daylight workspace reminiscent of Wright's Johnson Wax building.

**ARCHITECT:** Franklin D. Israel Design Associates, Beverly Hills, California—Franklin D. Israel (principal-in-charge); Annie Chu (project architect); Barbara Callas, Joseph Holsen, Danny Kaplan, James Simeo (design team); Lindy Roy (drawings)

**ENGINEERS:** Davis Design Group (structural); STI Engineering (mechanical); G&W Electrical Consultants (electrical)

**CONSULTANTS:** Saul Goldin (lighting); Paul Fortune (interiors)

**GENERAL CONTRACTOR:** The Dunn Company

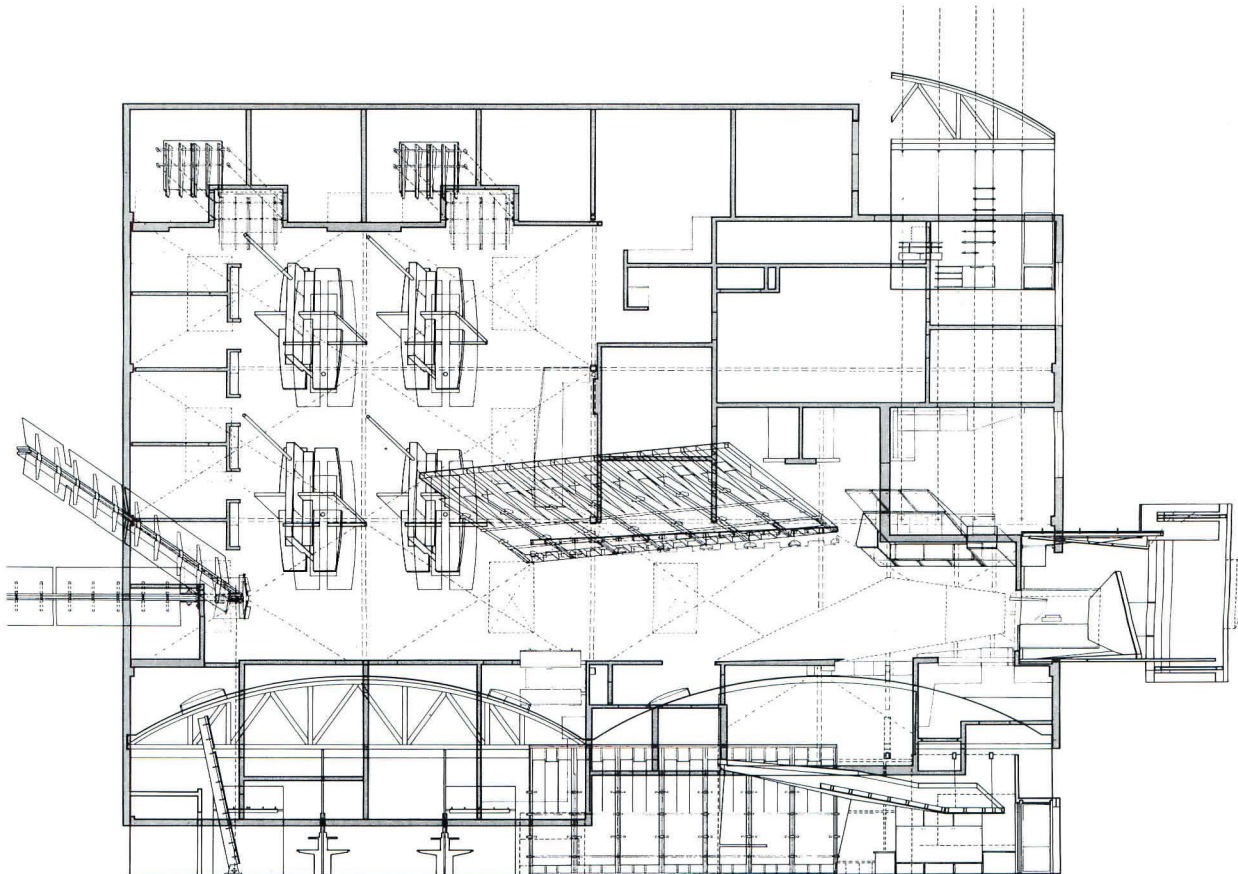
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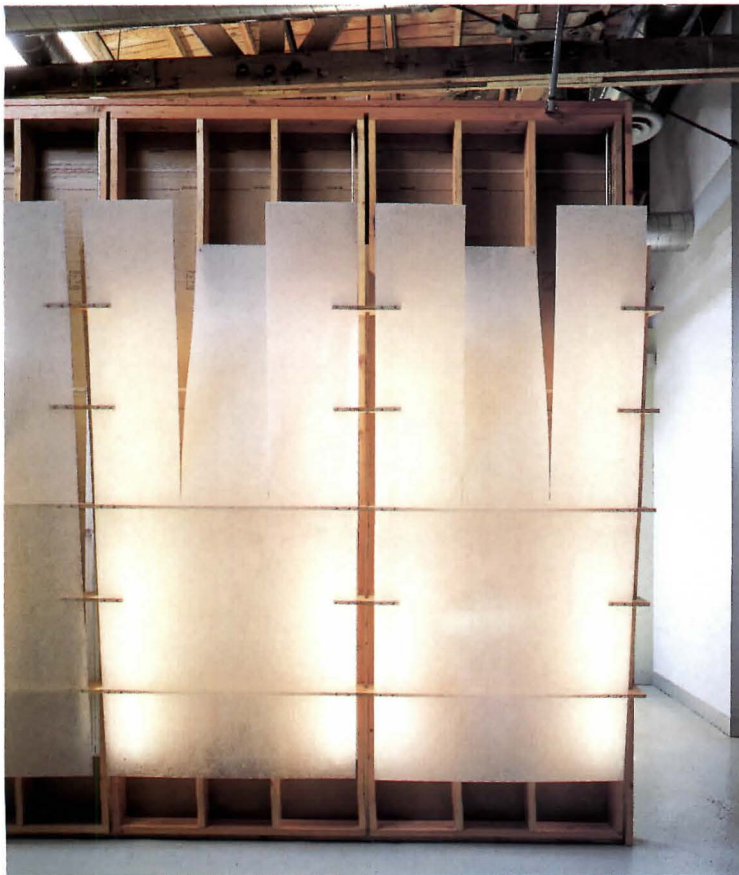
**PHOTOGRAPHER:** Grant Mudford





**Production area features freestanding fiberglass screen wall and birch plywood workstations (top). Limelight's executive office (facing page, top left) and conference room (facing page, top right) include custom furniture, such as a glass-on-laminated-plywood conference table. Details of fiberglass light wall along entry corridor (facing page, bottom left) and plywood and aluminum workstation (facing page, bottom right) reveal Israel's esthetic: inexpensive materials, abstract forms.**







# Of the Land

THE MINNESOTA VALLEY NATIONAL WILDLIFE Refuge follows the Minnesota River for more than 20 miles, winding through wetlands, farmlands, and suburban sprawl before it meets the Mississippi River on the southern border of the Twin Cities. One of only four urban wildlife preserves in the country, this 8,000-acre greenbelt boasts a new interpretive center designed by local architect Ellerbe Becket for the U.S. Fish and Wildlife Service. To encourage visitor attendance, the federal agency located the Wildlife Interpretive Center 12 miles from downtown Minneapolis. The building's 11-acre site is assembled from several former residential parcels; it is bordered on the north by an airport and an interstate highway, on the west by mid-rise office buildings and hotels, and on the south and east by the river valley.

"I didn't want to build a stereotypical nature center, the log cabin in the woods, when I had a freeway and suburbs right next to the site," explains project architect Karl Ermanis. Accordingly, Ermanis arranged the 35,000-square-foot facility as a series of long, low wings crowned with irregular shed roofs and clad in varied materials. With an almost naive exuberance, the architect applied a range of colors, from dark and light green to ochre to deep red, to accentuate the disparate

volumes of his picturesque composition and differentiate the functions housed within the interpretive center.

Ermanis describes the imagery of the center as an "abstraction of rural southern Minnesota buildings," and his variegated ensemble of forms and materials defies a single metaphor or stylistic antecedent. In addition to drawing upon the region's indigenous stone, Ermanis chose a range of contemporary building materials, including burnished concrete block, stucco, stained-wood planks and shakes, metal panel systems, and terne-

**The interpretive center mediates between suburbia and the wetlands of the Minnesota River (below). The facility's service entrance to the west (facing page) received the same attention to detail as the north-facing main public elevation (above).**



**Wildlife Interpretive Center  
Bloomington, Minnesota  
Ellerbe Becket**





coated metal roofing. The architect capitalized on the inherent texture and color of these low-cost materials, enhancing their intersections through careful attention to detail. Although the polychromatic building is bold, the architect's palette is no more vivid than the colors of Minnesota's fall foliage. Indeed, with its stepped section, native stone, and exterior courtyard, the facility follows Frank Lloyd Wright's dictum for a building to be "of the land."

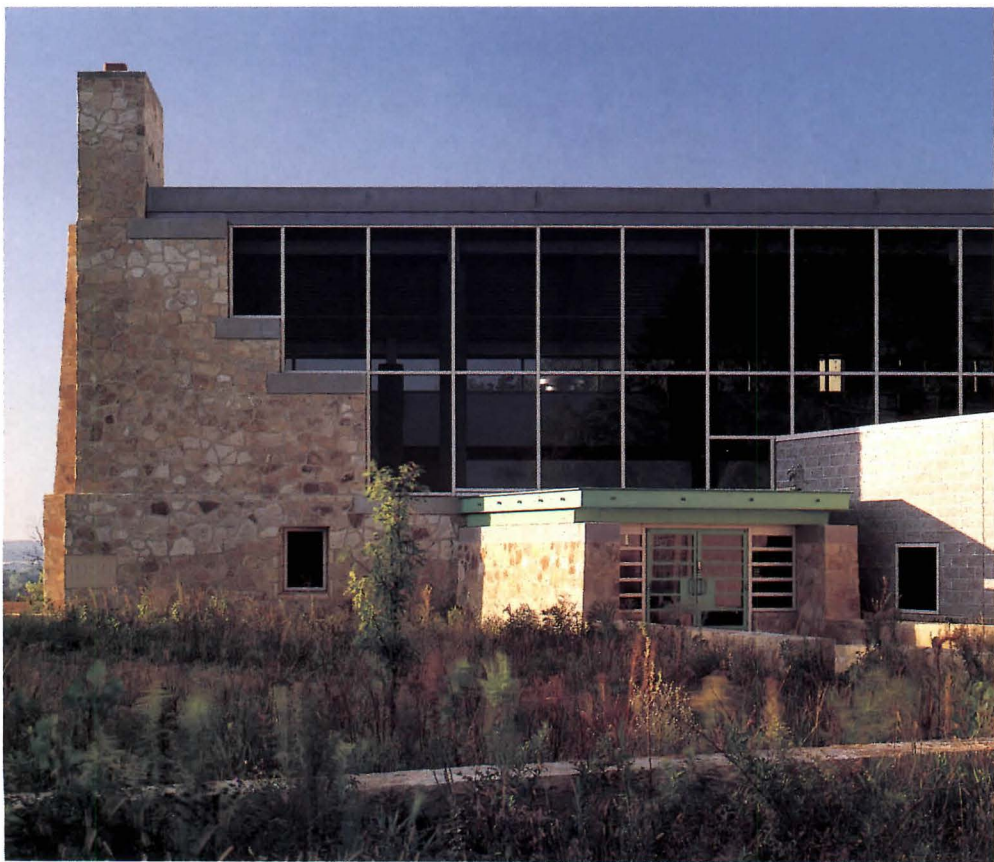
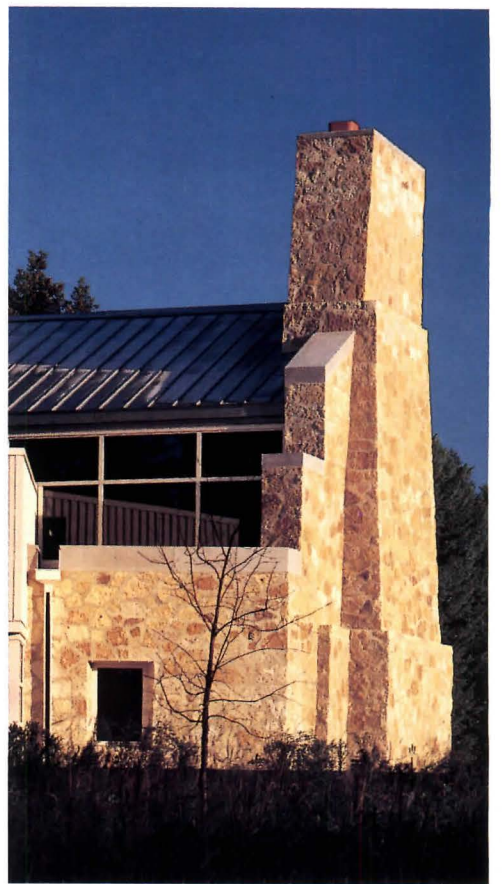
Crucial to the success of the facility is its siting, which responds to internal functions and the topography. To reduce the apparent bulk of the building, Ermanis broke the complex into a highly articulated composition that appears like a collection of ancillary farm structures set along the river bluff. In addition, he created a series of earthen berms to camouflage parking and service areas. He oriented the building along an east-west circulation spine to create a wall that defines an edge between commercial development to the northwest and the natural features to the south. Paying careful attention to the placement of the building's small windows and expansive glazing, the architect screened views of nearby suburban sprawl and took advantage of selected panoramas.

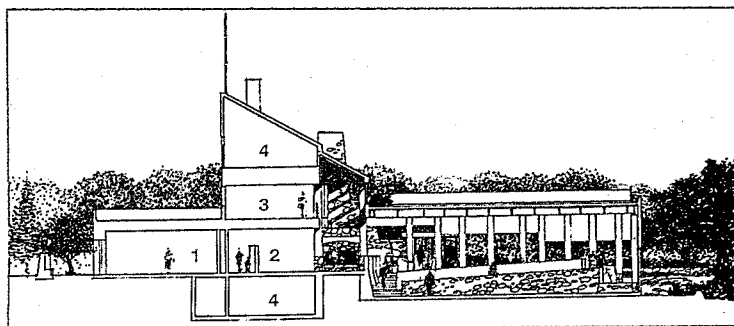
The goal of the interpretative center is to reintroduce the public to the wonders of nature. The facility's 125-car visitor parking lot has therefore been relegated to the outer edge of the site to encourage use of the refuge's elaborate trail system, which leads to an observation deck designed by the architect. But for those visitors heading straight for the center, a prominent Kasota limestone chimney and base anchoring the east end of the building signal the main entrance.

Within this stone formation, Ermanis created a hearth room, which is dominated by a limestone fireplace crowned by a rough-hewn wood mantel and ringed with cushioned benches. Although this symbolic heart of the building may allude to Wright's work, the main 7,800-square-foot exhibition hall is more reminiscent of the interiors of Alvar Aalto, who mastered the manipulation of light in northern climates. Facing south, with expansive windows that take in views of the refuge, the fan-shaped gallery steps down over four platforms to echo the flow of the river and respond to the slope of the site. A north-facing clerestory brings in additional natural light to the circulation spine and exhibition space beyond. Working with The Burdick Group, a San Francisco-based exhi-

**The center's courtyard features a working model of the river's lock system (above). A towering stone chimney (facing page, top left and right) anchors the east end of the structure. The main entrance is housed in a one-story pavilion (facing page, bottom right), its doorway accented with bright green detailing (facing page, bottom left).**

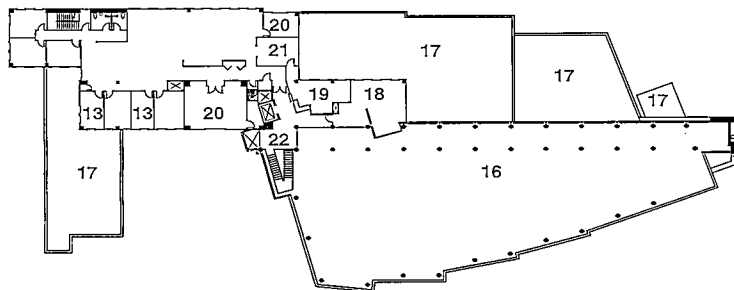




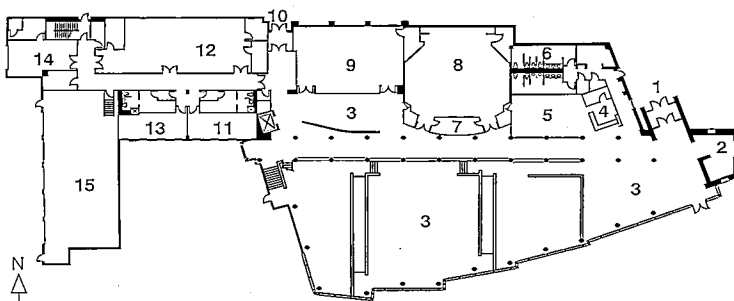


NORTH-SOUTH SECTION

- 1 CLASSROOMS
- 2 TEMPORARY EXHIBITS
- 3 ADMINISTRATION
- 4 MECHANICAL



SECOND FLOOR



GROUND FLOOR

- |                     |                           |
|---------------------|---------------------------|
| 1 MAIN ENTRANCE     | 12 STORAGE                |
| 2 HEARTH ROOM       | 13 OFFICE                 |
| 3 EXHIBIT AREA      | 14 RECEIVING              |
| 4 INFORMATION       | 15 MAINTENANCE GARAGE     |
| 5 BOOKSTORE         | 16 OPEN TO EXHIBITS BELOW |
| 6 REST ROOM         | 17 ROOF                   |
| 7 PROJECTION ROOM   | 18 RESOURCE LIBRARY       |
| 8 AUDITORIUM        | 19 RECEPTION              |
| 9 CLASSROOMS        | 20 CONFERENCE ROOM        |
| 10 STAFF ENTRANCE   | 21 WORKROOM               |
| 11 STAFF BREAK ROOM | 22 WAITING AREA           |

bition design firm, the Ellerbe Becket team developed a system of flexible, freestanding displays with electrical and mechanical support systems concealed beneath crafted wooden floor panels.

To the north of the main circulation axis on the ground level, the architects located the center's other main public spaces: a 125-seat auditorium, community meeting rooms, and a comprehensive nature bookstore. A dark-green volume with a steep roof line that peaks above the complex houses the administrative wing, with second-floor offices for the 27-person staff that oversees the refuge. The wing also contains a library, reading room, and mechanical systems that are tucked into the attic.

Ermanis and his team paid careful attention to every elevation, even to the service entrance and loading dock that anchor the western edge of the facility. These utilitarian functions (including storage and maintenance) are housed in a low-lying block clad in white metal panels that is positioned perpendicular to the main structure. This arrangement creates an exterior courtyard, visible from the exhibition hall, where wildlife agents have installed a working dam system that replicates the locks of the nearby river.

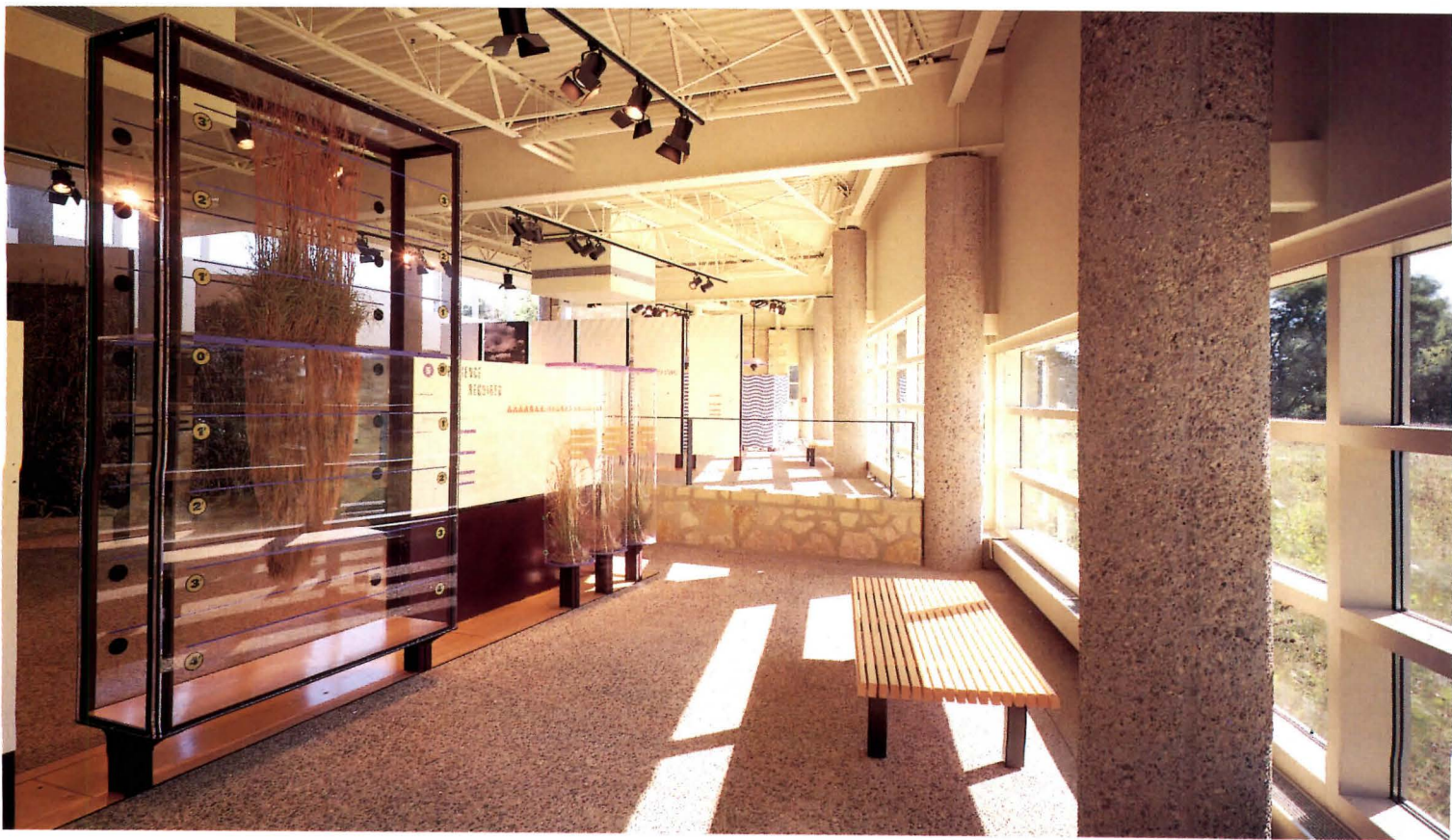
A new landmark in an ambitious program to preserve the Minnesota Valley Wildlife Refuge, the interpretative center bridges natural and manmade elements to achieve a surface richness and variegated profile despite its modest scale and low budget. Ellerbe Becket's colorful assemblage of forms mediates between contemporary influences and nostalgic recollections without losing its architectural balance.

—LYNN NESMITH

**WILDLIFE INTERPRETIVE CENTER  
BLOOMINGTON, MINNESOTA**

**CLIENT:** U.S. Fish and Wildlife Service  
**ARCHITECTS:** Ellerbe Becket, Minneapolis, Minnesota—Scott R. Berry (studio chief); Frank Brust (project manager); Karl Ermanis (project designer); John R. Tinkham (project architect); Gregory J. Kozulla, Patricia Pitcher, Gary Thompson, Gerald A. Voermans, Bradley Vokes (architectural team); Brian R. Johnson (interiors); Bryan Carlson, Dean M. Olson (landscape); James A. Fenlason (construction administrator)  
**ENGINEERS:** Ellerbe Becket—Clifford D. Ingles, Jack Sharkey, Doug Maust, Jerome Biedny, Jr., Mark Holden, Laurie Jones, Douglas J. Renier  
**CONSULTANTS:** The Burdick Group (exhibition design)  
**GENERAL CONTRACTOR:** Ar-Kay Construction  
**COST:** \$3.4 million—\$98/square foot  
**PHOTOGRAPHER:** Jeff Goldberg/Esto

The architects organized the center's functions along an east-west axis (plans and section). A second-floor reading room adjacent to a staff library juts into the main circulation path (facing page, top left), which terminates in the hearth room (facing page, top right). South-facing exhibition area is flooded with natural light (facing page, bottom).



# Seaworthy Spirit

IN OAKLAND, CALIFORNIA, ON A STRETCH OF waterfront dotted with old brick warehouses, industrial buildings, and a few modern commercial structures, stands a brightly painted, multimateriale office building. Its creators, Ace Architects of Oakland, call it a contextual design, and indeed the new spec office building seems no more out of place than its neighbors in the visual cacophony of the Bay. Since Ace was its own client for the building, which houses the firm's offices, the architects were free to choose whatever frame of reference intrigued them. They drew heavily on the nautical imagery of the setting for their inspiration; the building's odd juxtaposition of corrugated-metal and copper- and metal-clad volumes was inspired by the lore and romance of the sea.

For principal David Weingarten, contextual buildings need not mimic their next-door neighbors nor draw solely upon other architecture for ideas. "Most architecture is about other buildings, so one building ends up resembling another," he laments. "Architecture can be a lot richer than that." To prove his point, Weingarten and his partner, Lucia Howard, describe their building as a confrontation between a sea monster, a whale, and a battleship that is frozen in time and will never be resolved. "It's a battle of the Titans," says Weingarten, who clearly relishes the image. Howard visualizes the building in more concrete terms: as a telephoto view of the waterfront in which ships, cranes, and buildings have been compressed into a single image. The architects named their building

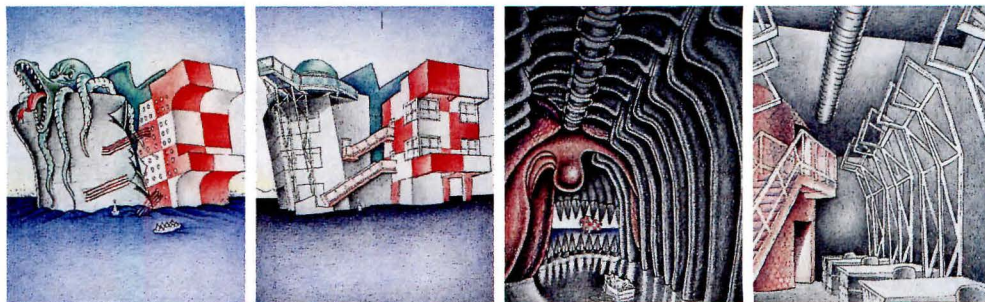
The Leviathan; to them, it represents an epic sea monster like Moby Dick.

Ace's architects carried out the nautical imagery that inspired them in both literal and metaphoric ways. The sea monster is rendered in green copper, its head is a dome atop the third story, and its spine comprises a pair of industrial skylights that march from front to back. The color of the dome is achieved by applying copper paint to a galvanized-metal silo top, which then oxidizes in the same manner that real copper would. The reptilelike scales that cover the monster's sides are asphalt-composite shingles clad with a thin layer of copper; oxidation is accelerated by applying a coat of acid.

Metal spandrel panels with concealed fasteners cover a curved volume along the northwest corner that gradually widens as it gets taller. Here, flush detailing between spandrels and windows creates a slick, continuous surface, much like the skin of a whale or a battleship. More sea imagery is reflected in the corrugated siding, which, Howard says, is reminiscent of cargo containers aboard ships; the red-and-white checkerboard pattern is borrowed from a nearby water tank. Standard aluminum windows are carefully detailed to align precisely with the color breaks in the panels.

The floor plan derives from the metaphorical concepts and conceits that shape the structure. Not surprisingly, spatial configurations do not conform to a standard office building layout of rectangular spaces defined by a grid of columns. Instead, window walls

**The Leviathan's imagery is described by Ace Architects as a collision between a sea monster covered in copper scales (facing page, top) and a ship covered in metal panels (facing page, bottom left). Checkerboard pattern of the corrugated-metal rear facade (facing page, bottom right) references cargo containers. Weingarten's sketches (left) translate allegory into reality.**



The Leviathan  
Oakland, California  
Ace Architects





slope upward, and curving forms intersect straight ones. The corridor that wraps the offices on the third floor, with its porthole windows and seaworthy lights, evokes an ocean liner deck; an industrial motif is achieved with finishes such as corrugated-metal ceiling panels and ribbed carpeting.

Howard and Weingarten describe their own two-story studio on the top floor as the belly of the beast. Galvanized nonstructural steel ribs march through the almost 30-foot-high room, which is finished in oriented-strand particleboard washed with a silvery-gray paint. Under the dome at the top front corner of the building, which the architects call “the brain,” copper plastic laminate is applied to cabinetwork; copper-colored blinds have been ordered for the windows.

Although the allegorical elements could have been too literally rendered, the architects have consistently applied materials and images throughout the 10,000-square-foot building to achieve an effect that is anything but slavish or silly. Massing, materials, and detailing produce both a visceral response and an intellectual stimulus, daring viewers to unravel the relationships between volumes.

The architects seem nonplussed by what they’ve wrought. “You couldn’t do this in

other parts of the Bay Area,” claims Weingarten, whose firm has gained a certain local notoriety for its quirky designs. “Oakland has no design review and no height limits; zoning is Texas-style. This was an opportunity to design something unique.”

Within the building’s transitional spaces, disparate elements intersect and create a rich and unexpected palette of textures and colors. Ace’s Leviathan may be a metaphysical monster, but it offers real lessons in the use of conventional materials to create anything but a conventional effect. ■

—SHARON LEE RYDER

*Sharon Lee Ryder is a San Francisco-based writer.*

**THE LEVIATHAN  
OAKLAND, CALIFORNIA**

**ARCHITECTS:** Ace Architects, Oakland, California—David Weingarten, Lucia Howard (principals-in-charge); Joel Miroglio, Keith Rivera, Dessa Rooney (design team)

**ENGINEERS:** Steven Tipping & Associates (structural); William Mah & Associates (mechanical); Zeiger Engineers (electrical)

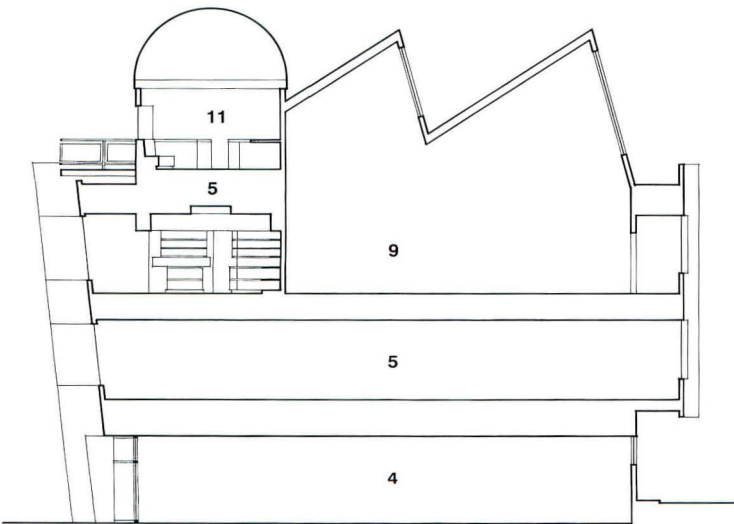
**CONTRACTORS:** Stokes, Russell, Hayden (general); PMC Roofing (metal siding)

**COST:** Withheld at owner’s request

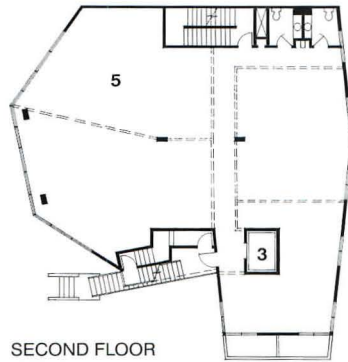
**PHOTOGRAPHY:** Alan Weintraub

**A galvanized-metal silo top and copper-covered shingles delineate the head (top left) and spine (top right) of the Oakland sea monster. Weingarten jokingly remarks that some people have hinted that he should jump off the third-story gang-plank (facing page).**

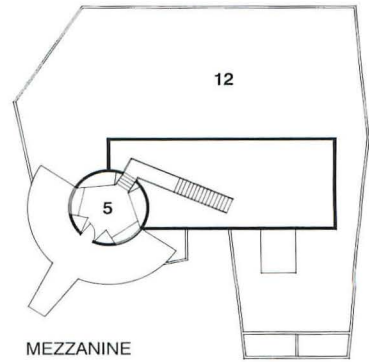




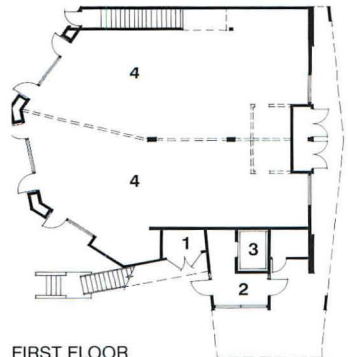
NORTH-SOUTH SECTION



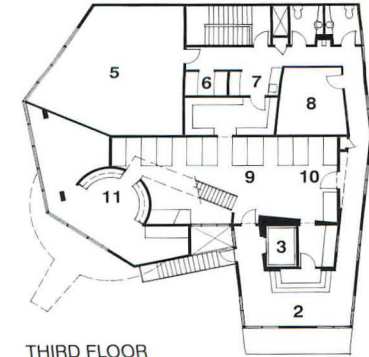
SECOND FLOOR



MEZZANINE



FIRST FLOOR



THIRD FLOOR

- |                   |              |
|-------------------|--------------|
| 1 OFFICE ENTRANCE | 7 KITCHEN    |
| 2 LOBBY           | 8 CONFERENCE |
| 3 ELEVATOR        | 9 STUDIO     |
| 4 RETAIL          | 10 GALLERY   |
| 5 OFFICES         | 11 LIBRARY   |
| 6 PRINT ROOM      | 12 ROOF      |





**A stair inside the two-story drafting room of Ace's own offices (above) leads to the building's "brain"—the library—under the dome (facing page, top right). Materials in the corridor outside the architects' offices (facing page, top left) mirror exterior's shingles and colors.**

Side 1 and i.e. Headquarters  
Portland, Oregon  
SERA Architects



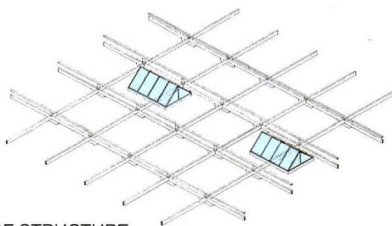
# Corporate Moves

WITH A TENSILE AIR SOLE IN ONE HAND AND a pink suede pump in the other, Vice President Ron Nelson leans back in his chair to explain Nike's latest venture. "Comfort and style," Nelson says simply of the shoes produced by the fitness giant's newest divisions, Side 1 and i.e. He might also be describing SERA Architects' design of his company's stylish offices in Portland, Oregon. Punctuated by curving planes of strandboard, jutting angles of steel, and milky white sand-blasted glass, the 23,000-square-foot renovation exudes an air of informality and the latest version of industrial chic.

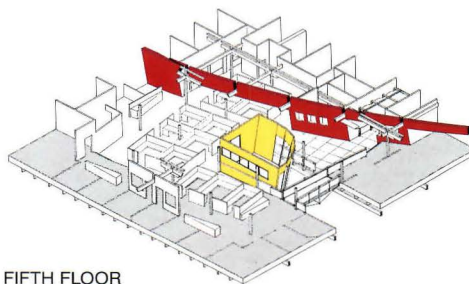
Although housed under one roof, Side 1 and i.e. cater to different segments of the growing women's sports market. First introduced in 1989, Side 1's line of fitness shoes and clothing conveys, in typical Nike fashion, a colorful and upbeat image. I.e., on the other hand, was founded in 1988 to create casual shoes that combine running-shoe comfort with leather-soled fashion.

Despite the different images of the two divisions, Nelson and his staff decided to unite the offices of Side 1 and i.e. on two floors of a dilapidated warehouse in Portland's Pearl District, a former industrial area that is rapidly becoming populated with lofts, art galleries, antique shops, and restaurants. This downtown location was chosen over Nike's corporate campus in Beaverton (ARCHITECTURE, June 1991, pages 58-65), Nelson explains, to encourage a more entrepreneurial environment for the start-up companies, which he contends will eclipse their competition—Reebok and L.A. Gear—in record time. "Our image is creative, not corporate," the V.P. maintains.

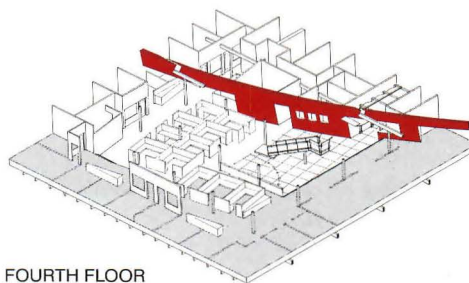
Nike's emphasis on design innovation allowed SERA Architects, a local firm known for preservation, to devise a bold alternative to the standard industrial loft renovation. Instead of concealing the eccentricities of the five-story warehouse, the architects worked within the landmark's constraints: a worn, timber-frame structure, irregular fenestration



ROOF STRUCTURE



FIFTH FLOOR



FOURTH FLOOR

**View from Side 1 offices to reception area and "lobby-horse" on fifth floor (facing page) reveals atrium staircase and corner of glass-enclosed conference room. Oriented strandboard wall (above and axonometrics) contains niches for product displays (above) and conceals support spaces.**



patterns, low ceilings, and large floor plates. To afford daylight and views within the offices, the architects elevated the floors on the east and south sides of the building so that the existing windows, positioned 5 feet above the slab, would be at a 3-foot viewing height. To compensate for the resulting variance in height between the two sides of the floors, they constructed a ramp that descends gradually from perimeter offices on the south and east to support spaces on the windowless north face and work areas on the west.

The most distinguished feature of the 1906 lumber warehouse is its sturdy structure of timber beams and columns, which SERA left exposed and whitewashed as a light-colored backdrop to new architectural elements. Varnished or polished to accentuate their rawness, the materials chosen by the architects underscore the industrial esthetic of the old building.

To link Side 1 on the fifth floor with i.e. on the fourth (the third floor is used for storage and production), SERA punctured the center of the loft with a double-height atrium topped by a skylight. Functions arranged around this open space follow the typical corporate layout of open workstations ringed by perimeter offices and a centrally located con-

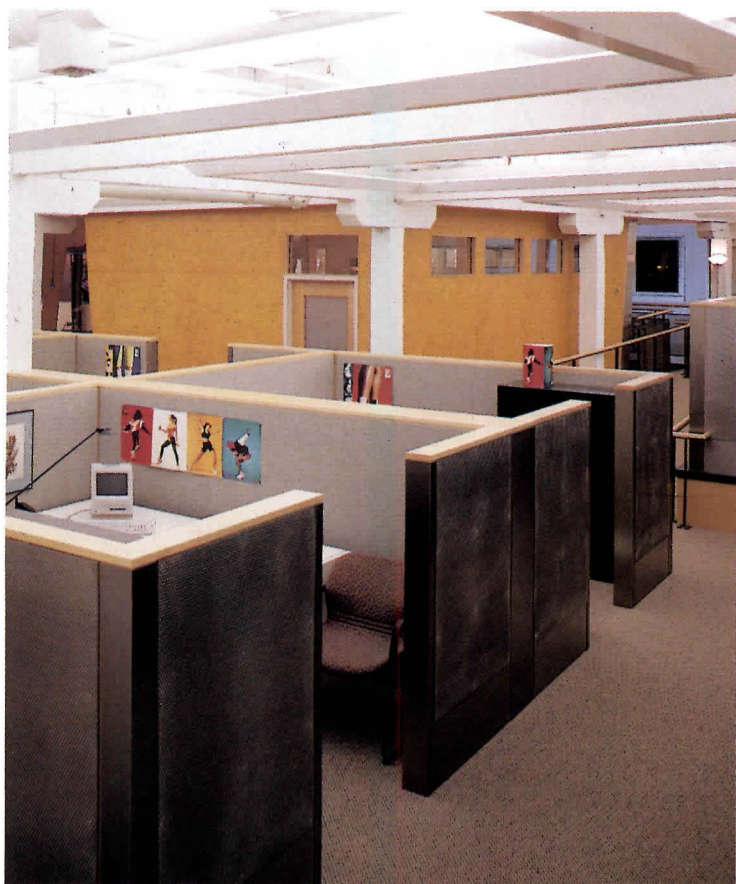
ference room. But the architects twisted the formula by skewing, rotating, and splicing materials to counter the orthogonal grid of the building and infuse the space with a sense of motion. "Side 1 and i.e. products are all about movement," points out project designer Mark Haidle, "so we felt this approach was appropriate."

Upon arrival, visitors enter Side 1's offices on the fifth floor under a perforated-steel canopy supported by eight steel fins mounted on large casters. Dubbed the "lobbyhorse" by Haidle (its undulated canopy is a take-off on Nike's swoosh), the metal construction doesn't actually roll, but implies a sliding motion. Kineticism is further emphasized by diagonally gridded maple inlay on the particleboard floor and steel-clad workstations that are skewed 8 degrees off the warehouse's orthogonal frame. From the reception area, a metal-clad steel staircase, also angled against the existing shell, descends to i.e.'s offices on the fourth floor. And a rubber-floored bridge spanning the atrium allows views to the showrooms below.

Visually connecting the two divisions are overscaled elements that slice up and across the loft. A glass- and stained-strandboard-enclosed conference room with aluminum-

**Curved glass and aluminum-studded conference capsule extends through atrium (facing page) to provide two levels of meeting rooms (above). Staircase connecting Side 1 and i.e. is paneled in perforated steel and topped by a maple handrail. Original timber-frame structure is exposed and painted white.**





clad muntins flares outward to the top of the atrium to house two levels of meeting areas. Like a fishbowl, the conference capsule allows views of Side 1 and i.e. managers planning their next corporate strategy, but, as in the private offices, the glass partitions are sandblasted at their base to serve as opaque modesty panels. From the northeast corner of the offices, a curved plane of oriented strandboard sweeps across the open work areas to display shoes and to conceal support spaces and private offices on the east side of the building. Structural and material differences between this textured wall and the rough, timber structure of the warehouse are emphasized by black-painted reveals where the two materials intersect.

Combined with the sloping floors on each level, the oriented strandboard wall, funnel-shaped conference room, and metal staircase and canopy reinforce the overall sense of dynamism that pervades the headquarters of Side 1 and i.e. While lively, these elements are rendered in neutral tones as a foil to the companies' more colorful furnishings, product displays, and graphics. SERA has appropriately allowed Nike's latest foray into sports and fitness to take center stage. ■

—DEBORAH K. DIETSCH



**SIDE 1 AND I.E. HEADQUARTERS  
PORTLAND, OREGON**

**ARCHITECT:** SERA Architects & Interiors, Portland, Oregon—Thomas Cole (principal); Mark Haidle (project designer); Mike Etzel, Steve Henneberry, Eric Hasenberg, Lynn Martin, Paul Thimm (design team)

**ENGINEERS:** KPFF Consulting Engineers (structural); Systems Design Consultants (mechanical/electrical); Wilsey & Ham Pacific (civil)

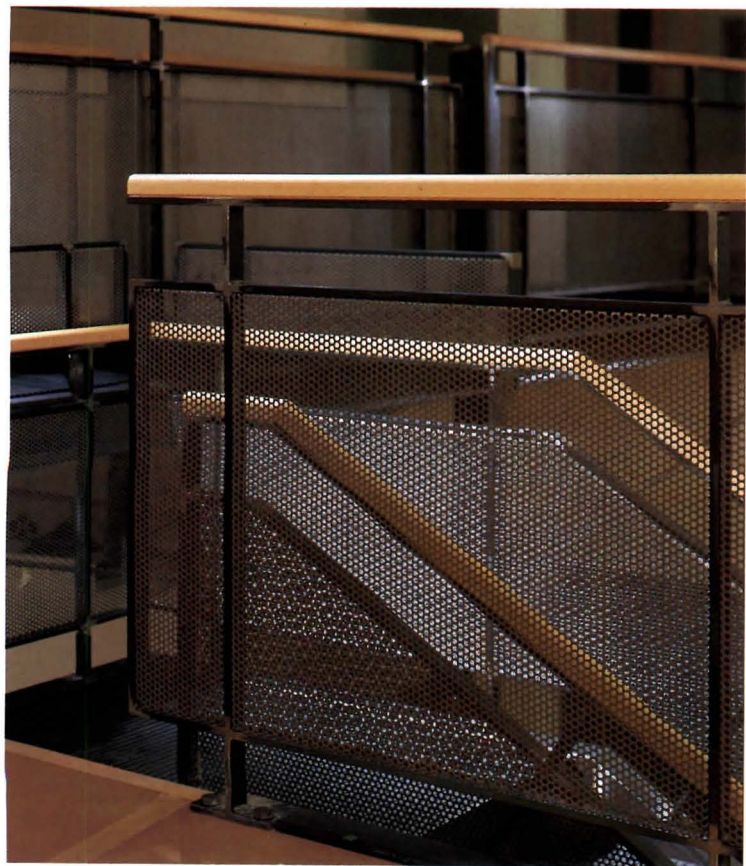
**CONSULTANT:** Heritage Investment Corporation (historical)

**CONTRACTOR:** Walsh Construction Company

**COST:** Withheld at owner's request

**PHOTOGRAPHER:** Strode Eckert Photographic

**Details reveal steel fins of lobbyhorse (facing page, top left); particleboard floor with maple inlay (facing page, top right); perforated metal on staircase (facing page, bottom left) and workstations (facing page, bottom right). Junctures between strandboard and timber (top left and right) are emphasized by reveals.**



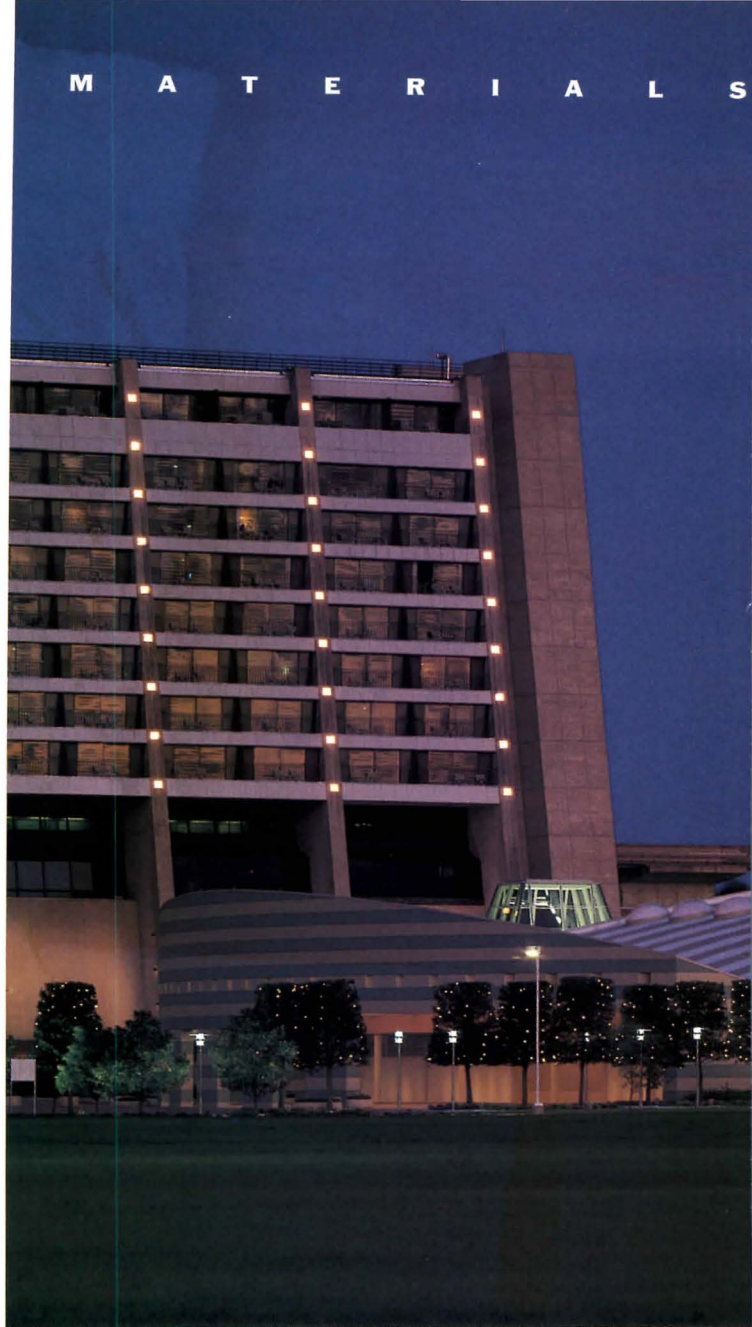
IT WAS NOT HUBRIS FOR ROBERT SIEGEL TO liken Gwathmey Siegel & Associates' new convention center at Walt Disney World to the 1950 United Nations Headquarters in New York City. In fact, Siegel's grand analogy was a clever stratagem: by asking his clients to picture the U.N. Secretariat slab towering above the General Assembly building, he believed they would comprehend why his design begged to be an expressive, even lyrical, counterpoint to Disney's 20-year-old Contemporary Resort Hotel.

Expressive it is. Deliberately free of the colossal animal sculptures, painted palms, and dwarfish atlantes that ornament the latest rash of high-profile Disney buildings, the 120,000-square-foot convention center creates a strong horizontal sweep against the vertical rise of the adjacent 1971 hotel. Its fragmented forms, arranged against a field of bold color, break daring new ground for Gwathmey Siegel, which in the past has looked to Modern materials that chromatically speak for themselves.

Disney originally commissioned the New York firm in 1988 to provide a revised master plan for the entire site. Not only did the entertainment company ask the architects to design a meeting facility, it wanted them to correct a vehicular approach to the hotel that was remarkably ill-planned, considering Disney's vaunted skill at moving people efficiently through its theme parks. Gwathmey Siegel fixed all that. The new entry sequence directs visitors onto the site in front of the Welton Becket-designed hotel, where they drive across a wide plaza between a topiary bosque and the striped convention center to arrive at the hotel's new porte cochere.

The architects' early studies had explored the merits of keeping the hotel and the new meeting center separate. But Gwathmey Siegel reasoned that the site would be en-

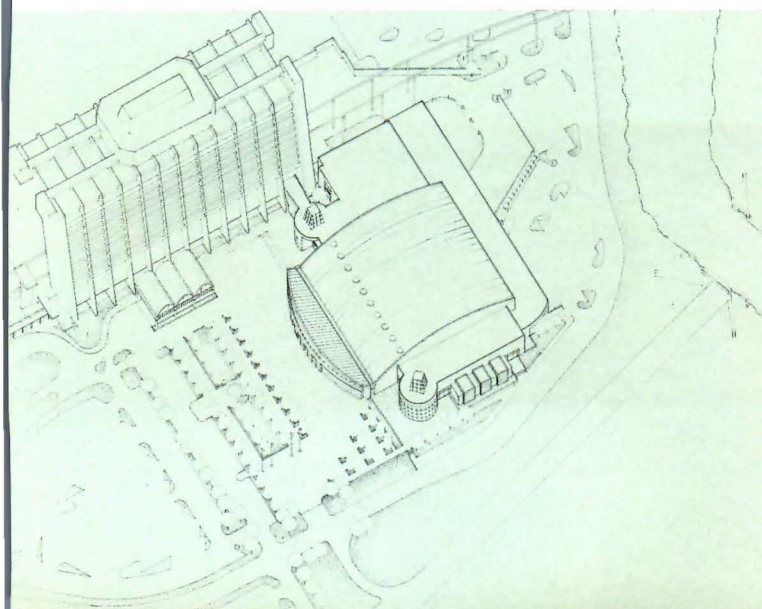
**The bright colors and discrete forms of Gwathmey Siegel's new convention center (top) stand out against the Brutalist backdrop of the 1971 Contemporary Resort Hotel. A new forecourt and plaza (right and site plan) clarify the entrances to the buildings. A steel-braced translucent canopy (facing page, right) sweeps out into the urban space to receive conventiongoers.**





Disney Contemporary Resort  
Meeting Facility  
Lake Buena Vista, Florida  
Gwathmey Siegel & Associates

# Beyond Convention



livened by linking the existing and new buildings and mixing the comings and goings of vacationers and conventiongoers. At the same time, the juxtaposition would allow access to the hotel's meeting spaces for overflow functions. Therefore, the architects placed the convention center to the southwest of the hotel to define the tree-studded plaza, which breathes welcome life into the site and produces a lively graphic composition when viewed from the hotel above. The existing "Dixie cup" topiary trees were sacrosanct—Disney considered them vital to the hotel's image. Many more were added to reinforce the new site design, and they glisten at night with tiny white lights that illuminate the plaza.

Despite the fragmented treatment of its perimeter, the convention center has an overall clarity that reflects a simple parti. The architects located the expansive main ballroom at the center, flanked the ballroom with meeting spaces in the two wings that run east and west, and stretched a north-facing lobby across the front of the building. At the entrance, a swooping canopy reads as an extension of the vaulted roof—a familiar form in Gwathmey Siegel's residential and institutional buildings—that shelters the lobby and main ballroom. Bubble skylights on the roof trace the main axis that connects two rotundas at the east and west corners, each of which makes a transition to secondary circulation paths leading to meeting rooms. Service functions are tucked to the south of the ballroom in a low-rise box.

Only after the convention center began to take shape did ideas begin brewing about the use of color to lend scale and visual punch. "When you really have no materiality, like stone or wood or steel or any of that good stuff that comes with its own colors," explains Siegel, "color becomes one of the few ways within a budget-driven project to make hierarchies. This whole project became one of how color and texture would help make spaces more interesting, create background and foreground, and enhance scale issues. Color was fundamental."

The firm's success in breaking the mold of monolithic exteriors—so common to the convention-center genre—is surpassed only by the richness of the center's interior. Whether one enters through the front canopy or the hotel connector, passage into the lobby is a delight, even for the most jaded veterans of the trade-show circuit. A soaring ceiling dotted with circles of natural light draws the eye to the ends of the lobby, punctuated by the

**Mixing three colors of pavers produces a woven effect in the plaza (top right). Twinkling topiary trees can be seen beyond the banded canopy (facing page, bottom right) that serves as the main entrance. Distinct functions generate forms and colors that modulate the building envelope, such as a trio of meeting rooms on the west facade (right) and a rotunda anchoring the northwest corner (facing page, left).**





bright and color-saturated rotundas. Free-standing glass-block walls conceal ubiquitous banks of pay telephones, while adjacent bays contain crafted reception desks of stained white oak.

Natural light is liberally introduced into these “prefunction” spaces, either through skylights, as in the rotundas, or through clerestories, which are used to great effect to splash light on the asymmetrical ceiling of the west corridor. A progressive diminution of scale takes place as one moves from plaza to canopy to lobby to meeting room—a perception that is reinforced by lighting, section, and floor pattern.

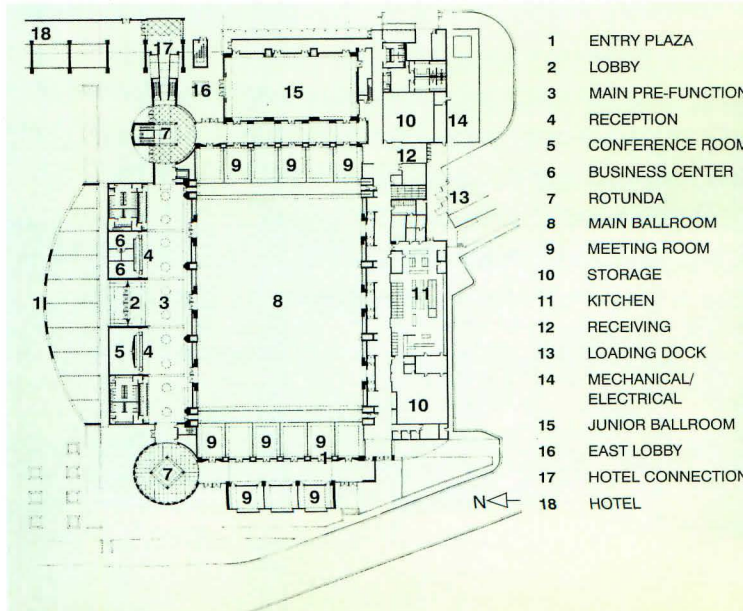
The system of self-ornamentation developed by Gwathmey Siegel, first suggested by the center’s striped and scored stucco exterior, becomes apparent on the inside. Throughout the building, a system of regulating proportions establishes geometric rules for all embellishments, including door heights, signage placement, and the dimensions of wedge-shaped uplights.

Outside and in, the cylindrical rotundas at the east and west ends of the lobby exert a strong force on the building. These passageways are fraternal twins: they are made of the same basic genetic material but are visibly different. The west rotunda is a corner element that protrudes from the building mass; it is a place of repose, wrapped with stacks of frosted glass squares. Light fixtures in each opening produce a glowing facade at night.

The east rotunda, on the other hand, is positioned to accommodate active circulation. Piercing its center is a bridge floored in glass block and finished in porcelain panels, which serves as the second-floor access to an elevator for the physically disabled. In the context of the whole convention center, which is warm and inviting, the bridge and adjacent escalators convey a cool, industrial quality that sets them apart. While they succeed in providing the vital function of connecting the center to the hotel, their form, color, texture, and detail evoke the disquieting impression that they have been applied and not fully integrated.

The architects’ most notable victory over traditional notions of meeting-center design takes place in the main ballroom. A large-scale diamond pattern in the carpet draws the gridiron-size room into one unit, yet allows for easy subdivision into three smaller components without visual compromise. Likewise, the expansive, faceted plane of the polished aluminum ceiling accommodates infinite room configurations, while reflecting

**Asymmetrical volumes, abundance of daylight, and sensitive detailing set the Disney convention center lobby (facing page) apart from most of its counterparts. The east rotunda accommodates movement: a glass-bottomed bridge crosses it at second-story level (top right), while stairs nestle against one of its curved sides (center right). Walkway connects to hotel (plan).**





the activity and lighting effects below in abstract form. "It took a while and a lot of model study," says Siegel, "for people to get comfortable with the idea that this was not too austere to be a ballroom as well as an exhibition hall." But, in fact, the room serves both purposes well. The ceiling grid accommodates flexible lighting for theatrical productions, allowing convention organizers to produce a full range of activities in the space—everything from elaborate trade exhibits to show-stopping extravaganzas.

Breaking the monotony of the ballroom walls is a series of gridded oak units that humanize the room and provide ambient light, acoustical relief, and thematic flair. Set within the gridded units are 4-foot-tall, backlit transparencies reproduced from the artwork for *Fantasia*, preserved in Disney's archives. Conceived and executed by photographer Elliott Kaufman, the images were selected for their abstract appearance, although, as Siegel observes, they are "literal enough that you know they have to do with Disney."

That imperative—to create something that "has to do with Disney"—may pose the most difficult challenge in designing any project at Disney World. The pressure to remain thematically true to an entertainment agenda can render architecture that is strong on image but weak on content. Fortunately, in Gwathmey Siegel's new meeting facility, meaning, as well as Mickey, prevails. ■

—VERNON MAYS

*Vernon Mays is editor of Inform, the architecture magazine of the Virginia Society AIA.*



SECTION THROUGH PRE-FUNCTION GALLERY



SECTION THROUGH MAIN BALLROOM

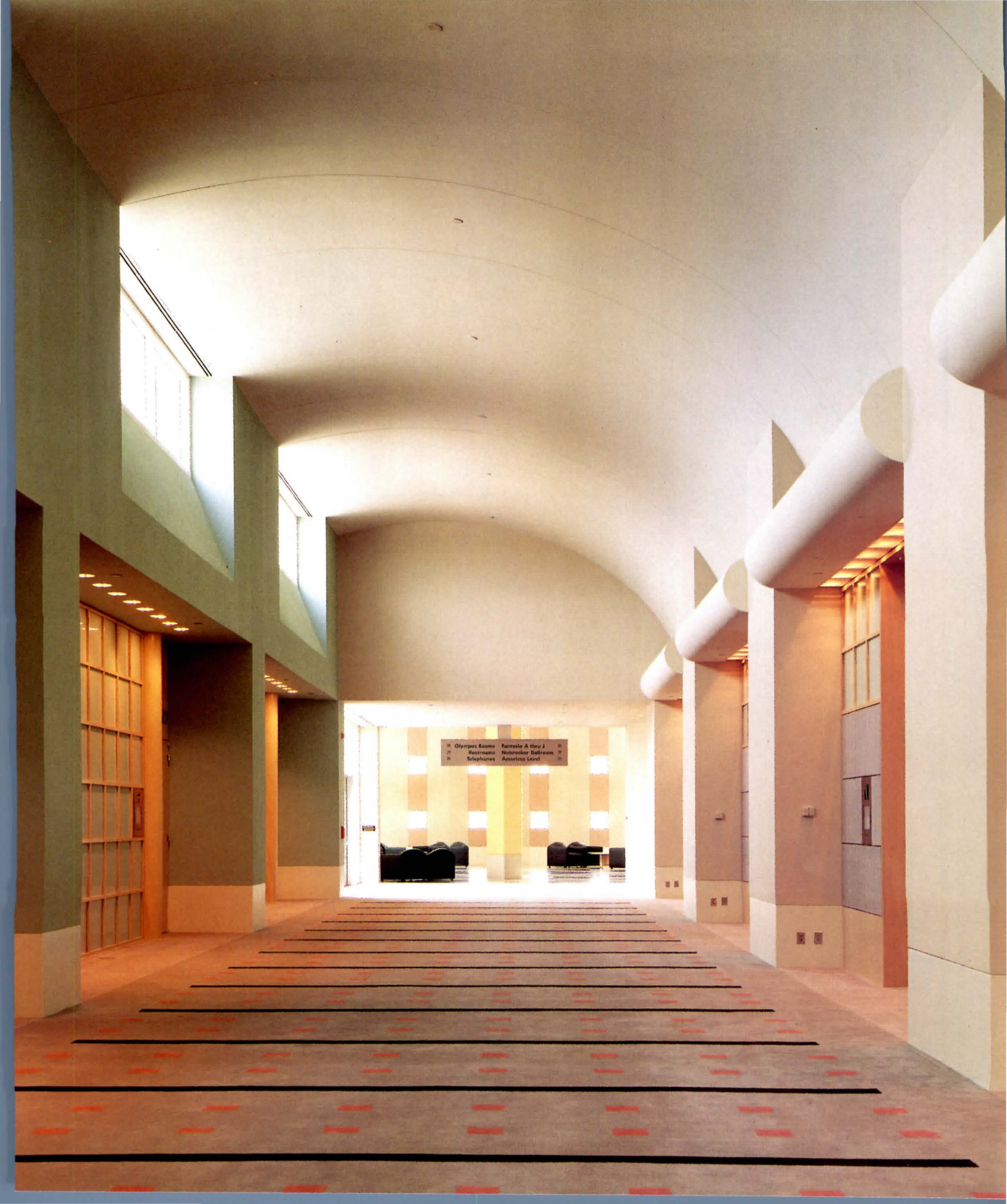


SECTION THROUGH JUNIOR BALLROOM

Light washes through clerestory windows in secondary west corridor that leads from rotunda (facing page). The system of reference planes that regulates the placement of wall elements is evident in the hall separating the ballrooms (top right) and the gridded units that contain *Fantasia* images in the main ballroom (center right). Sections (right) show bubble skylights and light wells atop rotundas.

**DISNEY CONTEMPORARY RESORT MEETING FACILITY  
LAKE BUENA VISTA, FLORIDA**

**CLIENT:** Disney Development Company  
**ARCHITECTS:** Gwathmey Siegel & Associates Architects, New York City—Charles Gwathmey, Robert Siegel (principals); Joseph Ruocco (associate-in-charge); Keith Howie, Rayme Kuniyuki (project architects); Ed Arcari, Pat Cheung, Stephen DeFossez, David Hendershot, Michele Kolb, Richard Lucas (project team)  
**ASSOCIATE ARCHITECT:** Alan Lapidus  
**LANDSCAPE ARCHITECT:** Sasaki Associates  
**ENGINEERS:** Olsen & Associates (structural); Matern Professional Engineering (mechanical/ electrical); Davis McMahan, Roger & Associates (civil)  
**CONSULTANTS:** Cerami & Associates (acoustics); Walt Disney World Design & Engineering (audio visual); Hilliker Associates (food services); Hart & Graboski Associates (graphics/signage); C. M. Kling & Associates (lighting); Elliott Kaufman (photomuralist)  
**GENERAL CONTRACTOR:** Centex-Rooney  
**COST:** Withheld at owner's request  
**PHOTOGRAPHER:** Jeff Goldberg/Esto



↳ Olympic Rooms    Terrace A thru J    ↳  
↳ Restrooms        Menstruator Bathroom    ↳  
↳ Telephones        America's Level        ↳

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Compact and versatile, the OSRAM HQI-DE lamp is available in 70 and 150 watt sizes and in two color temperatures. So no matter who or what you're spotlighting, the OSRAM HQI-DE is the bright choice.

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# Technology & Practice info

Information on building construction, professional development, and events

## East Bay Fire Investigation

FOR THREE DAYS IN OCTOBER, A FIRE COVERING 1,600 acres destroyed 3,354 homes and left another 328 damaged in the hills of Oakland and Berkeley, California. In addition to claiming 25 lives, the fire is possibly the most costly in United States history. Property losses are currently estimated to be in excess of \$1 billion.

Last month, a committee of more than 50 federal, state, and local government representatives met to consider ways to lessen the impact of such future disasters in Alameda County and similar regions in California. Jointly chaired by the Federal Emergency Management Agency (FEMA) and the California Office of Emergency Services, the group released its preliminary recommendations November 25.

According to the committee's Hazard Mitigation Report, the fire started when "embers from an undetermined source were blown into bone-dry brush and onto nearby shake roofs by swirling winds of 20 to 25 miles per hour." Record-high temperatures, a dry east wind, dry brush, and freeze-damaged trees all combined to fuel the fire, which grew out of control in a matter of minutes.

The committee's findings also revealed that wood-frame and Shingle Style houses with cedar shakes fared the worst. Houses clad with stucco finishes and tile roofs withstood the fire slightly better, though many were destroyed by temperatures in excess of 2,000 degrees Fahrenheit. Scattered across the fire zone are the charred remains of as many as 200 landmarks, designed by such architects as Bernard Maybeck, Julia Morgan, and Charles Moore.

The Hazard Mitigation Report's preliminary recommendations, which address zoning regulations, evacuation plans, and the abundance of potentially flammable vegetation, urge compliance with state urban wildfire prevention guidelines that have long been in place. Developed in 1965 and updated in 1980, the Fire Safe Guides for Residential Development in California have not been enforced by many local governments. Many



WIDE WORLD PHOTOS, INC.

**Stucco- and tile-clad houses withstood the October fire in Oakland better than others (above). A total of 3,354 neighboring homes were destroyed in the three-day blaze.**

of the houses destroyed in the East Bay were built before 1965, and were therefore never forced to comply with fire-safety codes.

Once the pressing problems of soil erosion and flood prevention in the razed area have been solved, many East Bay residents are planning to rebuild, armed with some unnecessarily hard-won lessons. As the report laments, "Generally, local fire ordinances have only been initiated after major fires have resulted in a significant loss of structures and/or lives."

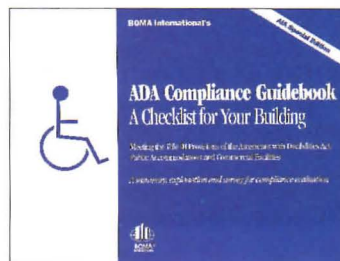
In an effort to halt this tragic trend, FEMA director Wallace Stickney has initiated an aggressive collaboration between federal and local officials called Operation Urban Wildfire: "We need to educate—not just inform—the people who live in these areas," he says. —M.S.H.

## AIA Offers ADA Assistance

OWNERS OF EXISTING PUBLIC FACILITIES must remove physical barriers to the disabled or offer alternative assistance by January 26 to comply with the Americans with Disabilities Act of 1990 (ADA). After that date, alterations to existing structures and to new public and commercial buildings scheduled for first occupancy after January 26, 1993, must be designed to conform with the new law. The AIA reports more than 5 million buildings in the United States are potentially affected by the new regulations.

Since ADA is a civil rights law, and not a building code, barrier-free environments are not clearly defined in terms of building-construction requirements. To aid architects and owners in sorting out their responsibilities, the AIA has recently released a special edition of the Building Owners and Managers Association International's *ADA Compliance Guidebook: A Checklist for Your Building*, which discusses the law's terminology and technical requirements in the form of a workbook. The AIA will conduct the first session of a three-part video conference series entitled "Opening All Doors" on February 6, which will provide an overview of the new law. Two additional video conferences will be held on March 18 and April 21 on the design and code issues raised by ADA. Each of the three-hour video conferences, featuring a panel of architects and code officials, will be broadcast in locations throughout the United States and will be followed by an hour of discussion on local issues. The AIA has also created one day-long and three half-day workshops that cover the implementation of the regulations.

The four workshops are designed to be held independently and will cover issues similar to those presented in the video conferences. For further information on the AIA's upcoming events, contact: (202) 626-7478, or your local AIA component chapter. —M.S.H.



**ADA Compliance Guidebook**

# Technology & Practice info

## Collaboration at UCSD

WHEN SHE WAS APPOINTED FOUNDING DEAN of the new School of Architecture at the University of California, San Diego last year, Adele Naude Santos vowed to explode decades-old conventions in architectural education. Classes don't begin until next fall, but Santos has already put her stamp on the school through two well-attended symposiums organized under her direction.

Last spring, a cross-cultural group led by Indian architect Balkrishna Doshi spent a day discussing low-cost housing, including Doshi's projects in Jaipur and other Indian cities. The session was a welcome antidote to the usual star-studded, Anglo-European-dominated architectural event. In November, the school followed with "Converging Lines: Architecture Beyond Boundaries." The two-day gathering collected an interdisciplinary group that included architects and automotive designers. "In many schools of architecture, boundaries are tightly drawn," Santos says, explaining the eclectic crew assembled for the symposium. "I think there are enormous opportunities for stretching our definitions."

Panelists ranged from Vice President of Walt Disney Imagineering Chris Carradine and San Francisco landscape architect Martha Schwartz to Los Angeles architects Michael Rotondi and Ming Fung, plus Santos and her four faculty members: critic William Curtis; architect/designer Craig Hodgetts; architectural social theorist Dana Cuff; and daylighting expert Susan Ubbelohde. The weekend's nine discussions pointed the way toward new modes of architectural process through collaboration and technology.

Jerry Hirshberg, chief designer at San Diego-based Nissan Design International, a design subsidiary of the Japanese automotive giant, coined what became the weekend's operative buzzwords: "creative abrasion." Although most of the guests agreed that collaborations can push inspiration to higher planes, they acknowledged there can be friction among creative egos.

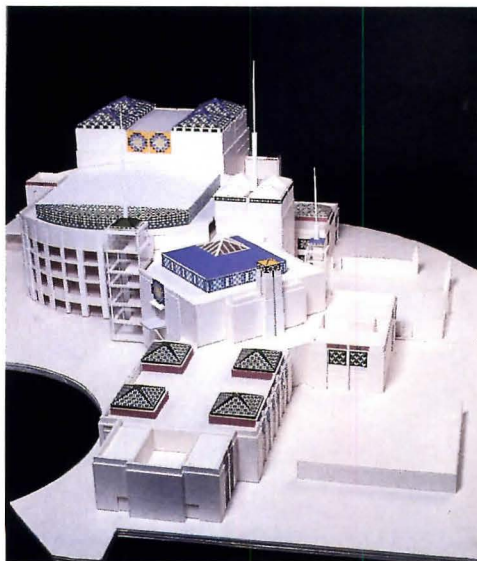
A panel entitled "Different Dimensions: The Multidisciplinary Design Practice," featured Hodgetts, his partner Ming Fung, Michael Rotondi, and his new partner graphic



ALAN DECKER

artist April Greiman. "The issue isn't technology, but the value of human exchange," according to Rotondi, who left Morphosis last year to pursue a multidisciplinary venture. His first collaboration will be a

prototype multimedia business training center on the East Coast, designed with Greiman and Eric Martin, a graphic designer and director of the Macintosh Lab at the California Institute of the Arts in Los Angeles. Rotondi



**Conference organizer Adele Santos, who collaborated with WRT landscape architects and artist Mathieu Gregoire on the Perris Civic Center (top), is featured with Nissan Chief Designer Jerry Hirshberg (above center). Graphic artist April Greiman worked with Los Angeles architect Barton Myers to create tile patterns for the Cerritos Arts Center (above).**

described a midlife crisis that caused him to move from the "myth of the architect sketching on a napkin" to design based on collaborating with both clients and other artists.

Environmental artist Mary Miss presented her collaborations: with architect Stanton Eckstut on the South Cove project, a public plaza in Battery Park City, New York; and with Santos on the new Center for the Arts at Albright College in Reading, Pennsylvania. Los Angeles architect Ming Fung showed the result of her collaboration with William Gibson, author of the novel *Neuromancer*. Their project, in which the Bay Bridge was commandeered by the homeless, was submitted as part of the "Visionary San Francisco" show at the San Francisco Museum of Art last year. As part of a panel on "Creating Imaginary Worlds," Carradine explained how Disney Imagineering employed a similar fantasy narrative process to develop its Pleasure Island entertainment park in Orlando. Such imaginary narratives can energize the design process, and, as Fung pointed out, nonarchitects often supply the most creative story lines.

Cuff, moderator of the collaborations panel, best put the weekend in perspective by summing up three models of architectural process: Hirshberg's "creative abrasion" between architects and outsiders; interdisciplinary interaction within architectural offices; and the traditional model of the architect as "heroic genius" or "Rambo." By the end of the weekend, "Converging Lines" had produced convincing evidence that, for architecture to grow into the future, Rambo will be required to take second billing. —DIRK SUTRO

*Dirk Sutro is the architecture critic of the San Diego edition of the Los Angeles Times.*

## Boston Symposium Addresses Healing Designs



A HANDFUL OF ARCHITECTS ARE SEEKING ways to design healthcare environments that not only accommodate the latest medical practices, but actually help heal patients. Last November, nearly 700 architects, designers, and healthcare professionals met in Boston for the fourth National Symposium on Healthcare Design to examine the therapeutic potential of well-designed medical facilities. "Design has the inherent capability to enhance the quality of human experience," claims architect and symposium founder Wayne Ruga. "In healthcare, design can heal people."

The concept of linking design to improvements in patients' health has only been openly discussed in the last few years. During the symposium, speakers articulated the healing properties of color, nature, art, and music, in addition to a sense of privacy and security, in patient quarters. Eberhard Zeidler of the Zeidler Roberts Partnership in Toronto, who has been exploring the therapeutic impact of architecture for 30 years, reported that doctors at the Walter C. MacKenzie Health Sciences Center, completed by his firm in 1986, attributed a 30 percent decrease in the use of analgesic drugs to successful design. Other architects cited clear circulation systems as one criterion for reducing patient stress. Philip Monteleoni of Skidmore, Owings & Merrill in New York explained his prototypical L-shaped plan, which incorporates separate elevators and hallways for visitors and patients.



**Zeidler Roberts' Hospital for Sick Children (top), Payette Associates' ambulatory care building for Johns Hopkins (center), and SOM's St. Luke's/Roosevelt Hospital (above) are under construction.**



Monteleoni's plan can be seen in SOM's St. Luke's/Roosevelt Hospital Center, now under construction in New York.

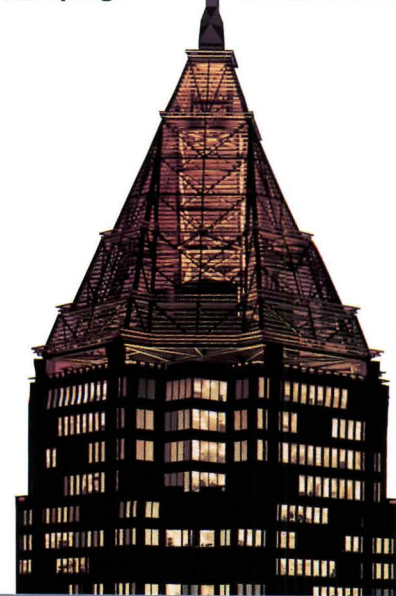
Monteleoni, Zeidler, and Thomas Payette of Payette Associates in Boston advocate natural light and exterior views to orient occupants and enhance interiors. Zeidler, for example, organized the program requirements of Toronto's 1.2 million-square-foot Hospital for Sick Children around an eight-story, glass-covered atrium. Payette designed the Johns Hopkins Hospital ambulatory care facility with a glazed, multi-story concourse, providing views to the exterior and floors below.

Symposium organizer Ruga believes that the growing healthcare construction market and hospitals' use of design as a marketing tool will engage more architects in the field, resulting in innovative, health-promoting buildings. ■

—K.S.

## Atlanta Spire

Building technology has been pushed to new heights by Kevin Roche John Dinkeloo and Associates in the firm's design for Nations-Bank Plaza, a 55-story office tower under construction in Atlanta. Each of the building's approximately 20,000-square-foot floor slabs spans up to 40 feet between 12 steel-and-concrete composite supercolumns (eight at the perimeter and four at the core). The 3-foot-wide, granite-clad supercolumns rise uninterrupted from the building base to the top floor, a structural system used in only six buildings in the United States. Above the top floor, a 90-foot-tall prefabricated spire installed in nine pieces now caps the 1,023-foot-high skyscraper, which is Atlanta's tallest. Finished with 23-karat gold leaf, the 50-ton spire is made of molded fiberglass, the first such architectural application of the material. The fire-retardant and corrosion-resistant fiberglass permits interference-free television broadcasts from rooftop antennae concealed within the spire's 12-foot-diameter skeletal frame. Completion is scheduled for this spring.



# Some architects are joist system. And they?

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solid sawn lumber. All told, the savings on material, nails, glue, and labor could add up to as much as 36%.

And the finished product is a stiff, quiet, predictable floor.



# Working with Color Consultants

Experts offer architects advice on the art and science of pigments and hues.

WHEN ARCHITECTS PICK COLORS, THEY USUALLY cling cautiously to whites, grays, and muted tones. But over the last 15 years, as interest in polychromy has resurged, more practitioners have ventured into the realm of brighter and more saturated tones. And as they have, a new specialty has emerged—the color consultant.

These experts are schooled in a range of disciplines—painting, graphic design, and interior design. The majority work for product manufacturers, analyzing future color trends so that companies can offer their wares to architect and consumer in the most current hues. Many of these consultants are members of the Color Association of the United States (CAUS), which annually develops an interior colors forecast. The 1993/1994 projection, explains CAUS Associate Director Margaret Walch, “reflects a tendency toward clearer, cleaner, lighter, and brighter shades and an emphasis on yellows, purples, yellowed greens, and periwinkle blues.” Currently, some colorists note a connection between the public’s growing environmental concerns and its recent preference for yellows and greens—colors of nature.

A few specialized color experts consult directly with architects. Though aware of the general trends, these colorists focus on colors appropriate to a particular project. At a recent New York City AIA chapter seminar on color and the environment, Kenneth X. Charbonneau, color and merchandising manager of Benjamin Moore Paints, advised his audience, “I believe there are colors that are ap-



TINA FREEMAN



Paint formulated by color consultant Donald Kaufman (top left) may contain as many as 12 pigments, in contrast to the two or three mixed into manufacturers’ standard offerings. Comparing the Color Association’s forecast for 1993-94 (left) with its prediction for 1988-89 (lower left), reveals the public’s evolving preference for brighter colors. Kaufman juxtaposes complementary colors in the proposed interior of the Canadian Broadcast Centre by John Burgee Architects (bottom left and right).



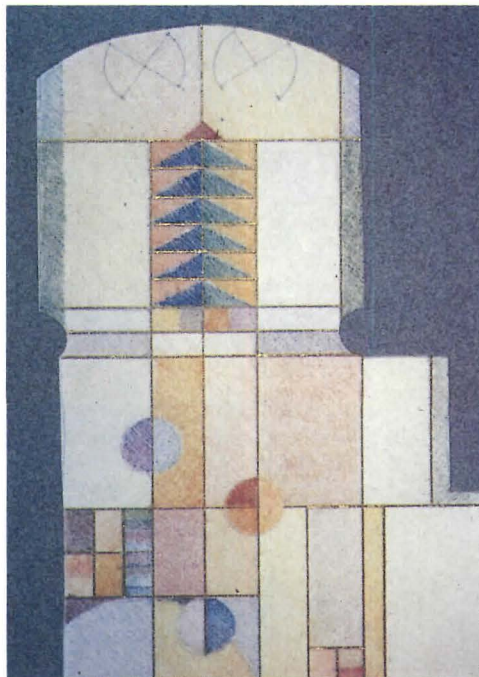
FROM “LISTENING TO ANGELS,” 1991, BY LAURIE ZAGON





TIMOTHY HURSLEY

The color scheme for Chicago Place (above), at 700 North Michigan Avenue, developed from a joint effort between SOM's Chicago office and Sussman/Prejza. Collaborating with SOM after the architects had begun to design the exteriors of this 400,000-square-foot building, the Los Angeles design firm was challenged to develop a theme and graphics package for the project that would respect the restrained character of the surrounding historic district and still generate a lively image for new retail areas. A celebration of Chicago's cultural legacy, emphasizing works of Louis Sullivan and Frank Lloyd Wright, became Sussman/Prejza's guiding theme. Principal Deborah Sussman describes her color palette as a "golden glow" inspired by Sullivan's banks. Color selection was time-consuming and exacting. For instance, Sussman/Prejza cut out individual chips of colored paper to study the aggregate composition of the terrazzo floor (right) before a test sample was poured.



appropriate regardless of what is presently chic. Harvest gold may be the absolute and only color that is correct for a particular situation. And does it really matter that it is not the fashionable color right now?"

Although most architects and all color consultants stress the importance of considering color early in the design process, few colorists are brought into the project at the schematic design stage. Some are asked to develop a theme and color palette after design—and occasionally, after construction—is completed. Others fine-tune, through mixings and mock-ups, the colors of a palette already established by the architect. The degree of contribution by a color consultant depends, ultimately, on the architect's attitude toward color and creative collaboration.

Like most architects, John Burgee typically selects his own colors from color system swatches. But when it became clear that color was going to be critical in the design of Toronto's Canadian Broadcast Centre (CBC), he knew the design team was ready for a color specialist. Burgee enlisted New York-based artist and color consultant Donald Kaufman, who began his current career in the 1970s while painting houses to supplement his income as a painter and art teacher. During this period, he discovered that standard house paints were not formulated in accordance with color mixing techniques taught at art school. Fifteen years later, Kaufman has applied his fine arts training to scientifically mix paints for architectural applications.

Kaufman worked with Burgee on the Toronto project to develop a color rationale and hierarchy. The exterior colors were selected first: a light gray for the basic organizing grid; red—the strongest color on the color wheel—for a secondary grid to express the dynamic functions that occur within the building without overpowering the exterior. In contrast, an intense green was selected for the interior elevator core because, as red's opposite, it is the color that the eye is naturally drawn toward after seeing red. This kind of logic was applied to the selection of all the project's colors.

More often, Kaufman collaborates with architects in projects where the initial color palette has already been established. Kaufman develops and coordinates the palette and formulates the actual paints. Such was the case in several residential projects designed by Gwathmey Siegel & Associates (photos, facing page). "I have definite ideas of how to articulate and prioritize the forms and spatial ideas with color," voices Charles Gwathmey.



TINA FREEMAN



TINA FREEMAN

"I set the architectural color strategy and tones. But Donald helps me have a dialogue with myself. I like to work with him as an expert in developing gradations of colors."

This gradation can become quite complex. Gwathmey's Steinberg Residence in East Hampton, Long Island, for example, boasts 17 colors with no more than 15 percent difference in value from one to another. "Donald knows how to combine a taupe with a peach so that one is not discordant with the other. If I selected paints from a paint manufacturer's standard systems book, I would get colors that might be offbeat to one another."

Kaufman is the first to admit there is nothing magical about his paint formulas. "I haven't done anything exceptionally original except taking what I learned in art school and putting it into a paint can," he notes. His techniques include mixing paints according to complementary colors. "Complements are the way of controlling and enriching colors," Kaufman continues. "You can reduce

the intensity of a red without actually changing its hue by mixing it with the color that is exactly opposite on the color wheel." Paint manufacturers, however, do not apply this principle for reasons of economy and technical requirements driven by the needs of industrial products. Specifically, mass-produced paints are formulated to avoid a phenomenon known as metamerism, in which two colors look the same under one light and different under another light.

By mixing complementary opposites within the same formula, light from across the spectrum can be reflected by the paint, thereby creating a facsimile of natural light. "Daylight is what we respond to more than anything else," says Kaufman. The ability to reflect light at all wavelengths, or to show full spectrum within every color, is what characterizes the colors we normally think of as beautiful in nature. Most designers love wood or stone because these materials contain a tremendous gradation of multiple colors."

**Gwathmey Siegel & Associates enlisted Donald Kaufman to develop paints for the Steinberg Residence (above left) in East Hampton and the Swid apartment (top right and above) in Manhattan. The subtlety of the color schemes belies the complexity of the mix. The Steinberg house, for example, is finished with 17 distinct colors. Natural woods of different colors are also woven into the design. Gwathmey established the basic palette to reinforce the architectural layering of the form. Walls that are parallel to the ocean, for instance, are coded with one hue; walls perpendicular to the coast are coded with another. This system of articulation results in dynamic intersections of planes rendered in beige, taupe, and earth tones. The architect relied on Kaufman to formulate the paints in harmony with one another. By balancing warm and cool pigments within each formula—and therefore incorporating colors from across the spectrum—Kaufman's paints create the illusion of luminosity.**



Color dominated the design of the Kaiser Medical Center in Vallejo, California, which was created by a multidisciplinary team within SOM's San Francisco office. The in-house staff included architect Tom McMillan, interior designer Bobbie Fisch, and graphic designer/color expert Debra Nichols. Organizing the medical building along single-loaded corridors (above) around three inner courtyards, the designers introduced light, views, and color to enliven interior spaces and orient visitors. Framing a garden, the curtain wall along the corridor was specified as green glass with mullions reminiscent of 19th-century greenhouse structures. Continuing the garden theme, a grayish green aggregate was chosen for the exterior precast concrete walls, a lighter shade of green was applied to interior structural columns, and terra-cotta tile was selected for interior paving. Inspired by Mexican architect Luis Barragan, solid planes of vibrant pigments animate the interiors. Large walls of color stand opposite the building's main entrances (right). These walls, which are washed with light from skylights above and painted salmon, icy blue, and egg-yoke yellow, help direct visitors to their desired destination. The signage continues the color scheme. The architects requested that 8-by-10-foot swatches be applied on site before approving the paints. As is common with color work, some of them had to be reformulated once viewed in situ.



Graphic designer Deborah Sussman of Los Angeles-based Sussman/Prejza has worked with several firms to develop a theme and graphics package, from which her color consultancy has grown. At 700 North Michigan Avenue, a retail project designed by Skidmore, Owings & Merrill in Chicago, she proposed the cultural heritage of Chicago as the theme, which led to renaming the project "Chicago Place"; developing a decorative motif based on the wild onion, once used by native Illinois tribes; and drawing a color palette from the works of Louis Sullivan.

Sussman's color ideas are inspired by many disparate sources: history, fabric, fruit, a Los Angeles hillside on a smoggy day. The best color work, she believes, occurs when an architect's ideas about space and massing influence the collaborator's work. "It's very important to listen to an architect's conviction about a color attitude," Sussman explains. "The architect may not ask for a specific color, for instance, but may want to separate one form from another or to have the envelope read differently from the structure. You have to draw it out if it is not clear. That's what makes collaboration worthwhile."

Architect Larry Oltmanns, senior designer of Chicago Place, admits that SOM's Chicago team probably never would have hired a consultant to work strictly on color, because they have staff members who are talented in that field. But he found discussing color with Sussman brought new ideas into the project that they would not have arrived at on their own. He does not believe an architect needs a color specialist for every project. "But when there is an interest in doing something fairly complex with color," he adds, "a consultant is something worth looking at."

One former SOM employee, graphic designer and colorist Debra Nichols, observed that staff architects increasingly sought out her advice on color and materials during her 15 years with the San Francisco office. As a color specialist, Nichols finds she learns the potential and limitations of paints and other materials from manufacturers. "Understanding the technology helps you know when you can push the limits—perhaps experimenting with making something more metallic than has been done before," she explains.

Some consultants, such as Tina Beebe of Santa Monica, California, have worked with a few architects and clients on an ongoing basis. A student in the early 1970s of color theorist Joseph Albers at Yale, Beebe finds that theory has become part of her color intuition. Nevertheless, she develops palettes



based on factors emerging from the project itself, such as the site, design goals, client needs, and historical precedent. Beebe finds that architects are more aware of color as an architectural tool. "It's one more material to establish their intentions." She observed this handling of color when she worked in Charles Moore's in Essex, Connecticut, office and the Venice, California, studio of Charles and Ray Eames during the 1970s. She now collaborates on projects with Moore Ruble Yudell, Pei Cobb Freed & Partners, and A.C. Martin & Associates, including the latter's Los Angeles parking structure (right).

Architect Ron Frank of A.C. Martin finds collaboration with the right colorists rewarding. "Both Debra Nichols and Tina Beebe have innate architectural sensibilities. They don't try to just wallpaper the building with color. They successfully work with the architect's design intent. And that makes it exciting. A good color consultant can reinforce the design concept and make it a little more vibrant, a little more exciting."

Though she occasionally consults on color herself, artist Laurie Zagon of Laguna Niguel, California, believes that architects are capable of selecting colors themselves. "Color is simpler than many think," she insists. "Architects have people on their staff who can work with color. The problem is that they are intimidated, but all they need to do is test their selection on their own staff. Ask what three colors should dominate the space they are designing and see how many answers are the same. Then test it on the client and client's staff. Very often, everybody comes up with something very close. Intuitively we all know the answer, but we don't always trust that it is true." Zagon encourages architects to apply the full spectrum of color—or rainbow, as she calls it—in each project, whether it is with paint, artwork, or finishing materials. Every room should contain the three primary or three secondary colors, though these hues need not be in equal proportions or intensities.

Ultimately, color is a personal choice. But as the work of consultants indicates, color selection means more than pasting up a few color system swatches on the studio wall. For those architects whose firms are small or who are working on a special job, the color consultant may expedite the process of honing in on a special hue. After all, explains Kaufman, "The eye can distinguish between some 7 1/2 million colors, so the chances of immediately finding one color that is perfect for your project are small." ■

—NANCY B. SOLOMON



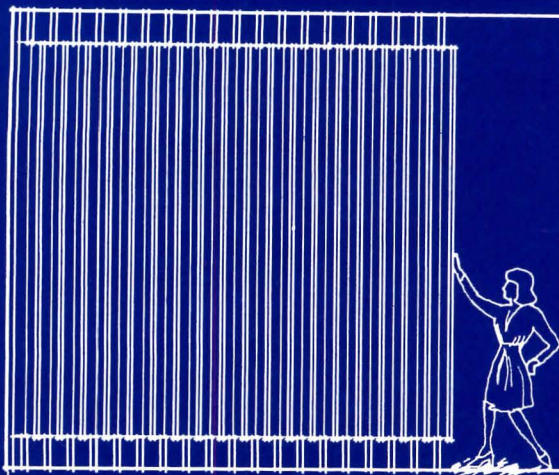
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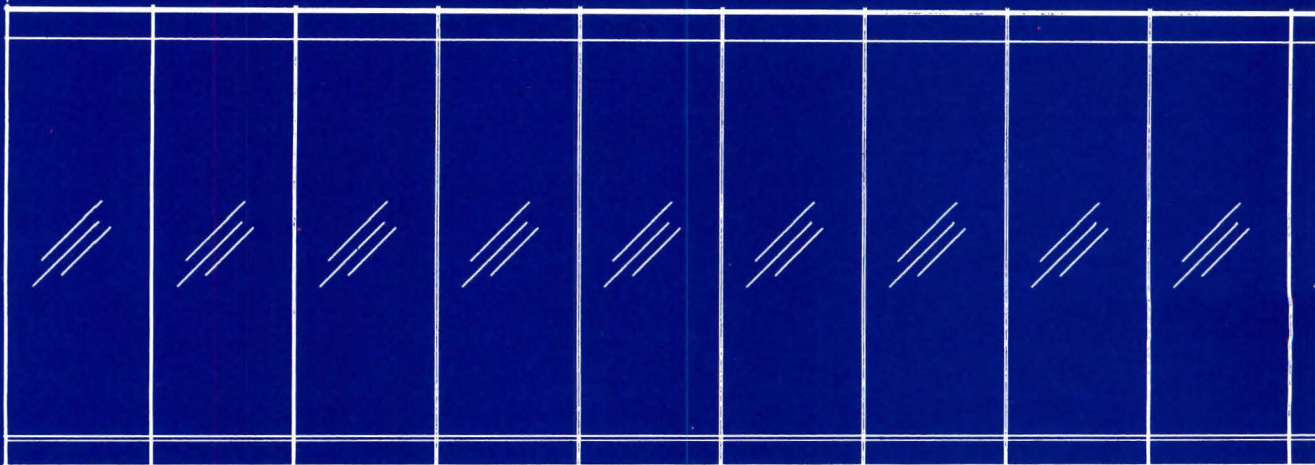
TOM BONNER

Owned by Maguire Thomas Partners and designed by A.C. Martin & Associates, the 17th & Grand parking structure (above) in downtown Los Angeles is one of the first garages to be built under the city's new mandate requiring downtown developers to provide parking spaces along the periphery of the urban core. Recognizing that the parking structure provided a tremendous graphic opportunity, project architect Ron Frank suggested to the client that a color expert be involved. The structure was already under construction when consultant Tina Beebe was asked to develop an appropriate palette. Influenced by the de Stijl movement, Beebe's scheme reinforces the architect's attempts to de-emphasize the building's mass. The facade's major structural grid, which alternates between floors so that two stories appear as one, is delineated by a light gray, while the intermediate floors are painted a darker, receding shade. In concert with the color of the sky, blue screens at the corners further lighten the building's image. The designers applied bright, playful colors to smaller facade components (left) to animate the building, which can be seen from the freeway. Intense red rails, decorative yellow rectangles, and deep cobalt blue banding also help to break down the building's mass. Beebe developed several color schemes, which were tested on paper and then at the building site, before final color selection.

# LEAVE IT TO THE EURO THAT GOES FROM ZERO



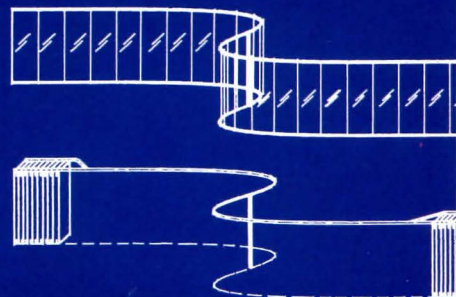
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EUROPEAN ENGINEERING HAS ALWAYS HANDLED THE WORLD'S TRACKS WITH EASE AND AGILITY. THE HAWA MOVABLE DOOR SYSTEM IS NO EXCEPTION. NO MATTER HOW YOU DESIGN IT, CURVED OR STRAIGHT, FOR A BATHROOM OR A BALLROOM, THE HAWA SYSTEM GLIDES WITH THE TOUCH OF A SMALL CHILD'S FINGER. EVEN IF THE PANELS WEIGH AS MUCH AS A SMALL CAR. EVEN AFTER 20 YEARS, BECAUSE DIRT AND DUST JUST CAN'T JAM THE HAWA WALL SYSTEM.

## INTRODUCING ANOTHER EUROPEAN BEAUTY THAT HANDLES THE CURVES AS EASILY AS THE STRAIGHTAWAY

PERHAPS NO MOVABLE WALL SYSTEM IS MORE FLEXIBLE THAN THE HAWA WALL, WHICH GIVES YOU CONSIDERABLE DESIGN FLEXIBILITY OF YOUR OWN. CONSIDER THE SYDNEY OPERA HOUSE WHERE A CURVED HAWA GLASS WALL, 73 FEET LONG, ENCLOSES THE CAFE. YOU CAN CREATE A CIRCLE, AN S-CURVE WITH GLASS PANELS OR WOOD, AND PARALLEL OR PERPENDICULAR STACKS FOR THE PANELS. ALL WITHOUT CREATING PROBLEMS FOR YOUR HAWA SYSTEM.



# Plaster Renaissance

For custom finishes and colors, architects revive a traditional material.

FROM SOUTHERN CALIFORNIA TO NEW ENGLAND, architects are expressing a growing enthusiasm for finishing their designs in sensuous and colorful plaster. Los Angeles architect Rebecca L. Binder, for example, renders both interior and exterior walls in exquisitely pigmented plaster. "Because of its low cost and ease of construction," she explains, "plaster is the material of choice in 80 percent of our residential work." Carol Shen, principal of ELS/Elbasani & Logan Architects in San Francisco, declares that plaster exteriors "win by default" because they are more cost-effective than wood siding, stone, metal, precast concrete, and brick. Oliver Cope, a New York architect whose residential clients are requesting plaster walls with growing frequency, believes that the "acoustical quality of a plaster wall is far superior to typical gypsum wallboard." And Los Angeles designer Franklin D. Israel, whose pigment-impregnated plaster walls afford a sense of luxury to low-cost projects (right photos and pages 32-43), says the material "nearly has the impact of a Renaissance fresco. It gives a room depth, and it seems to glow, which can totally modify the mood of the space."

## Plaster technology

ONE OF THE MOST ANCIENT BUILDING MATERIALS, plaster's basic composition and application have changed little over the centuries. Simply defined, plaster is a cementitious material, usually a mixture of portland cement or gypsum with water and sand. It is applied in the plastic state to surfaces such as walls or ceilings to which it bonds and subsequently "sets," or hardens.

Gypsum, which is mined worldwide in a relatively pure state, is an excellent binder when blended with chemical additives that regulate its setting speed. Gypsum plaster deteriorates when moist, however, so it is primarily used indoors. It may be mixed "neat" or with an aggregate, such as sand, and applied over almost any substrate. Aggregates extend finish coverage, lower cost, enhance performance, reduce shrinkage, and increase plaster's strength and plasticity. Sand, because



TOM BONNER



TOM BONNER (AND DETAIL, RIGHT)

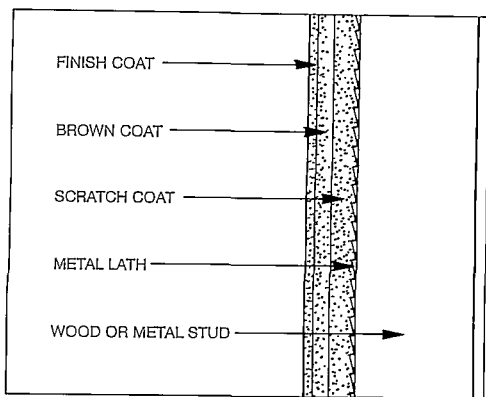


WAYNE CABLE

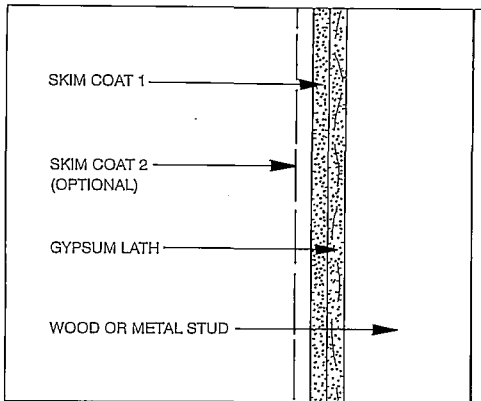


MARK BALLOGG, STEINKAMP/BALLOGG

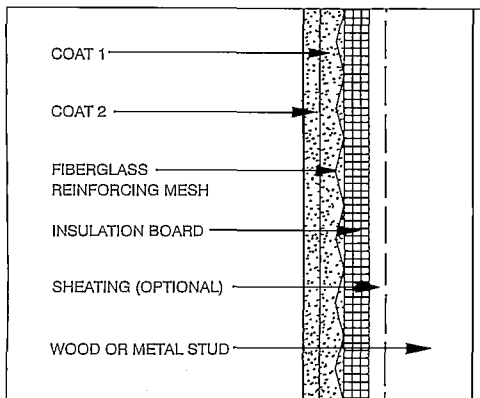
A three-coat, pigment-impregnated plaster finish gives the executive offices of Tisch/Avnet Production Studios by Frank Israel a colorful glow (top left, above, and right). Schroeder Murchie Laya Associates' Lincoln Park Residence in Chicago (center left) features a conical dome roughly rendered in two brown coats of plaster on 1/2-inch gypsum lath. The curved wall of Florian-Wierzbowski's Chicago apartment renovation (bottom left) is finished with a textured three-coat plaster on metal lath.



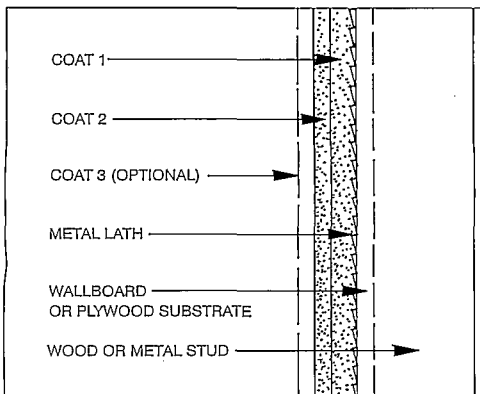
TRADITIONAL 3-COAT PLASTER



VEENER PLASTER (1 OR 2 COATS)



EIFS (MODIFIED STUCCO)



STUCCO (2 OR 3 COATS)

it is dense, also helps to reduce sound transmission. Perlite is another lightweight aggregate that increases plaster's fire resistance and insulating value. A fine silica sand may also be added to the plaster to produce a sand-float finish.

Portland cement plaster, which is commonly known as stucco (bottom left), is ideal for exterior walls because it performs well when subjected to moisture or mild freeze-thaw conditions. Portland cement is made by fusing limestone and clay in a kiln and then grinding the product. Aggregate, usually fine sand or perlite, is an essential element of portland cement plaster. In fact, stucco consists mostly of sand with portland cement as a binder to fill the voids between particles. Stucco requires careful gradation of the aggregates, which increase its density and resistance to stresses caused by thermal and moisture variations. Stucco's texture depends on the finish specified by the architect. Terms for available surface treatments vary according to geographic region, and the chart on the facing page is labeled according to terms and definitions established by the Portland Cement Association.

#### Installation techniques

TRADITIONAL PLASTER IS BUILT UP IN THREE successive layers. The initial coat binds, or "keys," mechanically to its substrate. Then the first coat, or "scratch," is scored to make it a suitable substrate for the second, or "brown" coat. Finally, a third "finish" coat is applied, which keys to the rough coat below. This three-coat method (top left) is not always necessary today, but it provides a conceptual framework for understanding the current installation processes.

The oldest method of plaster installation calls for directly applying the material to a structural masonry wall. Keying occurs because of the surface roughness of the brick or block, so that two coats, a brown coat and a finish coat, suffice. Early in this century, factory-made gypsum blocks became popular for fireproof construction, and stippling was applied to the surface for easy keying of a brown coat. Today, applying plaster to concrete blocks is popular in Florida and the Caribbean, where masonry construction is still cheaper than wood or metal framing.

In the 1920s, wood lath was replaced in wood-frame construction by metal lath, or sheets of steel mesh nailed to studs. Today, expanded metal lath is reserved for exterior stucco installations, and plaster is most often applied over some type of lath board. While

stucco systems are also troweled over various types of board substrates, it is important to note that stucco always keys to metal lath superimposed on the board.

For gypsum plaster, gypsum lath (also called "plaster base") is usually specified. It consists of a gypsum wallboard whose paper facing has been treated with a catalyst to induce rapid setting, and it represents the most widely accepted form of "veneer plaster" (left, second from top). According to John Boland of the Chicago Plastering Institute, veneer plaster is a thin, high-strength material that is applied in either one or two coats to a total thickness that ranges from 1/16 to 3/16 inches. One-coat systems are usually applied as skim coats over gypsum wallboard. The wallboard is then taped at the joints as usual and spackled. A two-coat veneer may be applied to either concrete block or gypsum lath. On concrete, a liquid bonding agent is first applied to the surface; a skim coat of plaster is then added.

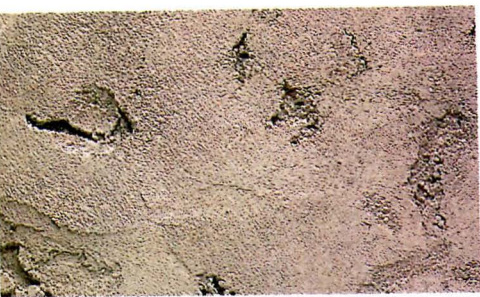
One of veneer plaster's advantages is that it is as hard and durable as paving concrete, or three to four times stronger than gypsum wallboard alone. Despite this advantage, there are a few plasterers who still prefer the old-fashioned three-coat method. Stephen Balser, a plastering subcontractor and president of Art in Construction in New York, maintains that the three-coat method creates an integral skin, while veneer plaster is "only as good as the wallboard."

Veneer plaster is perceived by some in the construction industry as a challenge to more common wallboard partitioning. Clients prefer the durability of plaster and are demanding its use, especially traditional plaster detailing. According to Bruce Pottle of the St. Paul-based Minnesota Lathing and Plastering Bureau, the cost of a veneer plaster wall may be only about \$1.40 a square foot, compared to \$1.25 a square foot for gypsum wallboard—and its durability makes it well worth the expense.

The look of traditional plaster detailing may be achieved through new gypsum-plaster hybrids including glass reinforced gypsum (GRG), a premolded, high-strength gypsum plaster product reinforced with glass fibers. GRG offers a cost-effective solution for multiple custom-fabricated shapes.

#### Stucco applications

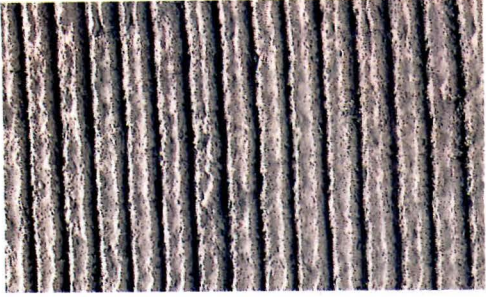
STUCCO SYSTEMS ARE INSTALLED LIKE GYPSUM plaster, except they do not adhere to gypsum lath or any kind of lath board. Stucco may be applied to masonry and concrete



**California:** A thin texture coat troweled over a first coat is applied in a random pattern of overlapping strokes. Higher areas are flattened with a trowel.



**Arizona:** A heavy texture coat is applied with a trowel. After surface moisture is absorbed, a second heavy coat is left rough with small areas of texture.



**Combed:** The finish coat is combed vertically or horizontally with a template of desired spacing to create grooves without exposing the base (brown) coat.



**Scraped:** A "torn" surface is achieved by scraping the 1/4-inch-thick finish coat after it dries with a trowel held at right angles to the plane of the wall.



**Light Lace:** First coat is troweled or dashed to cover base. After the first coat dries, a second coat is applied in random directions and flattened lightly with a trowel.



**Heavy Lace:** A first coat is troweled or dashed to completely cover base. Once the surface moisture dries, a second coat is troweled over it in random directions.



**Light Dash:** A first coat is dashed for complete color coverage. When it dries, a second coat of thinner consistency is dashed or sprayed on with an atomizing gun.



**Briar:** A first coat is applied by trowel. Texture coat is applied by holding trowel at an angle to the surface. The heel of the trowel serves as a pivot point to produce fanlike ridges.



**Rock 'n' Roll:** A finish plaster coat containing a small pebble aggregate is rolled by a trowel for desired texture. Action of trowel rolls the pebbles to create patterned troughs.



**English:** A thick, textured second coat is applied in varying directions in short strokes with a rounded trowel, leaving a rough, irregular pattern.



**Trowel Sweep:** A second coat is applied with overlapping fan-shaped strokes to form narrow, high ridges where mortar flows over the toe of the trowel.

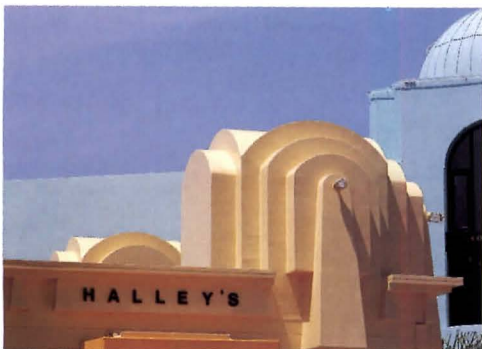


**Tunnel Dash:** A first dash coat produces complete coverage. When the surface has dried a day later, a second, heavy texture coat with a reduced water ratio is applied.



Exterior wall of Whittier College Performing Arts Center (above) by A.C. Martin and Associates of Los Angeles consists of 1-inch-thick stucco on wire mesh over gypsum

wallboard. Cornice trim at curved gable is stucco applied to sharply-formed metal lath, while molding below is applied to a formed Styrofoam substrate.



Ace Architects finished "Aceland," a retail and office development in Oakland (top and above), with an EIFS system. Instead of polystyrene insulation board, however, Styrofoam serves as the underpinning, followed by the manufacturer's three-step system: mesh followed by two coats of plaster, which, according to principal Lucia Howard, is "more elastic than stucco."



In California, ELS/Elbasani & Logan chose stucco for the new Ford Center Fieldhouse at Stanford University (above). The building relates to adjacent Burnham Pavilion (top), a masonry gymnasium renovated by ELS. The firm usually favors EIFS systems in the cool San Francisco climate, but in this project, a gypsum wallboard substrate with building paper replaced the usual insulation board.

substrates, as well as to metal lath over gypsum wallboard, plywood sheathing, or rigid insulation. To save a step, some manufacturers provide a metal lath that comes with a paper backing; the contractor "wraps" the frame by stapling the paper-backed mesh right onto the studs. The building paper covers the plywood sheathing and helps to prevent cracking due to the movement of the wood as it absorbs moisture.

When stucco is applied over rigid insulation, either by spraying or troweling it on, it is called an exterior insulation and finish system, or EIFS (page 88, second from bottom). Such materials are two-coat systems applied over a fiberglass-reinforced mesh adhered to polystyrene board. The stucco in such systems is usually a modified portland cement plaster. Acrylic modifiers are added to the stucco to enhance its elasticity and to allow it to bond more readily to a variety of substrates. These additives cause the plaster to retain water needed for hydration during the curing process. Carol Shen of ELS/Elbasani & Logan says that "contractors prefer stucco lookalikes" because of the speed and ease of working with standardized systems.

#### Architectural applications

WHILE ARCHITECTS SPECIFY PLASTER TO meet the demands of tradition, climate, and cost, many also relish the decorative possibilities of its plastic, monolithic surface. Lucia Howard, a principal at Ace Architects in Oakland, California, for example, exploits the freedom to create fanciful shapes out of plaster (pages 50-55). She believes that the options—GRGs, veneer plasters, stucco—are "becoming more affordable," and that the availability of new EIFS products have sparked interest in plaster in general. Taking advantage of plaster's potential, Howard recently mixed bits of straw with veneer plaster to simulate traditional Japanese walls for a California residence. The plaster was thickened to accommodate the straw and then troweled onto gypsum lath on wood studs.

Over the course of plaster's long history, traditional methods have evolved to take advantage of its inherently decorative nature. Perhaps the technique that best shows off plaster's coloration possibilities is fresco, in which color is impregnated in the plaster while it is wet. Stephen Balsler of Art in Construction produces colored plaster walls by layering two to four coats of pigmented plaster over an existing substrate, often adding wax to the mix to achieve a polished finish.

Stucco Lustru Veneziano, a New York-

based firm featuring the work of Italian artisan Quintilio Polilli, specializes in the traditional Italian plaster finishing known as *sfumatura*, a feathered effect created by overlapping layers of plaster. Adapted to the veneer plaster system, the process involves five to eight coats of pigmented plaster, totalling 1/16 of an inch, troweled to produce a highly colored, mottled effect.

Baltimore artisan Elizabeth Faas enhances plaster wall surfaces with a complex layering technique. First, Faas applies a coat of sealer to the gypsum wallboard or plaster substrate. Then she adds a coat of “modified Venetian gesso” (it contains gypsum plaster), using a palette knife. Since the base solvent of this substance is the same as the sealer, it reacts with the first coat to adhere. It is also “soluble into itself, so it never actually dries,” according to Faas; ingredients in the mix produce a veil of color. Another layer of plaster is added to make the finish somewhat more uniform, although the surface is intended to be uneven. After sanding, a final coat of sealer is added that dissolves through to the first coat. Faas contends that her plastering technique “replicates an encaustic finish.” Encaustic, an ancient beeswax-based paint of which the best surviving examples are tomb paintings in Roman Egypt, was eventually replaced by oil paint.

New York architect Oliver Cope’s plaster detailing represents the most commonly applied traditional plaster finishes, which have changed little over the centuries. For a beach house on Long Island, New York, he designed several traditional plaster motifs in moldings, barrel-vaulted ceilings, and a circular stair tower. Valentino Ciccone, a Stamford, Connecticut-based plaster artisan who worked on Cope’s house, explains that to prepare shop-cast moldings, he creates a wooden template from the architect’s drawn profiles. The model for the molding is then shaped, or “run,” by dragging the template across freshly laid plaster. From this plaster model, he makes a rubber mold from which 6- to 8-foot lengths of the molding are cast.

From Frank Israel’s pigment-impregnated walls to Oliver Cope’s precast moldings, plaster’s versatility encourages a breadth of experimentation for creative practitioners. The material’s persistence is a tribute to its adaptability over the centuries to changing construction methods, although plaster itself has remained essentially the same. ■

—DONALD LONDON

*Donald London is a New York-based architect.*



JOHN M. HALL

**Huge swags in the parlor of a New York brownstone (above) were designed by Robert A.M. Stern Architects and cast from glass-reinforced gypsum (GRG) plaster. A latex**

**mold for the swags was created from a canvas model. The steel-reinforced piece was brought to the site and bolted to the wall. GRG rosettes conceal the fasteners.**



PAUL WARCHOL

**In a midtown Manhattan apartment, architect Steven Holl devised angled, 10-foot-high plaster partitions constructed of three coats of portland cement plaster over steel stud framing. Holl built 1/2-scale cardboard models and took them to the site. “The slight curves in the walls are like the folds in a paper airplane,” he asserts. A final skim coat creates the finish, which is unsealed and unpainted.**



RICHARD CHEEK PHOTOS

**The Treaty Room (top) designed by Allan Greenberg serves as the centerpiece of the Classical reception suite at the Department of State in Washington, D.C. The elliptical ceiling medallion and column capitals (above) are cast from plaster. The entablature is run in wet plaster. Modillions, egg-and-dart, and water-leaf ornament are cast and applied to the cornice and architrave.**

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# Glass Artistry

An architect-trained craftsman develops new techniques and applications.

ARCHITECT AND GLASS ARTIST KENNETH vonRoenn is standing in his Louisville, Kentucky studio, surrounded by fragments of ancient church windows and sketches of his latest projects. "The traditional techniques of leaded stained glass have limited applications; their market is shrinking," he observes. As head of Architectural Glass Art, a studio that combines design and construction, vonRoenn is expanding the applications of the material by developing new fabrication techniques and experimenting with new types of glass.

In 1977, vonRoenn was drawn to Yale University's school of architecture, one of the few schools, he says, where architectural ornament was considered valid. There he studied under Kent Bloomer, a noted theorist on ornament, who calls vonRoenn "as much an architect as an artist; when Ken undertakes a commission, he knows how the building and its space work, and how architecture's narrative and symbolism can exist in glass design." Rather than applying his craft as a pastiche, vonRoenn consults with architects in the planning stages on the properties and technical requirements of new kinds of glass. With an understanding of the entire project-wide esthetic, vonRoenn then either fabricates the glass himself or recommends other

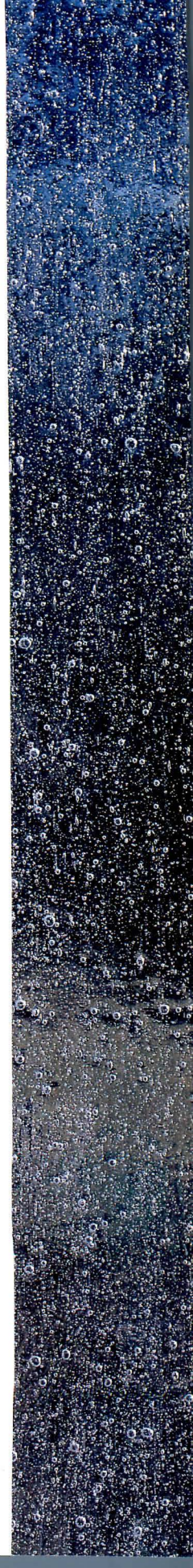
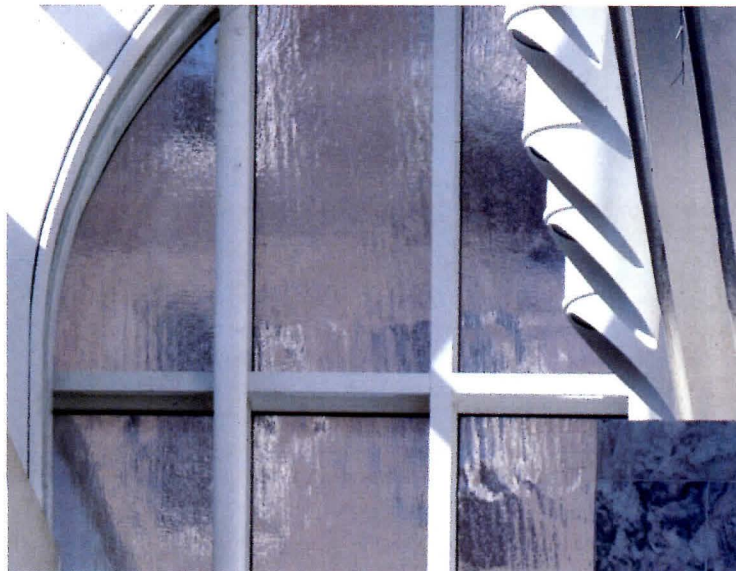
artists who can achieve the desired effect.

VonRoenn counts among his architect clients William Turnbull & Associates, Charles Moore, Herbert Newman & Associates, Cesar Pelli & Associates, Voorsanger & Associates, and HOK. "Ken has an architect's sense of design," comments Turnbull. "He's an architect who has branched out into designing with glass."

VonRoenn began his art-glass career in 1972, pushing a broom for his father-in-law in the very shop he now heads. At the time, it was the Louisville Art Glass Studio, which was founded in 1892 by his wife's great-grandfather and was noted for its stained-glass work. Combining his interest in painting with glass crafting, vonRoenn began to execute his own stained glass designs. After graduating from Yale, VonRoenn returned to Louisville in 1983 to pursue a conventional architectural practice and to continue his art-glass work. He took charge of the Louisville Art Glass Studio in 1990 and reconstituted it as Architectural Glass Art.

The glass that vonRoenn developed for a recent addition to the Pierpont Morgan Library is an exciting example of his command of the latest glass technology. Designed by the New York firm Voorsanger & Associates,

**Voorsanger & Associates' winter-garden addition to the Morgan Library (below left) offers privacy in midtown Manhattan without sacrificing illumination. Textured "seedy" glass (below right) clads the addition's walls and is laminated to tempered glass with a cured liquid-resin core, which allowed the glass to be bent.**



the addition connects Stanford White's Morgan Library at the corner of East 36th Street and Madison Avenue to the J.P. Morgan, Jr., mansion at 37th and Madison with a wintergarden that is enclosed by a curved glass roof and glass walls. Voorsanger wanted the exposed elevation of the addition, particularly the side that faces Madison Avenue, to admit light while maintaining privacy.

"The architects required a handmade quality, so we chose a double-rolled cathedral glass with lots of air bubbles in it," explains vonRoenn. But the glass also had to be strong, malleable, and fabricated in large sheets. "You can't bend conventional laminated glass with a polyvinyl-butyl interlayer," says vonRoenn, "nor can you use PVB with a textured glass." The cathedral glass also had a size limitation of 32 by 84 inches. To achieve curved, laminated, textured glass, vonRoenn adapted a European technique that involved pumping a liquid resin between 1/8-inch cathedral glass and 1/4-inch tempered glass, and then curing it with ultraviolet light. The resulting cured liquid-resin interlayer (CLRI) adheres better than PVB film, is less sensitive to moisture infiltration, has better sound absorption qualities, and is capable of blocking ultraviolet light.

To achieve the large sheet sizes the Morgan required (some as long as 14 feet), vonRoenn developed a production technique in the shop for seaming pieces of laminated glass, which, he claims, had never been done before. The pieces of cathedral glass were joined by 1/16-inch seams filled with silicon sealant, over a continuous piece of tempered glass; the seams were then aligned with the center lines of adjacent horizontal mullions. Architectural Glass Art anticipates fabricating 50,000 square feet of similarly seamed laminated glass for a skyscraper designed by Roche Dinkeloo & Associates that will rise in Singapore.

At North Carolina National Bank's corporate headquarters in Charlotte, designed by Cesar Pelli & Associates, vonRoenn installed a CLRI-laminated, double-rolled colored glass ceiling. "The biggest problem was to illuminate the 2,000-square-foot ceiling evenly," says vonRoenn, who built a mock-up (as he does with many of his projects) of the ceiling to study its lighting. Even distribution was achieved by bouncing fluorescent lighting across a vault above the glass lay light. "Ken has a very high level of craftsmanship, and we're delighted with the result," remarks Pelli.

The atrium of the Mountain View City Hall, vonRoenn's largest project to date, is a good example of his creative collaborations

with architects. When William Turnbull won the competition for the building's design, he had vonRoenn in mind for the 7,000 square feet of glass that would adorn the atrium skylight and four stories of the atrium's walls. VonRoenn had previously teamed up with Turnbull and Charles Moore on glass for a house that was designed for developer Gerald Hines in Aspen, Colorado. "Part of Mountain View's budget was for public art," explains Turnbull. "I didn't want a gigantic piece of unrelated sculpture sitting in a plaza. Architecture is space and light, and I wanted to incorporate artwork into the glass."

VonRoenn started work on the atrium's glass during the schematic design phase. "To be most effective, I have to start as early as possible in the building process—to understand in broad terms what the architecture is about, and what the role of the art will be," says vonRoenn. For the city hall, he chose to emulate a nearby Bay Area architectural landmark: Willis Polk's 1917 Hallidie Building in San Francisco, a lacy filigree of cast iron and glass considered to be one of the first glass curtain wall buildings (ARCHITECTURE, November 1990, page 106). Mountain View City Hall features a similar layering of gridded glass that stresses the verticality of the atrium and draws attention to the 100-by-40-foot gabled skylight.

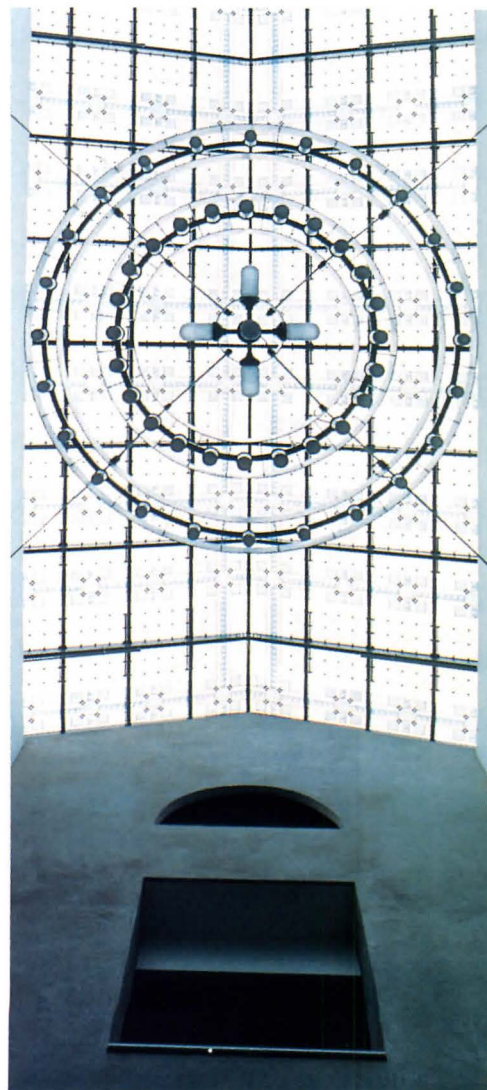
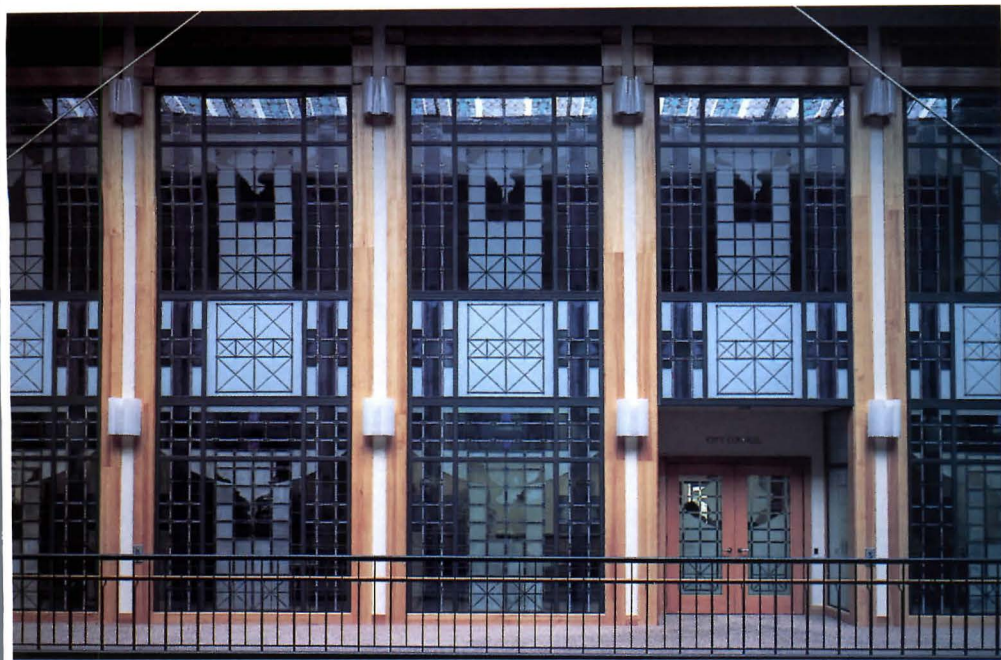
For the atrium space, vonRoenn created a collage of blue and green leaded glass, white antique glass, and textured clear glass that has been sandblasted with geometric patterns and molding profiles. Small pieces of beveled glass mark the intersection of overlapping grids in the design, while other pieces are silk-screened with ceramic frit depicting Classical architectural details from turn-of-the-century ornamental-iron catalogs—cornices, moldings, and scrollwork. The result is a rich, complex design. But the atrium is also a utilitarian space that provides natural light while the glass maintains the privacy of the offices that face it.

Experimenting with new glazing technologies and products is a staple of vonRoenn's work. For the windows and doors of the Hammond Residence in Louisville, for example, he fused horizontal strips together with an ultraviolet adhesive; the bevels appear to be carved seams that arc across the surface, echoing the curves of antique glass. "An ultraviolet adhesive cures with UV light," explains vonRoenn, "and has a coefficient of expansion comparable to the glass." Thicker lead between the glass strips at the edges than between those toward the middle gives



**Mountain View City Hall**  
Mountain View, California  
William Turnbull Associates, Architects

**A civic landmark for the heart of Silicon Valley, 40 miles south of San Francisco, the 77,000-square-foot Mountain View City Hall (above) is paired with a 46,000-square-foot community theater. The two buildings define a plaza and create a gateway between octagonal towers (top and facing page, top right). At the center of the City Hall is a four-story atrium (facing page), where Ken vonRoenn's glass artistry is given full rein. Turnbull evokes images of nearby Bay Area vernacular architecture through stucco-covered towers and bays, while vonRoenn turned to San Francisco's most famous glass-and-iron landmark, the Hallidie Building, for his inspiration. On the atrium's two upper floors (facing page, top left), blue and green glass at the outer edge of each bay is painted with cast-iron details from 19th-century building catalogs, while glass at the bay's center is sandblasted with profiles of Classical moldings and geometric patterns. Fire codes dictated that the art glass be sandwiched between two pieces of tempered plate glass. Gridded designs of blue and green glass appear in the skylight (facing page, bottom left and right), washing the atrium's side walls with a cascade of color. The design is applied with a colorfast paint, which does not discolor when exposed to ultraviolet light, to a polyvinyl-butyl film placed between the two sheets of tempered glass.**



the glass a layered look. Similar techniques were applied to the glass doors of the Lustgarten Residence in Loveladies, New Jersey, and to the doors and windows of the Guthrie Residence in Anchorage, Kentucky.

Dichroic glass is one of the newest materials that vonRoenn is now working with. Developed for the U.S. Army, dichroic glass is coated with metallic deposits that convert the spectrum of light hitting it into a single wavelength. "Pure white light is reduced to one color when it passes through dichroic glass," says vonRoenn, "while the glass reflects the color on the opposite end of the spectrum." The color of the light changes as it strikes the glass at different angles, and as it is viewed from different angles. VonRoenn has incorporated dichroic glass into a sculpture that is to be placed under a skylight in the Maricopa County Administration Building in Phoenix, Arizona; mock-ups of the piece demonstrate the glass's chameleonlike quality.

Renewed interest in the craft among manufacturers is leading to increased flexibility in glass. One industry trend, says Nick Lamb, architectural products manager of Libbey-Owens-Ford, is to try to get the best of hard and soft coats in a single piece of glass. Hard coats, durable coatings that are applied during glass production, offer good light transmission, but they also have higher shading coefficients. Soft coats, such as reflective coatings, which are applied after glass is produced, have the opposite qualities: they are less durable, allow less light transmission, but offer lower shading coefficients. "We're trying to develop glass that cuts out more solar heat without cutting out light," asserts Lamb.

Raymond G. Gallagher, senior research associate of the flat glass products division of PPG Industries in Pittsburgh, Pennsylvania, adds that glass with electromagnetic interference shielding is being studied. "This glass would provide protection from invasive electromagnetic surveillance, offering security without having to resort to windowless rooms," Gallagher notes. PPG is also working on unique glass compositions that will, unilaterally or in conjunction with thin coatings, help control solar heat loads in buildings and automobiles.

Continuing efforts by glass companies to produce stronger, more energy efficient, and more versatile glass will allow architects greater latitude in their design. Such breakthroughs in glass research will also provide new raw materials for fine artists like Ken vonRoenn to expand their craft. ■

—MICHAEL J. CROSBIE



The leaded glass front door and side lights for the Guthrie Residence (above) in Anchorage, Kentucky, grew out of the client's wish for privacy. VonRoenn incorporated a variety of glass types: long, horizontal, and curved pieces of beveled glass that are joined with a clear adhesive cured with ultra-violet light; circular scallops of beveled glass laminated to antique glass; beveled glass prisms; sandblasted stripes on clear glass; and colored antique glass. The project won a grand prize in the 1987 American Craft Awards, sponsored by *The Guild* magazine.

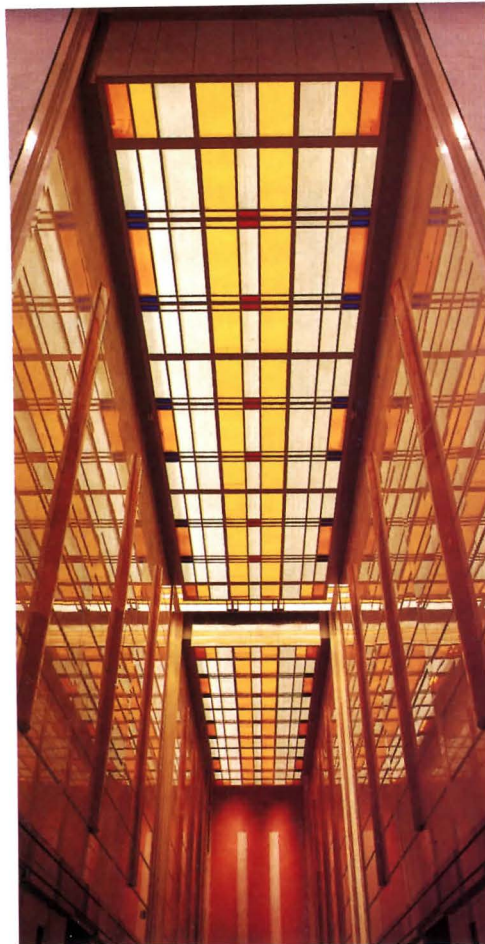
The Hammond Residence in Louisville (left) incorporated vonRoenn's glass in a pair of doors and two arched living-room windows, 3 feet 6 inches wide by 9 feet tall, that face an entry court, making privacy a design consideration. The windows include leaded beveled glass joined with a clear, UV-cured adhesive and antique glass. VonRoenn notes that the house is designed for formal entertaining, a purpose he kept in mind when he incorporated a combination of 1/2-inch, 1/4-inch, and 3/16-inch leading to create a sense of multiple layers.

MIKE ROBERTSON

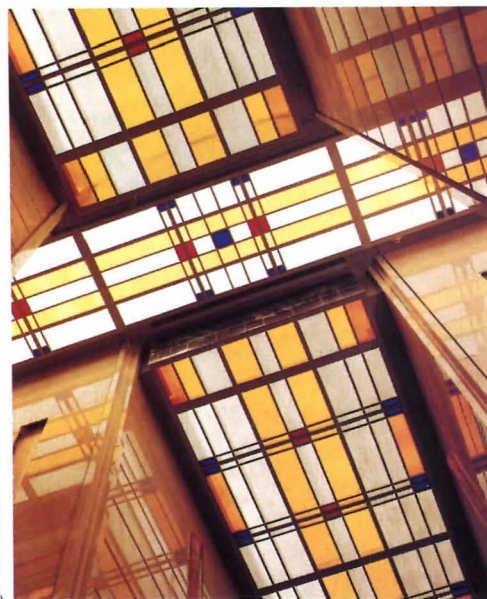


To maintain privacy between living areas and a master bedroom suite in Madden & Ryan Architects' Lustgarten Residence in Loveladies, New Jersey, vonRoenn created a pair of 9-foot-high glass doors (above) framed in aluminum for stability. Leaded antique glass that had been airbrushed with white and rose glass paint, beveled glass, and circular glass lenses were attached to a painted-aluminum H-channel frame with a silicone adhesive. The aluminum crossbar near the top of the door adds lateral strength and is located above head height to reduce the scale of the door.

At Othello's Jazz Club (right) in downtown Louisville, Kentucky, musical rhythms are replicated by laminating beveled glass to plate glass with a ultraviolet-cured adhesive. The lower half of the plate glass is sandblasted except where the beveled glass occurs, an effect achieved by masking the plate glass with rubber adhesive strips before sandblasting. The upper portion of the window is punctuated by horizontal rows of beveled prisms. By magnifying and refracting the movement of traffic and passersby, the piece incorporates the streetscape.



Cesar Pelli's design for a luminous lobby ceiling (left and below), in North Carolina National Bank's headquarters in Charlotte, was fabricated by vonRoenn's shop. The material consists of a textured colored glass laminated to tempered glass—required by code—with a cured liquid-resin core and suspended in an aluminum frame. Rather than illuminating the ceiling with fixtures directly above the glass, fluorescent light is reflected off hidden vaults to ensure balanced illumination.



JOANN SIEBURG-BAKER

JOANN SIEBURG-BAKER



MIKE ROBERTSON

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ARCH 192

# Toward a Greener Architecture

AIA's newly issued Environmental Resource Guide focuses on building materials.

"WHEN YOU BUILD A BUILDING, YOU RAPE the Earth." Buckminster Fuller's sentiment notwithstanding, the American Institute of Architects hopes to encourage architects to design environmentally responsible buildings. Toward that goal, the first issue of the AIA's Environmental Resource Guide (ERG) makes its debut this month. The guide, a quarterly publication available by subscription, is intended to raise the profession's consciousness about how design choices affect the environment.

To produce the publication, a new AIA Committee on The Environment (COTE) was formed in 1990 by members who have long been involved with environmentally conscious design, such as William A. McDonough, Robert J. Berkebile, Gregory Franta, and Paul Bierman-Lytle (ARCHITECTURE, May 1991). COTE also consults with an advisory group comprising environmental experts, among them David Goldstein, a senior staff scientist of the Natural Resources Defense Council (NRDC); Robert Simmons, a policy advisor with the U.S. Environmental Protection Agency's Pollution Prevention Office; and H. Patricia Hynes, director of the Amherst, Massachusetts-based Institute on Women and Technology. Private consultants, such as Scientific Consulting Group in Rockville, Maryland, contributed to the ERG's first issue.

According to Robert Berkebile, a Kansas

City architect who chairs the Committee on The Environment, the ERG is intended as an evolving document. The fluid nature of research and findings on environmental issues makes it impossible to produce a step-by-step guide for environmentally sensitive architecture, since a consensus has yet to be reached on what constitutes a truly "green" building. The airtight, sealed buildings of the 1970s, for example, were considered paragons of energy efficiency, but turned out to be harbingers of "sick-building syndrome" and other environment-related illnesses.

## Ecological questions

AS A RESULT OF SUCH CONTRADICTIONS, THE guide typically raises more questions than it answers, according to AIA staffer Douglas Greenwood, who is project manager for the ERG. As its name suggests, the guide is intended more as a guide book than a reference book, such as AIA's *Architectural Graphic Standards*. It addresses problems posed by buildings in a natural setting—site planning and design; materials selection; energy and its conservation; waste; and building ecology. Separate sections on each topic open with an overview of the problem, followed by research findings and technical information.

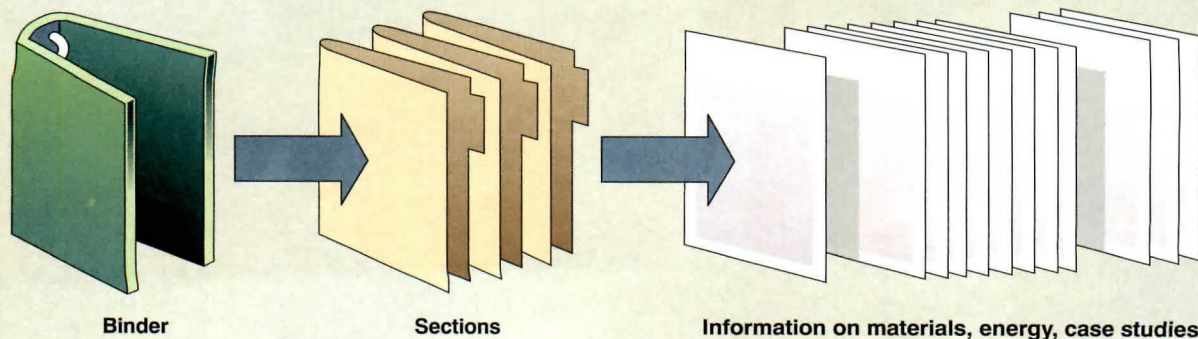
For instance, the ERG prompts architects to ask whether there are ways to shift energy use from supplies that are nonrenewable and

create pollution to those that are sustainable. How would energy conservation and renewable energy reinforce important design objectives? What code trade-offs might be allowed in an energy conserving design? Most significantly, the guide asks architects to question whether new construction is needed at all—will preserving an existing building fit the client's needs? Such an approach will conserve what the guide refers to as the "embodied energy" represented in the materials of an existing building: "the energy it took to harvest, manufacture, transport, and install materials in the structure. It is not unusual for embodied energy to be equivalent to 10 years' worth of operating energy for a building."

When contemplating site design, the ERG recommends that architects consider rare ecosystems or valuable minerals on the site. The guide poses such questions as: have hazardous materials been dumped here? How much energy will be consumed in changing site contours? Will chemicals in the soil react with construction materials?

Building materials should be selected according to how much energy is required to make and maintain them, whether the materials are made with renewable or sustainable energy sources, how much energy is required for transportation, and how much waste results from installation. As Greenwood points out, most manufacturers are tuning into

## AIA Environmental Resource Guide



**AIA's Environmental Resource Guide is a quarterly document available on a subscription basis that comes in a three-ring binder so that updated information can be easily added. Sections address various environmental issues, from tropical rain forests and materials analysis to the ecology of the architect's office.**

environmental concerns of consumers because they know it's good business. Adds Berkebile, "We've started a network among environmental groups, architects, and industry to approach this as a team. And we've found that industry wants to produce benign products." He adds that manufacturers are now coming to the AIA for specifications on how to make their products more environmentally sound.

The resource guide will regularly present case studies that exemplify environmentally conscious design. The first issue examines the new headquarters for the National Audubon Society, designed by the Croxton Collaborative of New York as a renovation of a 19th-century warehouse in lower Manhattan (ARCHITECTURE, May 1991, pages 104-105). Original materials were recycled and new elements specified according to their content of recycled products.

The resource guide culminates with a bibliography of periodicals, catalogs, and books that focus on environmental issues. The guide also includes information on product sources, such as the Nontoxic Hardware Store in Riverside, California, which specializes in "products for the chemically sensitive and environmentally aware," and an index of names, addresses, and brief descriptions of 70 environmental groups nationwide.

#### Aluminum analysis

THE MOST PRODUCT-SPECIFIC INFORMATION in ERG's first issue focuses on building materials, specifically aluminum and particleboard. These materials were chosen because of their widespread application in buildings and—perhaps reflective of the guide's dependence on the vagaries of environmental research—because there is "more available data on them," according to Doug Greenwood. The

section on aluminum presents a lengthy discussion on the environmental hazards of mining bauxite, from which aluminum is made. Bauxite accounts for approximately 8 percent of the Earth's crust and is strip-mined for aluminum manufacture. Mining sites are cleared of trees and soil, layers of bauxite as much as 15 feet thick are removed, the soil is replaced, and trees are often replanted.

Four to six pounds of bauxite are required to produce a pound of aluminum, and 8 percent of the life-cycle energy consumption of aluminum occurs in the mining and refining

### **It is impossible to produce a step-by-step guide for environmentally sensitive architecture, since there is no consensus on what constitutes "green" buildings.**

process. Aluminum requires 11 times more energy to produce than steel, although steel generates far more hazardous waste. Bauxite must be ground, heated to remove water, mixed with caustic soda, and again heated in a kiln at 2,000 degrees Fahrenheit. The result is powdered aluminum oxide, which is processed into metal. The powder is dissolved in a molten salt bath, through which 50,000 to 250,000 amperes of direct electrical current are passed, causing the solution to separate into aluminum and oxygen. Temperatures of 3,000 degrees Fahrenheit are necessary to induce the separation. "In contrast," notes the guide, "scrap melting [of recycled aluminum] requires only 1,200 degrees Fahrenheit," and only 5 percent of the energy required to produce the metal from bauxite.

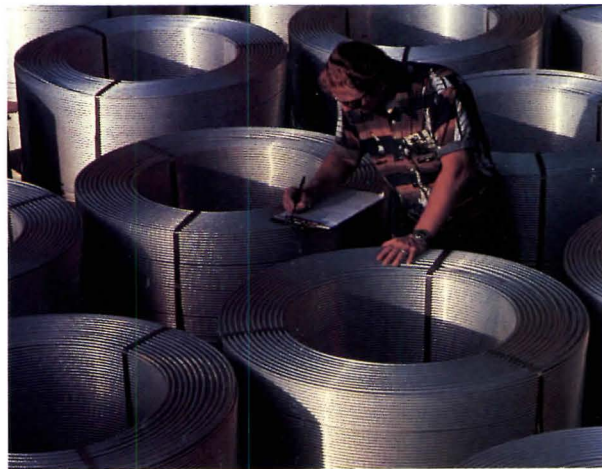
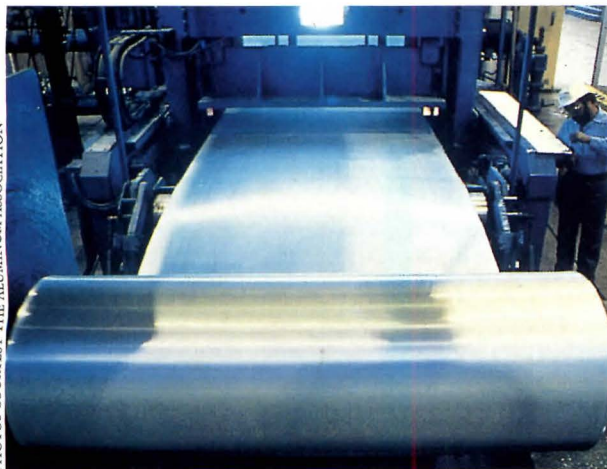
Aluminum production annually generates about 115,000 tons of wastes containing fluoride, cyanide, and miscellaneous smelting plant residues.

Currently, recycled aluminum culled from used beverage cans and scrap auto parts accounts for approximately 28 percent of total production. Very little aluminum—approximately 15 percent of the total used in construction—is recycled within the construction industry for several reasons: aluminum is usually bound into buildings (such as in pre-cast or poured concrete) making it difficult and economically inefficient to separate. There is no established recovery system; scrap metal from demolished buildings is often dumped as landfill; and aluminum's resistance to corrosion assures it a long life.

Architects concerned about aluminum's energy waste should specify building products that use recycled aluminum, or design building assemblies that allow easy extraction of the material for recycling. The guide repeats the NRDC's suggestion that architects can keep up the demand for recycled aluminum, thereby increasing the incentive to reuse it. The ERG also recommends that innovative construction and demolition methods be employed so that more used aluminum can be reclaimed, but it leaves it up to the architect to develop such processes.

#### Particleboard analysis

THE SECTION OF THE ERG DEVOTED TO PARTICLEBOARD outlines its prevalent use in the construction industry as floor underlayment, door cores, shelving, and floor decking. Particleboard is made primarily of sawmill waste, so it generates little energy waste in its construction. The material's primary components are wood chips, shavings, and sawdust bound with resin adhesives. The wood



**Aluminum is one of the first materials analyzed in the ERG. Fabrication (left) of the metal typically requires approximately 90,000 Btus per pound of material produced, making it one of the costliest materials in terms of energy consumed. Recycled aluminum reduces energy consumption by 95 percent.**



particles are sprayed with the resin adhesives and are then cured at temperatures up to 200 degrees Celsius under pressure of approximately 1,000 psi.

Of all the particleboard produced in the U.S., 98 percent is bound with urea formaldehyde (UF) resin. Phenol formaldehyde (PF) is also used, as is isocyanate (ISO) crosslinking resin. Formaldehyde is a hazardous substance, classified as a probable human carcinogen by the National Institute of Environmental Health Sciences. It can cause eye, nose, and skin irritations; bronchial asthma; nausea; headaches; and other allergic reactions. Its negative environmental effects derive from off-gassing. Studies indicate that certain types of UF particleboard emit volatile organic compounds such as acetone, hexanol, and nearly a dozen chemicals, half of which are suspected carcinogens. According to the National Particleboard Association, however, formaldehyde emissions have been cut by 80 to 90 percent over the past decade. ISO resin particleboard contains no formaldehyde, and consumes less energy than PF particleboard in its curing process. PF particleboard costs approximately twice as much as UF board, while ISO board is higher still. Both materials are more costly because they are resistant to water (unlike UF board), and ISO is a more expensive resin.

The resource guide asks architects to consider specifying exterior-grade particleboard—specifically PF and ISO, rather than UF—for all applications because these board types resist moisture, and formaldehyde emissions rise with exposure to humidity. Thus, the use of particleboard should generally be avoided in areas that will regularly experience high temperatures and/or high humidity. ISO particleboard should be specified for buildings occupied by those known to be sensitive to

formaldehyde. For the first year after the material's installation, ventilation rates should be boosted beyond ASHRAE standard 62-1989. Architects should also be aware of the combined effects of formaldehyde emitted by durable-press fabrics, coated paper products, certain types of foam insulation, cosmetics, paints, and other coating, in addition to particleboard.

#### **Environmental responsibility right now**

BEYOND SIMPLY RAISING ARCHITECTS' AWARENESS of environmental problems, the ERG presents five actions that architects can take

### **The guide is a means of encouraging a dialogue among architects, manufacturers, and builders about the environmental impact of their work.**

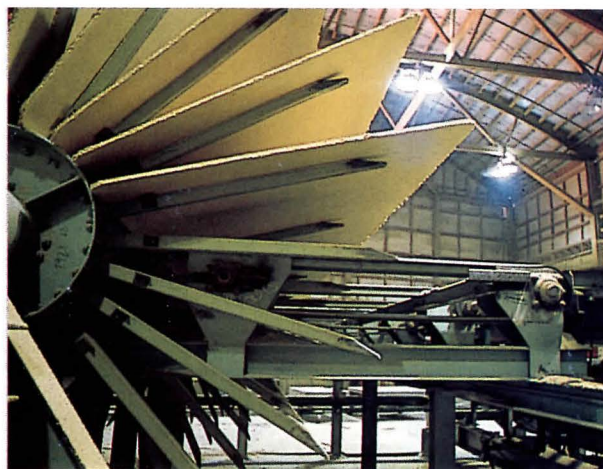
immediately to safeguard the environment. Architects can maximize client participation in all utility-sponsored rebate-incentive programs to conserve energy and other natural resources. They can stop specifying cooling systems that contain refrigerants with ozone-depleting chlorofluorocarbons. They can actively support utility companies' energy initiatives and the life-cycle costs method of selecting systems and assemblies for heating, cooling, and lighting. They can specify woods from sustainable forests, and they can meet or exceed ASHRAE 90 standards for outside air (approximately 20 cubic feet per minute per person) in all projects.

Robert Berkebile emphasizes that the other way architects can contribute to reducing the environmental impact of their buildings

is by critiquing the ERG. He describes the guide as a means of encouraging a dialogue among architects, manufacturers, builders, and related professionals about the environmental implications of their work. "We're soliciting feedback from engineers, architects, and anyone else who is reading this material," Berkebile explains. "The only way we can make the guide user-friendly is to modify it based on their criticism." Kirk Gastinger, who serves as vice-chair of COTE's steering group, notes that the guide will be criticized by architects because "there are no answers here. The ERG doesn't simply say, 'this product is bad for the environment, so specify such-and-such alternative.'" But Gastinger points out that the "concept of the guide is well ahead of the science," and it will be up to architects to put pressure on manufacturers to design products that are environmentally responsible.

In the resource guide's introduction, Berkebile writes, "We faced a critical question: when to publish. Four or five years down the road, when more data is in, or now, with fragmentary data at best. As the Committee on The Environment wrestled with the decision," Berkebile reports, "we discovered that architects were anxious to have any information at all. We decided to share this knowledge as soon as it's available." The three-ring binder format makes it easy to discard out-of-date information, add new sections as they become available, and supplement the guide with material on environmentally conscious architecture collected by the subscriber. Future issues will focus on building ecology, tropical rain forests, and energy conservation. An annual subscription costs \$125 for AIA members and \$200 for nonmembers. ■

—MICHAEL J. CROSBIE



**Particleboard's prime ingredient is sawmill waste (far left), which accounts for 90 percent of its content. Boards are formed (left) by spraying the material with formaldehyde resin and compressing it under high temperatures. Formaldehyde may release gases that are known to be carcinogenic.**

# THE ARCHITECTURE OF THE HOUSE

Deborah K. Dietsch Coordinator/Moderator  
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**Transforming the Traditional House**  
Influence of residential designs on new mixed-use development.

**Jan. 28** Hank Koning & Julie Eizenberg  
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Relationship between form and function in custom residences.

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# New Frontiers in CAD

Recent software developments closely simulate how architects really design.

WILL COMPUTER-AIDED DESIGN OF THE FUTURE resemble Captain Kirk's exploration of new worlds through holograms? Or will it look more like HAL orchestrating a host of databases to synthesize an integrated model of the universe? In either case, technological developments over the next decade should make such visions less farfetched. Only 20 years ago, most software was limited to straightforward automation of drafting and analytical tasks. Now, software can give architects capabilities impossible in other media. Although the drama of *Star Trek* or Stanley Kubrick's *2001* may not accompany these new systems, their three-dimensional visualizations and descriptive databases will increasingly change the way architects design.

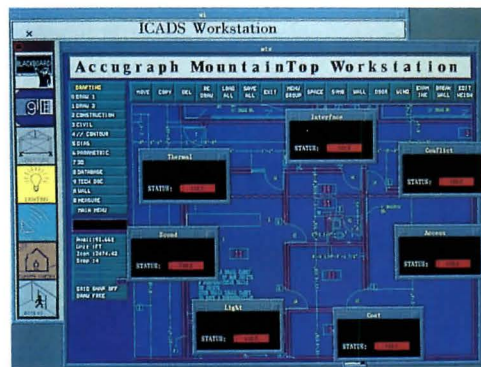
Most recent software developments would not have been possible without today's more powerful hardware. Faster computations and larger memory capacities enable software developers to implement high-resolution renderings, designer-friendly interfaces, and integrated databases. More importantly, many developments rely on architects' thinking about what might help them work more efficiently and creatively. Known as expert systems, napkin software, and virtual reality, these innovations allow architects to mechanically approximate the design process better than conventional CADD systems.

## Expert systems

IN SIMPLE TERMS, ARCHITECTURAL EXPERT systems are software bodies of knowledge that architects can consult during design. They usually combine large databases of technical

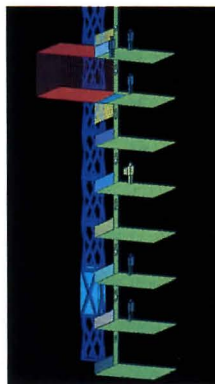
information and design rules with an "inference engine," which applies logic in deriving meaning from drawings. Still in their infancy, most such systems focus on narrow aspects of design or technology, such as specifications (ARCHITECTURE, March 1991, pages 157-160).

A new version of Unix-based Mountaintop, due out later this year from El Paso, Texas-based Accugraph, is an attempt to broaden the focus. Known as ICADS, the Intelligent Computer-Aided Design System, it includes a collection of "intelligent consultants" that was originally developed at the CAD Research Unit of California Polytechnic State University. ICADS figuratively looks over the architect's shoulder. Its geometry interpreter differentiates between walls, windows, and other drawn elements. Six expert "observers" continually evaluate drawings for lighting, structures, access between spaces, acoustics, thermal control, and cost. Their job is to advise the architect when they spot potential problems, according to their databases of "knowledge," which include building codes, site requirements, climate data, and design information. For example, if an architect draws a room without windows, the daylighting adviser will comment. The designer can then request additional information or decide to postpone consideration. When the suggestions from several advisers conflict, such as when win-

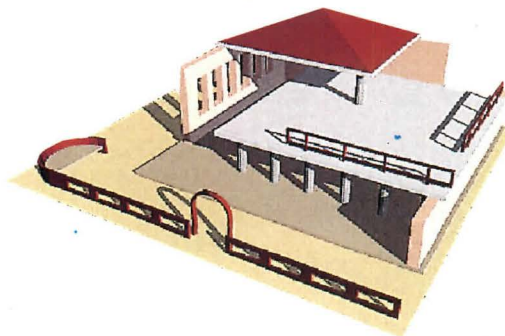
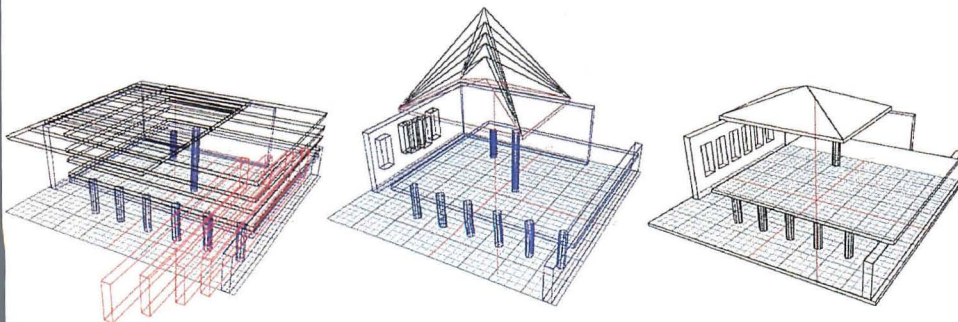


Continuous design feedback is provided by the Intelligent Computer-Aided Design System, or ICADS (above), operating within Accugraph's MountainTop. ICADS interprets the geometry of a drawing and provides

expert advice in several areas, including lighting, structures, and acoustics. The Construction Visualizer from Georgia Institute of Technology (left) simulates construction processes, assists with on-site placement of materials, and provides visual communication between designers and contractors. A material hoister simulates the vertical movements of workers and equipment, optimizing construction planning. The ability to design in perspective with



Form-z by Autodesk (below, left to right) enables an architect to instantly create, transform, move, and visually explore a variety of geometric configurations before settling on a final design.

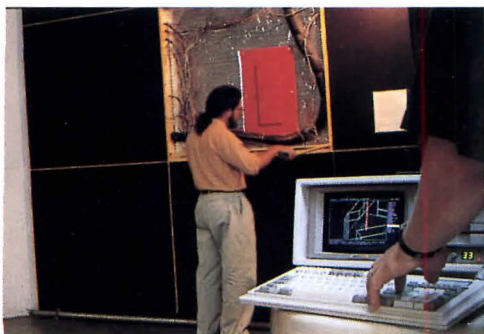


dow placement is good for daylighting but detrimental to thermal conditions, the program provides alternate resolutions.

Sara FDS is a facility design system from Sara Systems of Las Cruces, New Mexico, that provides support for design and analysis from building concept and construction documents to facility management. Available for DOS, Macintosh, and Unix environments, Sara FDS has been built around extensive capital-projects databases and the Cost Data-bank, which has been compiled over the past 25 years by the Association of University Architects. These databases enable the software to make inferences about a proposed building based on such minimal project information as location, construction timing, and building type. With programmatic needs, historic precedent, adjacency criteria, code requirements, and other information, the system can automatically generate building programs and bubble diagrams. At every step, the architect can modify the results provided by the computer before proceeding. Through this interactive editing, spatial diagrams can be developed into preliminary floor plans that can then be exported to CADD systems as a basis for working drawings. Sara FDS also evaluates alternative building systems and generates construction estimates, schedules, and facility-management inventory databases.

Another expert system is the Construction Visualizer, currently under development at the School of Civil Engineering at the Georgia Institute of Technology, which simulates the construction process and enables managers to anticipate site and building development. Unlike two-dimensional drawings, which

**On-site measurements are transferred directly into Generic 3D (below left) by architects from Seattle's Workshop 3D. This model evolves into the final design (below center) which is consulted during construction to locate footings and measure materials. The final rendering (below right) is another generation of the same model.**



**Upfront, by Alias, facilitates urban infill design by overlaying a computer model on a scanned photograph of an existing site (above). Perspectives and shadows are easily adjusted to match the context.**

quickly become obsolete as construction progresses, the simulator allows builders to rehearse procedures, anticipate problems, and locate building materials and equipment. For example, a construction supervisor could decide where to place a crane based on the speed and reach of the crane's boom, the material hoister's specifications, the workers' paths, and the topography of the site.

#### Napkin software

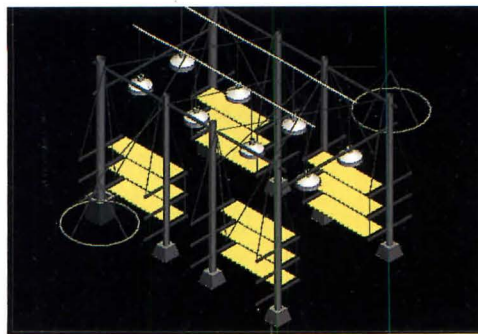
WHAT THESE EXPERT SYSTEMS AND SIMULATIONS have in common is that they are more attuned to what architects need than to what is easy to program. This is also true of "napkin software," the electronic equivalent of preliminary design sketching. These systems, unlike other 3D modelers, are inexpensive, easy to use, and, most important, are able to draw in perspective. They are gaining in popularity because they match many architects' habit of conceiving a design in 3D rather than 2D. Unlike high-end systems, in which multiple views of a design are displayed but only one 2D plane is available for drawing, these systems give the architect the sensation of creating and manipulating solid objects.

Drawing in perspective has long been a programmer's nightmare, because any point

on a 2D projection of that view is ambiguous and could represent an infinite number of points in 3D space. Interpreting the designer's spatial intent from a 2D cursor's location has required clever interfaces that exploit certain assumptions about buildings and about how architects read drawings. Unlike generic modeling systems that must accommodate free-form product design, these systems accept (but are not limited to) simplifying conventions about horizontal floor planes, the verticality of walls, and so on. A few programs that now operate in a "napkin" fashion are Form-z by Autodesk of Columbia, Ohio; Upfront by Toronto-based Alias; Generic 3D by Autodesk of Bothell, Washington; and ModelShop by San Francisco-based Paracom.

Architect Ray Freeman, principal of the Seattle-based Workshop 3D Design Studio, has been working with Generic 3D for several years. "I promote the idea that you design a three-dimensional object in 3D," he says, "then project 2D drawings as necessary to get it built." But he has encountered resistance from other architects who have grown accustomed to visualizing buildings through 2D projections because they are easier to prepare when drawing by hand. "It's a catch-22," Freeman explains. "For a long time, architects didn't realize that computers could allow them to draw in 3D, so they didn't pressure software developers to give them the means to do it." Now that this mode of designing is available, it may encourage both architects and developers to expand their ideas about other facets of design thinking that may be computable.

Although different from the software mentioned above, because the user draws in plan while watching the model develop in 3D, Virtus WalkThrough from the Virtus Corporation of Cary, North Carolina, has a few other features that are designed to accommodate architectural thinking. For example, the designer does not have to begin by creating walls that imply a surrounded space; it is also possible to create the space itself as



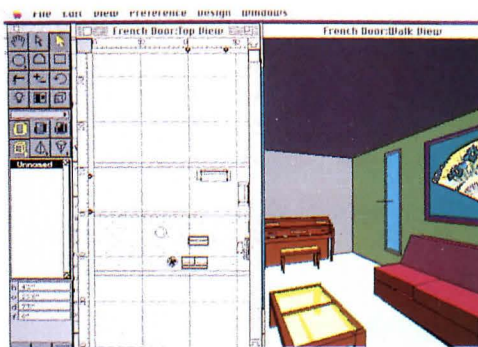
an object. According to Jay Pace, computer manager of The Taliesin Architects, this is how Frank Lloyd Wright thought about design. "Wright thought the reality of the building was the space within the walls," Pace says. "With Virtus WalkThrough, we can build the volumes of space first and later build the walls around the space." Another unusual feature of this software is that by moving the cursor over the plan, the designer sees a real-time animation of the space. This process provides a sense of immediacy and control over the environment that, even though the images are simple, is qualitatively different from the delayed feedback normally associated with setting up and then computing an animation.

### Virtual reality

IMMEDIATE RESPONSE IS AN IMPORTANT ELEMENT of the technologies known collectively as "virtual reality." These systems enable users to view, navigate, and modify computer-generated environments. Some systems include a helmet with a slightly different display for each eye, adding a stereoscopic effect to the impression of spatial reality. Although public interest has grown faster in the past year than the number of available products, these systems hold tremendous appeal for architects who, a few years from now, will be able to manipulate realistic architectural elements and tour clients through unbuilt projects.

One of the few commercial products available is WorldToolKit from the Sense8 Corporation of Sausalito, California. Though intended for further customization by programmers, the system includes a demonstra-

**Applications of virtual reality allow designers to walk through a space and test such elements as color, lighting, texture, accessibility, and traffic patterns. In this Sense8 rendition of Rockwell International's command/control facility, originally modeled in Autocad, the user moves through the space at a normal walking speed, (below, left to right).**



**Virtus WalkThrough allows a designer to walk through a space and turn around in it. Though restricted to relatively simple models (above), its immediacy of feedback challenges high-end virtual reality applications.**

tion application for architects. A designer can "walk through" a model that has been imported as a DXF file, and, with special input devices, interactively apply texture to surfaces, modify lighting, and edit objects. Apparent movement through the modeled space is fairly smooth and realistic (depending on the sophistication of the host hardware), but it's still easier to create and modify the design outside the virtual world, back with the familiar mouse and keyboard.

In spite of virtual reality's obvious potential, the marketplace has not been flooded with such products geared to the architectural profession. The hurdles are both technical and financial, according to Robert Jacobson, associate director of the Human Interface Technology (HIT) Laboratory at the Washington Technology Center in Seattle, one of several U.S. laboratories investigating these issues. He cites four major areas in which the technology needs work: modeling software tools for designing within virtual worlds, telenetworking to link geographically separated firms, higher resolution visual displays, and better position sensors to improve mobility. New solutions may require quantum leaps beyond current capabilities. For example, instead of trying to push the limits of

miniaturized, high-definition display screens, the HIT Lab is developing ways to create images inside the eye with lasers that scan images directly onto a viewer's retina.

Because visually complex environments are difficult to reproduce in real time, another important research question is how much audiovisual detail is required for various purposes. In "Virtual Seattle," a few elements such as the Space Needle, a ferry, the Kingdome, and Mount Rainier give participants enough cues to identify the city. But understanding the attributes of the space is more complex. HIT Lab researcher Bill Wiseman explains, "We don't yet know what spatial elements are needed to adequately define a space. We're trying to understand the distinction between place and space."

An interior environment may be characterized by static elements such as color, lighting, and textures, and by dynamic elements such as access, acoustics, and traffic patterns. According to Wiseman, virtual reality provides the first opportunity to combine all these elements in a dynamic, three-dimensional environment and to communicate them to the entire development team. "The key," Wiseman claims, "is to build a design system that has a full complement of tools that are intuitive to use."

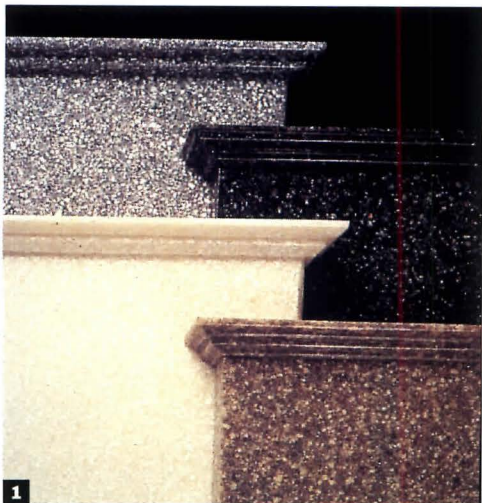
Urban planners by training, Jacobson and Wiseman are frustrated by the lack of support from architects in funding technological developments. Jacobson argues, "Architects may think this is a good idea, but they have to demonstrate their commitment. Otherwise, they'll end up with tools built for some other industry's purpose. If architects got behind virtual reality, they'd discover that the whole field would begin to respect their needs." He adds, "We can already help architects experiment with the building's design. But forcing us to find solutions to specific problems will give technology the boost it needs. It's a difficult leap of faith, but I'd like to show somebody the possibilities." ■

—B.J. NOVITSKI



# True Colors

Synthetic products imitate natural materials and offer bright palettes.



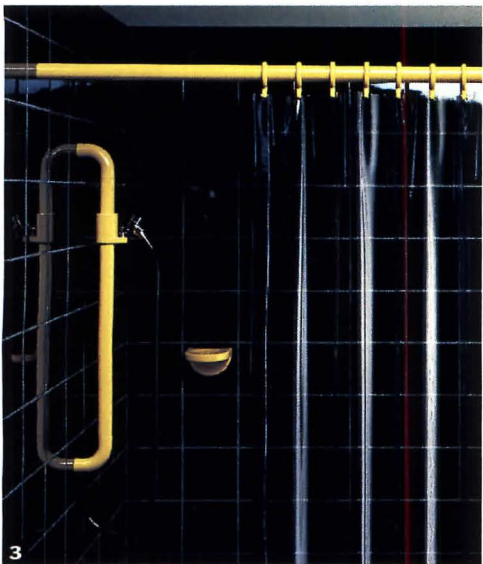
1

**1. Avonite's Crystelle Collection** is a man-made solid surfacing material that simulates natural granite in four colors: gray, black, white, and brown. Circle 401 on information card.



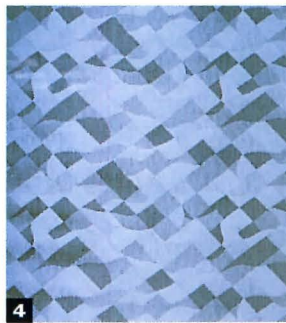
2

**2. Foremost Manufacturing's** new line of ductwork, **Colormost**, is available in 16 standard color finishes. Circle 402 on information card.



3

**3. HEWI** produces an extensive range of bathroom accessories made of nylon and available in 13 colors. Circle 403 on information card.



4

**4. Chromafusion** can print any color, graphic, or texture on a plastic layer bonded between laminated safety glass. Circle 404 on information card.



5

**5. Bogesunds'** latest line of worsted-wool upholstery fabrics, the **Myth Collection**, is offered in 13 patterns and 105 color combinations. Circle 405 on information card.



6

**6. Monsanto** offers **Saflex OptiColor**, a new plastic interlayer for laminated glass in a wide range of transparent and translucent colors. Circle 406 on information card.

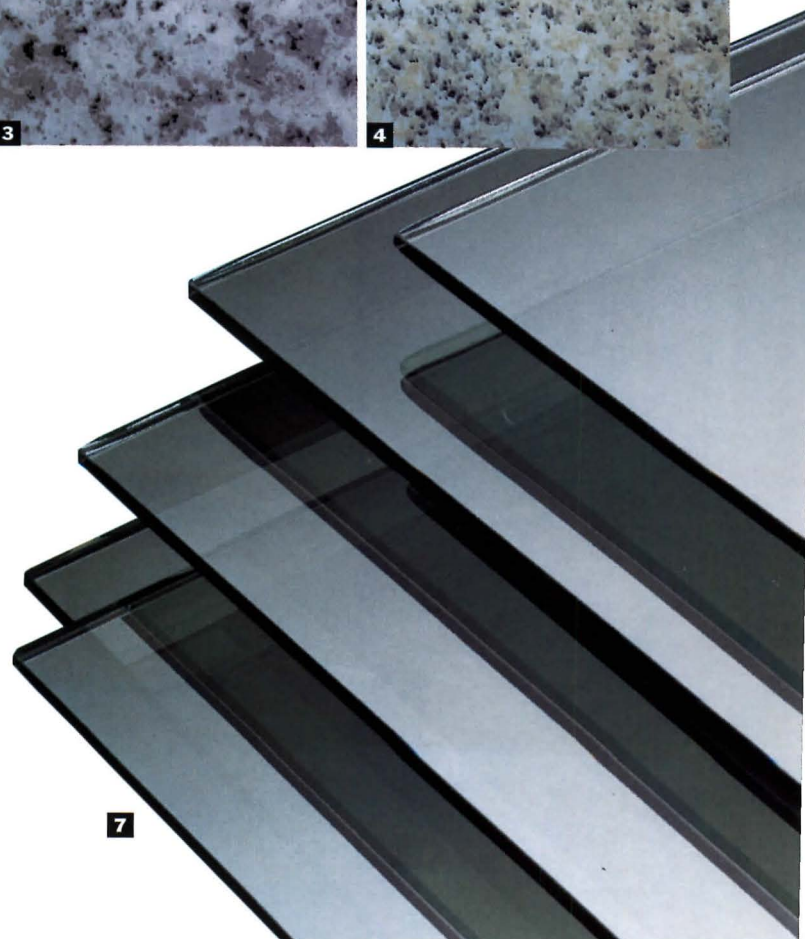
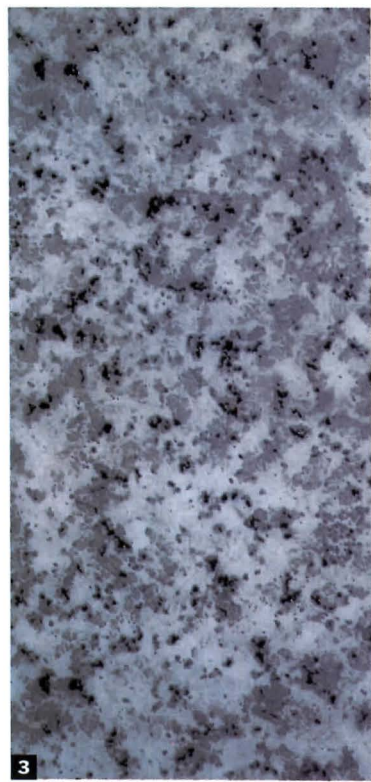
# PRODUCTS

## Glass Menagerie

Manufacturers expand glazing options with new shapes, patterns, and technologies.



**1, 2. IBP's Glass Block Grid system eliminates the need for mortar and is available in a wide variety of sizes for windows, walls, and floors. Circle 407 on information card.**  
**3, 4. Automation Robots USA and its sister company SFV produce Granitoglass by transferring a multicolored screen print (3), derived from photos of a stone, to the back of ordinary tempered or laminated glass (4). Circle 408 on information card.**  
**5. Pilkington Glass Limited manufactures Datastop, a clear glass that eliminates the wire mesh previously required to shield against electromagnetic radiation. Circle 409 on information card.**  
**6. Pittsburgh Corning's Tridron 45 Block turns window, wall, and partition corners. Blocks are available in frosted or clear patterns. Circle 410 on information card.**  
**7. Ford Glass Division now offers Sunglas Jade-Ice, a green colored glass that reduces heat and ultraviolet-light transmission. Circle 411 on information card.**



# ADVERTISERS INDEX

Circle Number		Page Number
—	AIA Documents .....	111
34	American Olean Tile .....	20-21
6	American Stair Glide (Access Industries).....	14
1	Andersen Windows .....	8-9
22	Armstrong World Industries .....	C2, p.1
2	Atochem North America .....	16A-D
48	Belden Brick Company (East, Midwest Reg.).....	78
36	Brite Vue .....	22
—	Calcomp, Inc. ....	98
16	Cedar Shake & Shingle Bureau .....	15
38	Chicago Faucet Co. ....	24
10	Edison Price .....	23
20	Georgia Pacific.....	C4
50	Hafele .....	85-85
30	Hurd Millwork Company .....	10
26	Kawneer Company .....	4-5
44	LCN Closers .....	72
46	Louisiana-Pacific .....	76-77
24	Marvin Windows .....	2-3
8	Metal Era .....	16
18	MUTOH .....	C3
28	National Propane Gas Assn. ....	7
4	Nixalite of America .....	6
—	Osram Corporation .....	70-71
32	Pittsburgh Corning Corp.....	12
54	Sloan Valve Company .....	92
12	Smart House, Inc. ....	29
—	Smithsonian Institution. ....	102
14	Sternberg Lanterns .....	110
40	TITUS .....	30
—	University of Michigan .....	14
52	Vistawall Arch. Products .....	86
42	Vulcraft.....	26-27

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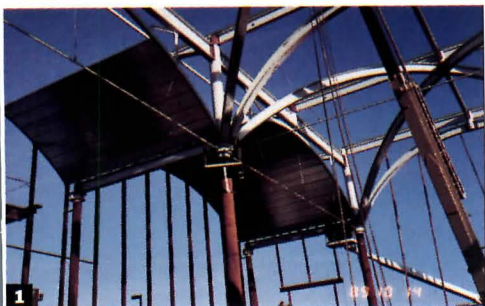
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# Metallic Forms

New shapes and improved finishes enliven steel and aluminum panels.



**1.** Epic Long Span Deck is a combination roof and finished-ceiling panel capable of spanning more than 30 feet. Circle 412 on information card.

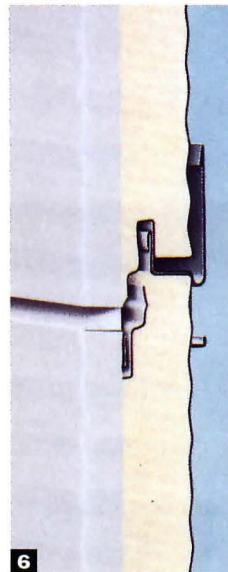
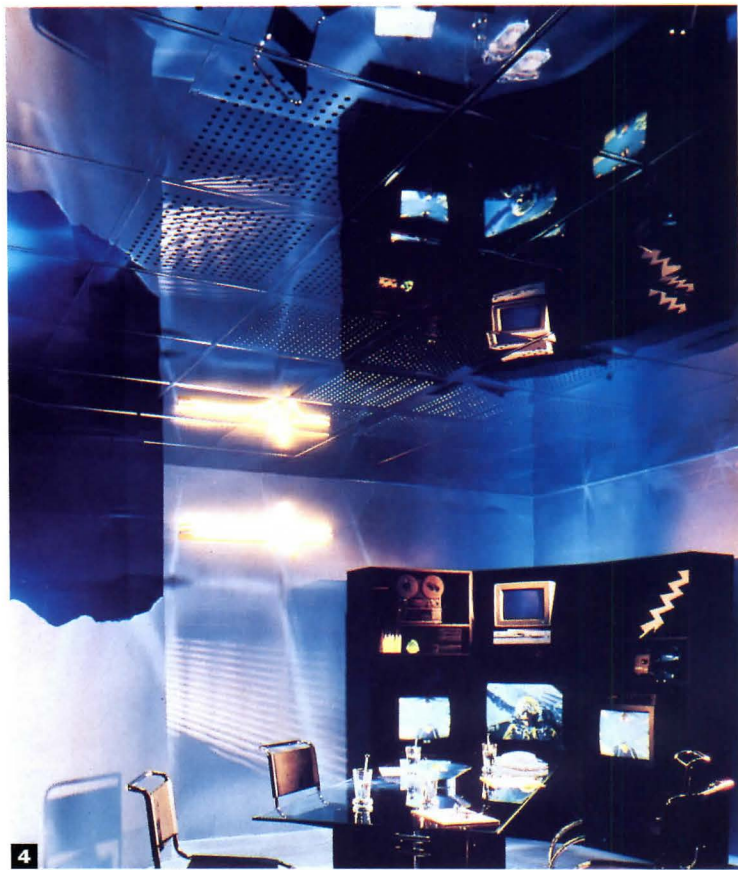
**2, 3.** H.H. Robertson manufactures Form-core, a fire-rated aluminum composite panel with a honeycomb core for curtain walls. Circle 413 on information card.

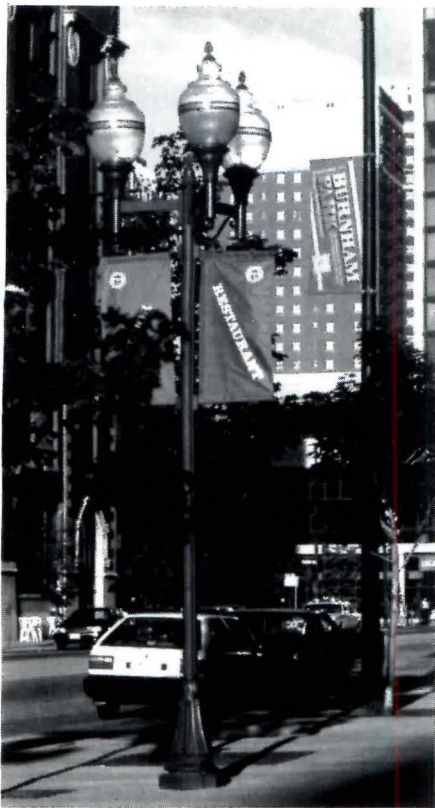
**4.** Chicago Metallic Corporation produces MirrImage, a perforated or nonperforated heavy-gauge-steel ceiling panel with a chrome finish. Circle 414 on information card.

**5.** Superform USA, a division of Alcan Aluminum, offers aluminum panels that can be fabricated into custom shapes. Circle 415 on information card.

**6.** E.G. Smith Construction Products' Crown Signature Series offers insulated steel panels constructed over a substrate of corrugated galvanized steel. Circle 416 on information card.

**7.** Steelite now produces CAP, a system of curved metal architectural panels. Circle 417 on information card. ■





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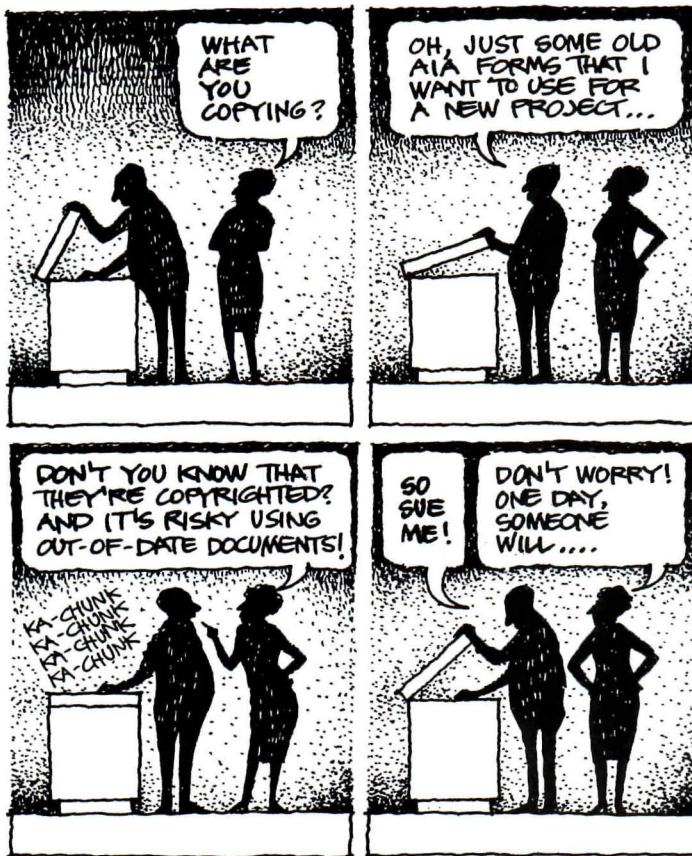
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—by Roger K. Lewis, F.A.I.A.

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# Neat file

ARCHITECTURE'S "No Excuses After This" information exchange

## Concrete CSI Division 03000

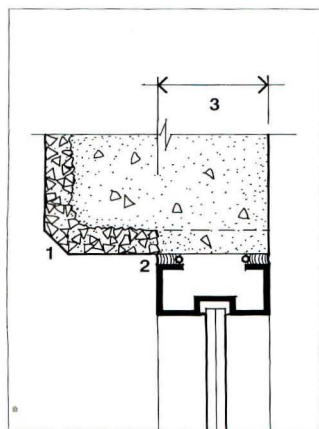
### Exposed Aggregate

A common method of exposing the aggregate in poured-in-place concrete is to spray the surface of the poured concrete with water and brush it with a stiff brush a few hours later. However, this method increases the water-to-cement ratio and weakens the mix. Brushing the surface may also disturb the aggregate and create fissures where water can penetrate, causing the pavement to disintegrate. To maintain the integrity of the concrete while exposing the aggregate, a top surface retarder should be used. The retarder allows the material to achieve sufficient stiffness while the top 1/4 inch of surface remains soft. The surface can then be washed and brushed off the next day, when the aggregate is hard. A sealer should be applied in areas where salts are used on paving surfaces in winter.

*Michael J. DeCandia  
L.M. Scofield Company  
Clifton, New Jersey*

### Precast Panel Details

The aggregate face mix of precast concrete panels usually extends around the outside face of the panel and returns at the panel's edges. This condition requires that the head, jamb, and sill of a window frame be protected against the rough aggregate finish, which usually



PRECAST PANEL EDGE DETAIL

- 1 6" PRECAST PANEL WITH EXPOSED AGGREGATE FACE MIX
- 2 SEALANT AND BACKER ROD
- 3 SMOOTH AREA REQUIRED

leads to problems in applying sealants. Both the Precast Concrete Institute and the Sealant and Waterproofing Institute specify a smooth surface where sealants are to be applied. One way to ensure a good joint is to grind the concrete panel edges smooth before applying the sealant. Another is to detail the design of the panels and specify to the precast manufacturer that the edges of the panels be smoothly finished, without exposed aggregate surfaces. Proper joint conditions (left) should be addressed in construction documents and reviewed in shop drawings.

*Steve Wiseman, AIA  
James N. Gray Construction, Inc.  
Lexington, Kentucky*

## Steel Framing CSI Division 05120

### Maintaining Steel Bracing

To ensure that steel frames remain plumb during construction, it is important that the frame be braced, and that the bracing be maintained until all steel connections are made and the frame is rigid. This advice is drawn from our own experience with a steel frame that was partially erected in the fall, with work suspended over the winter. Unfortunately, the contractor did not ensure that cable ties were kept taut in two directions, or that they remained in place. When construction commenced the following spring, the frame was not replumbed before the final steel connections were made. A misalignment was discovered while laying up the masonry shell to enclose the building—when it was too late to replumb the frame. Specifications should state that bracing is required once the frame is plumb, and that such bracing should be maintained until final steel connections are made. Documenting the progress of construction through photography is one of the best ways to retain evidence that the bracing is intact and being maintained as stipulated. A photographic record, with dates imprinted on the negatives, should be kept and new pictures taken each time the site is visited. A videotape of the construction site may also be helpful because it offers a panoramic view of the job under way.

*William Ketcham, AIA  
Booth/Hansen & Associates  
Chicago, Illinois*

### Steel Framing Thickness

When specifying light steel framing (cold-rolled framing from 20 gauge to 14 gauge, used in load-bearing curtain wall applications), it is important to identify gauge thickness, yield strength, and flange width required for the performance of the system. Most manufacturers of steel framing produce studs and joists with different thicknesses for different applications, even when the gauge is specified. For example, 20-gauge curtain wall studs may be produced from .0312 inches minimum thickness steel (uncoated), while 20-gauge load-bearing studs may be produced from .0341 inches minimum thickness steel (uncoated). It should be noted that by definition the minimum thickness is measured uncoated. In addition, various yield strengths (33 ksi, 40 ksi, 50 ksi) may be available, as well as various flange widths (1 1/4, 1 3/8, 1 3/8, 1 3/4, 2, 2 1/2 inches).

*Stephanie A. Weidner, AIA  
Teng & Associates  
Chicago, Illinois*

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