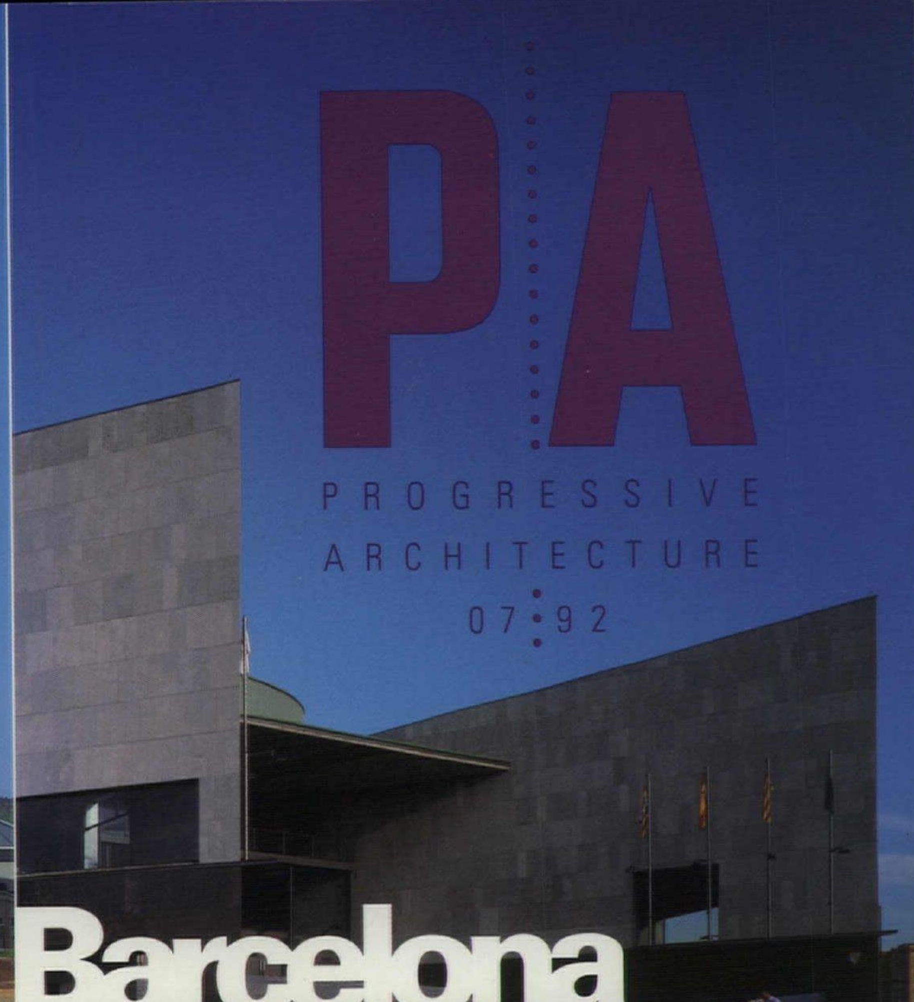
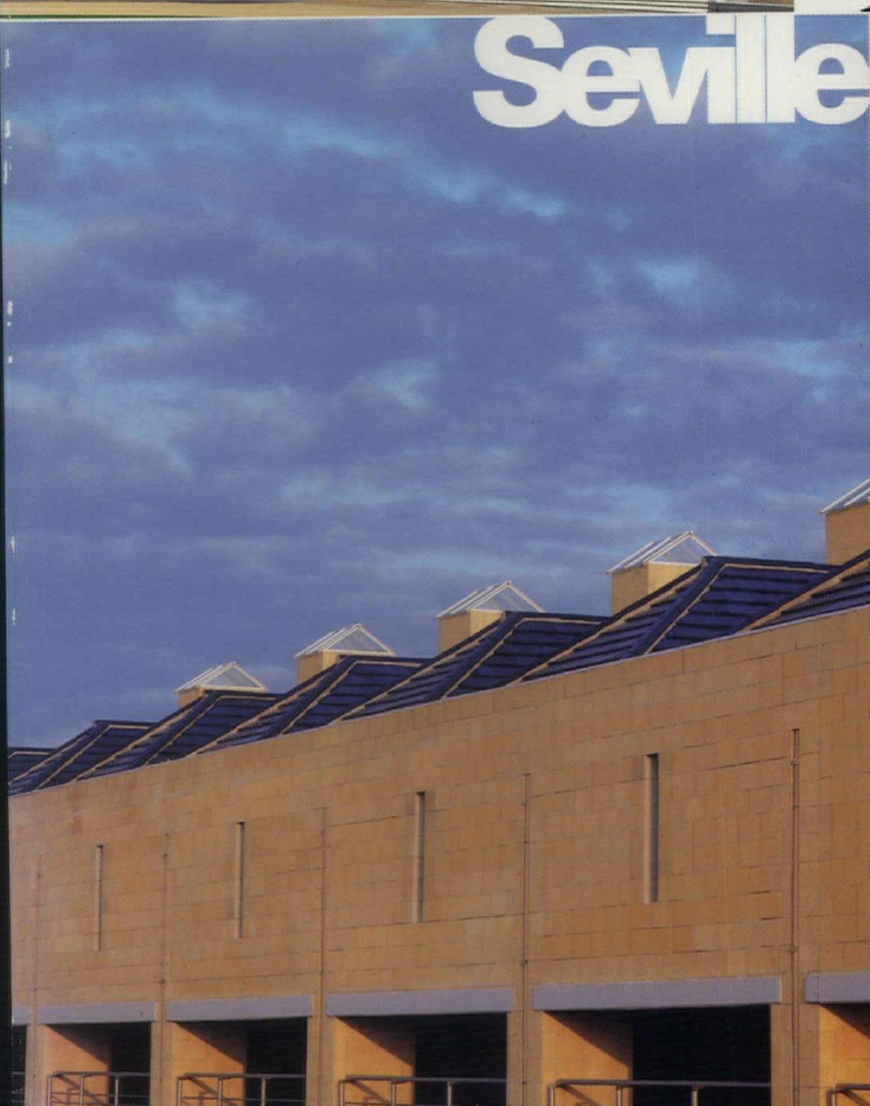
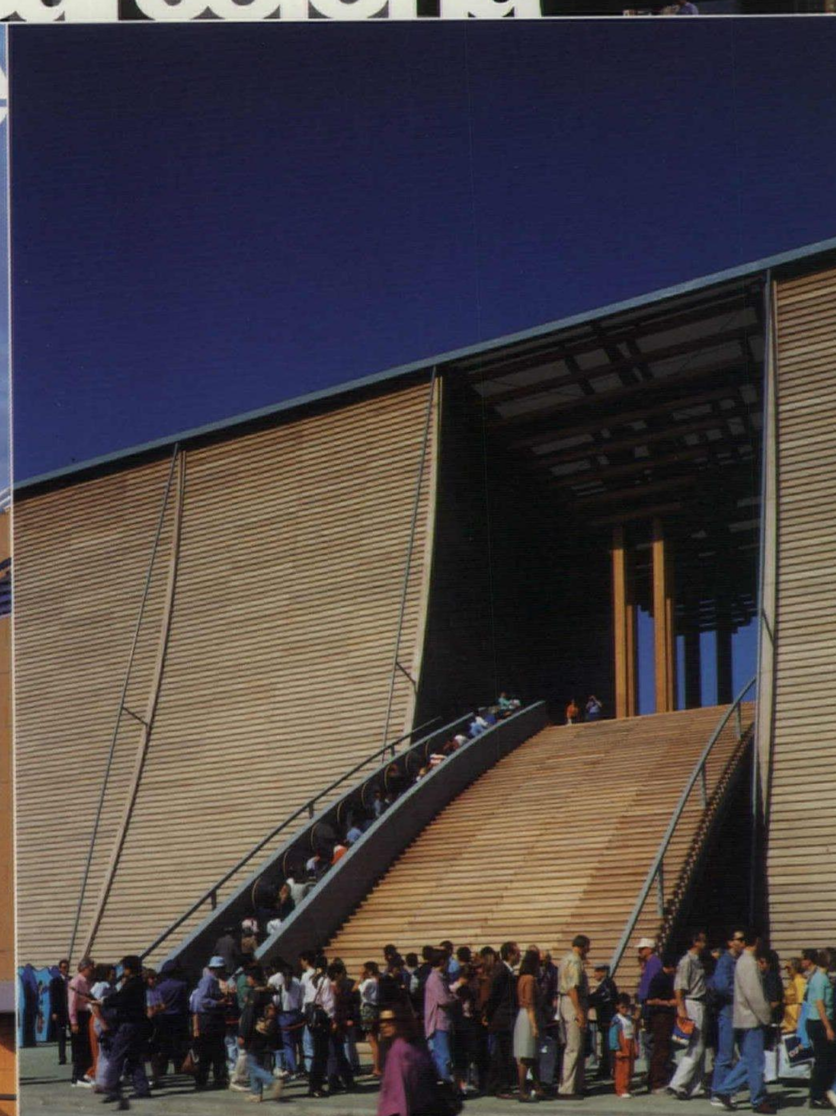
PA
PROGRESSIVE ARCHITECTURE
07 92



Barcelona

Seville

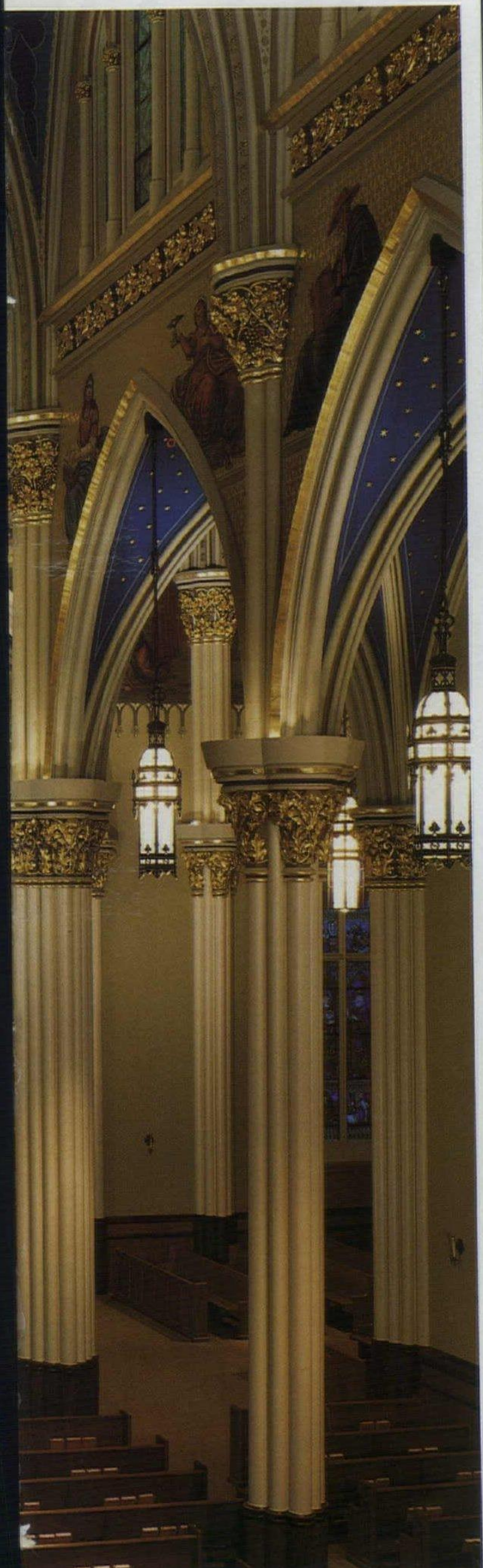




In Addition To Malls And Skyscrapers, We've

Photograph © Don DuBroff/SPG, Chicago

Helped Light Some Very Special Houses.



When the University of Notre Dame's Sacred Heart Basilica needed an inspiring lighting design, they chose Jerome Biedny Jr. and his team at Ellerbe Becket, Inc.

They, in turn, chose GE Lighting.

Faced with the challenge of enhancing the gorgeous aesthetic of the site without violating more secular concerns (namely, cost-effectiveness), Biedny combined an ingenious design with our PAR 30, 46, and 56 lamps, as well as our tiny-yet-stunning Precise™ MR16 and our SP-30 Multi-Vapor® Metal Halide lamps.

The ensuing results were so uplifting, they garnered the prestigious 1991 Edison Award.

To learn how you too can create brilliant lighting, call your GE specialist at 1-800-523-5520.

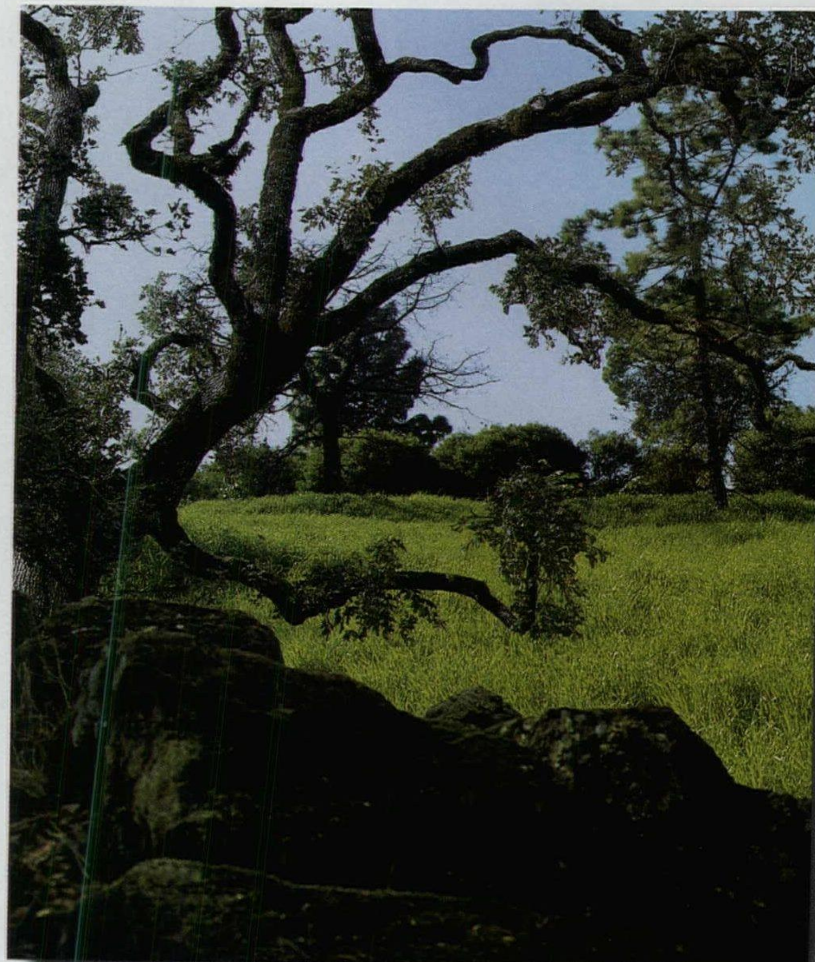
GE Is Light.

GE Lighting

Circle **No. 002**

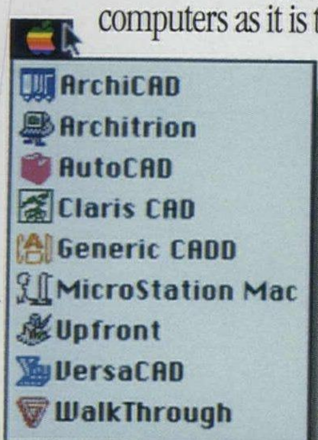
A Macintosh w
preserve the

"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.

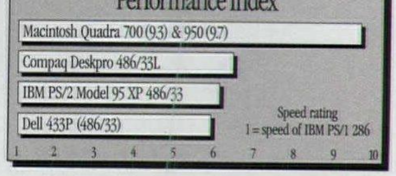
Yet, to this day, the Apple® Macintosh® remains the only kind of computer designed from the very first chip to work the way people work, instead of forcing people to work like a computer.

Indeed, the most powerful expressions of this idea yet are the Macintosh Quadra™ 700 and 950 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.



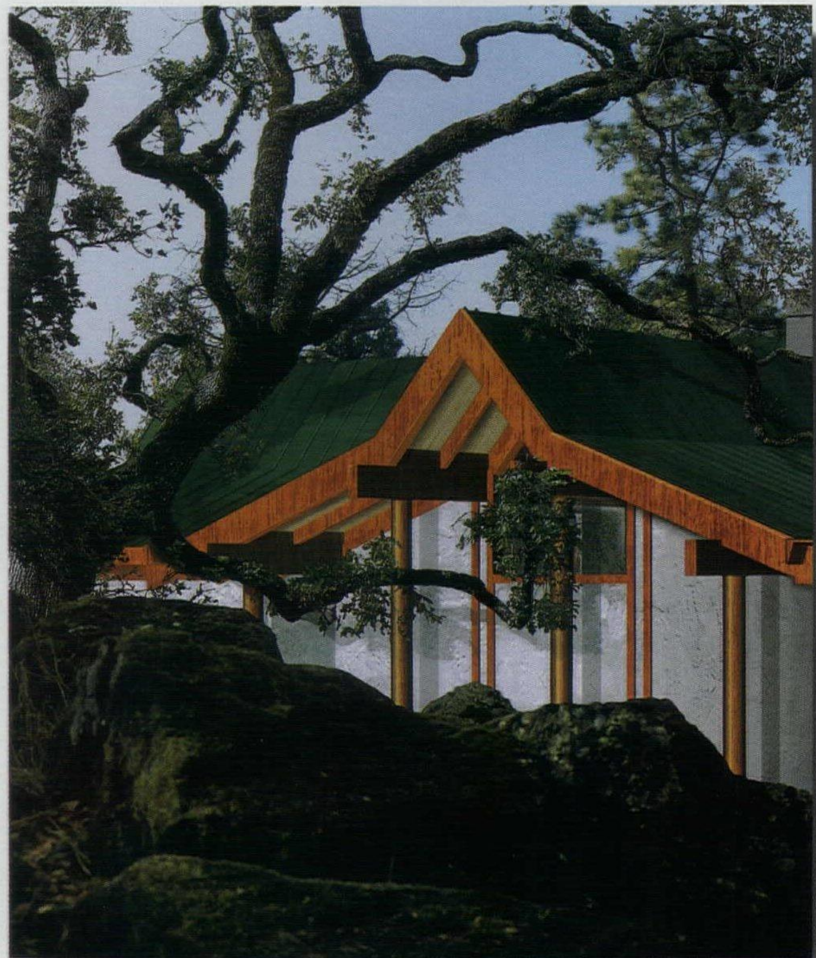
Macintosh Quadra significantly outperforms 486 PCs from IBM, Compaq and Dell running Windows 3.0.

That's because both the 700 and 950 are powered by the awesome Motorola 68040 (rated at 20 and 25 MIPS, running at 25 and 33 MHz), which integrates the processor, math coprocessor and RAM cache all onto one chip.

All this power means that you can now use

*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.

ith the power to environment.



cartridge drive, and a disk array or more than one gigabyte of internal hard disk storage.

There are two Macintosh Quadra models. The 950 sits next to your desk; the 700 fits on top of it.

You can increase the memory of the 950 to up to 64MB of RAM so you can have several large files or many programs open at the same time.

And you don't have to buy an extra video card because high-resolution 24-bit photographic-quality video** support is already built in.

Macintosh Quadra helps people work together, too. File sharing and networking are both built in, making it possible for anyone to build a network simply by plugging in a cable. For high-performance networks, Ethernet is built in as well.

With accelerated 24-bit video support built in, Macintosh Quadra brings spectacular, photo-quality color to programs like ArchiCAD and Architrion without the expense of an extra video card.

the simplicity of a Macintosh to do things like create a stunning 3-D model of a building and combine it with a photograph of the environment or location where you want the building to go. Then take your clients on a real-time tour of the structure with programs like Virtus WalkThrough, letting them interact with the computer and choose the areas they want to explore.

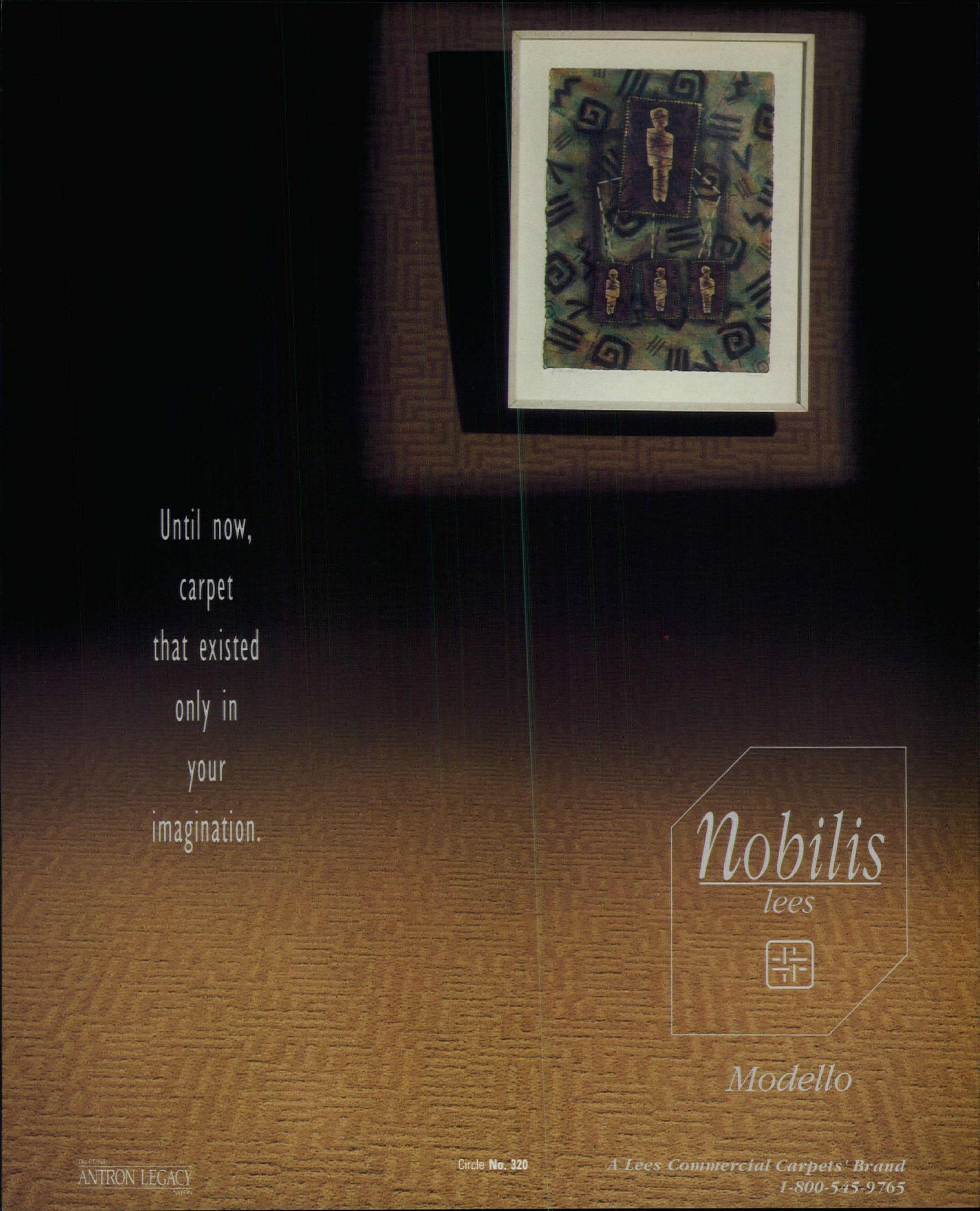
You can add a 400MB hard disk to both the 700 and the 950. And the 950 even lets you add a CD-ROM drive or a removable

And Macintosh Quadra runs thousands of business programs at screaming speeds, including Lotus 1-2-3, WordPerfect and PowerPoint. To help you with every aspect of your business.

Your authorized Apple reseller would be glad to demonstrate all this and more. To find out the name and location of the one nearest you, just give us a call at 800-538-9696, extension 205.

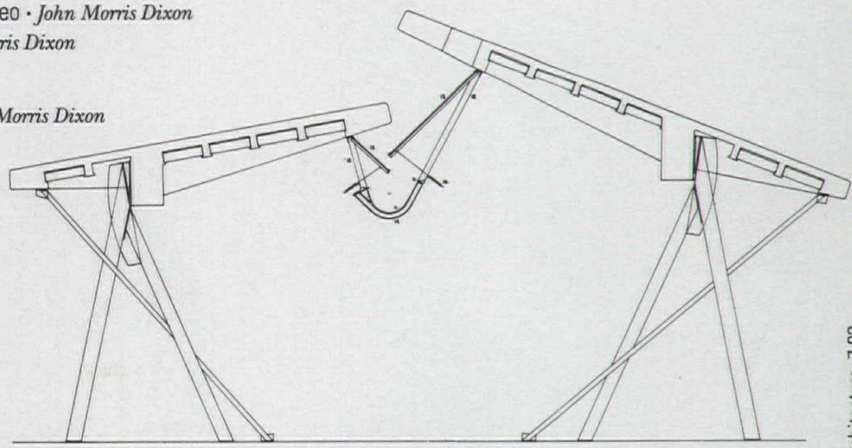
And discover the kind of power it takes to preserve the environment. The kind of power no other personal computer can offer you. The power to be your best.®

with optional third-party video card. Main exterior house image and interior house image designed by Douglas Anawalt and rendered by View by View. House in field image created in ArchiCAD by Michael Bird, AIA, Adirondack Design, Saranac, NY. Mention of third-party products is for informational purposes only and constitutes


Until now,
carpet
that existed
only in
your
imagination.
Nobilis
lees
Modello
ANTRON LEGACY
Circle No. 320
A Lees Commercial Carpets' Brand
1-800-545-9765

Cover: *(clockwise from upper left): Olympic telecommunications tower (page 63), Badalona Sports Palace (page 70), Japanese Pavilion, Expo '92 (page 94), Seville Airport (page 82). Photos: Ferran Freixa, Hisao Suzuki, Mitsuo Matsuoka, Dida Biggi. Design by Derek Bacchus.*

Design
Editor in charge: Mark Alden Branch



Cross-section, Olympic Archery Pavilion, p. 74.

Technics

P/A Annual Awards Program

Practice

Departments

For Subscription Inquiry:
1-800- I READ PA (1-800- 473-2372)
Or 216-696-7000 (Ext. 4027) Eric Strong

ABP

Penton Publishing P/A Progressive Architecture (ISSN 0033-0752) is published monthly, except semimonthly in October, by Reinhold Publishing, A Division of Penton Publishing, 1100 Superior Ave., Cleveland, OH 44114-2543. Philip H. Hubbard, Jr., President; Robert J. Osborn, Vice President. Penton Publishing: Sal F. Marino, Chairman and CEO; Daniel J. Ramella, President and COO; Philip H. Hubbard, Jr., President, Eastern Operations Group. **Executive and Editorial Offices, 600 Summer St., P.O. Box 1361, Stamford, CT 06904. Phone (203) 348-7531. FAX (203) 348-4023.**

WITH FOUNTAINHEAD, INTRICATE DESIGNS ARE A PIECE OF CAKE.

Most designers choose Fountainhead by Nevamar® for its rich, natural beauty and its remarkable durability. But the intricate designs you can create in Fountainhead solid surfacing are the icing on the cake. Fountainhead is easy to rout and shape. And Fountainhead inlay kits make the most extraordinary designs a snap. Curves, shapes or colors...an Accredited Fountainhead Fabricator can achieve almost any custom inlay or edge treatment you can imagine. Available in 15 colors, Fountainhead is the perfect recipe for one-of-a-kind solid surfaces. So satisfy your appetite for creativity... with Fountainhead. For information, samples, or the name of an Accredited Fabricator, call 1-800-638-4380. Nevamar Corporation, 8339 Telegraph Road, Odenton, Maryland 21113.

NEVAMAR®
DECORATIVE SURFACES

Fountainhead is protected by a 10-year limited warranty.

Circle **No. 322**


Forms + Surfaces
"High Definition" Bonded Bronze
In the more than 20 years that Bonded Bronze has been offered, it has achieved a place of distinction among fine interior surfacing materials. Now, eight sophisticated new "High Definition" designs have been added to the original collection of textures and patterns.
For more information on "High Definition" Bonded Bronze and the name of the Forms + Surfaces representative in your area, call:
Forms + Surfaces
Box 5215 Santa Barbara, CA 93150
(805) 969-7721 Fax (805) 565-1578
Circle No. 337

Editorial
The News of the Riots

In the recent riots in L.A. and elsewhere, architecture played a central role in signaling people's anger. That civil unrest also suggested a new role for this profession as an advocate for our cities.

Where were you when the L.A. riots broke out? I was standing in a Cleveland bar with a number of colleagues and community leaders, watching CNN on the television, and about to head for dinner to celebrate the opening of P/A's demonstration affordable house (see next month's P/A for details). The riots were, for me as for all who had assembled in the bar that evening, a sobering fact. Whatever needs our prototype house met, they paled in comparison to the number of unmet needs obvious in the anger and frustration of the rioters. Of what significance is any private initiative in our cities when there are such enormous gaps in our public policy?

Likewise, the riots showed that people did not need improvements to their physical environment, whether the construction of a single house or an entire neighborhood, so much as they needed non-physical goods, such as social justice and economic empowerment. I even began to wonder, as I stood there watching CNN, if we might serve people better not by building a house for them, but by teaching them the skills to build houses for themselves.

Be that as it may, I have come to see the riots – and their relationship to architecture – in a somewhat different light since then. Rather than being peripheral to the riots, architecture actually played a central role. Recall, for a moment, the televised coverage of the riots. We saw over and over again burning buildings – and buildings of a particular type: commercial structures located on major thoroughfares. Some news commentators seemed baffled by this, since the arsonists were destroying the very establishments that served their neighborhoods and, at least in part, employed people in their communities. But those commentators overlooked the larger intent of the riots, which, among other things, was to dramatize the outrage people felt over the Rodney King verdict and, on a broader level, to draw attention to the plight of people in the inner cities. And to that end, the burning of big buildings, illuminating the night sky and making South Central L.A. look like an inferno from the CNN helicopter, served the rioters well.

I am not condoning arson. Clearly, many innocent people suffered during the riots at the hands of relatively few. However, the L.A. riots succeeded (where, I think, no amount of petition-signing or protest marching would have) in waking up a somnolent public and our mostly feckless politicians to the enormity of this country's urban problems. As such, these riots were part of a long history of using architecture as a kind of distress signal, torching the biggest things around to make a political point.

That point, in fact, is as much architectural as it is political. Just as this country, in the last decade, has generally turned its back on the poor – seeing their condition as a matter of moral deficiency rather than of economic misfortune – so too has this profession, during the same period, largely turned its back on social activism, preferring, instead, to define architecture in narrower, more formal terms. Many people have argued that the moralistic politics of the 1980s sowed the seeds for the current social unrest; you could make the similar argument that this profession's formalist obsessions have blinded us to the needs and perceptions of ordinary people.

The riots, I think, were proof of this. Political protesters target buildings, not only because structures are visible and their burning is dramatic, but because at least some segments of the public see buildings – especially large public and commercial buildings – as representative of the establishment, as embodiments of money, status, and power. That begins to explain why, in L.A., the rioters avoided burning residential structures and black-owned businesses, and why they did go after major commercial complexes. These were burned not because they meant so little to these people, but because they meant so much.

The riots got a message through to our political leaders that the time has come to put aside partisan bickering and to begin to work toward solving our urban problems. I think the architectural community too should see them as a signal that the time has come to put aside our ideological differences and to begin seriously advocating the rebuilding and revitalizing of our cities. **Thomas Fisher** ■

Views

Admiring Meier

I admire dedicated architects, but there are some like Richard Meier who excite me. Their designs are exciting and consistently innovative and substantial within the constraints their clients, society, and local bureaucracy place before them as challenges. He, and other stars as well, consistently meet these challenges and with their talent, vision, and flexibility continue to attract clients of substance.

Richard Meier is so visible *because* he *is so talented,* and he has consistently produced recognizably great and innovative buildings for years. Critics less tolerant of change lose their objectivity in evaluating great architecture such as Richard Meier's Getty design (P/A, Feb. 1992, p. 103) and, we think, miss the entire point!

We personally applaud his invitation to explore and investigate experiential design. The only criticism of the Getty should be from those who are unwilling or unable to encourage those striving for architecture as not only a grid of structures to house art but as a total art experience. Richard Meier has reached those of us who not only want "to get there" but also want to enjoy the trip.

Robin and Lauren Hilliard
Builders
Davenport, California

Stimulating Magazine

As you demonstrate so well, an architecture magazine has multiple functions. It presents the best products of architects here and abroad. It analyzes them, evaluates them, and comments on them. It stimulates new ideas and trends. P/A does this effectively through its annual Awards program and lately by sponsoring competitions usually on the problems of the public realm. It reports future happenings in its News section.

The Views feature invites reactions and opinions from its readers. I have taken advantage of this opportunity from time to time.

Lately, I have been negligent in not welcoming the Perspectives section. Its emphasis on design philosophy from a historical point of view is needed in these critical times.

Your magazine's Technics projects are timely and provocative. They point to a direction that, in view of our environmental and fuel shortage problems, is bound to preoccupy the profession.

Mr. Kaplicky of Future Systems (P/A, May 1992, p. 160) need not be on the defensive saying that "in nature there are no straight lines." In the hands of creative architects technology is the prime catalyst and driving force toward architectural expression. In my long years of practice I found this creed to lead to my best work.

Ladislav Rado, FAIA
Biscayne Beach, Florida

A key to Audubon's success is a system of high-efficiency gas-fired absorption heater/chillers that serve air handlers on each floor. It uses a localized variable volume box that allows for fine-tuning of air wherever it's placed. And will save $18,000 per year over conventional design. As architect Randolf Croxton put it, "While we have been characterized as doing environmental design, we have really ended up doing high-performance design." Natural gas is at the heart of that performance.

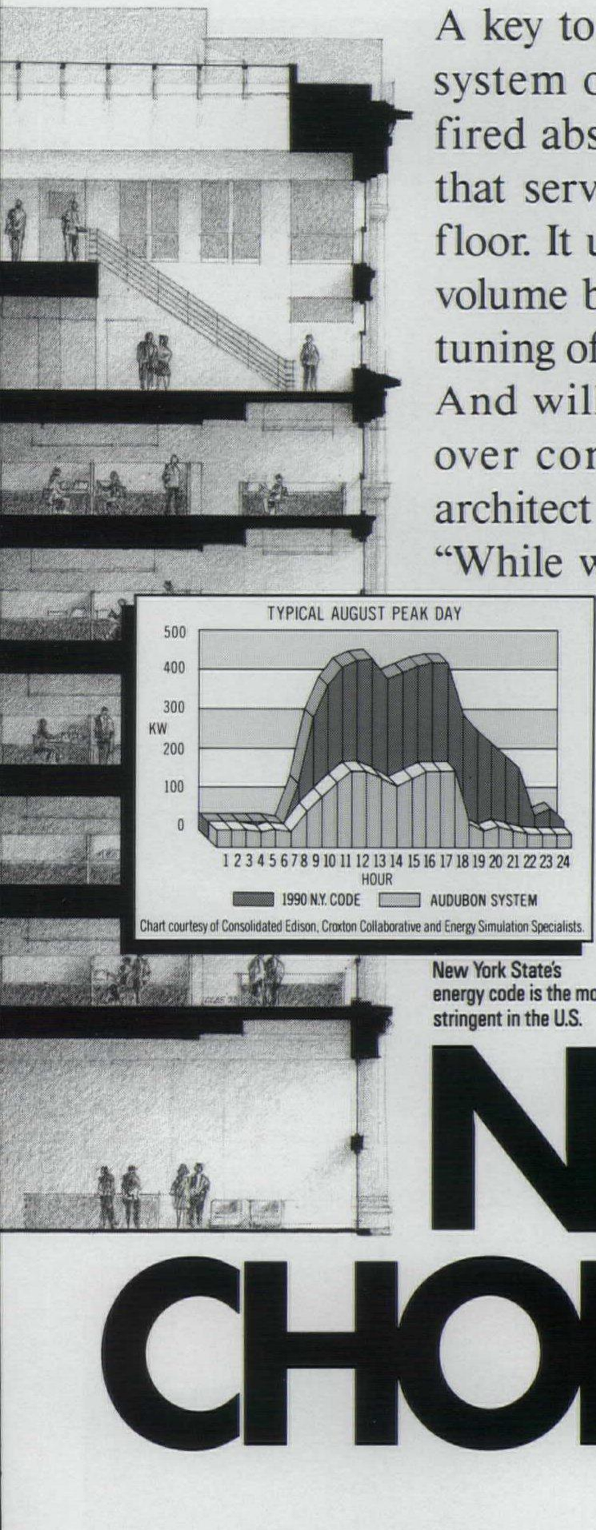


Chart courtesy of Consolidated Edison, Croxton Collaborative and Energy Simulation Specialists.

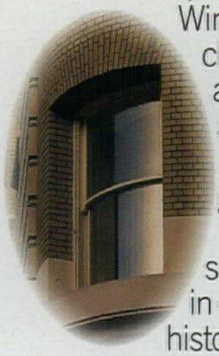
New York State's energy code is the most stringent in the U.S.

NATURAL CHOICE

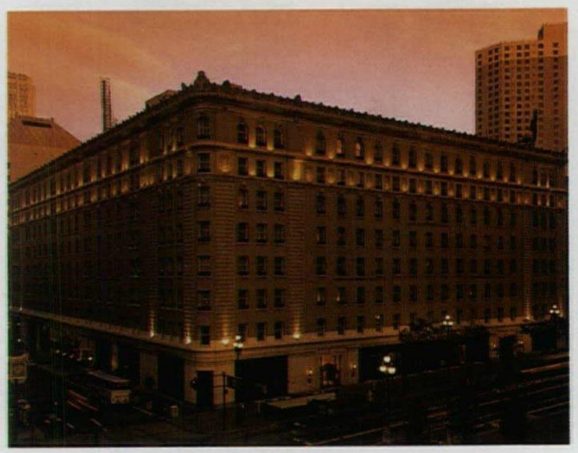
Use natural gas. We'll all breathe easier.

IT'S HARD ENOUGH TO GET ONE ROOM AT THIS HISTORIC HOTEL. IMAGINE WHAT IT

Since 1875, the Sheraton Palace Hotel has been one of San Francisco's most beloved institutions. So when its restoration was being planned in 1989, every effort was made to preserve the details of its original design. Among other things, that meant the replacement of nearly 600 windows. And because of their experience in such projects, Marvin Windows and Doors was chosen. First to receive attention from Marvin and their local distributor were the hotel's graceful curved glass windows, an area in which Marvin's expertise is particularly well known.



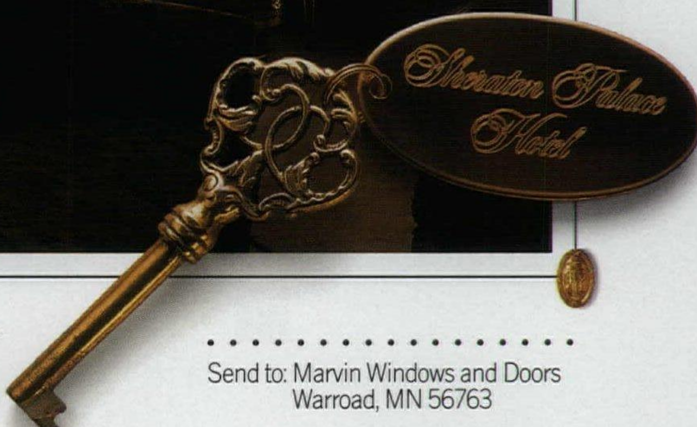
No less of a challenge were the hotel's 585 aging double-hungs. Each demanded the same craftsmanship and attention to detail in order to maintain sightlines and replicate the historical profiles of the originals. And to guarantee their durability and consistency, each would have to incorporate the same performance features, too.



So Marvin suggested Magnum Tilt-Pac replacement sash, known for their strength, energy efficiency and economic advantages. And went on to propose glazing them with a special laminated glass to further insulate the rooms from the noise of the busy streets below.

In all, close to 600 windows in over 30 different sizes were designed and built to exacting, historical

TOOK TO GET ALL 552 OF THEM.



standards. Including some of the largest Tilt-Pac replacement sash ever made. And as the sole supplier, Marvin was there from initial ordering to final installation to insure that the whole process went smoothly.

The Sheraton Palace Hotel reopened in April of 1991 after 27 months of painstaking restoration work. In part, because the hotel ordered room service for all 552 of its rooms. And Marvin delivered.

MAKE US YOUR FIRST CALL, NOT YOUR LAST RESORT.

If you've got a replacement or restoration project you want to discuss or a window problem you can't solve, call the one company you know will have the right solution. Call Marvin at **1-800-346-5128** (1-800-263-6161 in Canada). Or mail the coupon for a free catalog featuring our entire line of made-to-order windows and doors.

Circle **No. 332** on Reader Service Card

Send to: Marvin Windows and Doors
Warroad, MN 56763

Name ______

Company ______

Address ______

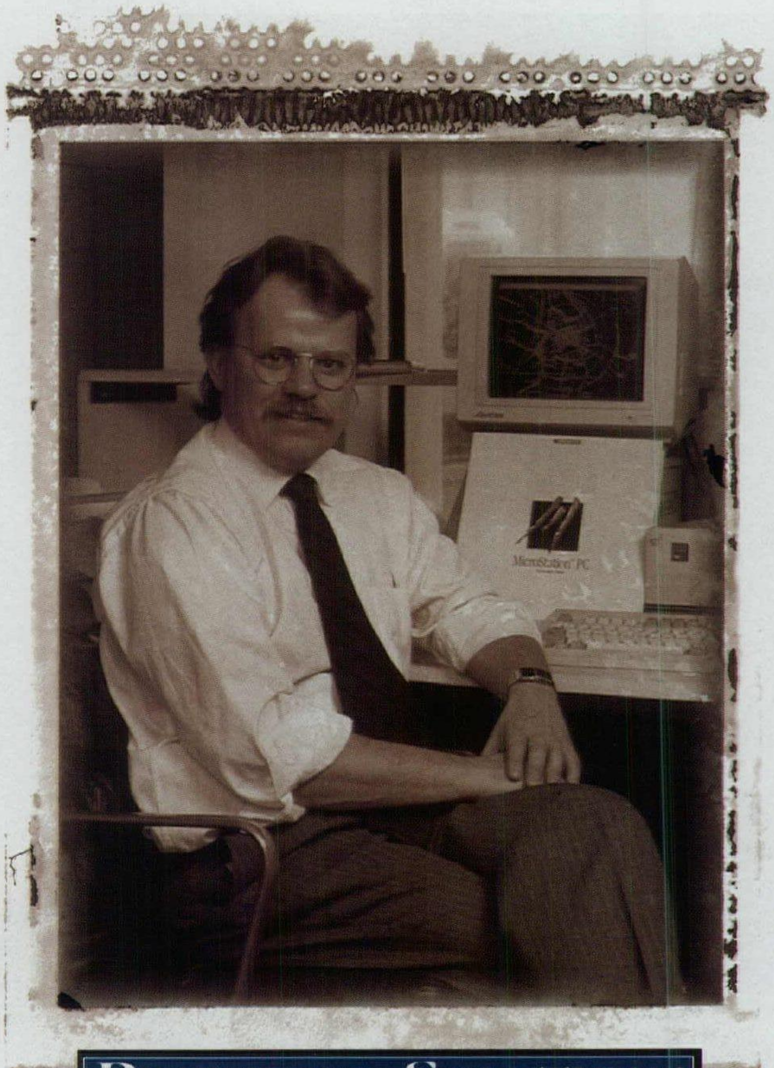
City ______ State ______

Zip ______ Phone ( ) ______ 1509207A

Please send me: __ Commercial Catalog
__ Residential Catalog

MARVIN
WINDOWS & DOORS
MADE TO ORDER.

"Powerful and flexible in a workgroup environment."



PROVIDING SOLUTIONS
LORD, AECK & SARGENT INC.

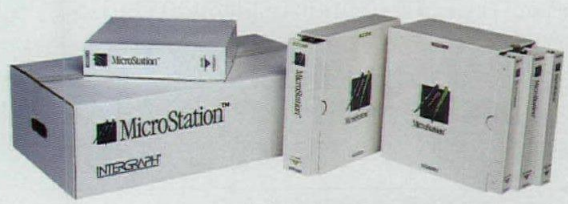
"One of the most effective things about using MicroStation on the network is that everyone has access to all the information on a project."

"MicroStation provides us with an incredibly well-thought-out methodology for easy interface with people who are not in our office."

"We're encouraging both our engineers and our clients to utilize MicroStation so that we can work together more effectively."

"Without MicroStation, our company would not have grown as fast or gone as far as it has today."

Terry Sargent, A.I.A.
Lord, Aeck & Sargent Inc.
Atlanta, Georgia



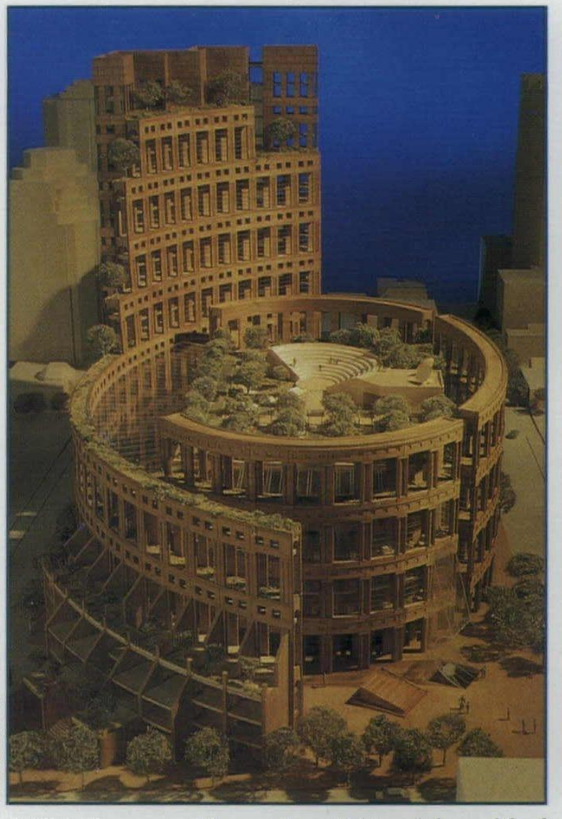
MicroStation™
The CAD Standard of Excellence

INTERGRAPH

For information on MicroStation, contact your authorized MicroStation dealer or call 800-345-4856 in the U.S.; outside the U.S., contact an Intergraph sales office.

Circle **No. 335** on Reader Service Card

News Report



Michal Ronnen Safdie

Kent Kallberg Studios

Kent Kallberg Studios

Safdie's Vancouver Library scheme (left) and those of finalists HHPA (above right) and KPMB (below right).

Safdie Team Wins Vancouver Library

A competition for a new central library and federal office building on a full block in the heart of downtown Vancouver, British Columbia, has produced a startling design of great originality and considerable urbanistic virtue.

The winning team was Downs/Archambault & Partners, Vancouver, in association with Moshe Safdie Associates, Boston. Its design places stacks, computer facilities, and other systems in a seven-story central block topped by a landscaped roof garden and amphitheater.

Coiled around this block, and linked to it by bridges, is an elliptical wall, 12 feet deep and glazed on both sides, containing reading and study spaces. Wrapped partway around this is a second, thinner elliptical wall that forms a curved entry concourse to the library. The second wall attaches to the office tower on the corner of the site, its concave façade continuing the curve of the outer wall and enfolding the colosseum-like drum of the library.

The buildings will be of precast concrete with pilasters and bands of inset squares cast into the library walls. Here the architects promise a "marquetry" of concrete, stone, and metals, although the precise blend of materials is still being studied.

Instead of a single grand plaza, public spaces will comprise smaller "piazzas" at two corners, the entry concourse, and the roof garden. Shops and restaurants will line the concourse and extend toward the street.

"The spirit of the library design was to make a building that is inviting and transparent," Safdie said. He also suggested that it "evokes memories of the origins of our civilization."

The other two teams of finalists were: James K.M. Cheng Architects/Musson Cattell Mackey Partnership, both of Vancouver, in association with Kuwabara Payne McKenna Blumberg, Toronto; Waisman Dewar Grout Carter, Vancouver, in association with Hardy Holzman Pfeiffer Associates, New York. Both produced fairly straightforward Modernist schemes with rectilinear towers rising beside lower library blocks. The Cheng team's design is the more embellished of the two, with hatlike roofs raised above both buildings.

The choice was made by the Vancouver city council, with the aid of an advisory committee that included architects William Pedersen of New York, Fumihiko Maki of Tokyo, and Bing Thom and Gerry Rolfsen of Vancouver. **Donald Canty** ■

A School for Science in L.A.

Morphosis of Santa Monica, Calif., is the winner of a limited competition to build a science-oriented elementary school in L.A.'s Exposition Park, a cluster of museums and gardens near the University of Southern California. The $30-million project stands in the shadow of Frank Gehry's Aerospace Hall.

The project won particular praise for pulling together a rich but disjointed context: in addition to the Gehry museum, the school adjoins, on opposite sides, a Victorian rose garden and a

What does the Americans with Disabilities Act mean for architects? A three-part series on the law begins this month in Technics Topics (page 41).

Disney Over There: John Morris Dixon critiques the Euro Disney development, which opened this spring, in Perspectives (page 96).

Pencil Points

Frank Lloyd Wright's Guggenheim Museum offically re-opened in June after a two-year renovation and the completion of a 10-story addition designed by Gwathmey Siegel & Associates, New York (P/A, April 1989, p. 82). A new downtown branch, the Guggenheim Museum Soho, also opened. Housed in an existing building, its galleries, museum shop, and public spaces were designed by Arata Isozaki.

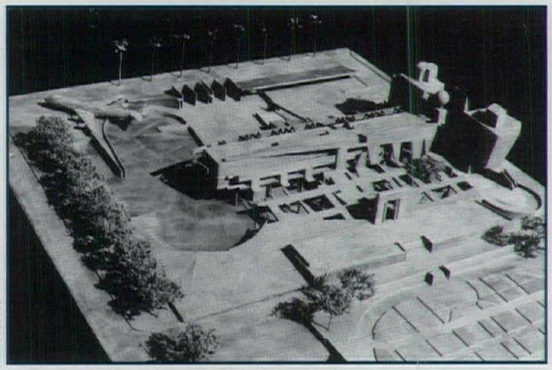
Olympia & York, the international property development company made famous in the 1980s with its whirlwind series of acquisitions and projects, has begun bankruptcy proceedings in both Canada and London. The loss of control over its home base in Canada and Canary Wharf in England (P/A, April 1992, p. 122), has all but crippled the company. Its extensive holdings in the U.S. – including the World Financial Center at Battery Park City (P/A, July 1985, p. 79) – have not yet been affected.

In other bankruptcy news, John Burgee Architects has filed for financial protection in New York. The firm, a spin-off of a partnership once held by Burgee and Philip Johnson, recently lost a $16-million lawsuit brought by a former partner.

Arata Isozaki has won the Nara Convention Hall international design competition sponsored by the City of Nara, Japan. The two-stage competition was part of a redevelopment plan initiated to position the city as an international cultural center.

Writer and critic Herbert Muschamp has been named architecture editor for The New York Times. Muschamp, former chairperson of the Department of Environmental Design at the Parsons School of Design in New York, replaces Paul Goldberger, who is now in charge of Times arts coverage.

Douglas DC8 jet outside Aerospace Hall. Also on the site is the World-War-I-era Armory Building, an awkward structure with some handsome carved detail. Located at the edge of the park, the school site is near a major downtown corridor.



Mark McVay

Winning school design by Morphosis.

The solution by Morphosis principal Thom Mayne calls for demolishing the Armory, preserving only its carved doorway, which becomes a free-standing threshold for the new school. The school extends the formal pattern of the rose garden by echoing the squarish shapes of the garden plots in a trellis that covers an outdoor lunch area. "Given the tough environment of the downtown L.A. area, we deliberately organized the building so that the school actually feels like a connection of the Rose Garden," Mayne wrote in his proposal. "Students come to a 'school in the garden', not a 'school in the jungle (city)'." The school's animated elevations meet the difficult challenge of dwelling peacefully in the shadow of Gehry's extroverted museum, famed for the fighter bomber bolted to its side. And in a particularly inventive use of context, Mayne located the athletic track close enough to the DC8 that runners are literally in the shadow of the airplane's fuselage; the arrangement makes a stationary landmark into an active marker of time and space for the runners on the track.

The program calls for an elementary school equipped with high-tech communications and teaching devices, including CRT displays that cover entire walls. The school is to be organized flexibly, enabling interior spaces to be divided into conventional classrooms, "clusters" of spaces, or as a single "global teaching station." The school is a joint project of the Los Angeles Unified School District, the Los Angeles Museum of Science & Industry, and the University of Southern California. The design jury was led by Robert Harris, FAIA, Dean of the USC School of Architecture.

Morris Newman ■

Pritzker Show Preaches to the Converted

The black-tie crowd at the opening of the Pritzker Prize exhibition "The Art of Architecture" – which included Frank Gehry, Thomas Beeby, Ada Louise Huxtable, and J. Carter Brown – was not meant to be the exhibition's ultimate audience. They gathered May 14 at the Harold Washington Library Center in Chicago for the opening and for the presentation of the Pritzker Prize to Portuguese architect Alvaro Siza (P/A, June 1992, p. 25). The exhibition's organizers say the show is not for the cognoscenti, but for the general public – to tell them something about good architecture and the Pritzker Prize.

Pritzker secretary Bill Lacy says the show is in part "a response" to the P/A editorial (May 1987, p. 7) by John Morris Dixon that called for greater visibility for awards programs through "events . . . programs on local TV, efforts that are hard for the local public to ignore."

The handsome exhibition is made up of free-standing panels, one devoted to each of the 15 Pritzker winners. (The show is to travel for ten years, with new panels added as new winners are named.) On one side of each panel is an eight-by-nine-foot photograph of a project by the architect. Among them are Siza's beautiful Kindergarten Joao de Deus in Penafiel, Portugal; James Stirling's complex Staatsgalerie in Stuttgart; and I.M. Pei's ethereal addition to the Louvre. The views of Gordon Bunshaft's Hirshhorn Museum in Washington, D.C., and Oscar Niemeyer's National Congress and Military Esplanade in Brasilia are strong presences, militantly out of vogue. (Bunshaft and Niemeyer won the award jointly in 1988.) Contrasts such as these convey powerfully the range of work acknowledged by the awards over the mere 13 years of their existence and suggest something important about their essential integrity: quality, rather than fashion, is rewarded.

Dan Rest

Model of I.M. Pei's Bank of China in Pritzker exhibition.

On the opposite side of each panel are smaller photographs and a drawing reproduced from an original in the architect's hand. There is also a long text about the architect and why he was chosen for the Pritzker. For those outside the field, the texts require an inhuman attention span and are not likely to be read. (The videotape that is a part of the show may be more illuminating, but it was not working when I saw the exhibit.) The show will be remembered as it is first seen – a series of powerful images. For all its intentions of telling the public about architecture, this show speaks to the knowing in their language. The photographs don't convey much beyond their own beauty.

Where things get murky for non-architects is in determining why one building is better than another, and there is not much help here in answering that question. That would require engaging people in the process – explaining something about program, problem constraints, compromise, and resolution – and creating some new material, not just raiding office archives for gorgeous pictures. This exhibit suggests that great buildings are like sculpture – perfect, inviolate, and inevitable – the products not of hard work but of inspiration, and therefore beyond explanation. This is not a very useful view to advance if the object is to teach people about architecture.

This is an exhibition about achievements, and there are great ones here. Though not very instructive, it is certainly impressive. **Cheryl Kent** ■

Universal Design: Is It for Everyone?

A fundamental change in attitude is essential to the fulfillment of the *Americans with Disabilities Act,* according to participants in "Universal Design: Access for Daily Living," a two-day conference held in New York in May. If the built environment is to be accessible to everyone, they argued, ADA mandates should not merely be adapted to a design, but should be integral to it.

At the conference, co-sponsored by the Cooper-Hewitt Museum, the Pratt Institute's Center for Advanced Design Research, and the Department of Rehabilitation Medicine at Columbia University's College of Physicians and Surgeons, participants acknowledged the ADA as a milestone, and charged the design community and product manufacturers with responsibility for using it creatively and compassionately. Children, the elderly, and people with physical, mental, and emotional disabilties – as well as every person who at one time or another will be disabled – must be recognized as possible users. (For more on ADA, see Technics Topics, page 41; for a critical view of the legal procedures, see Editorial, Oct. 1991, p. 7.)

What the 380 participants gathered for this first annual conference – including designers, manufacturers, academics, and public-sector health and human services professionals – heard most adamantly was an appeal for interdisciplinary collaboration, and for the integration of universal design studies into architecture and design school curriculum. Adaptability, flexibility, affordability, and aesthetics were proposed as enduring characteristics of universal design. Dr. Daniel Fechtner, a physiatrist at Columbia and the initiator of the conference, suggested that designers focus on people's abilities rather than their disabilities.

Architect Ron Mace of Barrier Free Environments said that "univeral design is no one thing, it's common sense and good design." With just that ideology, architect Kim Beasley of the Paralyzed Veterans of America presented stadium seating he has designed that allows people with mobility impairments to sit with other fans rather than be banished to a special area. The Baltimore Orioles' new stadium (P/A, June 1992, p. 26) is the first to be designed with the system.

The conference's most impassioned plea for accessibility was made by Denise McQuade of the Brooklyn Center for Independence of the Disabled: "You have to believe in this stuff. It's not academic, it's about soul, about human beings. It should be second nature to include the disabled in the design process." **Abby Bussel** ■

Capital Improvements for Austrian City

In 1986, the province of Lower Austria voted to establish a capital in its own realm, having been governed from offices in Vienna since its founding in 1922. In so doing, it brought upon its chosen city, the 1000-year-old St. Polten, a sense of importance and a need for new facilities. The most obvious requirement was a grand new capitol building. No less important were new dwelling units, schools, and cultural and commercial facilities, as the city elders foresaw a growth in population from 50,000 to 80,000 by the year 2020. Housing competitions are being held, and some of the winning schemes are under construction.

Ernst Hoffmann's capitol scheme for St. Polten.

Most dramatic of the developments, however, are two large schemes to be built on highly visible sites on the edge of the old town. One awarded to Ernst Hoffmann of Vienna (P/A, May 1986, p. 98), is the 2.3-million-square-foot capitol complex on a 72-acre site. The other, awarded to Coop Himmelblau in a competition held by a private developer, is a one-million-square-foot office/retail/housing center. The two projects could not be more differ-

(continued on next page)

Gehry Wins a Third International Prize

California architect Frank O. Gehry, who won the Pritzker Architectural Prize in 1989 and the Wolf Prize in the Arts earlier this year, has been selected as the winner of the 1992 Praemium Imperiale award for "lifetime achievement" in architecture.

The Praemium Imperiale was established in 1988 by the Japan Art Association; winners in five arts categories are chosen every year by the association's trustees. Other winners this year are Akira Kurosawa of Japan (theater and film), Pierre Soulages of France (painting), Anthony Caro of England (sculpture), and Alfred Schnittke of Germany and Russia (music). Each will receive a $115,000 prize.

The recent proliferation of such superstar prizes has proven profitable for Gehry: he received $100,000 as the Pritzker laureate, and shared another $100,000 from the Wolf Prize with Jørn Utzon and Sir Denys Lasdun. That leaves only the $225,000 Carlsberg Prize, awarded for the first time this year to Tadao Ando (P/A, June 1992, p. 27), for Gehry to anticipate. Such redundancy is typical of the Praemium Imperiale, which has gone to former Pritzker winners three out of four times. ■

New Urban Design Awards from the AIA

An AIA jury has selected seven winners – ranging from a single-block government center to the large-scale planning effort for Boston's Central Artery – in the first edition of its Urban Design Awards of Excellence program. Jurors for the Awards, which replace the AIA's Citations in Urban Design, were chairman William H. Fain of Johnson Fain & Pereira, Los Angeles; Peter Batchelor of the North Carolina State University School of Architecture; and Harriet Sherburne of Olympia & York, Portland, Oregon. Winners are:

- Camden Yards Sports Complex Development Plan, Baltimore (P/A, June 1992, p. 26), by HOK Sports Facilities

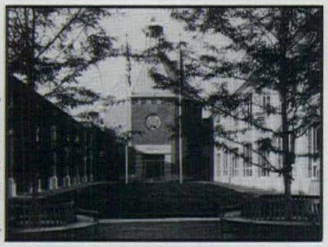
(continued on next page)

New Urban Design Awards from the AIA

(continued from previous page)

Group, Kansas City, with RTKL Associates, Baltimore, and Wallace, Roberts & Todd, Philadelphia;

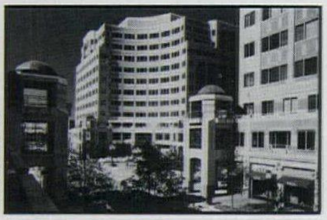
- Miles Inc. Development Agreement with the City of Berkeley, California, by Lyndon/Buchanan Associates, Berkeley, and Fern Tiger Associates, Oakland;
- Urban Design Guidelines for the Central Artery, Boston (P/A, Jan. 1992, p. 85), by the Boston Redevelopment Authority;



Steven Hall/Hedrich Blessing

Leesburg Government Center.

- Municipal Government Center, Leesburg, Virginia, by Hanno Weber & Associates, Chicago;



Maxwell MacKenzie

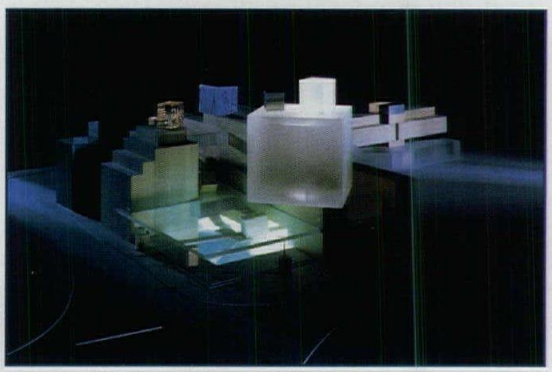
Reston Town Center.

- Reston Town Center, Reston, Virginia (P/A, May 1989, p. 83), by RTKL Associates, Baltimore, with Sasaki Associates, Watertown, Massachusetts;
- Southern Pacific Railyards Master Plan, Sacramento, California, by ROMA Design Group, San Francisco;
- Third Street Promenade, Santa Monica, California, by ROMA Design Group, San Francisco. ■

St. Polten *(continued from previous page)*

ent in design approach.

Hoffmann's capitol is a serene, even sedate, gently Modernist scheme of pavilions stretching 2000 feet along the Traiser River. It will form the first sight of the city from the main approach road, the town's numerous spires creating a backdrop beyond. Predominantly six stories high and clad in stone, precast concrete, and aluminum, the capitol has one vertical counterpoint of its own, a 230-foot steel and glass tone-chamber tower. Along the waterfront and between the pavilions, a series of plazas and promenades connects to paths into the old town. Two new bridges link the site to the opposite riverbank, where farmland is giving way to housing. The computer will also include a museum (for which a design competition is being held, with invited submissions by Richard Meier, Hans Hollein, and Daniel Libeskind, among others), a library, an exhibition hall, a concert hall, and a broadcasting studio by Gustav Peichl.



Gerald Zugmann

Europaplatz Center by Coop Himmelblau.

Coop Himmelblau's Europaplatz Center, located at a major crossroads west of the old town center, takes linear pavilions and flings them at odd angles, as if to shake the populace from its complacency. To guarantee good vibrations, a diviner was hired to determine beneficial siting angles for the long building blocks. Voids are placed where one might expect solids: a courtyard, for example, is sunk into the ground beside the yawning intersection at the site's most prominent corner. The latter is reminiscent of the largely misguided Modernist plazas of the 1960s. But Coop Himmelblau's Wolf Prix says he is pursuing a vision of the city as a beguiling, surprising place, a Medieval fabric woven with unpredictably angled streets and unanticipated squares, which should delight, not bore, the user.

The first phase of the capitol complex will be completed by St. Polten's millennium in 1996, and the rest by the year 2000. Construction of Europaplatz Center's 400,000-square-foot phase one is expected to begin next year. One can only wonder with which design approach the citizens – largely blue-collar workers, farmers, and shopkeepers – will more easily identify: the strait-laced pinstripe or the savvy punk. **Susan Doubilet** ■

The author, a former Senior Editor at P/A, is a freelance architect and journalist in New Jersey, and is Consulting Editor of Architecture New Jersey.

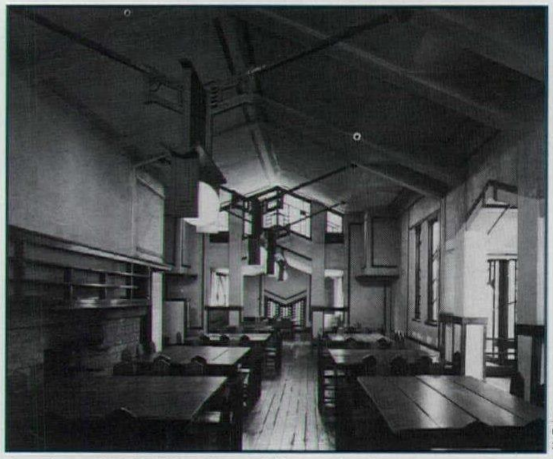
Wright School in Tokyo Endangered

A group in Tokyo has organized to save Frank Lloyd Wright's Myonichikan, the building he designed in 1921 for the Jiku Gakuen ("School of the Free Spirit"). The school's main campus is now in the suburbs, and the Wright building's site has become extremely valuable.

Myonichikan means "House of Tomorrow," but the building has fallen out of use and into disrepair. There are no immediate plans to demolish it, but the school's director, Gyo Hani, a nephew of the founders, won't promise to save it. The leader of the preservation group, Raku Endo, studied with Wright, and is the son of Arata Endo, the architect who supervised its construction. The group's American representative is the Chicago architect Masami Takayama. This May, in Tokyo, the group sponsored an international conference on Wright.

If Myonichikan became a landmark, its demolition would be forbidden, and most of the restoration costs – several million dollars – would be paid by the government. But the Cultural Affairs Agency can designate a landmark only upon request of its owners, who have rejected the possibility. The building's plaster and lath would not survive being moved, and Endo's group opposes trying to replicate it on a new site.

Given the demolition of Wright's Imperial Hotel in 1968, one might wonder if Japan just doesn't appreciate the architect. But according to former Wright associate Edgar Tafel, who spoke at the May conference, this is far from the case. There have been two major Wright exhibitions in Japan within the last year, and groups of Japanese architects often make tours of Wright's buildings in America. In the absence of a strong landmarks law, the preservation group believes that public awareness and pressure offer the best hope for saving Myonichikan. **Jonathan Hale** ■



Y. Takase

Interior of Wright's Myonichikan school.

The author, an architect in Watertown, Massachusetts, writes frequently on architecture and design.

P R E S E R V A T I O N

PAC-CLAD®
Metal Roofing Panels

The new Harold Washington Library in Downtown Chicago was designed to preserve generations of priceless literature. The library's roof was designed to preserve the architectural creativity in a cost-efficient way.

Preservation was a priority. Books from many branch locations around the city needed to be consolidated into one central location. Leaky roofs in the branches had already caused irreplaceable damage to some classic works.

Design guidelines called for an "old-fashioned" copper standing seam panel system, with barrel vaults and skylights. Such a look was chosen by the Chicago architectural firm of Hammond, Beeby & Babka because they believed a classic, antique look would work well with surrounding architecture.

Aesthetics and costs were the two primary reasons a Petersen Aluminum PAC-CLAD Roofing System was selected. The high snap-on standing seam panels met all design guidelines. A custom color kynar® finish, carrying a twenty year non-prorated warranty, was created to match the natural patina of weathered copper at a fraction of the cost.

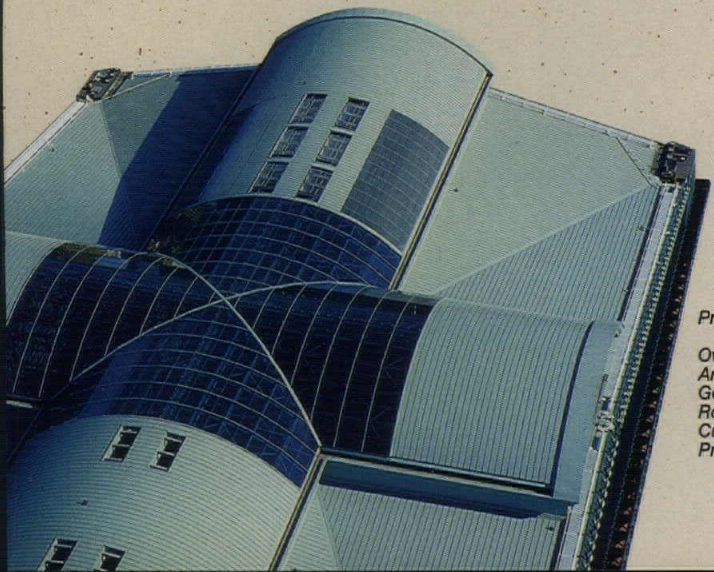
For more information and technical assistance, please contact Petersen Aluminum Corporation at **1-800-PAC-CLAD.**

PAC Petersen Aluminum Corporation

955 Estes Avenue, Elk Grove Village, IL 60007
1-800-PAC-CLAD or 1-708-228-7150
FAX: 1-800-722-7150

Other Plant Locations:

Annapolis Junction, MD	Tyler, TX
1-800-344-1400	1-800-441-8661



Project: Harold Washington Library
Chicago, Illinois
Owner: City of Chicago
Architect: Hammond Beeby & Babka/ A. Epstein & Sons
General Contractor: Schal/Mortenson
Roofing Contractor: James Mansfield & Sons Roofing
Custom Color: Patina Green
Profile: High Seam Panel

Circle **No. 318** on Reader Service Card

Calendar

Exhibitions

Czech Cubism
Through August 2

Montreal. "Czech-Cubism: Architecture and Design, 1910–1925" covers the prolific output of this early avant-garde movement. Canadian Centre for Architecture.

London's Boom Days
Through August 21

London. "City Changes: Architecture in the City of London 1985–1995" chronicles London's building binge. Royal Exchange.

Community Planning
Through August 31

Washington, D.C. "Choosing Futures: Planning America's Communities" explores citizen participation in the shaping of towns and cities. National Building Museum.

Wright's 125th
Through August 31

Chicago. The Chicago Athenaeum presents an exhibition in honor of the 125th anniversary of Frank Lloyd Wright's birth. Furniture, objects, and photographs of Chicago projects are shown. John Hancock Center.

Modern Design
Through October 25

New York. "Modern Design, 1890–1990" organizes this massive stretch of design history into five categories: Geometries, Soft Shapes, The Craft Tradition, The Architect's Eye, and Recollection and Rebellion. Metropolitan Museum of Art.

Competitions

AIA Awards Programs
Deadlines Vary

Washington, D.C. AIA awards deadlines for the second half of the year have been announced: Honor Awards (August 3); Twenty-Five Year Award (August 31); Kemper Award, Whitney Young Citation (September 12); 1993 Urban Design Awards of Excellence (October 1); Thomas Jefferson Award for Public Architecture (nominations, October 26); AIA/ALA Library Building Awards (October 29); Institute Honors; Architecture Firm Award, Henry Bacon Medal (nomination, November 2). Contact Peggy A. Meeham, AIA, 1735 New York Ave., N.W., Washington, D.C. 20006-5292 (202) 626-7438 or FAX (202) 626-7421.

SARA Awards
Registration deadline July 31, submission deadline August 28

Lombard, Illinois. The Society of American Registered Architects's 1992 awards competition is open to members and non-members. Completed and nearly completed house and housing, institutional, commercial, industrial, interior, rehabilitation, and remodeling projects may be entered. Contact SARA, National Headquarters, 1245 S. Highland Ave., Lombard, IL 60148 (708) 932-4622.

GSA Awards
Submission deadline August 7

Washington, D.C. The U.S. General Services Administration has announced its 1992 Biennial Design Awards Program. New federal buildings, historic preservation and renovation, landscape, graphic, engineering, energy conservation, and design management projects developed for GSA between January 1989 and December 1991 may be entered. Contact Marilyn Farley, U.S. General Services Administration, Public Buildings Service, 18th and F Sts., N.W., Washington, D.C. 20405 (202) 501-1888.

Environments for People with AIDS
Registration deadline August 15, Submission deadline October 19

Boston. "Raising the Roof, Opening Doors: living environments for people with AIDS" is a design competition co-sponsored by the City of Boston Public Facilities Department and the Boston Society of Architects. Contact Timothy Smith, Public Facilities Department, 15 Beacon St., Boston, MA 02108 (617) 635-0331.

(continued on page 24)

Calendar *(continued from page 23)*

Wolverine Exteriors
Entry deadline August 31

Livonia, Michigan. The annual "Finish First" competition honors projects using the Wolverine Exterior Design System; projects completed between September 1991 and August 31, 1992 are eligible. Contact Wolverine Technologies, Finish First, 17199 Laurel Park Dr., N., Livonia, MI 48152 (800) 521-9020.

Multifamily Housing
Registration deadline September 1, Submission deadline November 2

San Diego. The San Diego Housing Commission's affordable multifamily housing design competition has two themes: NIMBY ("addressing the misconceptions of affordable housing and the issue of balanced communities") and Transit Oriented Design (addressing "the integration of transit [trolley line] with affordable housing"). Registration opens August 3. Contact Brenda Baxter, Program and Policy Development, San Diego Housing Commission, 1625 Newton Ave., San Diego, CA 92113-1038 (619) 525-3610.

P/A Awards
Entry deadline September 11

Stamford, Connecticut. The 40th annual P/A Awards (see p. 29) recognize unbuilt projects in the categories of architectural design, urban design, and architectural research. Projects must be scheduled for completion after January 1, 1993. Winning entries will be featured in P/A's January 1993 issue. Contact Awards Editor, P/A, P.O. Box 1361, 600 Summer St., Stamford, CT 06904 (203) 348-7531 or FAX (203) 348-4023.

Conferences

Eco-Tec
September 1–14

Morsiglia, Corsica. "Eco-Tec" is an interdisciplinary conference on "the symbiosis of ecology and technology." Architects, artists, critics, and researchers will be in attendance. Contact Amerigo Marras, Project Director, Storefront for Art & Architecture, 97 Kenmare St., New York, NY 10012 (212) 431-5795 or FAX (212) 431-5755.

Europe in 1992
September 5–10

Brussels, Belgium. "The Production of the Built Environment: Europe 1992" will address the disintegration of the East and the integration of the West in terms of new development, economics, sources of labor, and other issues. Contact BISS Conference Secretariat, La Cambre, Marcel Pesleux, directeur, Place Eugène Flagey, 19, B-1050 Brussels, tel. 41-2-468200 or FAX 41-2-468261.

IFHP World Congress
September 13–18

Jerusalem. The International Federation for Housing and Planning's 41st world congress will address "National, Regional, and Urban Restructuring in the Wake of Rapid Changes: Trends, Implications, Policies." Contact IFHP Congress Department, Wassenaarseweg 43, 2596 CG The Hague, The Netherlands FAX (31) (70) 3282085

Housing/Housing Education
September 16–19

Winnipeg, Manitoba. "Housing Perspectives in North America: Sharing and Learning Together" is the title of the American Association of Housing Educators' annual conference. A one-day pre-conference/discussion on healthy housing will be held September 16. Contact Dana Stewart and Linda McFadyen, AAHE Local Arrangements Committee, Faculty of Architecture, Architecture Two Bldg., University of Manitoba, Winnipeg, Manitoba R3T 2N2 FAX (204) 261-7386. ■

Note

We strongly encourage readers to contact exhibition venues and competition and conference sponsors to confirm dates, request competition programs, etc. To provide timely Calendar listings, we need to have information one and one-half months prior to publication (July 15 for the September issue, for example). For possible inclusion, please send relevant material to Abby Bussel, P/A, 600 Summer St., Stamford, CT 06094 or FAX (203) 343-4023.

40th Annual P/A Awards

Progressive Architecture announces its 40th annual P/A Awards program.

The purpose of this competition is to recognize and encourage outstanding work in architecture and related environmental design fields before it is executed.

Submissions are invited in the three general categories of architectural design, urban design, and architectural research.

Designations of first award, award, and citation may be made by the invited jury, based on overall excellence and advances in the art.

Jury for the 40th P/A Awards

Judging

The judging will take place in early October 1992. Winners will be notified, confidentially, before October 31. Public announcement of winners will be made in January 1992, and winning entries will be featured in the January issue of P/A. Clients, as well as professionals responsible, will be recognized. P/A will arrange for coverage of winning entries in national and local media.

Turn the page for rules and entry forms.

Architectural Design

Thomas Beeby, *FAIA, Principal, Hammond Beeby & Babka, Inc., Chicago.*
Alan Colquhoun, *RIBA, AA Dip, Class of 1913 Lecturer, School of Architecture, Princeton, University, Princeton, New Jersey.*
Julie Eizenberg, *Principal, Koning Eizenberg Architecture, Inc., Santa Monica, California, and Lecturer, Graduate School of Architecture and Urban Planning, U.C.L.A.*
Ada Karmi-Melamede, *AIA, IIA, Karmi Architects & Company, Tel Aviv, Israel.*

Urban Design

John Kaliski, *AIA, Principal Architect, Community Redevelopment Agency, Los Angeles, and faculty, Southern California Institute of Architecture.*
Alan Ward, *ASLA, Principal Urban Designer and Landscape Architect, Sasaki Associates, Watertown, Massachusetts.*

Research

John Carmody, *Architectural Researcher, Associate Director, Underground Space Center, University of Minnesota, Minneapolis.*
Ben Refuerzo, *Principal, R-2ARCH, Designers/ Researchers, Los Angeles and New Orleans, and Associate Professor of Architecture, U.C.L.A.*

DEADLINE FOR SUBMISSIONS: SEPTEMBER 11, 1992

Entry form: 40th P/A Awards Program

Please fill out all parts and submit, intact, with each entry (see paragraph 14 of instructions). Copies of this form may be used.

Entrant:
Address:
Credit(s) for publication (attach additional sheet if necessary):

Entrant phone number:
Project:
Location:
Client:
Client phone number:
Category:

Entrant:
Address:
Project:

I certify that the submitted work was done by the parties credited and meets all Eligibility Requirements (1-7). All parties responsible for the work submitted accept the terms of the Publication Agreement (8-9). I understand that any entry that fails to meet Submission Requirements (10-18) may be disqualified. Signer must be authorized to represent those credited.

Signature ______________________

Name (typed or printed): ______________________

Awards Editor/Progressive Architecture
600 Summer Street, P.O. Box 1361, Stamford, CT 06904
Project:
Your submission has been received and assigned number ______

Entrant:
Address:

Receipt:

Awards Editor/Progressive Architecture
600 Summer Street, P.O. Box 1361, Stamford, CT 06904

Entrant:
Address:

(Return label)

Eligibility

1 Architects and other environmental design professionals practicing in the U.S. or Canada may enter one or more submissions. Proposals may be for any location, but work must have been directed and substantially executed in U.S. and/or Canadian offices.

2 All entries must have been *commissioned, for compensation, by clients with the authority and the intention* to carry out the proposal submitted. In the case of design competitions, the submitted design must be the one the client in-tends to execute. (For special provision in Research category only, see Item 6.)

3 Prior publication does not affect eligibility.

4 Architectural design entries may include only buildings and complexes, new or remodeled, that are scheduled to be completed after January 1, 1993. Indicate *schedule* on synopsis page (Item 12).

5 Urban design entries must have been accepted by a client who intends to base actions on them. Explain *implementation plans* on synopsis page (Item 12).

6 Research entries may include only reports accepted by the client for implementation or research studies undertaken by entrant with intention to publish or market results. Explain basis of eligibility on synopsis page (Item 12).

7 The jury's decision to premiate any submission will be contingent on verification by P/A that it meets all eligibility requirements. For this purpose, clients of all entries selected for recognition will be contacted by P/A. P/A reserves final decision on eligibility and accepts no liability in that regard. Please be certain entry meets above rules before submitting.

Publication agreement

8 If the submission should win, the entrant agrees to make available further graphic material as needed by P/A.

9 In the case of architectural design entries, P/A must be granted the first opportunity among U.S. architectural magazines for feature publication of any winning project upon completion.

Submission requirements

10 Entries must consist of legibly reproduced graphic material and text adequate to explain the proposal, *firmly bound* in binders no larger than than 17" in either dimension (9" x 11" preferred). No fold-out sheets; avoid fragile spiral or ring bindings. Unbound material in boxes, sleeves, etc., will *not be considered.*

11 No models, slides, films, or videotapes will be accepted. Original drawings are not required, and P/A will accept no liability for them.

12 Each submission *must include* a one-page synopsis, in English, on the first page inside the binder, identifying the project and location, clarifying eligibility (see Item 4, 5, or 6), and summarizing principal features that merit recognition in this program.

13 To maintain anonymity, no names of entrants or collaborating parties may appear on any part of submission, except on entry forms. Credits may be concealed by any simple means. Do *not* conceal identity and location of projects.

14 Each submission must be accompanied by a signed entry form, to be found on this page. Reproductions of this form are acceptable. All four sections of the form must be filled out, *legibly*. Insert entire form, intact, into unsealed envelope attached inside back cover of submission.

15 For purposes of jury procedure only, please identify on synopsis sheet each entry as one of the following: *Education (including dormitories), Houses (single-family), Housing (multiple), Commercial, Industrial, Governmental, Cultural, Recreational, Religious, Health, Urban Design, Applied Research*. Mixed-use entries should be classified by the larger function. If unable to classify, enter *Miscellaneous.*

16 Entry fee of $90 must accompany each submission. (Canadian office please send drafts in U.S. dollars.) Fee must be inserted in *unsealed* envelope containing entry form (Item 14, above). Make check or money order (no cash, please) payable to *Progressive Architecture.*

17 P/A intends to return all entries intact, but can assume no liability for loss or damage.

18 Deadline for sending entries is **September 11, 1992**. All entries must show postmark or other evidence of being en route by midnight, September 11. Address is printed below. In order to be seen by the jury, submissions must arrive at P/A's offices by September 30; we recommend use of some form of guaranteed delivery, such as Federal Express or Express mail. P/A accepts no responsibility for entries that are lost or delivered after September 30. If hand - delivered, entries must be received at address below, 6th floor reception desk, by 5 p.m. on September 11.

Pointers for submission

- *Document site and surroundings with photos and drawings.*
- *For additions and remodelings, clearly indicate old and new.*
- *If design projects involved substantial research, explain it concisely.*
- *For research entries, indicate applicability to design.*
- *For urban design, clearly indicate how projects are to be administered and funded..*

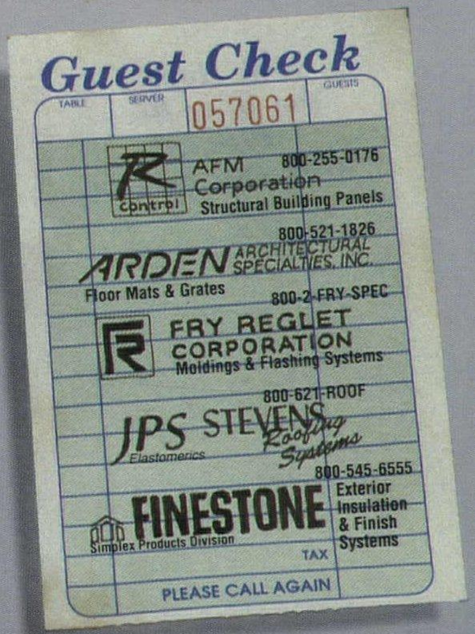
Deadline: September 11.

Deadline is strictly enforced.

Address entries to:

Awards Editor
Progressive Architecture
600 Summer Street
P.O. Box 1361
Stamford, CT 06904

Vertex Electronic CADalogs™ can cut down on those skipped lunches and late dinners.



The design is just about done. Now you have to find the building products you need to make it work. You can spend hours searching through manufacturers' binders. Or you can stick a CADalog disk in your computer and find the information you need in minutes.

Accessible, Up-To-Date Product Information

Each CADalog contains product information, specs, and installation details for one product line. Designed by architects, CADalogs help you find the right building products for your projects by stepping you through the appropriate selection options.

You can view the specifications and drawings on your computer screen. Then, transfer them to your word processing and CAD software for incorporation in your construction documents. Used directly or modified, they can save you hours of research, redrawing and retyping.

Substance, Not Just "Fast Food"

You might think of Electronic CADalogs as drawings and specs "to go," they are that convenient. But they are much more than that.

CADalogs provide you with valuable reference material right at your desk, on your PC. And, now part of *System ASG*, they work alongside our full line of AutoCAD® applications to offer you even more productivity.

Order Your FREE CADalogs Today

The CADalogs are available *free* to qualified professionals. Call the Vertex Division of ASG at **(415) 332-2123**, or fill out and return the coupon to order.

VERTEX™

A DIVISION OF ASG

The small print: CADalogs run on DOS-based PCs with 512K of RAM. They can be used from floppy disks or loaded onto your hard disk. They require a high density floppy disk drive (1.2Mb or 1.44Mb); DOS 3.3 or later; and an EGA, VGA, or Hercules display. Specification text is in ASCII format; drawings in DXF format.

VERTEX ELECTRONIC CADALOGS™

For fastest service, call the individual companies at the numbers listed. Or, circle those you are interested in and return this coupon today.

Name ______________________

Title ______________________

Company ______________________

Address ______________________

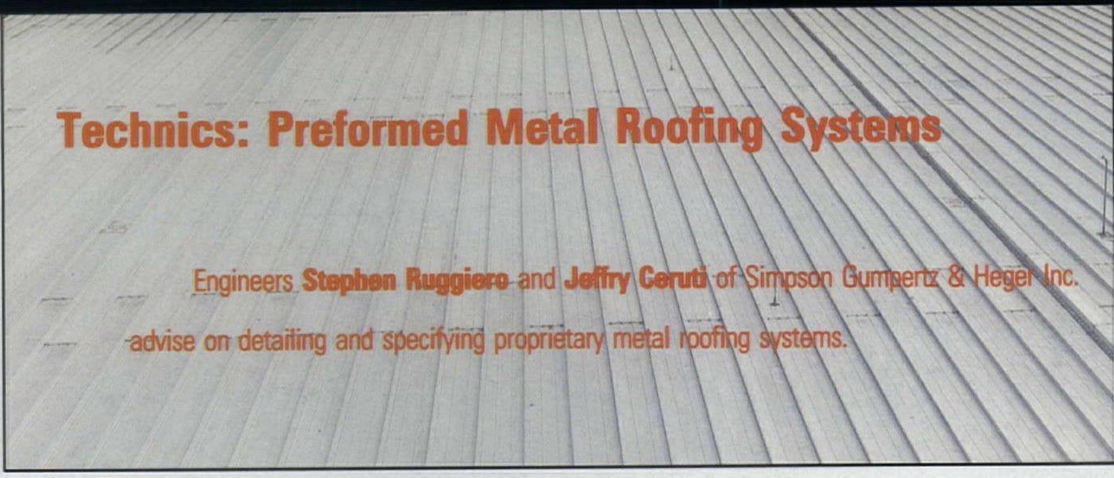
City/ST/Zip ______________________

Phone (______) ______________________

Tel: 415 / 332-2123 • **FAX: 415 / 332-2146**

VERTEX • 4000 Bridgeway, Suite 309

Sausalito, CA 94965



Technics: Preformed Metal Roofing Systems

Engineers **Stephen Ruggiero** and **Jeffry Ceruti** of Simpson Gumpertz & Heger Inc.

advise on detailing and specifying proprietary metal roofing systems.

For hundreds of years, metal roofing has proved successful on buildings around the world. Several aspects of traditional, field-fabricated metal roofs combine to account for their long-term success, including the durability of materials used (copper and stainless steel), steep-slope application that assures prompt drainage, and watertight joints fabricated by soldering or lock-jointing in place. Also, the relatively short panel length of 8′ to 10′ commonly used in these roofs reduces problems associated with differential thermal movement of the metal components.

To reduce the cost of traditional field-fabricated metal roofing, the industry introduced preformed metal roofing panels with a variety of standing seam profiles. These systems use less expensive materials (steel and aluminum) and their installation techniques considerably reduce labor costs. The roofing panels and system accessories are generally proprietary designs. Although preformed systems were initially limited to industrial-type, pre-engineered metal buildings, standing-seam preformed metal roofing is now commonly used on many building types where aesthetics and performance are critical.

Unfortunately, several characteristics of preformed metal panel systems make them less reliable than traditional metal roofing systems. For example, most preformed metal roofing panels are prepainted or coated, therefore the metal pieces cannot be soldered together to provide watertight connections. Although panel lengths of 50′ or more reduce installation costs, thermal movements and stress concentrations within such systems can be significant. Designers who acknowledge these conditions – and take care to address them – have used preformed systems successfully. Many designers who specify these systems, however, do not fully understand their performance characteristics and material capabilities, and are not familiar with proper detailing practices.

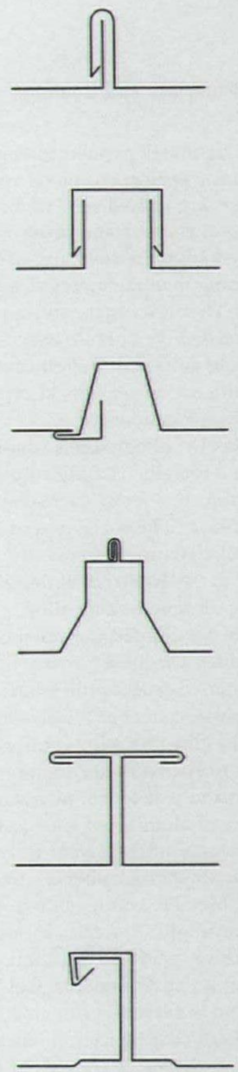
Characteristics of Preformed Metal Roofing

Preformed metal roofing systems are generally categorized as *architectural* or *structural* systems, depending on appearance and performance characteristics. Architectural metal roofing systems, like traditional field-formed roofs, are applied over continuous, steeply sloped, solid decking. The panels are usually 12″ to 18″ wide with 1½″ high seams, and are available in standing seam or batten seam configurations (1).

Unlike traditional metal roofing, the seams on architectural systems are not usually folded or locked together and will leak under a static head of ponded water; manufacturers commonly refer to them as "water-shedders." Most manufacturers recommend a minimum slope of 3/12 with a roofing underlayment (such as 30 lb asphalt-saturated felt paper) installed on the deck, below the metal roofing pans, to prevent leakage through the panels from entering the building. The panels are usually flat between the seams, without corrugations or stiffening ribs, and are usually made of 24 or 26 gauge steel or 0.032″ aluminum. The flat portion of the panel can be field-bent to lock onto metal hook strips or other pieces of metal, to hold down panel ends at eaves, ridges, or valleys. For the most part, architectural systems retain many of the characteristics of traditional metal roofing systems, and they can provide a satisfactory alternative to them.

Structural metal roofing systems are applied over substructural purlins; solid substrates are not required by the system manufacturers. The panels range from 12″ to 24″ wide, with 2½″ to 3″ high seams (1), and are made of 22 or 24 gauge steel or 0.040 aluminum. Because of their corrugations, field bending of structural panels is difficult, and most joints at panel end laps, eaves, valleys, ridges, and penetrations are simple lap joints gasketed with sealants. The metal pieces are lapped and fastened with exposed screws. Manufacturers typically recommend 1/4 in/ft minimum slope for structural metal roofing systems, and refer to them as "water barriers," because the seams are locked together after the panels are installed. The same minimum slope is recommended by the National Roofing Contractors Association for monolithic membrane roofing (such as EPDM, PVC, and built-up roofing). Structural systems depart from traditional metal roofing applications and are marketed as an alternative to other low-slope roofing materials.

Long panels and exposed fasteners in end laps or at flashing details result in several thousand fasteners throughout the roof, which create maintenance problems in structural systems. Thermally driven expansion and contraction of panels cause stress concentrations at fasteners, particularly when the panels are restrained against free movement. In time, the fasteners loosen and dislodge, or the fastener holes in the panels elongate, pro-



1a

1b

1c

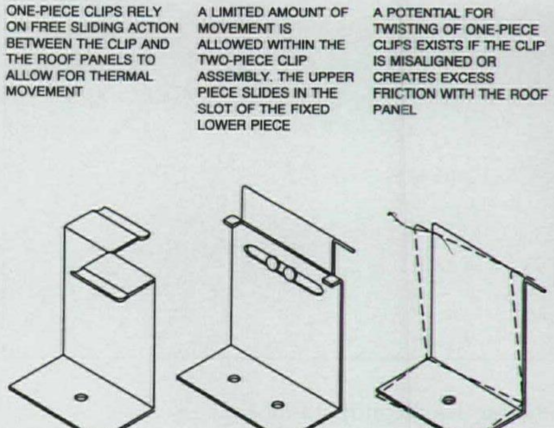
1d

1e

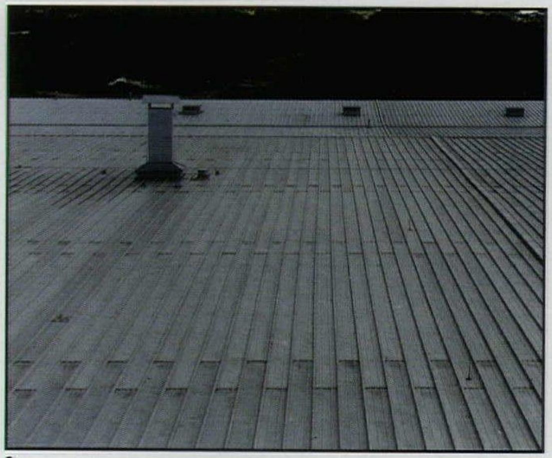
1f

All drawings redrawn by Evan L. Goldenberg

1 *Typical seam profiles for "architectural" systems (a–c, 1½″ standard height) and "structural" systems (d–f, 2½″ standard height). Architectural panels snap together or onto clips during installation, while structural panel seams are mechanically locked together after panels are installed.*



2


3

2 *Different types of clip anchors for structural panel systems.*

3 *Preformed structural system of Galvalume panels applied over purlins, with batt insulation between purlins. Note numerous panel end laps with exposed fasteners, and 1/24 roof slope.*

viding avenues for water penetration. The most important thermal movements occur along the rafter length (longitudinal) of the roof slope. However, thermal expansion and contraction across the width of the roof (transverse) can also become a problem if expansion joints are not used to subdivide the roof. The performance of these systems depends on accommodating thermal movement of the panels.

Corrosion of steel panels also is potentially a significant problem, particularly when paint is the only protective coating used for the steel. The base metal becomes a strong galvanic cell within the panel system if it becomes exposed because of damage or peeling of the paint. Corrosion of the exposed metal proceeds rapidly, therefore all painted systems should be inspected and maintained on a routine basis. Aluminized steel or a Galvalume coating is preferred for corrosion protection (see sidebar).

Panel Attachment and Accessories

Each manufacturer provides accessory clips for attaching the panels to the substrate structure and that – ideally – allow the panels to move independently of the clip in response to thermal cycles. The ability of the roof system to "float" is particularly critical to the success of structural systems, which often span long distances and which require many end laps (transverse seams). The design of the clips has evolved from the one-piece (friction fit) clip to a more sophisticated assembly of two pieces: a base that is fastened to the structure, and a sliding clip that engages the panel, but moves freely within the slotted base (2).

One-piece clips commonly used with architectural systems rely on sliding action between the metal clip and metal panel to allow the panel to expand and contract from thermal forces. In reality, there is always friction between the metal pieces that the thermal forces must overcome. As the panels slide over the clips, the friction forces induce stresses that can distort clips and cause them to bind with the panel. If clips are misaligned during installation, the friction is increased, and greater stresses are induced within the clips. As a result, the panels have multiple points of restraint and can buckle or warp with ensuing thermal cycles. For this reason, one-piece clips should not be used where roof lengths exceed 50′.

Structural systems are often used for roofs 100′ or more in rafter length (3). Many of these assemblies, however, still use a one-piece clip. The forces described above are even more pronounced in structural systems, because the standing seam construction uses sealants and fold locks that increase the friction between panels and clips. This ultimately subjects the fasteners at end laps to cyclical thermal movements and stresses that loosen or dislodge them.

Two-piece clips are vital to the performance of structural systems both in theory and practice. The amount of movement provided by two-piece clips is sometimes limited by the size of the slot in the lower piece. Manufacturers should be consulted to ensure the clips will accommodate the expected movement of long panels. Thermal movements can be calculated for various design conditions: for example, a 100′ long steel roof run exposed to a 125 F temperature change will expand or shorten approximately 1″.

Initial placement of the upper piece of the two-piece clip is critical as well; misplacement can cause the clip to bind during expansion or contraction of the panels. Most manufacturers recommend the upper piece be placed in the middle of the lower piece, to allow movement in both directions. When installation occurs during extreme temperatures, however, the clip should be placed to allow for excessive movement in one direction.

In addition to attachment at panel clip locations, the panels are usually "fixed" to the structure at either the ridge or the eave. Architectural systems are typically fixed at the ridge and the panel is folded over flashing at the eave; movement is provided within the fold at the eave. Structural systems are usually attached at the eave to increase wind uplift capabilities at the bottom of the roof, and the ridge is allowed to float. As such, the ridge flashing must be carefully conceived to allow movement without weakening the sealants or seals that typically "waterproof" the ridge closures.

Accommodation of thermal movement is also critical at the rake (roof edge) and large penetrations such as roof hatches. The panels and flashing along the rake must be integrated to ensure that

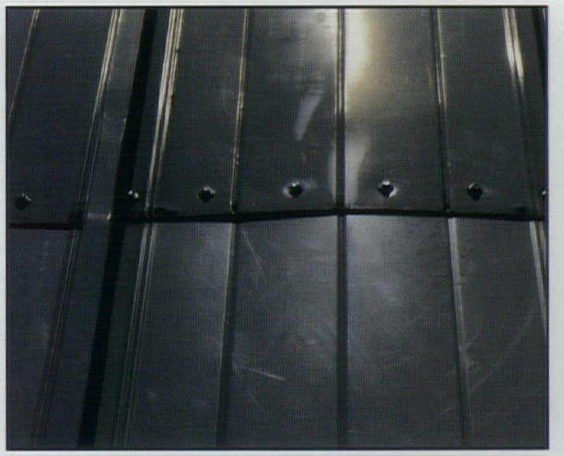
Materials and Coatings

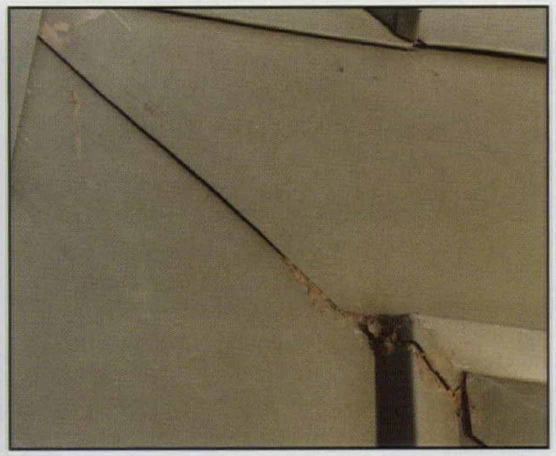
The most common materials used for preformed metal roof panels are coated steel and aluminum. Copper and terne-coated stainless steel are offered by some manufacturers at higher cost. The latter make more reliable flashings because they can be field-soldered, thereby avoiding the use of sealants at critical flashing locations.

Steel roofing panels usually have a metallic coating to protect the steel from atmospheric corrosion. The three types of metallic coatings commonly used are galvanized, aluminized, or an aluminum-zinc alloy. While hot-dipped galvanizing provides adequate corrosion resistance in most applications, aluminized steel and Galvalume (aluminum-zinc alloy coating) have provided better long-term corrosion resistance; manufacturers of aluminized steel and Galvalume offer 20-year warranties against atmospheric corrosion. Metallic coatings do not perform well, however, in highly corrosive (acid and chlorine, for example) environments. Galvalume is currently the most common coating used on steel roofing panels; it consists of 55 percent aluminum and 45 percent zinc alloy (by weight), applied by a hot-dipping process.

Aluminum is commonly used because of its resistance to atmospheric corrosion. Designers should be aware, however, that the coefficient of thermal expansion for aluminum is approximately double that of steel; aluminum panels will expand and contract twice as much as steel panels when subjected to the same temperature change. The

(continued on next page)


4


5

4 Bowing of panel end lap on a structural system. A water test simulating wind-driven rain caused leakage through gaps in the sealant between the two panels. No roof underlayment was installed.

5 Two valleys intersecting at the back of a dormer. Several pinholes between the prepainted metal pieces occur where the V-crimps of the valley intersect; the intersection relies on exposed sealant and the roofing underlayment to prevent leakage into the building.

the roof panels and/or rake flashing move independently of side walls. Similarly, heavy mechanical units require supports that are attached to the building structure. The roofing system should include an accessory flashing curb that permits the panel system to move relative to the fixed unit. Otherwise, the panels will be restrained against movement at these locations and will create stresses in exposed fasteners in the curb vicinity.

Thermal movement transverse to the roof slope should be considered on roofs wider than 200′. A limited amount of transverse movement capability is built into most panel cross-sections, but accumulated movement in wide roofs can cause the panels to bow along end laps and seams (4); this can produce gaps and open seams, and can deform panels at ridges and eaves.

Manufacturers of structural systems usually provide load tables for their products, so that designers can select purlin spacings and attachments based on the project's design loads. Design loads should include wind, snow, and maintenance traffic. Designers must be aware that the "floating" metal roof does not provide a diaphragm action to the building structure, and this should be considered in the sizing and lateral bracing of steel bar joists, purlins, and other structural members. Load tables are not usually provided with architectural systems; for wind uplift, designers should require the manufacturer to provide calculations or tests showing that the prefabricated system can withstand the design wind loads.

Flashing Details

Unreliable flashing details are probably the most common cause of leakage through metal roofs. They can be attributed to poor design and/or poor workmanship. Details for prefabricated metal roofing vary widely between architectural and structural systems. Manufacturers usually provide basic details for their products in catalogs. These details usually do not address all conditions on buildings (intersections of flashing such as the ridge at gable ends, for example), and they usually do not address typical transverse joints in the flashing. Most manufacturers state that the details provided are only suggested methods of installation, and they recommend that the designer or installer ensure that the details are adequate to meet project requirements. Manufacturers usually disclaim responsibility for leakage as a result of using their suggested details.

Flashing details for architectural systems generally follow traditional metal roofing practices, except that the prefabricated materials are not usually solderable. Typical flashing consists of metal pieces lapped over one another, or locked together, to shed water; most details rely on slope (3/12 and greater) to direct water away from critical areas. Because they are usually flat in cross section, architectural panels can be field-bent at flashing transitions to provide a connection without using exposed fasteners. Many manufacturers cite SMACNA's *Architectural Sheet Metal Manual* as a guide for flashing details. *Copper and Common Sense* deals specifically with field-formed copper, but it provides detailing concepts that are more reliable than some of those found in the *Sheet Metal Manual*.

With sufficient roof slope, typical flashing details for architectural systems perform satisfactorily. Problems occur, however, at intersections of different flashing conditions. As an example, dormers on roofs present tricky flashing details where the two valleys and the ridge intersect with the roof (5). Detailing at such transitions usually consists of several pieces of metal lapped to shed water. Because of the geometry of the transition, pinholes at folds in the metal are inevitable: metal cannot stretch around three-dimensional transitions. These pinholes can be covered with sealant, but they rely on the underlayment to prevent leakage. With traditional, unpainted materials, the pinholes would be soldered watertight.

Because structural systems are marketed for low-slope (1/4 in/ft) application, sealant gaskets are required to perform as a primary waterproofing material. Even if applied perfectly, sealant is not a durable material, and will not perform for the life of a metal roof. In time, the fasteners that provide the gasket pressure may loosen or dislodge, or fastener holes in the metal may widen, allowing water to enter. Furthermore, the durability of washer materials is a problem: rubber washers tend to harden and embrittle over time and fall off, leaving spaces between the metal and the

(continued from previous page)

yield strength of aluminum is much less than that of steel; this must be considered in panel clip and purlin spacings.

Paint coatings are often applied over base metal or metallic coatings to provide additional corrosion protection and a variety of colors. The most common type of paint coatings are fluorocarbons, such as "Kynar 500." Other common paint coatings include polyesters and silica-polyesters.

Most paint coatings on metal panels are applied to the metal coil stock in at least two layers, including primer and top coat. Each layer is cured by oven baking; the bottom side of the coil stock is usually only prime-coated. The prepainted coil stock is then roll-formed into roofing panels, or cut to stock sizes for flashing.

Early paint coating formulations on metal panels often failed because of loss of adhesion (subjecting the base metal to corrosion), or the paint chalked and faded prematurely. Field-applied paint repairs on metal panels are unreliable because of varying substrate conditions and unpredictable field conditions. Failed coatings usually become a maintenance problem for the building owner.

Although current paint technology offers better coating performance, damage to coatings can occur from storage, handling, installation procedures, and roof traffic. Touch-up paint is supplied by the manufacturer, but it does not provide the same level of integrity as the original oven-baked coating. Damage to the coating should be avoided; excessive scratches or damage during construction should be cause for rejection of the panels.

6 Typical end cap in a structural system.
7 Typical ridge detail on architectural system; the ridge closure is set in sealant and fastened through the panel to the plywood deck below. If water bypasses the closure, it must travel approximately 3" uphill to overtop the end of the panel. Water can, however, penetrate fastener holes below the closure through voids in the sealant. With copper or stainless steel, the ridge closure would be soldered to the panel to form a watertight connection.
8 Ridge details.
9 Adequate drainage is not provided at the upslope side of this roof curb, subjecting the exposed fasteners and the ends of the standing seams to ponded water. The seams should have ended further upslope, and a diverter with greater slope to the sides of the curb should have been installed.

Warranties

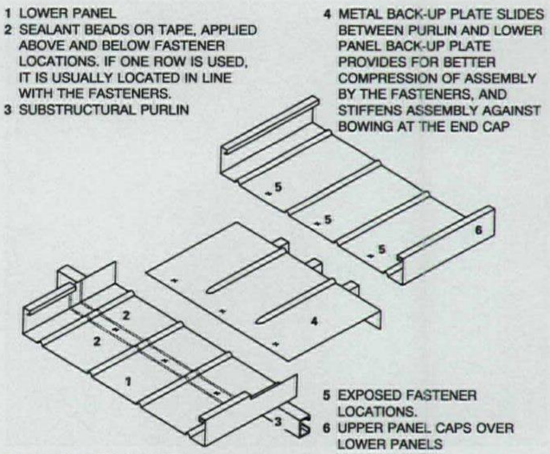
Metal roofing manufacturers' warranties usually cover the material and paint coating only. A few manufacturers of structural systems provide "watertight" warranties, but this is not widespread throughout the industry. Aluminized steel and Galvalume products typically carry 20-year warranties against corrosion of the metallic coating under normal atmospheric conditions. Galvanized steel products do not offer a similar warranty.

Paint coating manufacturers warrant their coatings against chalk, fade, peel, and loss of adhesion to the metal substrate. Most warranty periods are 20 years, and limitations on chalking and fading, for example, depend on the type of coating (polyester, siliconized polyester, and fluorocarbon coatings have different characteristics). Usually a limited amount of wear is allowed within the warranty.

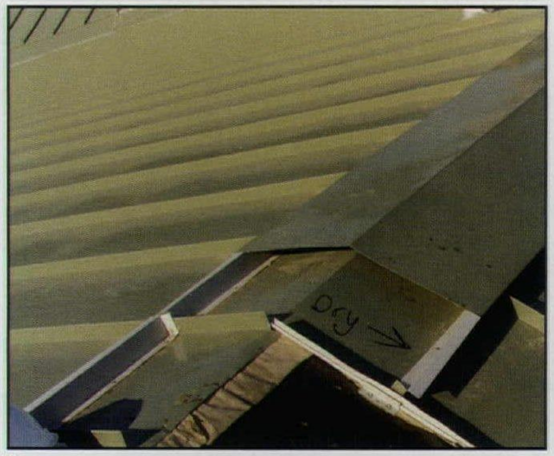
Many building owners and designers do not realize, however, that manufacturers' warranties are used primarily as a marketing technique and protect the manufacturer more than they protect the building owner. Some manufacturer's warranties against atmospheric corrosion of the base metal limit their liability to as low as $.20/ft^2 of roof area, and almost all warranties exclude labor costs.

Most coating warranties ex-

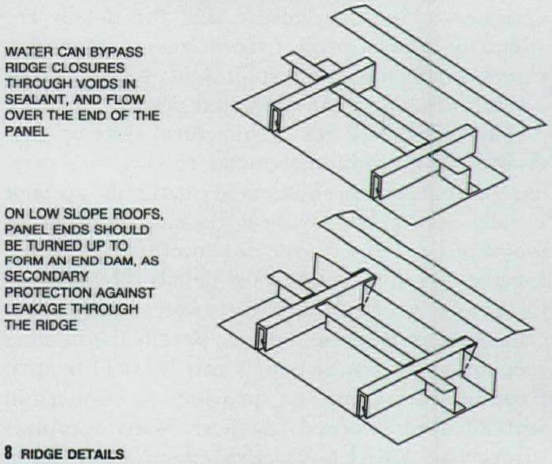
(continued on next page)



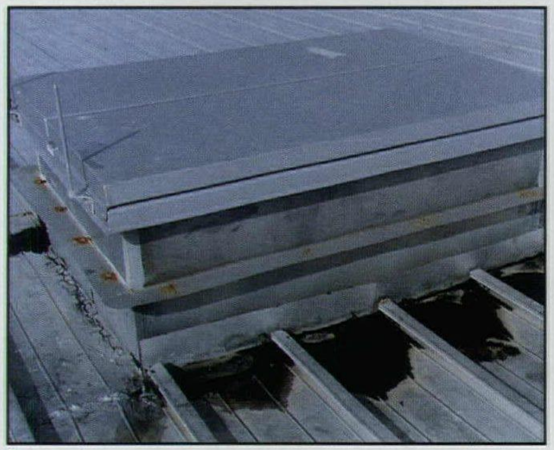
6 TYPICAL ENDCAP IN STRUCTURAL SYSTEM



7



8 RIDGE DETAILS



9

fastener. Whenever possible, exposed fasteners should be eliminated from the roofing design.

Common Detailing Problems

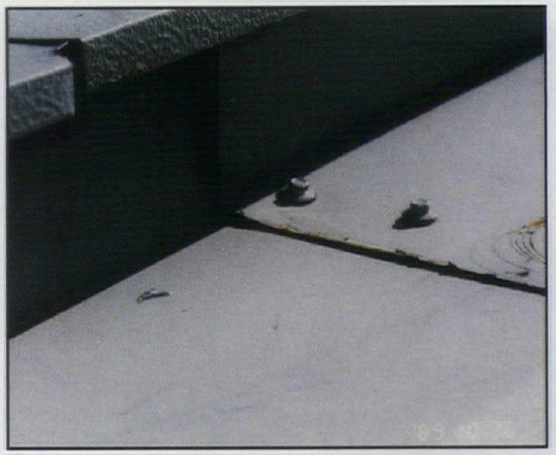
Panel end laps in structural systems are prone to leakage and require routine maintenance because they rely on sealants and exposed fasteners. Some proprietary systems have end-lap details that use compression (back-up) plates in the end lap to stiffen the lap and to provide increased section to engage fasteners (6). This type of end-lap construction helps reduce problems of convex bowing and lack of sealant compression that we have seen in systems that employ simple lap joints. Remember that at low slopes of ¼ in/ft to ½ in/ft, the amount of protection afforded by a 12" head lap against wind-driven rain is not sufficient to prevent leakage at gaps in the end-lap construction. Panel end laps should be eliminated from the roofing design, if possible.

Panel end laps in architectural systems are usually avoided by roll-forming long continuous panels. When end laps are required, the panel ends should be locked onto a hook strip that is attached through the top of the underlying panel to the decking. Thermal movement of the upper panel should be accommodated between the upper panel and the hook strip. The top of the underlying panel should extend past the hook strip to provide sufficient headlap.

Ridge details often present problems similar to transverse panel joints. A metal closure formed to fit between the panel seams is usually sealed to the metal panel (7), and a ridge cap is installed over this closure. Voids in the seal between the closure and the panel allow wind-driven rain to penetrate the system. Wind loads on the ridge cap can cause the cap to flutter, weakening the seal between the closure and the panel. If the roof is anchored at the eave line, thermal movement of the roof can further weaken the ridge seal. Some manufacturers provide rubber closures to be installed behind the metal closures, but these do not usually compress enough for watertightness.

The roof panel should extend past the metal ridge closure piece to provide sufficient headlap; the amount of headlap depends on the roof slope. On low-slope applications (less than 3/12), the top of the panel should be turned up to form an end dam, upslope of the closure piece (8). It is unrealistic to expect perfect sealant installation along hundreds of feet of ridge flashing. Wind-driven rain and negative (inward) pressure differentials at the ridge readily attack sealant defects on low-slope roofs. Designers should consider using a dual closure detail to take advantage of pressure-equalized design concepts (as suggested in CSI's monograph) at this critical roof juncture.

Large penetrations such as mechanical units and smoke hatches interrupt the continuity of the standing seams and may inadvertently provide additional points of fixity. Prompt drainage of water from the uphill side of the penetration must be provided by properly angled (sloped) crickets or diverters, to avoid ponding and back-up of



10

11

12

13

10 *Panel end lap at the rake; the panels and flashing pieces do not nest together properly, and allow gaps between metal pieces. Water can penetrate voids in the sealant at these locations.*

11 *This built-in gutter overtopped during heavy rain storms, causing leakage at the roof-to-gutter intersection; secondary drainage was subsequently installed. Additional leakage occurs through soldered seams that have broken from thermal movement of the gutter.*

12 *Accumulation of snow in a valley from a storm that deposited 3" of snow. The snow guard design prevents any snow from sliding off the roof. Note that the built-in gutter is filled with ice.*

13 *Ponding water at the ridge of a low-slope structural system; the panels were probably dented between supports from workers installing the ridge flashing.*

water. The end laps and cut (interrupted) ends of the panels, particularly on low-slope roofs, are vulnerable to leakage (9). Some sources suggest that large penetrations should be located near the eaves in structural systems because little movement is expected in the roofing at this location. We recommend against this, however, because the penetration will be exposed to more water flow than if it is located near the ridge.

Rakes and ridges that intersect walls are problematic in low-slope roofs because gaps often occur during the fit-up of metal-to-metal joints (10). At rakes, the flashing pieces or panels turn 90° and the transverse seams or end laps must also turn 90°. For a variety of reasons – including poor fit-up (nesting) and thermal movements within the roof assembly or along the flashing – unsealed gaps occur that allow wind-driven rain to penetrate the system. Rubber strip flashings are often required to resolve leakage problems at these gaps in metal-to-metal joints.

Built-in gutters are often a source of leakage and should be avoided if at all possible. If gutters are required, the seams between gutter lengths should be soldered, instead of lapped and sealed, and expansion joints should be provided between downspouts. If the gutter cross-section is constrained, however, thermal stresses will inevitably rupture soldered seams. Rubber membrane liners are vulnerable at laps (seams), particularly where the seam must turn 90° from the gutter floor to sidewall. Residual ponding is typical for gutters, further aggravating the potential for leakage at seams. We have investigated a number of roofs with built-in gutters that overflow (11) and create ponds over the panel end laps because of inadequately sized drains and leaders. Because of the relatively small storage volume of most gutters, designers must carefully choose the design rainfall intensity and duration for sizing the drainage system. Intensities should range from 7 in/hr to 12 in/hr, whereas most roofs are designed for the 3 in/hr to 4 in/hr of rainfall prescribed by codes.

Valleys and roofs below rising walls are subjected to increased run-off, and therefore require appropriate detailing and backup protection. In snow country, valleys can accumulate large volumes of snow (12) that create ponds as ice dams from downslope. In heavy runoff areas, metal-to-metal joints should be locked and the valley construction should be backed up by a secondary underlayment. Avoid the use of exposed fasteners, simple lap joints, and sealants as primary waterproofing in heavy runoff areas.

Aesthetic Issues

"Oil-canning" (waviness in the flat section of roofing panels) is common on prefabricated metal panels and is highly visible on steep-slope roofs. It is usually caused by either defective metal coil stock or by poor roll-forming during manufacture of the panel. Unless excessive, waviness from poor manufacturing should not unduly affect the performance of the roof. Restraint of thermal expan-

(continued from previous page)

clude panels that are exposed to high chemical concentrations or installed near the ocean. Standard 20-year coating warranties usually state that, in the event the coating fails to perform, the repair method to be used will be selected solely by the coating manufacturer, and that "failure" of coatings is determined solely by the coating manufacturer upon investigation. Usually, the repair method is limited to supplying touch-up paint to the owner for the remainder of the warranty period; the owner must apply the paint to the failed coating.

Coating warranties usually exclude damage to other building elements. The coating manufacturer, therefore, is not responsible for corrosion of the base metal as a result of a coating failure. Unless the metal manufacturer offers a material warranty against atmospheric corrosion, the owner must pay for the materials, as well as the labor, to repair or replace the affected panels. Even though warranted coatings are applied to protect the base metal, it must be resistant to corrosion.

"Oil-canning" (waviness) of metal panels is discussed in most panel manufacturers' literature. Technical literature often states that a "certain amount" of oil-canning is characteristic of metal panels, and is not cause for rejection; however, a clear definition of a "certain amount" of oil-canning is not provided.

sion of the roof panels may also cause oil canning.

Varying substrate conditions can create visual problems with typical metal panels. Denting of structural panels between supports (from installation workers, for example) is common on roofs without solid substrates (13), and it can cause ponding in low-slope applications. Variances in solid decking and wood blocking substrates will usually telegraph through the metal roofing and flashing, as the metal deflects to follow the substrate. Warped plywood, plywood with offset joints, and pre-cambered decks will create deflections in metal panels that may be visible from the ground. Concave-shaped roof decks can induce compression into the standing seams, causing the seams to buckle. Creases or buckles in metal may not present problems at first, but splits in the metal may form over time, as the metal "hinges" at the buckle from thermal movement.

Performance Specifications

Because of the number and variety of metal roofing manufacturers and systems, designers tend to use performance-type specifications for bidding purposes. In too many instances, however, designers fail to present adequately the salient performance requirements; they merely list a number of systems as acceptable for the project.

Specifications should include criteria for gravity loads, including loads incurred during construction, and wind uplift. The submitted manufacturer should be required to provide calculations demonstrating that the entire system can meet these design loads; modifications to the basic system may be necessary. Specification of an Underwriters Laboratory-approved system, such as UL 90, does not ensure the entire system can withstand a specific wind uplift force; the UL 580 test is conducted on a 10′ x 10′ sample area of a typical roof, without edge flashing or penetrations.

The range of thermal movement required of the system and attachment clip characteristics necessary to accommodate that movement should be included in the specification. Requirements for expansion joints parallel to the roof slope should be specified for roofs wider than 200′ and at expansion joints. The specifications should identify all specialty accessories (flashings) that must be provided by the manufacturer.

Special requirements for panel lengths must be explained in the specifications so the manufacturer and contractor can price the project accordingly. This is particularly important when panel lengths exceed 45′ (so as to eliminate the need for end laps). Special shipping and handling procedures for longer panels may be required.

Proper selection of metal roofing materials and coatings depends on each specific application. Most metals and coatings are not appropriate for exposure to industrial-strength chemicals, increased acidity, or to the high salt concentrations in the atmosphere found near oceans.

Specifications must describe other items related to the metal roof that may require coordination between trades. For example, properly constructed flashing at rising walls may require coordination among masons, window installers, and sheet metal workers.

Schematic contract drawings usually lead to design of flashing details during the shop drawing phase or during construction. The quality of the flashing design is difficult to control in these phases because the contractor has no standard to detail against. Shop drawings usually do not address all specific project conditions, including corners and transitions. Contract drawings should contain typical sections for all flashing conditions, and because problems often occur at intersections of flashing, the drawings should include isometric details of flashing transitions. Splice joints in flashing should be detailed, and gutter and downspout sizes and spacing stated.

Shop drawings must be reviewed carefully to obtain a system that will function properly. The designer can modify a manufacturer's standard details, if necessary, to ensure that original design concepts are carried out and that the system meets all specification criteria. Do not rely on the system manufacturer and its warranty claims as a substitute for time-proven design details.

Conclusion

Preformed "architectural" metal roofing systems can provide a satisfactory alternative to traditional, field-formed metal roofing on steep slopes (3/12 or greater). Designers and owners must recognize, however, that limitations intrinsic to the materials and details of preformed systems present a trade-off to the increased cost and longevity of field-fabricated systems.

While all low-slope roofing systems are vulnerable to workmanship problems, particularly at flashings, preformed "structural" metal roofing systems are not well suited in concept to low-slope application. The multitude of seams and exposed fasteners, and the reliance on sealant "gaskets" (under the stress of cyclical thermal movements) makes these systems less effective – in our opinion – than single ply and built-up roofing membranes.

Designers should attempt to simplify the roof geometry and eliminate complex flashing transitions; preformed metal roofing works best on straight runs without dormers, valleys, or other changes in plane or slope. The number of roof penetrations should be kept to a minimum. Mechanical units and other penetrations, for example, can be consolidated in a "well" at the center of the building, and concealed by metal roofing around its perimeter; the "well" can then be waterproofed with a membrane system that provides more reliable flashing at curbs and penetrations.

Stephen S. Ruggiero, PE, and **Jeffry J. Ceruti** ■

Authors Ruggiero and Ceruti are associate and engineer, respectively, in the Building Technology Division of Simpson Gumpertz & Heger Inc., Consulting Engineers, in Arlington, Massachusetts. They investigate metal roofing problems and design new and remedial metal roofing systems. The authors and their colleagues at SGH participate in various ASTM committees and the National Roofing Contractors Association as they relate to the performance of roofing and building construction.

Recommended Reading

Architectural Sheet Metal Manual, Sheet Metal and Air-Conditioning Contractors National Association, Chantilly, Virginia (703) 803-2980, 1987, 358 pp.

Copper and Common Sense, Revere Copper Products Inc., Rome, New York (315) 338-2022, 1982, 103 pp.

Preventing Leaks in Metal Roofing, R.C. Schroter, Monograph 07M611, Construction Specifications Institute, Alexandria, Virginia (703) 684-0300, 1990, 22 pp.

Report on Metal Roofing, National Roofing Contractors Association, Rosemont, Illinois (708) 299-9070, 1990.

"Design Considerations for Standing Seam Metal Roofs," F. Stephenson, *Roof Design,* September 1983, pp. 46–52.

Technics Topics
Access for the Disabled: Part I

Charles Kridler and **R.K. Stewart** of Gensler & Associates Architects discuss compliance with the Americans with Disabilities Act in this first installment of a three-part article.

The American population is estimated to include 43 million people who are disabled. The disabilities range from wheelchair confinement to the use of eyeglasses. As the population continues to age, the number of people with some form of mobility, vision, or hearing impairment will surely increase. Moreover, people with various forms of mental disability should not be overlooked in considering the nation's disabled population. Disabled people have, to a great extent, been denied access to the workplace and to the goods and services most people take for granted. In July of 1990, a major piece of legislation was signed into law that sought to correct that shortcoming.

The *Americans with Disabilities Act,* commonly referred to as the "ADA," is landmark civil rights legislation. The ADA makes it illegal to discriminate in employment or in access to goods or services against any individual who is mentally or physically disabled. Patterned after the *Civil Rights Act of 1964* and its subsequent regulations, the ADA defines its requirements in five distinct titles. Title I addresses discrimination in employment; Title II addresses the delivery of governmental services and access to public transportation; Title III addresses access to goods and services in commercial facilities and public accommodations; Title IV addresses access to telecommunications services; Title V contains miscellaneous provisions regarding application of the four primary titles.

For those of us in the design community, Title III will have the greatest impact on our work, although Title II will affect those practitioners whose clients include governmental entities. At this time, Title II guidelines related to the built environment are basically the same as those for Title III, although a different set of Title II guidelines may be published at some future date. Designers may need to address Title I issues if a client must provide reasonable accommodation for individual employees. Such accommodation would occur on a case-by-case basis.

The ADA was signed into law on July 26, 1990. Final guidelines for Title III were published by The Architectural and Transportation Barriers Compliance Board (ATBCB) on July 26, 1991. Titled the *ADA Accessibility Guidelines* (ADAAG), the guidelines serve as the minimum standards to ensure that buildings and facilities are accessible, in terms of architecture and design, to people with disabilities. The effective date of the ADA varies slightly by title. For the most part, compliance with Title II and Title III was required on January 26, 1992. Businesses that employ 25 people or fewer, or have gross receipts less than $1,000,000, have until July 26, 1992 to comply with Title III's provision. Businesses that employ ten or fewer, or have gross receipts less than $500,000, are granted an additional six months for compliance, until January 26, 1993. Within a very short time, all businesses that fail to take steps to comply with Title III of the ADA will be exposing themselves to legal action.

Title III

Title III defines two groups of facilities that must provide access to the disabled. The larger group is "commercial facilities," which are intended for nonresidential use and the operations of which involve commerce. A subgroup of commercial facilities is "public accommodations," which also provide services to the general public. Twelve broadly defined categories of public accommodations are identified in the Act. These include hotels and places of lodging, restaurants, places of public assembly, theaters, sales or retail establishments, banks, professional offices, transportation terminals, museums, galleries, libraries, parks, zoos, private schools, social service centers, and recreational facilities. Any facility that offers services to the public or invites the public to enter will be considered a public accommodation.

While all public accommodations are commercial facilities, not all commercial facilities are public accommodations.

Commercial Facilities vs. Public Accommodations

Title III of the ADA requires new construction and alterations of commercial facilities to comply with the ADA *Accessibility Guidelines.* The application of the *Guidelines* in these cases is not open to interpretation; compliance is required and should be incorporated into the facility's design from the outset of the design process.

Public accommodations are dealt with in a different manner. The ADA requires re-

Tech Notes

***Indoor Air Quality '92: Environments for People,* ASHRAE's sixth IAQ symposium, will be held October 18–21 in San Francisco. The proceedings of last year's *IAQ '91 Healthy Buildings* are now available. Seventy-five papers discuss energy and design concerns, ventilation, filtration, contaminants, and thermal and humidity issues. ASHRAE, Atlanta (404) 636-8400, 412 pp., $87.**

The Hardwood Plywood Manufacturers Association has revised its *Standard for Hardwood and Decorative Plywood.* This HP-1 1992 edition includes new face grades, an expanded glossary, and metric units. HPMA, Reston, Virginia (703) 435-2900, 26 pp., $10.00.

***Buildings at Risk: Seismic Design Principles for Practicing Architects* discusses ground motion, building configuration, restraint systems, nonstructural damage, and seismic rehabilitation, and includes a glossary and a list of selected references. AIA/ACSA Council on Architectural Research, Washington, D.C. (202) 785-2324, 85 pp., $18 prepaid.**

***Water in Exterior Walls: Problems and Solutions* , T. Schwartz, ed., STP 1107, contains 16 peer-reviewed papers on analysis and diagnostic techniques, testing, detailing principles, and common problems in masonry, curtain walls, EIF systems, weather stripping of doors, and joint design. ASTM, Philadelphia (215) 299-5585, 240 pp., $47.**

moval of architectural barriers in existing public accommodations, but not existing commercial facilities, where such removal is "readily achievable." Determination of what is "readily achievable" is based on two tests: 1 the removal of the barrier must be "easily accomplishable" without much difficulty; and 2 modifications are to be accomplishable without much expense. No specific dollar amounts are identified for determining the meaning of "much expense."

The "Readily Achievable" Standard

Determining what is readily achievable includes analyzing: 1 the nature and the cost of the modification; 2 the overall financial resources of the facility, the number of employees, and the impact on the facility's operation; 3 the overall size of the business entity, the number of employees, locations, etc.; 4 the type of operation and the geographic separation of facilities. The "readily achievable" standard, and its economic test in particular, do not require that all barriers be removed at once. The obligation to remove barriers is ongoing, allowing an entity's annual capital improvement budget to be used to remove barriers as funds become available each fiscal year. All commercial facilities throughout the country, in principal, will eventually become accessible.

As design professionals, we must recognize that the ADA is civil rights legislation intended to eliminate discrimination. It is not, and it is not intended to be, a national building code. While the ATBCB used ANSI A117.1 and other model building codes in developing the *Guidelines*, the standards are minimum ones that describe how access is to be provided. Determination of what is a "public accommodation" and which barrier removals are "readily achievable" require legal, not architectural, interpretations.

Architects should limit their role in the evaluation of existing facilities to identifying barriers and to proposing alternate solutions for their removal. The client and their legal counsel must interpret the law to provide direction for the barrier-removal program. By confining their activities to the identification of barriers and the proposed solutions, architects can avoid assuming any additional liability exposure in barrier-removal projects.

ADA Accessibility Guidelines

The construction of new facilities and the alteration of existing facilities must conform to the standards of the *Guidelines*. For removal of barriers, the *Guidelines* are also used to test the existing facility. While the *Guidelines* establish minimum standards, local requirements and/or a client's desires may provide greater access. It takes time to appreciate fully the scope and depth of the *Guidelines;* although it is full of helpful illustrations, the text must be carefully analyzed to apply all its requirements. We will discuss a few of these and suggest how to apply them.

Wheelchair Access

The ADA prohibits discrimination against all disabilities, but it is the spatial requirements for wheelchair movements that receive most of the attention. An architect must be cautious not to focus on wheelchair access and neglect the needs of vision- and hearing-impaired people. The ADA is about much more than just wheelchair access.

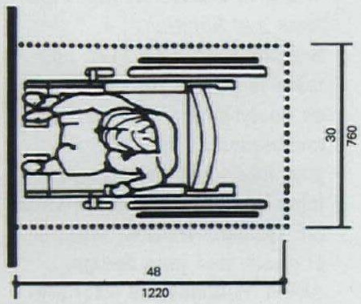
The basic dimensions for a wheelchair are 30″ in width and 48″ in length (1). These dimensions establish the clear floor space requirements used throughout the *Guidelines*. The reach ranges possible from a wheelchair vary, depending on whether a front or side approach to the required action is used (2, 3).

These data must be applied with caution. First, the reach ranges assume full mobility of the torso and arms of the individual, but not all people who are wheelchair-bound have that range of motion. Second, use of the upper or lower limits of the range dictates a certain way of moving. To always require one approach or the other may be unreasonable: we recommend a combination of the two ranges. Using a 48″ upper limit and a 15″ lower limit complies with both requirements while allowing either approach method to be used. These limits should provide the access to the largest possible population. It is also important to note that when the reach is over an object (a counter or cabinet, for example), the upper limit of reach must be reduced.

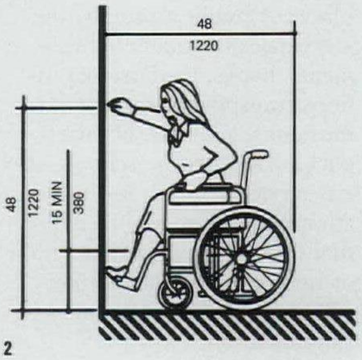
The minimum width of an accessible route is 36″, which will allow for movement of a single wheelchair. A reduction in width to 32″ for a doorway or portal is acceptable if the length of such a reduction is less than 24″ (4). Increasing the width of the route to 60″ will allow two wheelchairs to pass. A wheelchair can execute a 180° turn within a 60″ diameter circle or a T-intersection (5). Such turning opportunities are required at intervals not to exceed 200′ along any accessible route if it is less than 60″ wide.

Charles Kridler and **R.K. Stewart** ■

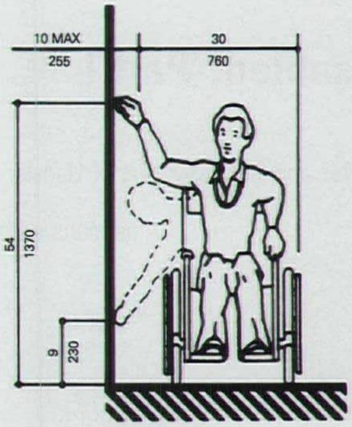
The authors are vice president and senior associate in the San Francisco office of Gensler and Associates, Architects.



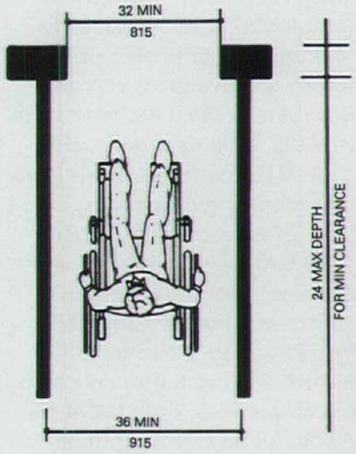
1



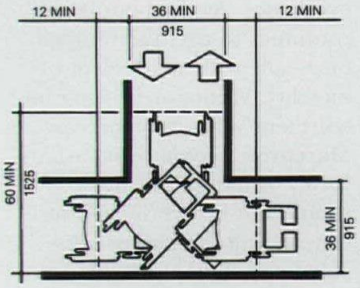
2



3



4



5

References

ADA Accessibility Guidelines (including Title III of the ADA), ADA Information Line, Dept. of Justice, Washington, D.C. (202) 514-0301.

ANSI A117.1, *Providing Accessibility and Usability for Physically Handicapped People*, American National Standards Institute, New York (212) 642–4900, 1986, 84 pp.

Next month: Floors, stairs, and areas of rescue assistance, and elevators.

These days any window company can think up a name, design a fancy logo and announce to the world that they have a commercial division.

UNLIKE OUR COMPETITORS, THAN THIS TO CREATE OUR

But present them with a complex commercial project, and you suddenly discover it's all smoke and mirrors.

Bring that same project to Pella,® however, and you quickly realize there's something real behind the name and logo. A highly-tuned organization with 25 years' experience serving the commercial market.

You discover that Pella offers an array of commercial products that are unsurpassed. Products that very often exceed industry standards in strength and performance. Pella also has the largest and most sophisticated testing facilities in the window industry.

Pella® COMMERCIAL DIVISION

Support teams made up, not of glorified salesmen, but local architectural

©1992 Rolscreen Company.

representatives teamed up with highly trained engineers, architects and technicians. Specialists who can provide energy audits, performance

WE'VE DONE A LOT MORE WORK COMMERCIAL DIVISION.

analysis, initial site surveys, preliminary design or final shop drawings, product mock-up field testing and on-site installation guidance.

And when it comes to Computer Assisted Design in the realm of windows, Pella pretty much invented the game. Our designer software makes our entire product line available to users of the AutoCad Systems, including cross sections, three dimensional window and door elevations, and floor plan views.

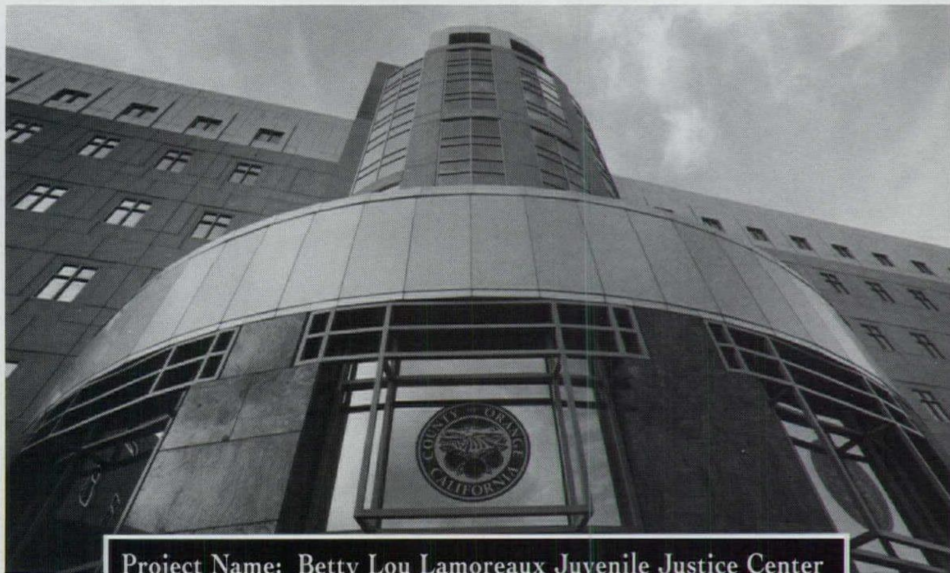
All of which goes a long way to explain why more architects today specify Pella windows than any other brand.

You see, it's not just the window. It's all the things that support it.

PELLA. BUILT TO IMPOSSIBLY HIGH STANDARDS.™

Circle **No. 317** on Reader Service Card

WIN.



Project Name:	Betty Lou Lamoreaux Juvenile Justice Center
Owner:	County of Orange
Architect:	Rowland/Ehrenkrantz Kamages
Engineer:	Ludovise and Associates, Inc.
Engineer:	Toft Wolff Farrow Associates
Consultant:	Heery/Vanir Construction Management

Project Name:	George Washington Carver Elementary School
Owner:	Santa Ana Unified School District
Architect:	RTA/Blurock Architects, Inc.
Engineer:	Robert Bein, William Frost & Associates

C R E A T I V E

WIN.

DESIGN FOR EXCELLENCE

Edison's 1991 "Design For Excellence" awards competition had two winners. They were judged as having best incorporated energy-efficient strategies into their designs thus exceeding minimum state energy efficiency standards (Title-24). The winners were The Betty Lou Lamoreaux Juvenile Justice Center and The George Washington Carver Elementary School. • But in reality this is a contest where we all win. The strides these architects and builders make in perfecting energy efficiency design are important steps toward more efficient energy use throughout the community. • We salute our partners in this endeavor, the California Energy Commission, our esteemed judges, all participants and, of course, our winners. • These winners receive cash and recognition, but in the end, we all win by receiving the benefits of their creativity. With an increased awareness of the importance of using energy wisely, our community can't lose.

SCE

Southern California Edison

1991 JUDGES

GREGG D. ANDER, AIA
SOUTHERN CALIFORNIA EDISON
ROSEMEAD, CA

RANDOLPH R. CROXTON, AIA
CROXTON COLLABORATIVE, ARCHITECTS
NEW YORK, NY

SCOTT ELLINWOOD, FAIA
SCOTT ELLINWOOD & ASSOCIATES,
RESOURCE CONSCIOUS ARCHITECTS
VENTURA, CA

MURRY MILNE, PROFESSOR
UCLA GRADUATE SCHOOL OF
ARCHITECTURE & URBAN PLANNING
LOS ANGELES, CA

JAMES T. KELLY, MIES
CALIFORNIA ENERGY COMMISSION
SACRAMENTO, CA

ART S. KERVORKIAN, COMMISSIONER
CALIFORNIA ENERGY COMMISSION
SACRAMENTO, CA

CHARLES E. SHERMAN, P.E.
ENERGY SIMULATION SPECIALISTS, INC.
TEMPE, AZ

VERLE A. WILLIAMS, P.E.
VERLE A. WILLIAMS & ASSOCIATES, INC.
SAN DIEGO, CA

Circle No. 333

E N E R G Y

There Are 174 In AutoCAD

3. Phenomenal 3D rendering. Capabilities that used to come only with AutoShade® are now built into AutoCAD® Release 12. And hidden line removal is up to 100 times faster.

4. AutoCAD SQL Extension (ASE) allows you to access data in standard database management systems via SQL. ASE provides commands for manipulating external nongraphic data and linking it to graphic entities in AutoCAD drawings.

5. Region Modeler creates intelligent 2D models. Allows you to quickly create 2D shapes with holes and complex boundaries. Automatically finds area, perimeter and inertial properties of a region.

6. Automatic timed save at user-selected intervals.

7. Now you can use PostScript® typefaces in AutoCAD drawings.

8. You can also import PostScript files into AutoCAD, and plot them.

9. New boundary polygon command surrounds an area with a closed polyline automatically.

10. New Fence or Polygon window crossing selection feature speeds selection of entities in dense and complex areas of drawings.

11. No Main Menu! You now enter directly into the AutoCAD drawing editor, where you can perform standard file handling and configuration operations, as well as work on your drawing.

12. Dramatically improved entity selection speed in large drawings.

13. Nested entity dimensioning. Entities within blocks or external references are now easily dimensioned.

14. Locked layers feature prevents accidental modification of drawing data.

15. PostScript output feature lets you enhance AutoCAD drawings by using PostScript-compatible imaging programs.

16. Release 12 and Release 11 drawings are forward and backward compatible.

17. Support for 255 individual pen widths for laser and electrostatic plotters.

18. You can plot without leaving the drawing editor. (And without losing the UNDO file.)

19. Now you can import TIFF, GIF and PCX raster images into your drawing.

20. GripEdit feature allows interactive editing of selected entities without running a command.

21. PickFirst feature lets you select entities prior to executing a command.

22. Improved external references. You can attach, reload or bind Xref files while the "master" is being edited.

23. Enhanced hatching. Automatically hatch bounded areas with a single pick.

24. New continuous polyline linetypes facilitate contour mapping and other applications.

25. Programmable dialog boxes can be customized for your particular working environment or by third-party application developers.

26. AutoCAD's new integrated calculator performs calculations based on existing geometry and includes extensive algebraic and geometric functions.

27. New ALIGN command lets you move and rotate entities in 2D or 3D.

28. 3D ROTATE command rotates entities about an arbitrary 3D axis.

29. 3D MIRROR command mirrors entities on an arbitrary 3D plane.

30. CHANGE command enhancements simplify entity property modifications, such as elevation, color, layer, linetype and thickness.

31. Advanced, multipoint tablet calibration allows compensation for map projections or stretched drawings.

32. Platform-independent menus and dialog boxes that follow operating system standards. So AutoCAD works like other programs on your computer.

33. An improved graphical interface makes the power of AutoCAD more accessible to everyone.

34. Cascading pull-down menus that put more power at your fingertips.

35. Pop-up menus at the cursor location for often-used items.

36. Screen menu is automatically updated to reflect the currently running command.

37. Shift and Control key combinations allow you to invoke more commands with your mouse and digitizer buttons.

38. Single mouse click-and-release action for selecting pull-down menus.

39. Automatic Drawing Conversion. Full support for any drawing created by any version of AutoCAD.

40. Enhanced CONFIG command allows for configuring AutoCAD from the drawing editor.

41. New dialog boxes give you control of dimension variables and styles.

42. Dimension dragging feature provides visual feedback while creating dimensions.

43. RECTANGLE command now allows you to create a rectangle with just two screen picks.

44. Enhanced Write Block command helps developers maintain "smart" drawings (entity handles).

45. Enhanced command transparency lets more commands be used inside other commands.

46. Transparent "Object Filters" dialog box allows more flexible definition of selection sets.

47. ZOOM Window is now the default.

48. DXFIX utility reads R12 DXF™ files and translates them into R10 files.

49. New COMPILE command compiles shape files, font files and Type 1 PostScript fonts.

50. Now you can fill closed polylines with PostScript patterns for extremely high-quality output.

51. Network users can view and plot AutoCAD drawings without using server authorization.

52. Database-specific drivers link AutoCAD and external nongraphic databases, such as dBase,® Paradox,® Oracle® and others.

53. Create New Drawing command now allows you to start with an unnamed

New Features Release 12.

drawing or specify a prototype drawing.

54. OPEN command presents "Open File" dialog box to simplify loading of existing drawings.

55. SAVE AS command now changes the current drawing name to new name specified.

56. END and QUIT commands prompt you for a file name when exiting an unnamed drawing, to prevent you from losing data.

57. Several AutoLISP® enhancements, including much faster loading of LISP routines.

58. A wide range of new and enhanced system variables, especially created for the power user.

59. DD Modify command allows for interactive editing of entity parameters.

60. New Units Control dialog box shows all units, angles and direction values on-screen as well as precision settings.

61. New special context-sensitive help dialog boxes allow you to browse through available help files.

62. New View Control dialog box allows selecting with a pick instead of typing in view name.

63. You can plot AutoCAD drawings as bit map files in PCF, TIFF, TGA and GIF formats. You can even automatically FAX your drawings to a subcontractor or client.

64. 24-bit, true color rendering is supported by appropriate hardware.

65. PostScript files can be brought in as outlines or fully rendered images.

66. Modify Entity dialog box enables you to edit an entity's properties directly.

67. Mirrored blocks can now be exploded.

68. List and load standard AutoCAD SHX fonts as well as Adobe Type 1 PostScript fonts from dialog box.

But Either One Of These Alone Makes It Worth The Price.

1. Something every AutoCAD® user has been waiting for: new technology that virtually eliminates regens. A new built-in 32-bit display list permits pans and zooms without regens. So you can spend your time editing your drawing, instead of waiting for regens.

2. The plot quickens. Now you get WYSIWYG plot preview, on-the-fly plot device selection and the ability to save plot configurations.

69. New option allows a box to be drawn around dimension text automatically.

70. Insert a text string before or after dimension text automatically.

71. Configuring for ADI® drivers has never been easier, with the new feature that displays all drivers in the appropriate menu when configuring AutoCAD.

72. HP LaserJet legal-size paper output is now supported by a new, improved device driver.

73. ADS applications can now be compiled by inexpensive "real mode" compilers; no need for costly development tools.

74. AutoLISP and ADS can now be used to drive the PLOT command.

75. Linetype scaling adjusts to view scale in Paper Space.

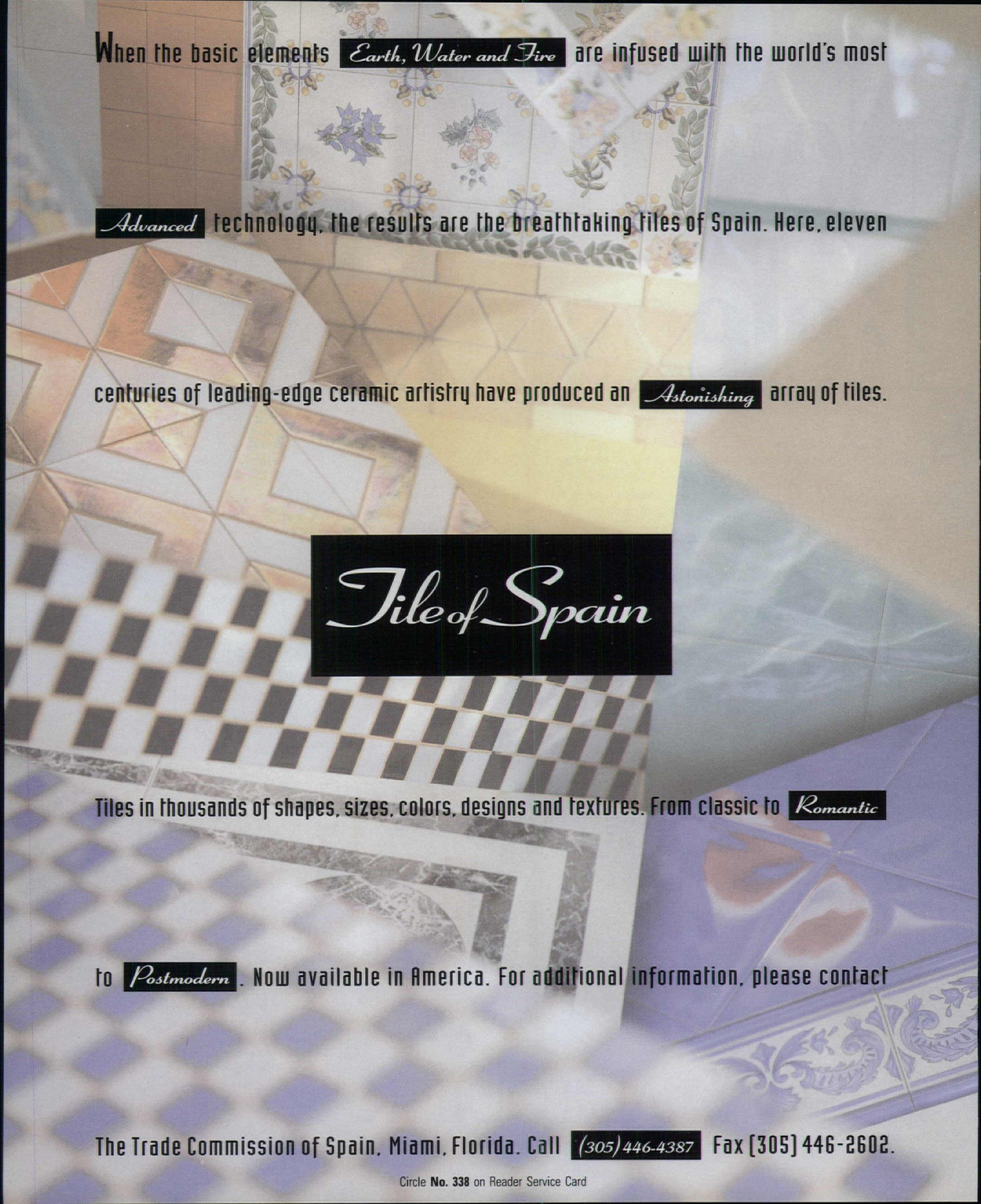
76–174. Unfortunately, we're out of space. But you get the idea. Release 12 is the most significant enhancement of AutoCAD ever. Its improved performance will pay off for every AutoCAD user. So the cost of an upgrade can pay for itself in a couple of weeks.

If you're still not convinced, call your Authorized AutoCAD Dealer. Your dealer can give you an even more complete list of the new features. And tell you what you need to do to upgrade. If you need more information or the number of your nearest dealer, call

1-800-445-5415, ext. 700.
Outside the U.S. and Canada fax 415-491-8303.

AUTODESK

Circle **No. 312** on Reader Service Card


When the basic elements Earth, Water and Fire are infused with the world's most
Advanced technology, the results are the breathtaking tiles of Spain. Here, eleven
centuries of leading-edge ceramic artistry have produced an Astonishing array of tiles.
Tile of Spain
Tiles in thousands of shapes, sizes, colors, designs and textures. From classic to Romantic
to Postmodern. Now available in America. For additional information, please contact
The Trade Commission of Spain, Miami, Florida. Call (305) 446-4387 Fax (305) 446-2602.

Practice

Norman Coplan reviews two cases involving the right to arbitrate construction disputes.

Law: The Basis for Arbitration

Although many architects and several insurance carriers do not believe that arbitration is the most desirable method of resolving disputes, it continues to be a common element in construction contracts. Two recent cases in Louisiana and Florida dealt with arbitration arising under AIA form contract. The first of these (Hurly v. Fox) involved the owner/architect agreement. The architect had instituted an arbitration proceeding to recover certain fees, and the owner cross-claimed for damages based on malpractice, but did not participate in the arbitration proceeding and presented no evidence in support of the cross-claim. An arbitration award was made in favor of the architect, "in full settlement of all claims and counterclaims submitted to arbitration." The court affirmed the arbitrator's award. In a subsequent proceeding, however, the court also ruled that the counterclaim had not been really adjudicated since the owner had presented no evidence, and that the owner was not barred by the arbitration award from prosecuting the counterclaim. On appeal, the architect argued that, in fact, the arbitrators had heard evidence on all of the claims of the owner.

The Appellate Court reversed the Trial Court's ruling that since the owner had the opportunity to present the claims in arbitration, the award did constitute "res judicata" and the owner was therefore barred from prosecuting them further. The failure of the owner to take advantage of the arbitration was the determining factor and not the actual evidence that may or may not have been before the arbitrators.

The second case, (C&M Ventures, Inc. v. Wolfe) involved a dispute between an owner and a contractor. The primary issue was whether an arbitration provision in the construction contract was applicable to questions concerning changes in that contract. In this case the owner had hired a general contractor to build a luxury home. A series of changes were made during construction, and the contractor sought to arbitrate disputes concerning these changes as well as questions pertaining to the base contract. The owner resisted arbitration on the ground that the changes were oral and not authorized in writing as required by the contract and that such writings were a condition upon which arbitration could proceed.

The construction contract provided that the owner could order changes in the work, provided the contract sum and the contract time were adjusted accordingly. All such changes in the work, said the contract, "shall be authorized by written change orders signed by the owner and the architect." The construction contract also provided that all disputes arising out of or relating to the contract documents would be decided by arbitration and defined the contract documents as consisting of the agreement, the general and supplementary conditions, the drawings and specifications, and all modifications issued by the architect after execution of the contract, such as change orders.

The contractor submitted written documentation of each change involved in his claim. The owner, however, argued that these changes were oral and that the evidence submitted in connection with the changes was not in compliance with the procedure for changes required by the contract. The contractor responded that the owner's argument was based on a technicality, which did not deny him the right to arbitration.

The court ruled in favor of the contractor, holding that the owner's claim that the contractor's noncompliance with the contract's instruction on changes did not disentitle him to his right to arbitrate. "The effect of such deviation," stated the court, "would be for the arbiter to determine." The court concluded that bifurcation of a dispute that involved both the basic contract and changes to the basic contract would clearly violate the spirit and clear wording of the contract.

Whether compliance with a contractual requirement is a condition to the right to arbitration is sometimes a close question. For example, a claim that is not asserted within the time specified in the State Statute of Limitations is barred and cannot be arbitrated. On the other hand, a requirement in the contract that a claim in arbitration must be asserted within a reasonable period of time engenders an issue that must be determined in the arbitration. Generally, a condition in the contract dealing with arbitration must deal with the arbitration process itself and not with substantive requirements of the contract. **Norman Coplan** ■

The author is a partner in the New York law firm of Bernstein, Weiss, Coplan, Weinstein & Lake.

Practice Points

According to the *Zweig Letter*, a new management newsletter for the design and engineering fields, the dual career path (separate tracks of advancement for technical and management professionals) is a myth. To advance in all but a few high-profile firms, employees must have not only technical skills, but communications, management, and project development skills as well. Call (508) 651-1559 for newsletter information.

What are the most frequent causes of litigation against design professionals? According to a seminar sponsored by the International Design Center of New York (IDCNY), contractors' errors, cost overruns, certifications required of designers, and project delays create the highest risk of litigation. For information about IDCNY programs call (718) 937-7474.

Salaries for architectural and engineering professionals are expected to remain flat through the end of 1992 according to the *PSMJ Professional Services Management Salary Survey*. The decrease in managers' bonuses represents the largest drop in compensation. The report costs $195; call (617) 965-0055 to order.

Information about HUD's Fair Housing Act, which prevents discrimination in housing access and financing, is available through a toll-free hotline, (800) 669-9777.

Walter Rosenfeld discusses some of the societal influences on the selection of building products.

Specifications: Return Engagement

The selection of building products, while under the overall responsibility of the architect, becomes in many cases the task of a separate specifier, particularly on large projects where products affecting design may be a small proportion of the total. Specifiers are quite familiar with this task, involving as it does their experience on many projects, their knowledge of many materials, and the use of their evaluating and judging skills. Contacts with product representatives and industry associations, and the study of trade literature, regular parts of specifiers' information-gathering activities, also stand them in good stead here.

In most cases, specifiers choosing from competing products are filling gaps left by designers, adding competitive products of a similar nature to those chosen by others, and generally completing the catalog of materials that must be purchased and installed so the building may be constructed and may function as the owner requires.

Manufacturers are, of course, acutely aware of the pivotal role the specifier plays on any project as he or she helps assemble the written documents needed for bidding and building. And they attempt, at great expense and effort, to influence specifiers and architects in their product decisions. Magazine advertising, direct mail, catalogs, electronic disks, manufacturers' representatives, participation in trade shows, sales calls, 800 telephone numbers: all are part of this communications effort.

But there are other influences on the specifier as well, and many do not come from manufacturers of construction products. Professional standards of quality, the requirements of durability and appropriateness, and product cost and availability are all considerations. And new influences are constantly emerging, often stemming from government regulations and society at large.

Consider the movement to provide accessibility to the handicapped, particularly in the years since the war in Vietnam. The far-reaching effects of this movement, now included in laws greatly affecting the design of buildings and products used in them from finish hardware to toilet compartments, are receiving new attention since the recent enactment of the Americans with Disabilities Act(see Technics Topics, p. 41).

An even more pervasive influence is the environmental movement, increasingly in the forefront of popular and congressional thinking. Control of waste on the site, soil contamination and excavation precautions, disposal of debris and hazardous waste, formulation of paints, rules on bituminous roofing materials, water-saving plumbing, energy-efficient electrical equipment, mechanical equipment designed to reduce connected loads and take advantage of off-peak electric rates are all becoming of increasing interest to owners, governmental authorities, engineers, and architects.

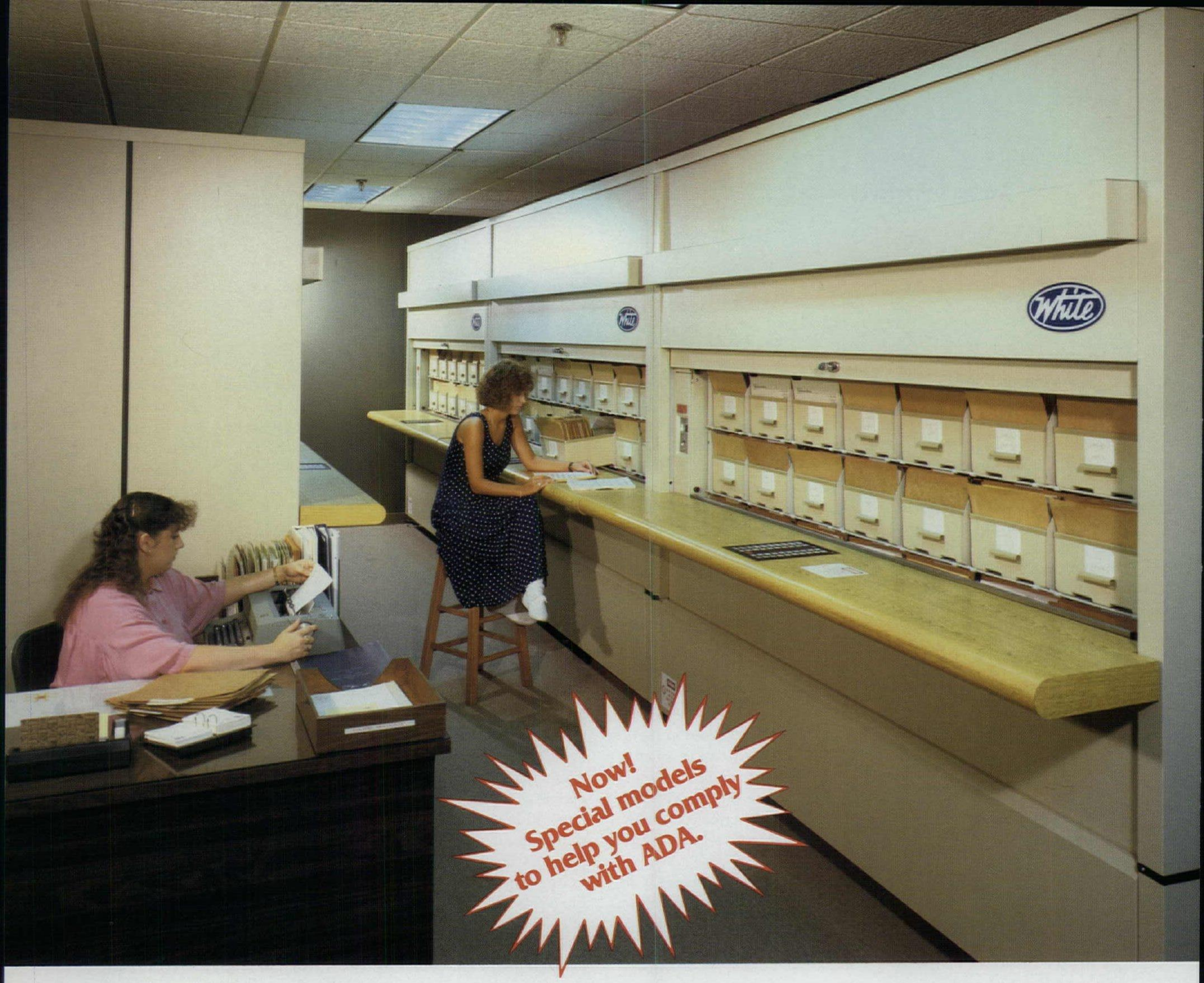
The latest environmental consideration to appear relates to both energy conservation and life-cycle costing of buildings: what is to be done with the materials of the building after it has outlived its useful life and must be removed to make way for other land uses? What do we do with the debris that was once the building we so laboriously designed, documented, and specified? A number of companies are beginning to advertise the recyclability of their building products even before we put them to use.

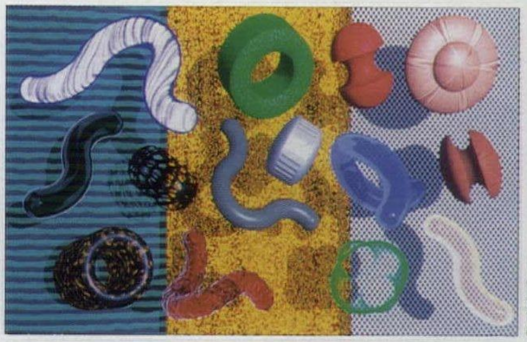
One of the earliest groups to think far ahead was the single-ply roofing industry, in which producers of EPDM rubber sheet pointed out that the roofing membrane could be removed, rolled up, and reused, particularly in a protected membrane configuration. And, indeed, rubber roofs became attractive to clients who, building in phases, roofed over lower stories this way and later, adding additional floors, relocated the same membrane "upstairs" for a new lease on life. Loosely laid roof insulation also filled this bill, and the economics of both were attractive.

Now a new approach has surfaced: reuse of building materials in an altered state. Even if the roof insulation is no longer needed, is damaged in removal, or can't be resold or reused for building, it can still be recycled. According to Dow Chemical, a leading producer of extruded polystyrene foam insulation, the material can all be recovered, melted down, and used to make other polystyrene products. (A blue coffee mug supposedly made of recycled roof insulation is offered in evidence.) Dow points out that not only is it technologically sounder to recycle its product, but it is also increasingly cost-effective to do so in view of the decreasing availability of landfill space in densely populated areas and the corresponding increase in disposal costs and fees. In the life-cycle cost of a building, if we include disposal of the "remains," the fees for burying the roof insulation must be added to the initial and maintenance costs to arrive at a true figure. Not all roof insulation, Dow points out archly, can be recycled. Some must be buried and fees paid.

Will architects and specifiers take these new realities into consideration in choosing roof insulation and a host of other building products? Eventually, they probably will, as owners become more aware, as manufacturers continue to compete for sales, as landfill disposal becomes more expensive, and as contractors continue to be hit with environmental charges. At the moment, this approach may not seem quite real. But remember where we were a few years ago when there were telephone booths; when lever handles on doors in the U.S. were rare; when few low-rise buildings had elevators or ramps; when most paint contained lead and mineral spirits; and when asbestos was a major ingredient in pipe insulation, floor tile, and the brakes on our cars. **Walter Rosenfeld** ■

The author is a consulting architect based in Newton, Massachusetts.


White
Now!
Special models
to help you comply
with ADA.



The Valis Group

Architectural "Shaders" create photorealistic textures in renderings

Curtis B. Charles and **Karen M. Brown** discuss desktop graphic design software that architects can use for marketing presentations.

Computers: Presentation Software

A range of software traditionally marketed to graphic designers can be used by architects to create high-quality presentations on their desktop Macintosh or PC computers. Most cost less than $1000 and provide presentation styles suitable for every stage of the design process from conceptual modeling to photorealistic video walkthroughs of a completed design. New versions of this software are easier to use and provide more professional results than those available only a few years ago. Because many of these products can support DXF-compatible file formats, designers can use them in conjunction with CAD. The following is an overview of desktop design tools available for sketching, modeling, rendering, imaging, presentation, and animation applications. (See Computer Products, page 105, for product information).

Conceptual Sketching. Programs such as Aldus Freehand and Alias Upfront are useful in the conceptual design phase. These tools allow designers to see the concept develop on the screen as they think. With Freehand, paper sketches or a site plan can be scanned in as a template to serve as an initial drawing for design development. As on tracing paper, a user can work with an unlimited number of 2D layers. Upfront, for Macintosh or Windows, allows a user to scan in a site photograph and interactively manipulate a design in perspective, plan, and elevation views.

Modeling. At the next level of design, sophisticated modeling programs such as Model Shop and Present Professional have the capability to perform accurate and sophisticated modeling, rendering, and animation. Model Shop is an entry-level modeling package that offers unlimited layers, Bezier curves, preliminary rendering, text capabilities, unlimited light sources, and measurements that are accurate to within a fraction of an inch.

More expensive, high-end modeling tools such as Present Professional can produce animated walkarounds. But the advantages of the more sophisticated applications are interactive modeling capabilities also referred to as "Digital Clay" because they allow the designer to push and pull on "handles" to reshape elements. Other software modeling techniques include additive modeling and constructive modeling. Additive modeling employs a technique that allows the designer to combine simple shapes such as 3D cubes, prisms, cones, pyramids, spheres, and cylinders to construct architectural models. Constructive modeling begins with 2D tools used to draw planes and contours; 3D creation tools can then be applied to give depth to a floor plan or a cross section.

Rendering. Once a 3D model is completed, either as a conceptual sketch or as a design completed in CAD, it can be saved in a DXF format to be rendered by applications such as StrataVision, or in a RIB (Renderman Interface Bytestream) format to be rendered by a software package that includes RenderMan.

At this stage, the designer chooses the optimal view points, camera angles, and light sources. Additional details such as textures, furniture, planting, and people can be added from the photorealistic clip art libraries.

Today's desktop modeling packages offer extensive libraries of building material textures including wood, brick, tile, stone, metal, enamel, ceramic, glass, and concrete. If a designer needs a building material that is not included in a software portfolio, the material (or a photograph of it) can be scanned and imported into the program as a PICT file to be used as a surface texture in the rendering.

The more sophisticated the image, the more memory and processing time a rendering will require to be completed. Several of the rendering software vendors have announced network systems that allow designers to take advantage of the power of multiple processors and links with UNIX workstations.

Image Editing. Other applications such as Letraset's Color Studio, Adobe's Photoshop, or Aldus's Digital Darkroom can be used to create a photomontage combining a rendered architectural model with a site photograph. These digital "photography labs" allow the designer to import an image of the proposed site with a desktop scanner or video interface. Once the site photo is imported, the rendered 3D model can be incorporated and scaled to match the perspective of the site. This is a particularly useful tool to present renovations to existing structures or to demonstrate the effect of several different design solutions on a sensitive site.

If photorealism is not desired, image editing software can also be used to stylize renderings as "impressionist" paintings or mosaics. Aldus Gallery Effects, for instance, provides a "classic art" edition that allows the user to mimic charcoal, graphic pen, chrome, craquelure, fresco, and watercolor techniques.

Output. Images created with these applications can be output to slides or prints by a service bureau for presentations. The cost savings over traditional image editing processes and site composition photography can be substantial.

Renderings can be incorporated into marketing brochures or client proposals by bringing them into page layout software, such as Aldus Pagemaker or Quark Xpress, where they can be combined with descriptive text.

For creating slide show presentations on desktop, both Microsoft Powerpoint and Aldus Persuasion are applications for slide and computer screen presentations. Like page layout applications, these programs combine electronic sketches, models, and renderings with text to create professional multimedia presentations.

Animated videos can be created on a personal computer with software such as MacroMind Director and AT&T Graphic Software Lab's Topas, which can output drawings directly to a video format. Macromind can import a variety of 3D model files, including DXF, to animate 3D architectural elements generated in other programs. Designers can also use Topas to create 3D models from scratch. Models can then be rendered and animated within the application to produce broadcast-quality presentations.
Curtis B. Charles and **Karen M. Brown**

The authors are principals in the Washington, D.C., based Architectural Presentation Firm of Karisse Designers.

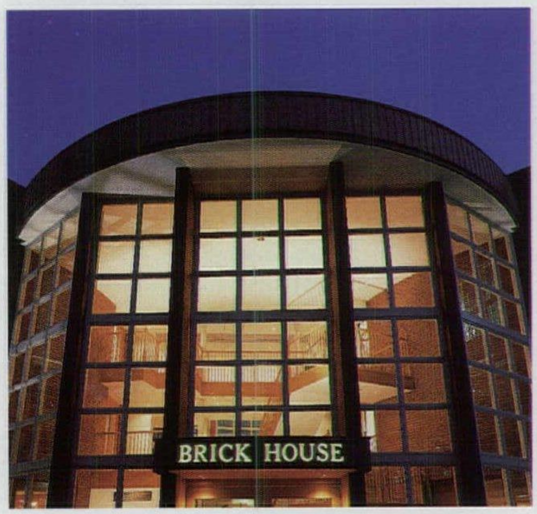
IN JAPAN, ANDERSEN HELPS AN ARCHITECT

"In designing this office building/ restaurant/showroom, we imported many Western ingredients," said architect Yuji Noga. "Andersen supplied us with the windows and engineering data. The wood interiors of their products worked well with the masonry structure."

And the engineering data? "Osaka city building codes are very strict," continued Noga. "Andersen Corporation's windloading and other performance data helped us install the three-story Andersen curtain walls securely and aesthetically."

Andersen® window materials compatibility, structural integrity and commercial viability. Solutions worth remembering whichever hemisphere you design in.

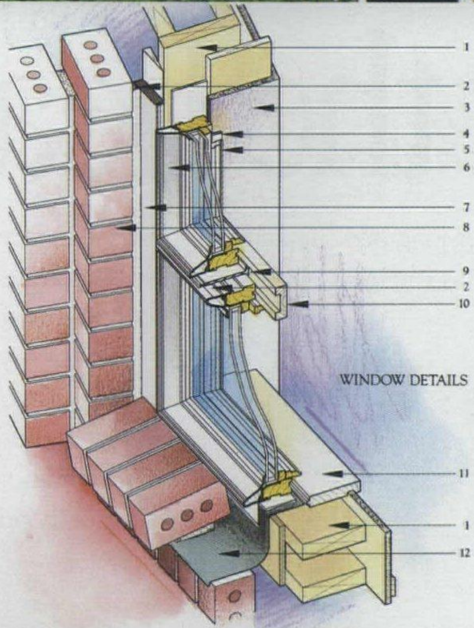
For the name of your Andersen representative, call 1-800-426-7691. Or write Andersen Commercial Group,℠ Box 12, Bayport, MN 55003.



BRICK HOUSE. OSAKA, JAPAN.

ARCHITECT: YUJI NOGA. ISSIKI ARCHITECTS & PARTNERS CO., LTD. TOKYO, JAPAN.

OPEN A WINDOW TO THE WEST.

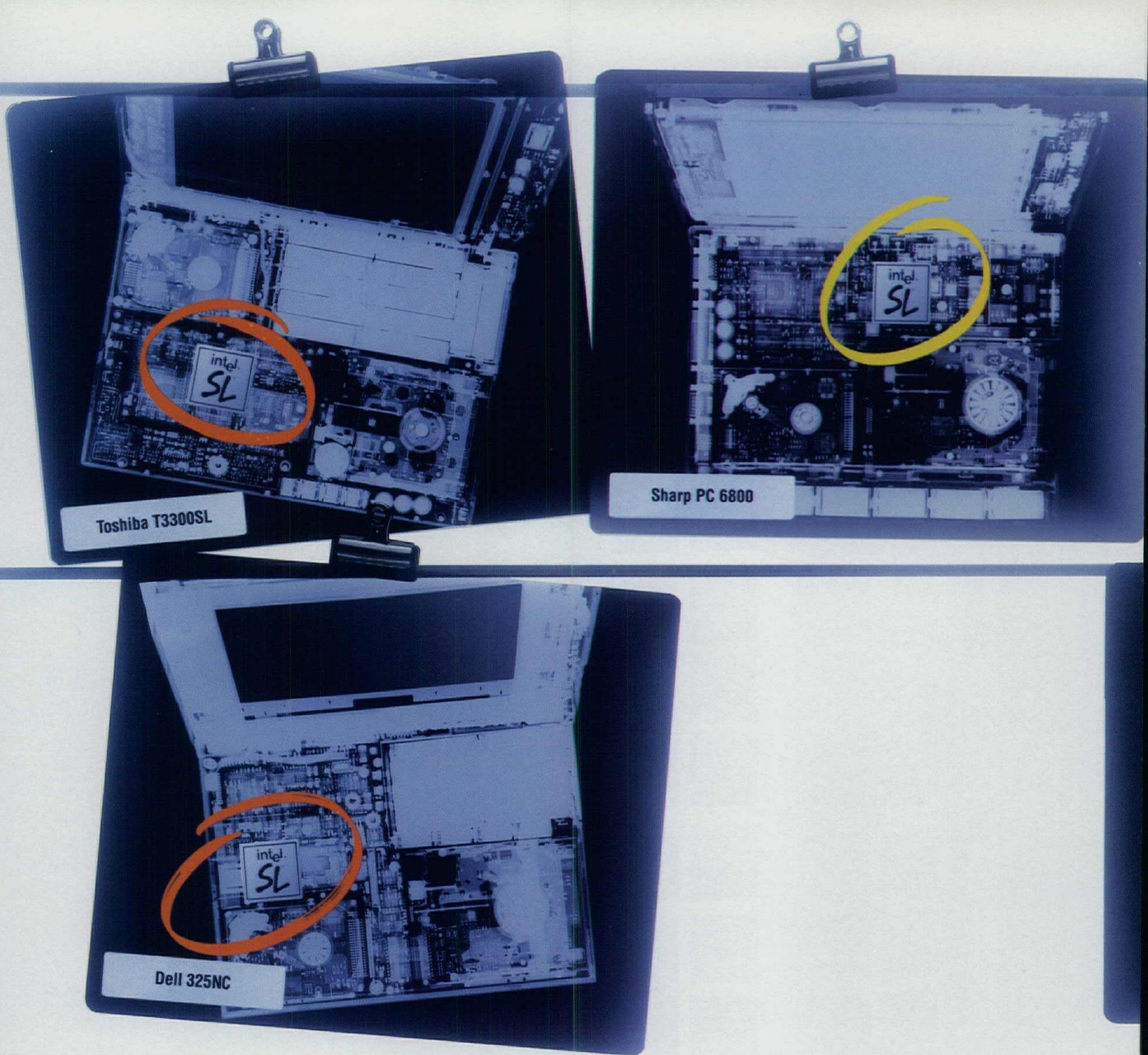


1. Wood framing
2. Sealant with backer rod
3. Gypsum board
4. Wood trim
5. Andersen® sash stop
6. Andersen® Flexiframe® unit
7. Andersen 3½" exterior casing *(optional)*
8. Face brick
9. Structural steel "T"
10. Wood casing
11. Wood stool
12. Flashing

ANDERSEN COMMERCIAL GROUP℠

Andersen A/W Windows·Patio Doors

Circle **No. 313**



Look what's at the heart

Take a closer look at some of the best notebook computers and it's easy to see why the prognosis is so good—they each have an Intel SL microprocessor.

The Intel SL gives each of these unique notebooks a leg up, because it was designed specifically for the stop-and-go world of mobile computing.

For example, the Intel SL has an instant on/off feature that eliminates long boot-up and shut-down sequences.

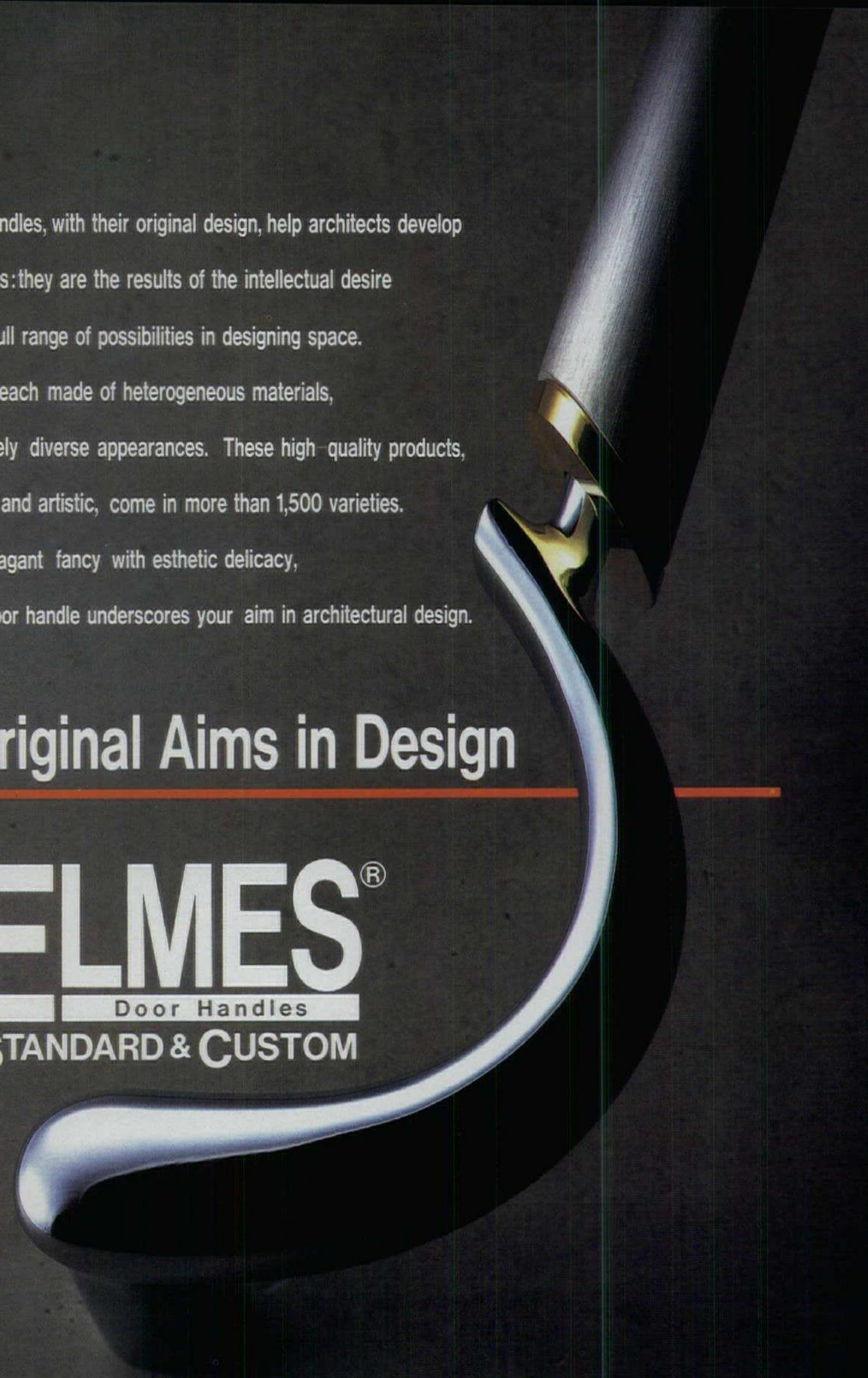
Stop-and-Go Battery Life*

Average 386 SX 4.8 hours

Intel SL 8.3 hours

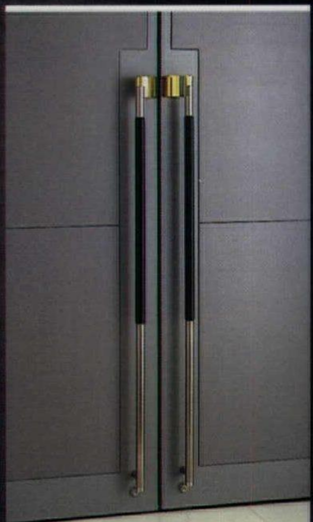
If you're interrupted, the Intel SL microprocessor holds your place and puts your entire system into suspended animation, using virtually no

ELMES® door handles, with their original design, help architects develop free expressions: they are the results of the intellectual desire to exploit the full range of possibilities in designing space. ELMES® handle, each made of heterogeneous materials, present extremely diverse appearances. These high quality products, both functional and artistic, come in more than 1,500 varieties. Blending extravagant fancy with esthetic delicacy, each ELMES® door handle underscores your aim in architectural design.

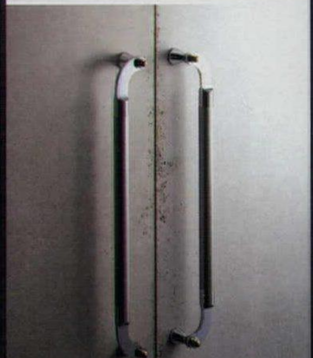


For Original Aims in Design

ELMES®
Door Handles
STANDARD & CUSTOM



● CUSTOM
Brass & Stainless steel & Leather



● T981
Stainless steel Brushed Finish+ Brass Chrome Finish with partial Brass Mirror Finish

● G3030
Cast Brass Mirror Finish+ Blast Finish with partial Glaze

elmes® Manufactured by:
Union Corp. in Japan

AREA: NY, NJ, CT, PA
DESIGN SOURCE BY DAVE SANDERS
115 Bowery St.
New York, NY 10002
Phone: (212) 274-0022
F A X: (212) 274-0627

AREA: MA, ME, NH, RI, VT
THOMPSON COMPANY INC.
805 Pleasant St.
E. Weymouth, MA 02189
Phone: (617) 331-6610
F A X: (617) 337-1128

AREA: IL, IA, IN, MI, MN, MO, KY, OH, WI
PACIFIC FASTNERS CORP.
575 Bond St.
Lincolnshire, IL 60069
Phone: (708) 634-1600
F A X: (708) 634-0593

AREA: DC, DE, MD, VA, WV
THE A.G. MAURO COMPANY
BALTIMORE BRANCH
1630 Sulphur Spring Road
Baltimore, MD 21227
Phone: (301) 247-2500
F A X: (301) 247-4951

AREA: NC, SC, TN
PLEASANTS HARDWARE CO.
1010 Northwest Blvd
Winston Salem, NC 27113-5258
Phone: (919) 725-3067
F A X: (919) 725-6921

AREA: AL, FL, GA, MS, PR
THE A.G. MAURO CO. OF FLORIDA
1105 Sand Pond Road
Lake Mary, FL 32746
Phone: (407) 365-4901
F A X: (407) 333-3066

AREA: AK, AR, CO, HI, ID, KS, LA, MT, NE, NM, ND, OK, SD, UT, WY
NICHIMEN AMERICA, INC.
LOS ANGELES BRANCH
Suite-1535, Citicorp Center
725 South Figueroa St.
Los Angeles, CA 90017
Phone: (213) 624-1911
F A X: (213) 624-1902

AREA: AZ, CA, NV, OR, WA, TX
MANTEN CORP.
869 E. Sandhill Avenue
Carson, CA 90746
Phone: (310) 538-9200
F A X: (310) 538-8081

Circle **No. 331**

08710/ELM
For further details see Ⓢ catalog No.BuyLine1681

Design

Barcelona Seville

As Barcelona hosts the Olympic Games and Seville holds a World's Fair, we consider the events and their respective approaches to architecture and urban design. But the architectural aspects of these two stories are quite different. Barcelona has exploited its big event, the Olympic Games, in order to effect carefully considered civic improvements; urban design and planning are emphasized over extroverted architecture – to a fault, argues Joseph Giovannini (next page).

While Seville's Expo '92 has also spurred new public amenities, such as the airport by Rafael Moneo (page 82), the fair's interest lies not in its whole (an uninspired master plan), but in its parts (the national pavilions).

Besides covering Barcelona and Seville, this issue also includes a review of another international event in Europe: the opening of the Euro Disney complex. In Perspectives (page 96), John Morris Dixon looks at the Paris amusement park and its theme hotels.

Olympic Overhaul

After more than a decade of building parks, plazas, roads, and public facilities, Barcelona is ready for 1992 – and the future. Critic Joseph Giovannini assesses the city's efforts.

The best place from which to understand the $8-billion Olympic overhaul of Barcelona may not be the Olympic Ring on Montjuïc, where Arata Isozaki's serene gymnastics stadium, Santiago Calatrava's telegenic telecommunications tower, and Ricardo Bofill's wrestling agora are located. The more revealing place is a ravine at the back of Montjuïc, a triangular field of grass as silent as a pool, where perhaps a single Barcelonan sits on a bench, listening to the stillness that allows him to hear the report of rifles in his imagination. It is here that pro-Franco forces executed Republicans in a mass unmarked grave during the Spanish Civil War, and here that Barcelonans come to remember. They leave flowers at random on the plane of grass. In the memorial park recently completed here, the architect Beth Galí – landscaping the site minimally, in reticence, with a stone memorial set in a basin – cultivates the stillness and the memory of events that forever shaped the collective consciousness of Barcelona.

Barcelona led the battles against Franco, and paid dearly. One of its enduring losses was to suffer 40 years of neglect, as Franco, targeting the city itself as a venue of resistance, effectively prevented new public spaces and buildings. Even infrastructure lapsed, as rampant speculative development and the blind needs of the car spawned happenstantial sprawl at Barcelona's growing periphery. From the 1950s, when Barcelona architects established a connection with their Milan counterparts (who were then developing an approach to the city involving memory), the Barcelonans speculated about how to change the city after Franco. In an atmosphere of urban repression, the design of Barcelona evolved into a political position and act, and after the dictator's death in 1975 politicians seeking office ran with specific architectural platforms and designated architects. A vote for Narcís Serra for mayor in 1977 was a vote for architect Oriol Bohigas. Their Socialist victory meant an architectural politics that emphasized public gathering spaces, and an extension of the old urban patterns of squares, streets, and promenades into the unshaped periphery. Small squares and public art would monumentalize parts of the anonymous city, and help foster a sense of community.

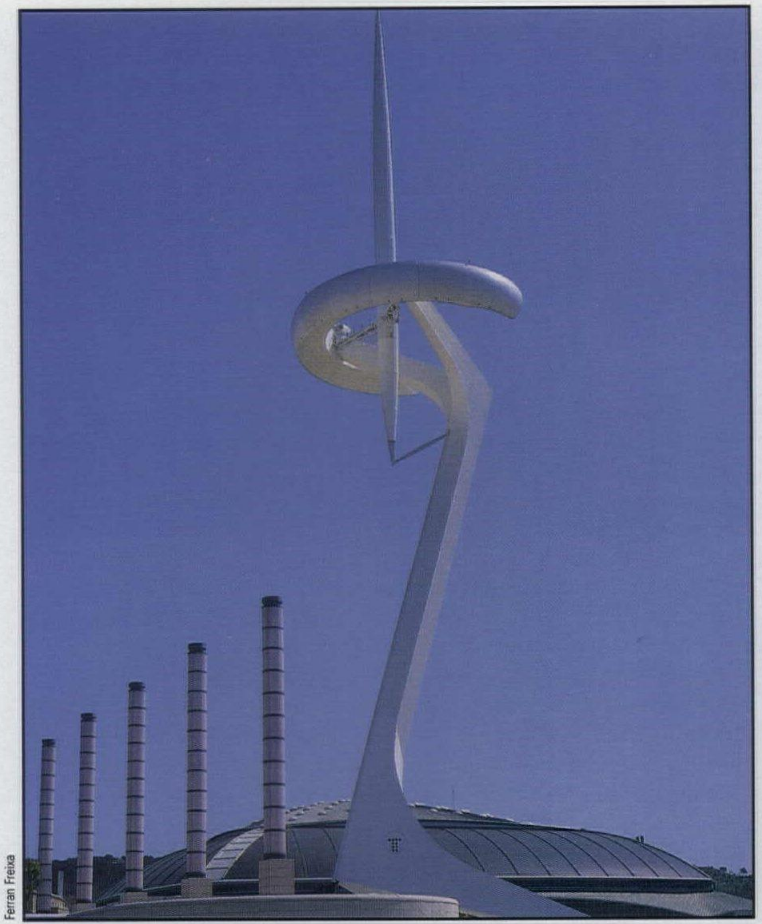
From 1978 through 1982, more than a hundred public spaces, often complemented with sculpture or murals, were strategically planted in the loosely organized outskirts to create focal "monuments" conferring an identifiable sense of place. It was a pragmatic, here-and-now, hands-on program of small urban actions, done with the available means in the feasible places, without any yearning for a rarefied idealistic utopia. Planners, working with architects who in turn were talking to the neighbors, were mending urban nowheres and wresting green space back from the car; their work coincided with a decentralization policy that broke Barcelona down into ten districts, each with a town hall. The small neighborhood parks constituted a modest but effective start in reclaiming Barcelona from neglect and in forging an awareness of the city as a place of "citizenhood" and public dignity. Its success encouraged Serra to look for a project through which the same principles of strategic planning could be applied on a large, city-wide scale.

A major reason that Barcelona sought the Olympics for 1992, then, was to secure an event that could be instrumental in engineering the remedial development of the city. Twice before, in 1888 and in 1929, Barcelona had used international fairs to build museums, esplanades, parks, sculpture, and vistas that endowed the city with a stature usually associated with the capital of a country. The city's leaders, with an eye on the near-at-hand EEC, wanted to leverage the prestige of the event to raise billions for improvements to resituate Barcelona in a new Europe where cities were emerging with an importance greater than nations. The politicians were as concerned with 1993 as with 1992: they were dealing with Barcelona's future, and the repressions of its past, as well as the glory of the Olympic moment.

What will be televised this July and August to millions is more than a matter of stadiums: it is a city-wide Haussmannian overhaul, perhaps the largest this century, that has telescoped a generation of public works into five years. It is also a tangible symbol that Barcelonans have reclaimed their city as their own while opening it to the world. From public parks to a vast ringroad, design has been simultaneously the means by which the city has taken itself back and the lingua franca of the self-reclamation. The overhaul recalls the late 19th Century, when – after another period of prolonged repression dating from the Carlist Wars – Barcelona was allowed to expand beyond the medieval walls within which it had long been confined. The new design explosion is much more than a matter of the tasty little night spots designed to the nines and an Olympic Village that will be converted to upscale co-ops. Barcelona is strategically planting the Olympics facilities, much like the neighborhood parks, to maximize healing and growth. Bohigas, the mastermind of the Olympics, calls the process "benign metastasis." Specifically, the Olympic planners, including Lluís Millet who was charged by Bohigas to make the specific proposals, eschewed not only clean-slate planning but also the bypass planning of a satellite Olympic city outside Barcelona. They decided to develop four strategically important Olympic zones where the development would firm up urbanistically weak or unfinished areas and intensify the city's structure without involving any displacement of people. They assumed as a given the existing urban patterns, and the European notion that urban space is fixed and permanent rather than disposable. They proposed the insertion of new structures that would in some way converse with the old, without mimicry: "We have the will to be modern because we're an industrial society," observed Lluís Domènech, an architect who did a master study for the city on the development and strategic placement of cultural facilities.

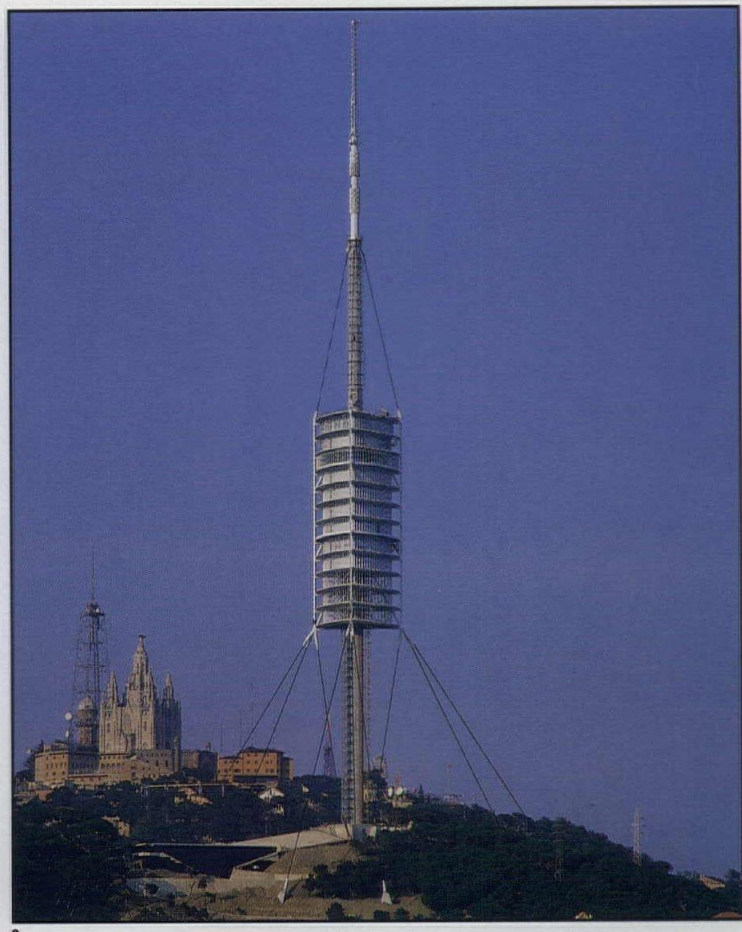
Inspired by the spend-little Los Angeles Olympics rather than the

Two telecommunications towers were built for the Games: Santiago Calatrava's (1) dominates the Olympic Ring on Montjuïc, while Norman Foster's (2) stands alone atop one of the hills that ring Barcelona. Also at Montjuïc is the Olympic Stadium (3) – remodeled by Vittorio Gregotti and Correa & Mila – where the Games' opening ceremonies will be held.



Ferran Freixa

1



Lluís Casals

2

Luc Boegly/Archipress

3

The most visible addition to the Olympic Stadium is the cantilevered Modern canopy (4) that stretches over part of the bleachers. The architects also excavated 18 meters of earth from the stadium's field to provide extra seating capacity. Ricardo Bofill's sports university at Montjuïc (5) will be the venue for Olympic wrestling.

spendthrift Montreal Games, the planners capitalized on existing facilities and steadfastly resisted overbuilding. There would be no sports palaces, for example, dedicated to weightlifting; everything was done at a scale that would eventually pay for itself. The games were used simply to leverage capital from outside sources to solve the city's seemingly intractable problems, especially its severed connection with the Mediterranean.

The Olympic Village, to house about 15,000 members of the Olympic family, best explains the strategic planning. In previous Olympic Games, the village was built outside the city, but Barcelona planners brought it into the existing city, to replace obsolete factories, burst through the tangled industrial zone, and open the entire city to the seafront. Barcelona has for centuries been isolated from the port that furnished its living, and the strategic placement of a substantial new quarter muscling its way to the sea has reclaimed the waterfront and reversed Barcelona's genteel avoidance of the Mediterranean. Existing sewage lines were rechanneled, the water made swimmable, the beaches cleared of their refuse, and the shanties demolished (among them, some much-loved old beachside restaurants). A seaside promenade was built along the five kilometers of reclaimed beaches, along with parks, parking lots, and sports facilities, some built atop the depressed beltway. The poor, who lived nearest the old industrial quarters, have become primary beneficiaries of Barcelona's transformation into a resort.

At an urban knuckle between the Olympic Village and the new Olympic Port, two fraternal-twin highrises – with the same height and volume but different skins – form a gateway between the city and water. Neither, unfortunately, survives the inevitable comparison to the expressive towers of Gaudí's Sagrada Familia nearby, still under construction. One, an office tower by the Barcelona firm of Iñigo Ortiz Diez and Enrique León Garcia, is a shadow of its Madrid model, the Banco de Bilbao; the second, a hotel by Bruce Graham of Skidmore, Owings & Merrill, is structurally exhibitionistic, caged in a cross-braced exoskeleton. Missing no opportunity to extend Barcelona's traditional urbanism of public spaces, planners conceived the new port as an urban square, programming its perimeter with restaurants, cafés, a sailing school, and a promenade. An uncharacteristically plain convention center and retail complex by Frank Gehry is being built here, along with a more characteristic giant goldfish sculpture metamorphosing around the gills into a Conquistador helmet (perhaps the wrong symbol for a city excluded by Madrid from the fruits of the conquests in the New World).

A second Olympic zone, Vall d'Hebron, was developed in a nondescript suburban quarter in the city's northwest, as a sports park for a part of the city without many public spaces. An existing Velodrome triggered the notion of a larger recreational zone. After the Olympics, the expansive grounds will serve as a commons offering tennis, jai alai, soccer, and passive park space, in a densely occupied but otherwise unfocused area. The tone for the younger unknown architects who were asked to design here was set by architect Eduard Bru, whose design for the grounds specified recycled railroad ties from the Olympic Village site, rust red Astroturf, steel curbs, and spongy pavers made from the rubber salvaged from old truck tires (ideal for jogging). Open concrete culverts channel rushing water, like streams. There is nothing artisanal, contextual, anecdoctal or typological in this environment that celebrates artificiality and invention. Though Vall d'Hebron is only suggestive rather than fully and generously developed, it represents a conceptual break from the dominantly contextual, old-new dialogues entertained in the design of the Olympic Village.

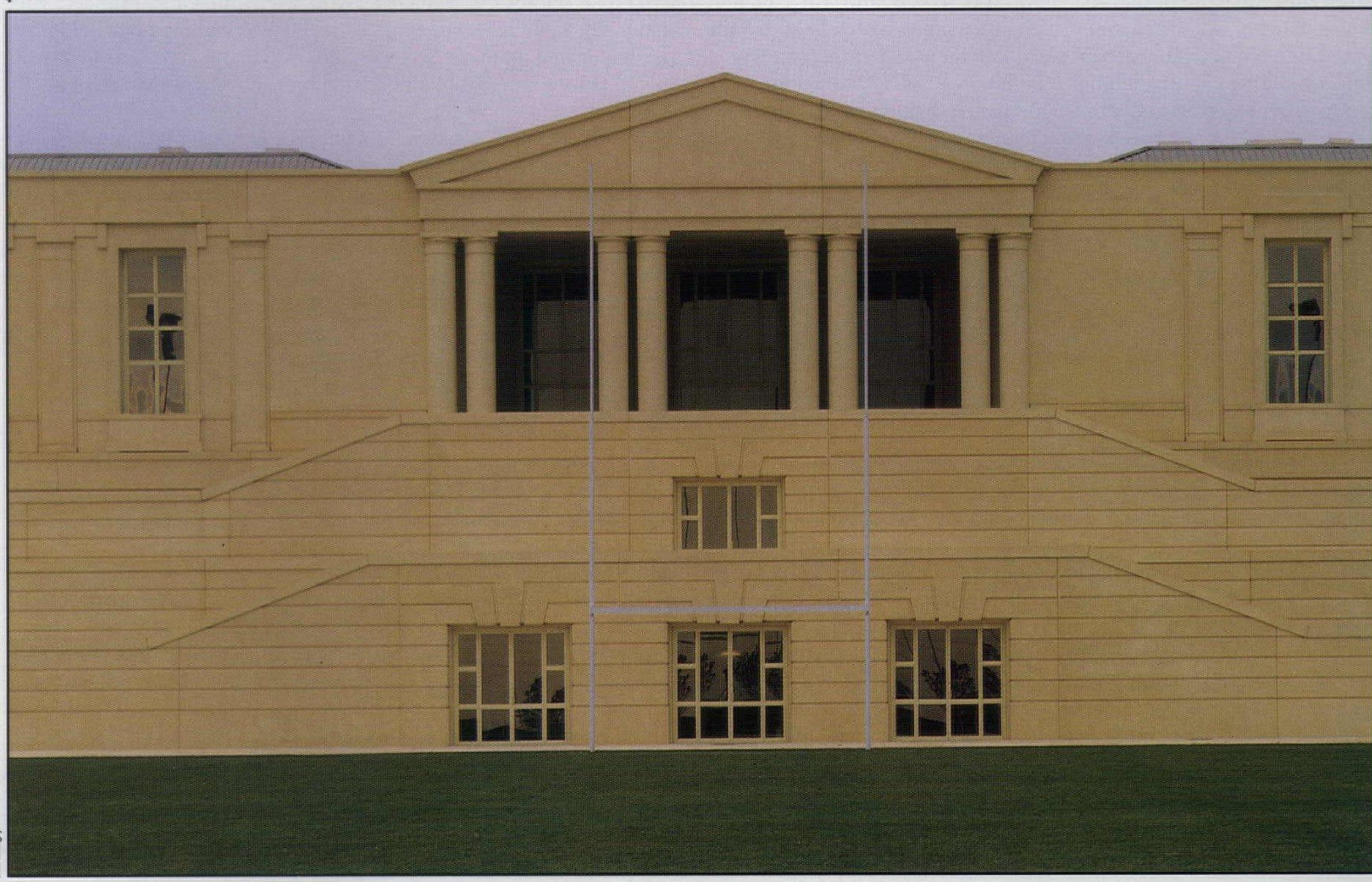
A beltway has been built to facilitate transport between Vall d'Hebron, the Olympic Village, and the other two Olympic zones, Montjuïc and the Diagonal (and to relieve traffic on surface roads after the Olympics). But again, the planners strategized the beltway to bring previously marginal areas into its loop, balancing the city and defining an urban core that – like Chicago within the Loop, or Manhattan, on its island – is geographically finite and capable of being "finished." Planners also made double use of the beltway by covering depressed sections with tennis courts, community centers, green zones, plazas, and even skateboard parks. Roadways that would have divided neighborhoods instead gather and focus them. A similar strategy was applied along Rambla Prim, in the north, where a wash with high-tension wires overhead running through a working class neighborhood was redesigned as a long paseo, the water channeled underground along with new service galleries for utilities. Anonymous apartment blocks with failed outdoor space are now zippered together for a matter of miles. The lives of people outside the Olympic economy have been dignified.

The originality, scope, ambition, and implementation of Barcelona's urbanism have been remarkable, and perhaps it should not be surprising that, with the insistent emphasis on urbanism, the Barcelona Olympics has not produced the equivalent of Nervi's stadium in Rome or Tange's in Tokyo. Bohigas has said that if the urbanism is good, and the city livable, the architecture perhaps does not matter so much. But this position, strangely puritanical in a city that produced such voluptuous buildings during its long and rich turn-of-the-century Modernista period, is perhaps theory-struck: one is disappointed by the lack of architectural enthusiasm, especially on Montjuïc and in the Olympic Village, where expectations are high.

On Montjuïc, the Isozaki stadium finally built (P/A, April 1991, p. 78) was a second simplified scheme, without the subtlety or dynamism of the first, with its irregular roof undulating like the surrounding hills. (The scheme was abandoned because of schedule, cost, and technical difficulties.) Ricardo Bofill's sports university may be notable for the flawless on-site industrial production of its pre-industrial classical forms; the acid-bathed cast concrete columns have the smoothness of skin. But its impressive Propylean staircase cascades the wrong way, down the back side where there is little occasion for ceremony, unless the trudging of future professors of athletics to and from the fields qualifies: the vacancy of the gesture reduces the architectural grandeur to grandstanding. Federico Correa and Vittorio Gregotti collaborated on retrofitting the existing

Luc Boegly

4



Luc Boegly

5

Other elements of Barcelona's makeover include Ricardo Bofill's airport (6), a curious blend of Classical and High-Tech sensibilities, and Frank Gehry's fish sculpture (7, shown partially clad) in the Olympic Village shopping area. Among the hundred public spaces created since 1981 are Carme Fiol's sober memorial next to the church of Santa Maria del Mar (8) and Piñon & Viaplana's Plaza of the Catalan Nations (9), built above railroad tracks in a less dense section of the city.

1929 stadium with a new canopy and additional seating, with reasonable but hardly inspired results. The white, lithe telecommunications needle by Calatrava egocentrically upstages the other well-behaved buildings on the esplanade, but the beautifully shaped, deliberately sculpted form is devoid of detail, and would have been more powerful and evocative sited at a distance where it would attract rather than demand attention. In its site, it seems only to point out the general incoherence of the Olympic Ring.

Unlike the Olympic Ring, the disappointments of the Olympic Village are not so much a matter of individual circumstance, but of the overriding urban rules that usurped conceptual initiative from each building. Most of the approximately four dozen buildings by three dozen local firms, on about 150 acres, conform to the volumetric specifications of the master plan by Martorell Bohigas Mackay, and emerge as service pieces and variations of a building type that support a very specific 19th-Century urbanism, where mixed-use buildings define streets and squares. The architects were more or less assigned the task of the exterior decoration of long, basically Modernist apartment blocks along the street, and the smaller, free-standing "villa" apartments in vast courtyards defined by the perimeter blocks. The urban plan was intended to eliminate the object-building, which planners felt vitiates public space, but in its binding typological generalization, the individual and particular were lost. The floor plans were determined by developers, and brick was required as cladding – an instance of a Modernist apartment-block acknowledging a regional building tradition.

What is perhaps most surprising in this contextualist enterprise is that by extending the 19th-Century grid of Barcelona's Cerda plan, and inflating it three times to a Le Corbusier superscale to accommodate large 20th-Century apartment blocks, the scale of the master plan alone obsolesced the existing buildings of the old industrial district. Planners say the extensive infrastructural work required underground made the preservation of the old brick factories unfeasible, but older buildings, many of them handsome and part of the city's living archaeology, would also have lent greater authenticity, the depth of time, a level of detail and unexpectedness in this otherwise abstract urbanism. The controlled and homogenized environment of the Olympic Village yields no surprises, just the consistency of very professional work. Only along the central esplanade, the unusual spinning pergolas by Enric Miralles and Carme Pinós, like a storm-tossed canopy of artificial trees, lift the project out of the merely reasonable and commercial, and give it a wildness.

If the template for the Olympic effort started in small urban "actions," where success resided in the comfortable typologies of the neighborhood square and park, extrapolating these domestic actions to the scale of the landscape has proved risky. It is clear that a park adapted to the top of a depressed beltway is preferable to a long, linear, high-speed hole, but it is not so clear that a normal park can be successfully transferred here without significant adaptation. Similarly, the notion of a gateway between the sea and the city, at the end of a long avenue, would seem to be an agreeable one. But whether twinned 40-story towers perform that quaint typological service is, as a result of the Olympics, an unanswered question that has to be looked at by the rest of the city forever. At the scale at which Barcelona is being redesigned, the domestic typologies of an older city no longer apply. The city-sensitive urbanism cultivated by Barcelonans since the 1950s needs some conceptual revision, especially in the areas outside the traditional city, where issues of scale change the game.

The architects who most successfully escape the typological bind are those practicing in precincts without tight urban control. By far the most interesting piece was almost a throwaway commission at Vall d'Hebron: the dressing rooms next to the archery ranges done by Miralles and Pinós (page 74) where the architects settled a loose concatenation of separately articulated dressing pavilions against a rise in the hill, so that, in a Heideggerian sense, they seem to dwell there, a part of it, but apart from it. The forms are lyrical, the stances of the individual pieces accidental, and the concrete, brick, and ceramic tiles, simple and pure. Another very successful effort is the basketball stadium in Badalona by Esteve Bonell and Francesc Rius (page 70), a basically oval stadium with a non-conforming horseshoe perimeter that opens generously at its entry: the architects brilliantly solved the age-old problem of opening the usually closed form of a stadium.

In this politically correct Olympics, with its sage emphasis on urbanism and infrastructure, it seems a carnal sin to regret the conspicuous absence of robust buildings. But in some way the order of the building has been dissolved by the order of the city, and this in a city with a history of masterly architectural achievements that succeeded in carrying the urban grain while maintaining their own identities. One thinks of the "Block of Discord" on Passeig de Gràcia, where the left-handed marginal architects like Gaudí and Jujol disagree with the right-handed, more conventional architects such as Domenech i Montaner and Puig i Cadafalch, and the urbanism survives the fight.

The underlying achievement of the Barcelona Olympics is that Barcelonans reclaimed their neglected city by impressive works of infrastructure, but the regret is that architecture might have been allowed to make a more significant contribution. Barcelona's built history is constituted of many brilliantly worldly buildings, and a few creatures of great architectural soul – all highly articulate in their detail, rhetoric, and spirit. The great efforts of the turn of the century – another period when Barcelona reinvented itself after a period of repression – collectively set up the anticipation of comparable works in a comparable moment, 1992. Their charisma is missed this time 'round. The urbanism of Barcelona's Olympics is enlightened, and a success in the execution, but it has not proved supportive of the individual building. Urbanism and architecture in Barcelona have been polarized into an either/or proposition.

Joseph Giovannini ■

The author is an architect and critic in New York.

Hisao Suzuki

6

Luc Boegly

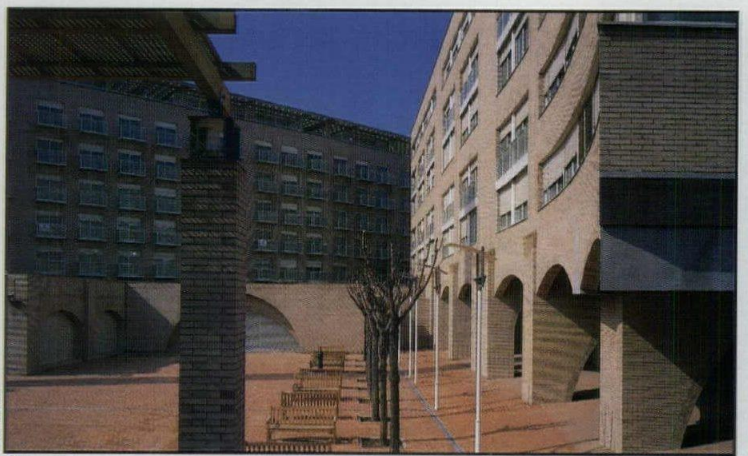
7

Lluís Casals

8

M. Branch

9

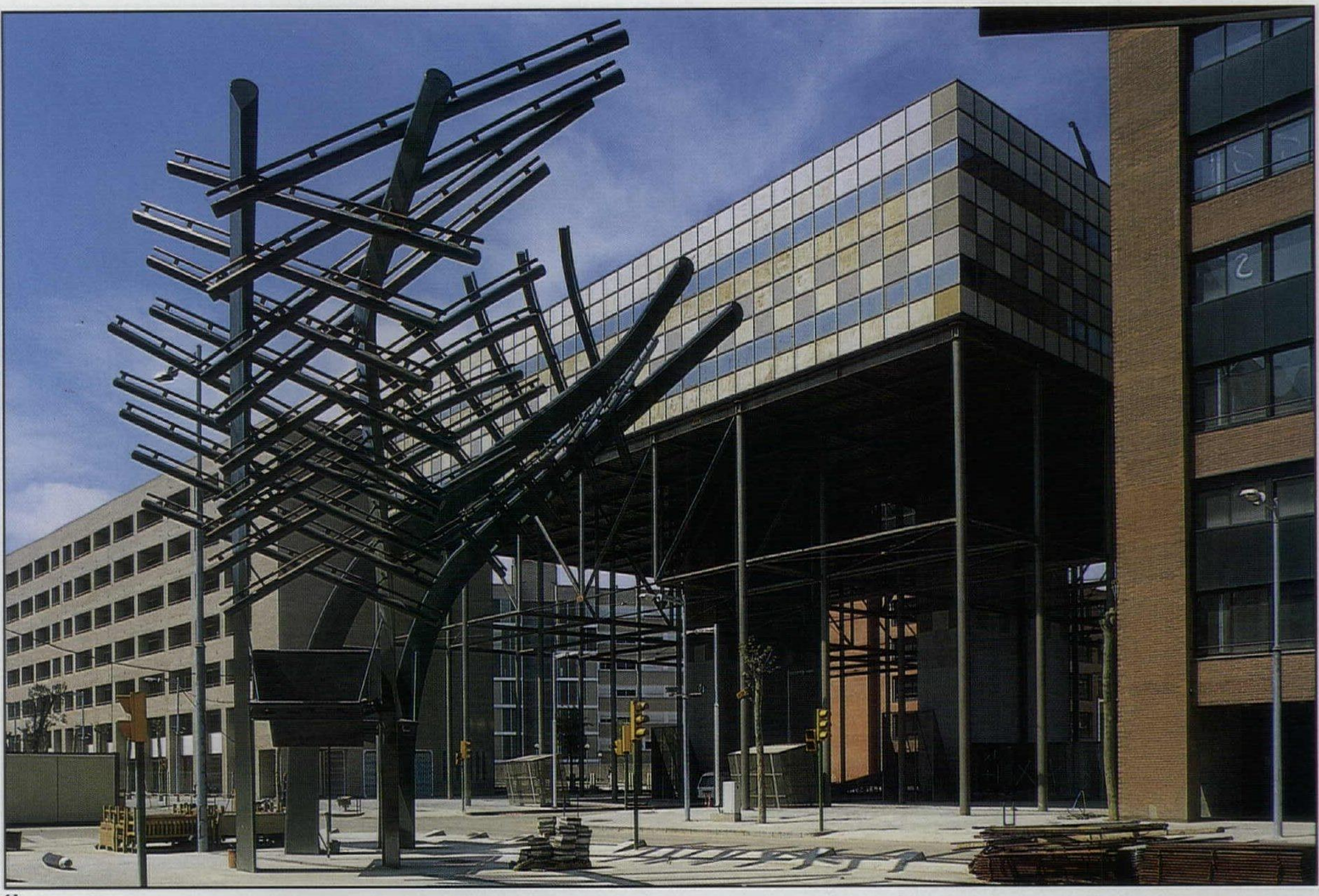

Lluís Casals
10


Luc Boegly
11


Luc Boegly
12

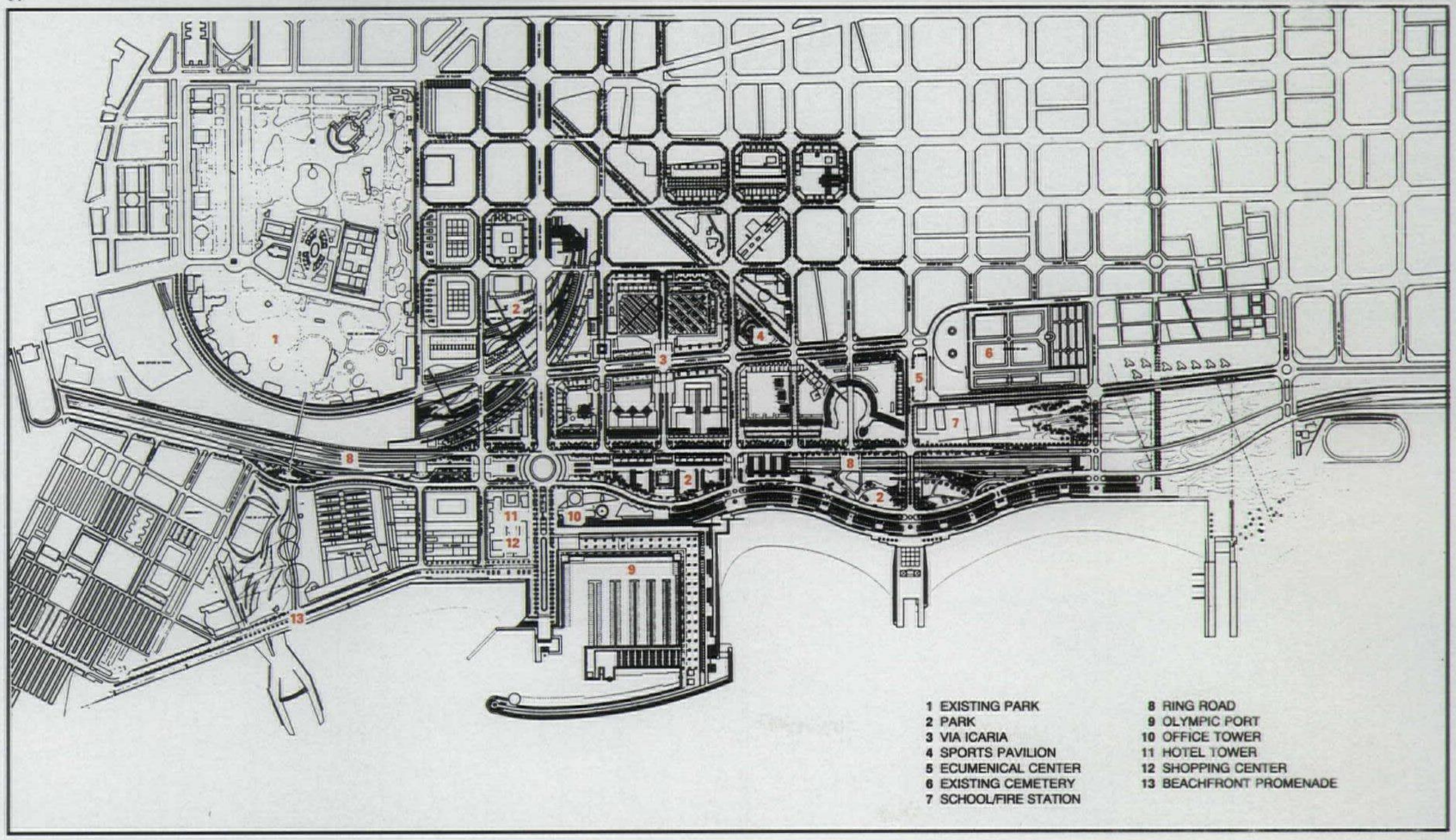
The Olympic Village (P/A, March 1987, p. 45) was planned by Albert Puigdomènech and the Barcelona firm of Martorell Bohigas Mackay, who also designed one of the apartment buildings (10). The other commissions were distributed to Barcelona architects who have won the city's top architecture honors, the FAD prizes. Among these are Tusquets, Díaz & Associates (11), and Lapeña Torres (13). A view of the Via Icaria (14), the main street that bisects the site, shows sculptural pergolas by Miralles & Pinós and an office building by Roser Amado and Lluis Domènech, one of the buildings that span the cross streets. Dominating the Village are towers (12, seen from the new Olympic port) by Iñigo Ortiz Díez and Enrique León Garcia (right), and Bruce Graham of Skidmore, Owings & Merrill (left).


Lluís Casals
13



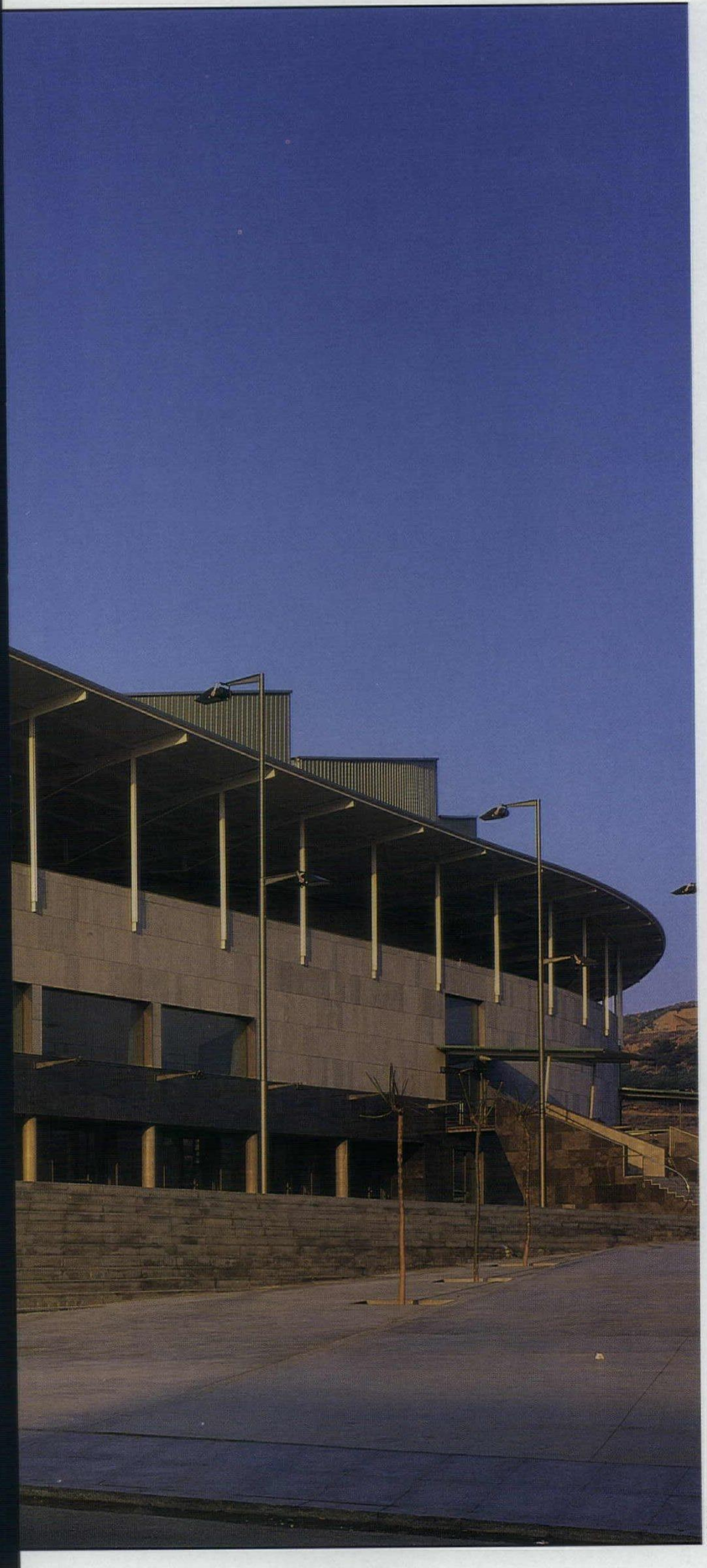
Luc Boegly

14



SITE PLAN, OLYMPIC VILLAGE

Home Court Advantage



Sleek and elegant, Bonell & Rius's Olympic stadium is a well-tempered landmark for a city of basketball die-hards.

Badalona's new Sports Palace is like an ark in drydock with a hull of stone cladding. Designed by Esteve Bonell and Francesc Rius of Barcelona, it is a building of concentric ellipses, layered around a forthright steel structure that spans a bowl-shaped arena. These features, commendable in their own right, are constituents of a broader design strategy – to make the Sports Palace an asset to the city rather than an urban Cyclops, the fate of most modern stadiums. Badalona's counterpart is different: it literally opens itself with a monumental stair, a threshold linking the ritual of sport with the life of the city.

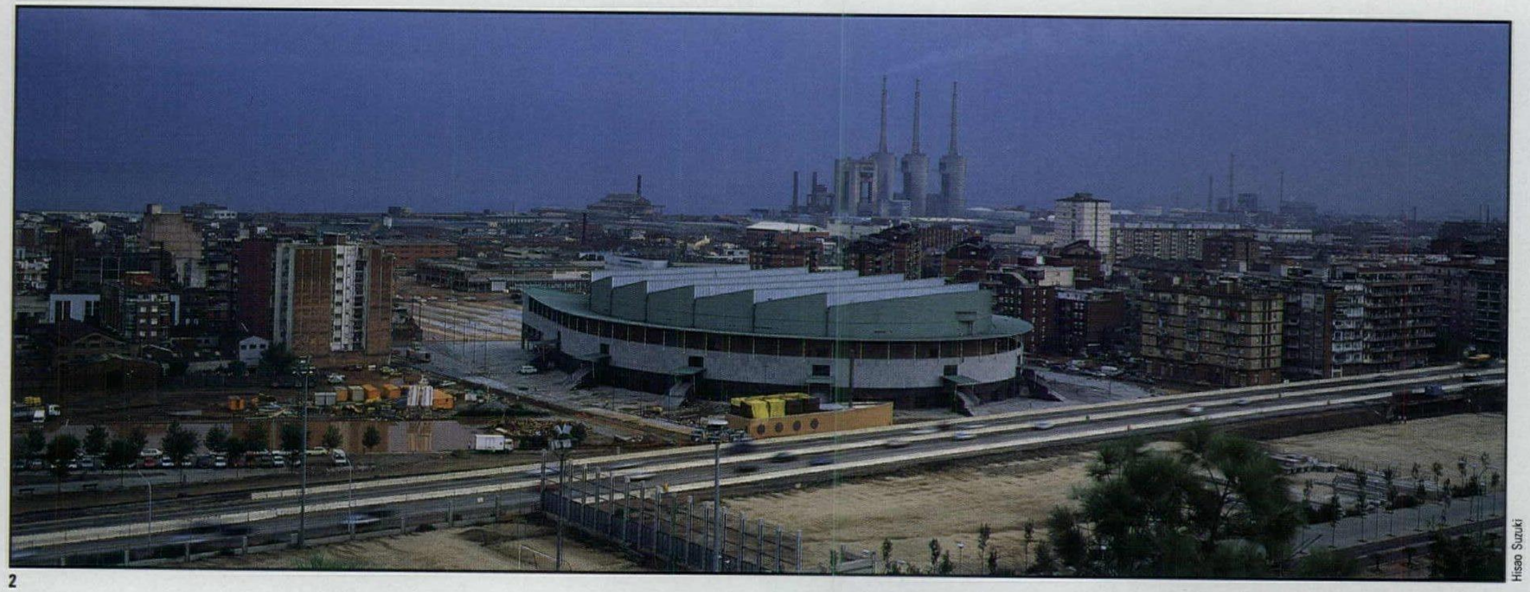
This summer's Olympians might not appreciate Bonell & Rius's sensitivity: the stadium, built in a blue-collar suburb of Barcelona, is far afield from the city's four centers of sports action (see "Olympic Overhaul," p. 62). But its ultimate users, the basketball zealots of Badalona – Catalonia's fever for the sport started here – are the true beneficiaries of the design. It will finally give them a home court to be proud of, one with the civic stature of a Roman amphitheater.

With its elliptical plan, the stadium alludes to ancient precursors, but the metal-clad sawtooth roof evokes local models – the factories and warehouses common to Badalona. Like those utilitarian structures, the stadium is a supershed, albeit one with a civic program. The beam-and-girder construction is as straightforward as a factory's; it spans an arena for 12,500, a volume as impressive as the great train stations of a century ago.

Its elegant shape notwithstanding, the ellipse is not easily reconciled with the city. The Roman solution was to surround amphitheaters with ring roads, but Bonell and Rius instead sustained Badalona's gridiron, and sited the stadium like an object that drifted toward a corner of its block, comparable to an oval in a Miró painting. The entry stairs, which rise from a small plaza, mark an axis toward the old center of Badalona, and thus maximize the directionality latent in the ellipse. The axis aligns with a cylindrical

Luc Boegly

Spectators flow into the Sports Palace (1) via the monumental stairway; ten smaller stairs encircle the arena, providing a quick exit route.


Hisao Suzuki

2

steel girder within: its eastern end, marked by a bulge on the front of the metal cupola, surmounts a single column *in antis*, recessed between twin prows formed by the return of the masonry walls.

This wraparound façade is the first of three layers that unfold as one proceeds to the basketball court. The entrance turnstiles admit patrons to a band of open *poché*, a double-height hall around the masonry ring that encloses the arena. This is a circular foyer, serviced by concessions and lavatories in the masonry structure. The passage is akin to walking within city walls, but without the claustrophobia. Covered by a metal roof, it is open to breezes and generous daylight, which models the curved masonry wall. The brick bonding, like the metal handrails of the stairs, has the sensitivity of Alvar Aalto, whose aesthetic has long been admired in Spain.

The steel structure, whose load is transferred to the masonry buffer, is the stadium's architectural trophy, its display reserved for those who enter the arena. This is a vast but comfortable space, complemented by the massive steel members above. Together, space and structure impart an aesthetic that is airy but solid – less delicate than the rhetorical steel structures we've often seen published.

Clerestories admit daylight that highlights the elegant profiles of the beams. Each has a scalloped edge, with tension rods fastened to the bottom chords and a pendant at midpoint. The effect is more than aesthetic: it indicates the tensile forces in the lower half of each beam and economizes on steel as well. Likewise, the cylindrical girder on the long axis has four bowed tension cables tied to its endpoints; the composite is a two-way structural system. Seen from the topmost seats, the steel array appears Herculean, but from the floor of the basketball court, the structure seems bouyant. It doesn't overpower the space.

Bonell describes the basketball stadium as "a cathedral with a pragmatic function"; indeed, the quiet dignity of the Barcelona's Gothic has links with the chaste Modernism emerging in the city today. Pragmatism has long been fundamental to Catalonia's self-image. Among contemporary architects, it's a consequence of the modest budgets and rudimentary craftsmanship typical of the region. But these haven't hindered the quality of design in Barcelona. If anything, they make it purer: the Badalona stadium is among the dozens of Catalonian buildings that Americans can can learn from. It proves that today's Modern aesthetic can be as limpid as it was in the United States a generation or two ago. **Philip Arcidi** ■

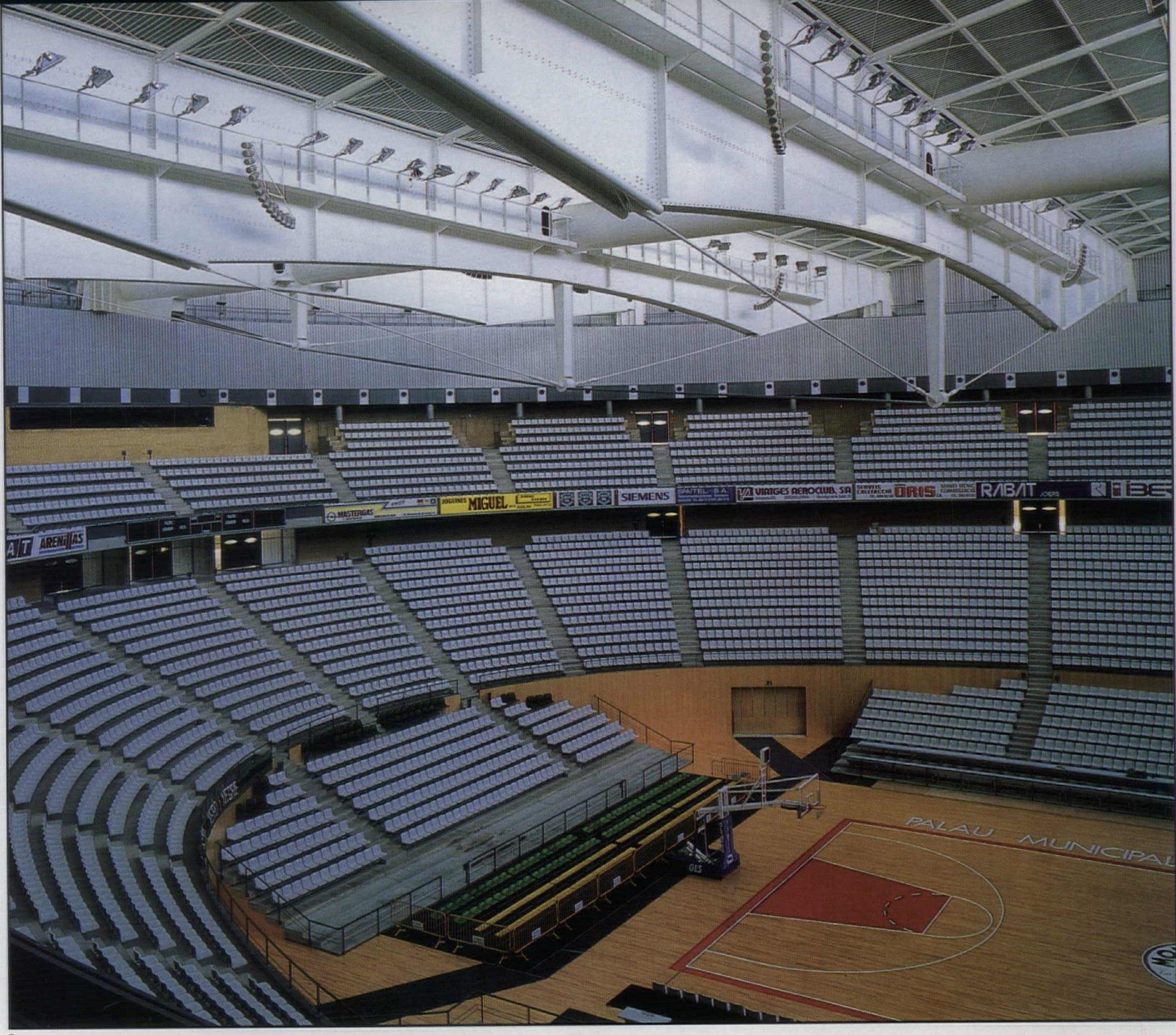
The elliptical arena is encircled by a hallway (2, 3) open to the breeze. Practice courts are in the basement (4), beneath the skylighted arena, a serenely utilitarian space (5).


Luc Boegly

3

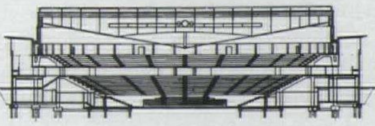

Luc Boegly

4



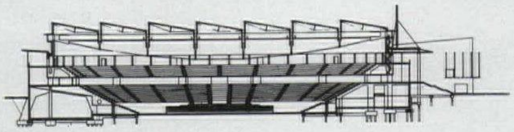
Lluís Casals

5



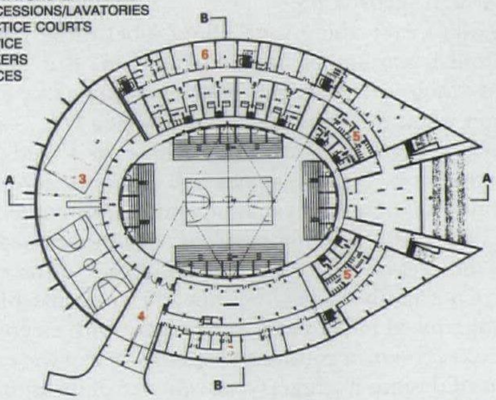
SECTION B B

100'/30m



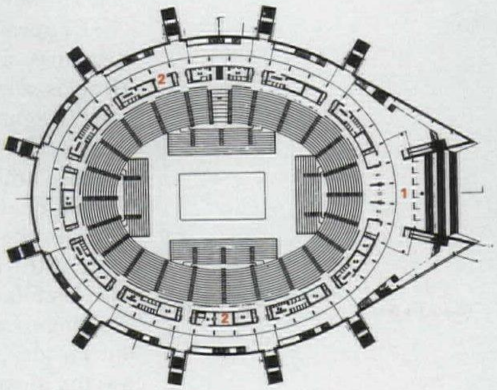
SECTION A A

1 SPECTATORS' ENTRANCE
2 CONCESSIONS/LAVATORIES
3 PRACTICE COURTS
4 SERVICE
5 LOCKERS
6 OFFICES



LOWER LEVEL FLOOR PLAN

N 100'/30m



MAIN LEVEL FLOOR PLAN

Project: *Badalona Sports Palace, Badalona, Spain.*
Architects: *Bonell & Gil, Barcelona (Esteve Bonell, Francesc Rius, partners-in-charge; Enrique Rego, Pere Rius, project supervisors; Moises Aguilar, M. Christine Aubry, Nicole Bongard, Jaume Calsapeu, Felix Khun, Thomas Lussi, Desirée Mas, Alan Mee, project team).*
Clients: *City of Badalona, Barcelona Olympic Committee, General Legislature of Catalonia.*
Site: *a city block in a dense suburb.*
Program: *270,000-sq-ft Olympic basketball stadium for 12,500.*
Structural system: *two-way steel roof structure; elliptical concrete wall.*
Major materials: *steel beams, metal roofs, cast-in-place concrete.*
Consultants: *Robert Brufau, Agusti Obiols, Luis Moya, structural.*
Contractor: *Dumez-Copisa.*
Costs: *3,500,000 pesetas.*

1

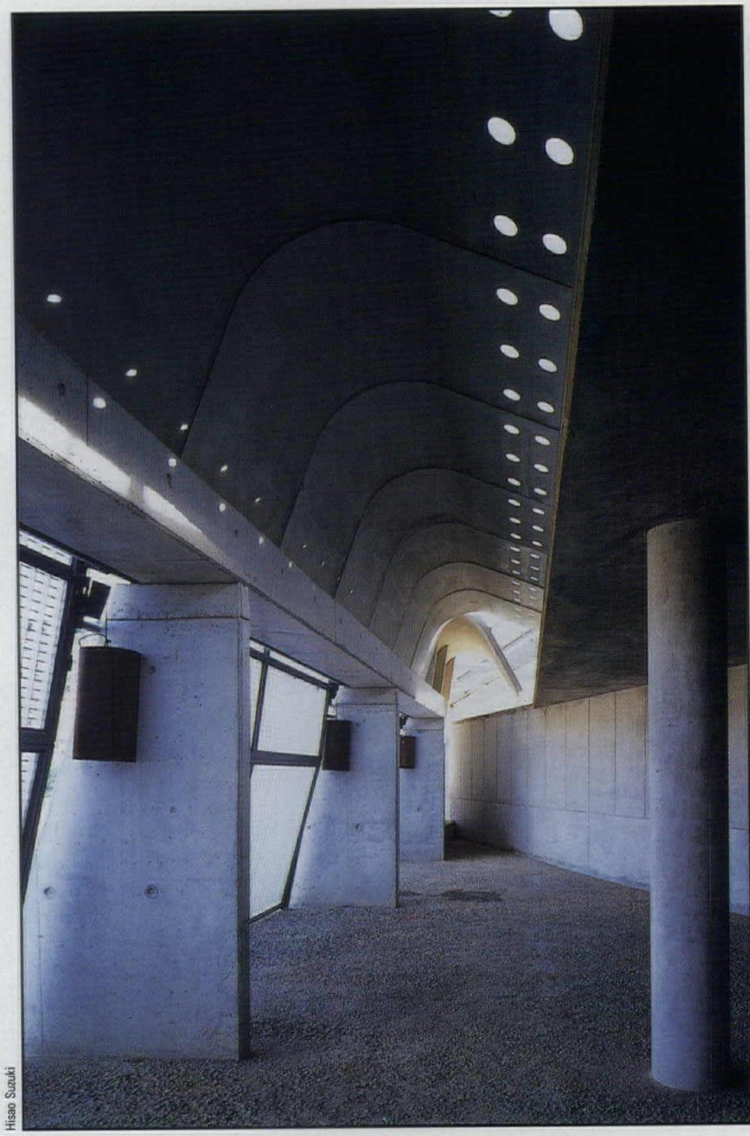
Luc Boegly/Archipress

Somatic Structures

Man-made caverns, Miralles & Pinós's Olympic archery pavilions render architecture a corporeal experience.

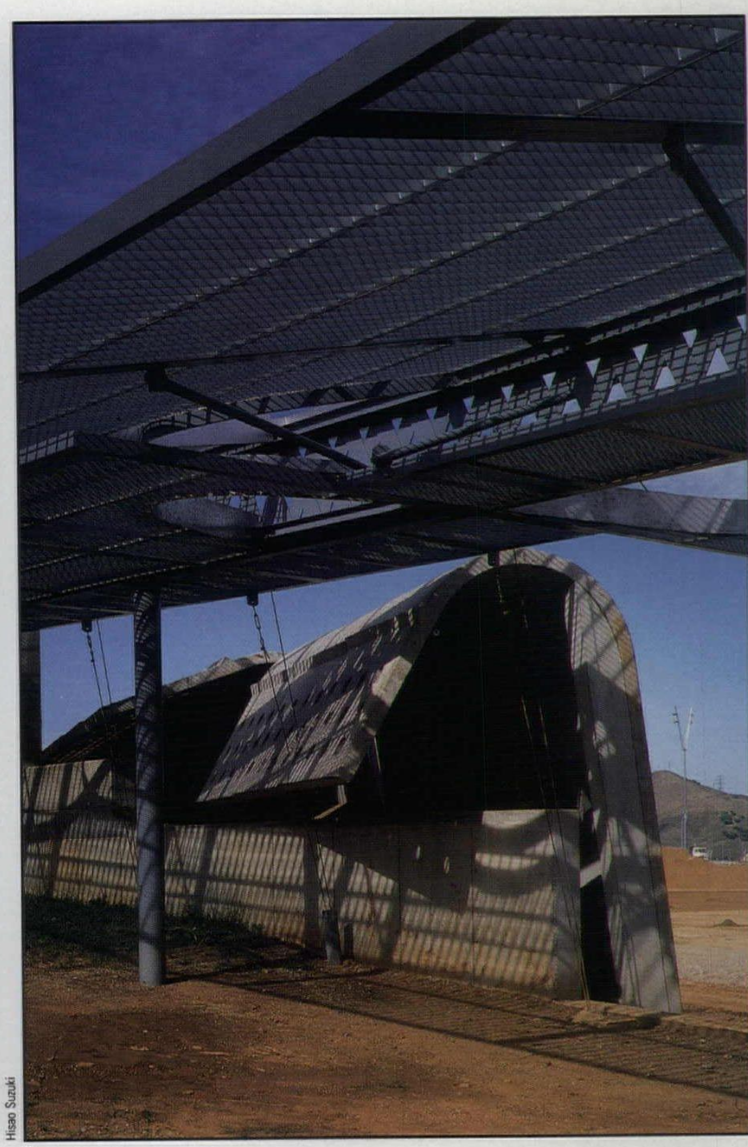
Webster's definition of "somatic" is twofold: the word describes the body from without and from within, the carapace and the cavity. It's an apt term for the pair of Olympic archery pavilions designed by Enric Miralles and Carme Pinós of Barcelona. Inside and out, these structures seem to be animated by a life force, molded by opposing forces that hold each other in check. The interiors – athletic locker rooms – are labyrinths in organic bodies, daylighted by crevices in corrugated enclosures. From the exterior, the pavilions are haunting figures, visages that survey the sports fields. These are among the strongest Spanish buildings of the past decade, as bold as they are thought-provoking.

If appearances were everything, one might label these pleated structures a Catalonian variant of Deconstructivism. But neither Miralles nor Pinós (their practices are now separate) talks about social fragmentation when they discuss their work (see P/A, August 1990, p. 109); instead, they see the archery pavilions as a mediation between athletes, spectators, and the sports hall that rises above the playing fields. Miralles acknowledges that he and Pinós invested the site with the issues they subsequently resolved: having bermed the edge of the fields, they set out to articulate the surface of the earth with architecture. Cuts in the berms became the imprints of the buildings. Each is burrowed in the earth, a structure with essentially one façade. This exposed skin, a counterpart to the face of the earth, was the initial focus of design; it triggered a sequence of decisions on the spaces and structures within.



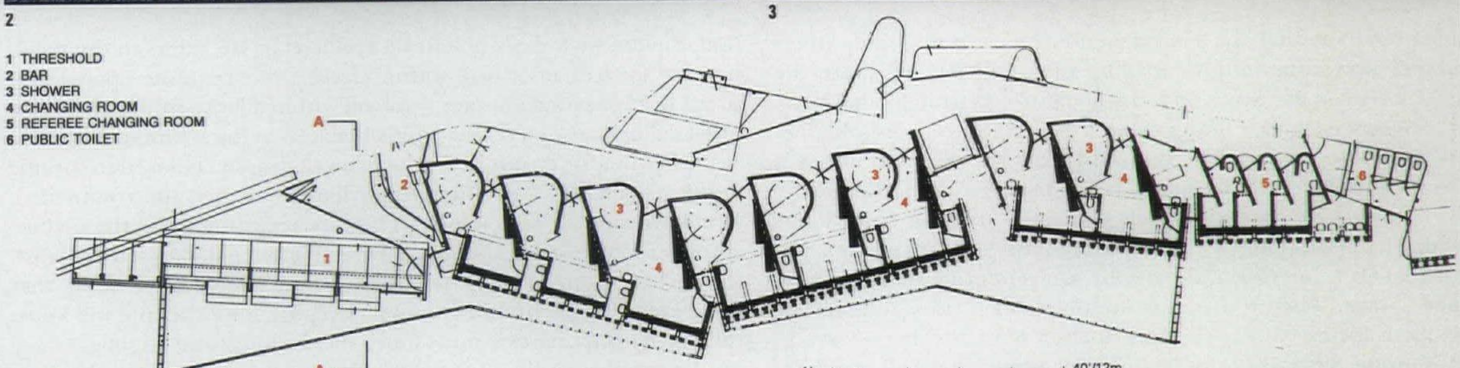
Hisao Suzuki

2

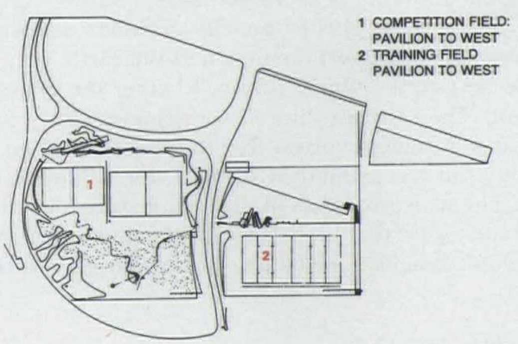


Hisao Suzuki

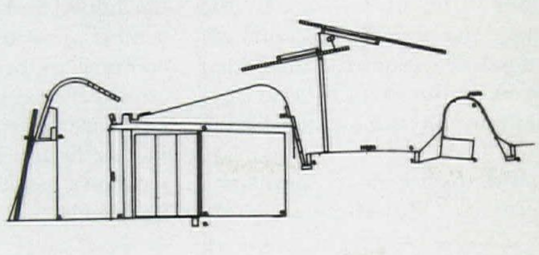
3



FLOOR PLAN



SITE PLAN



SECTION AA

A folding retaining wall that encloses locker rooms, Miralles & Pinós's concrete archery pavilion (1) lines the competition grounds, slated to become a soccer field after the 1992 games. (Temporary structures for the archers will be built on the field.) The threshold (2) to the lockers is lined with grated doors that fold on the horizontal. The curved roof is integral with the walls (3); each precast module was lifted into place by crane.

Luc Boegly/Archipress

4

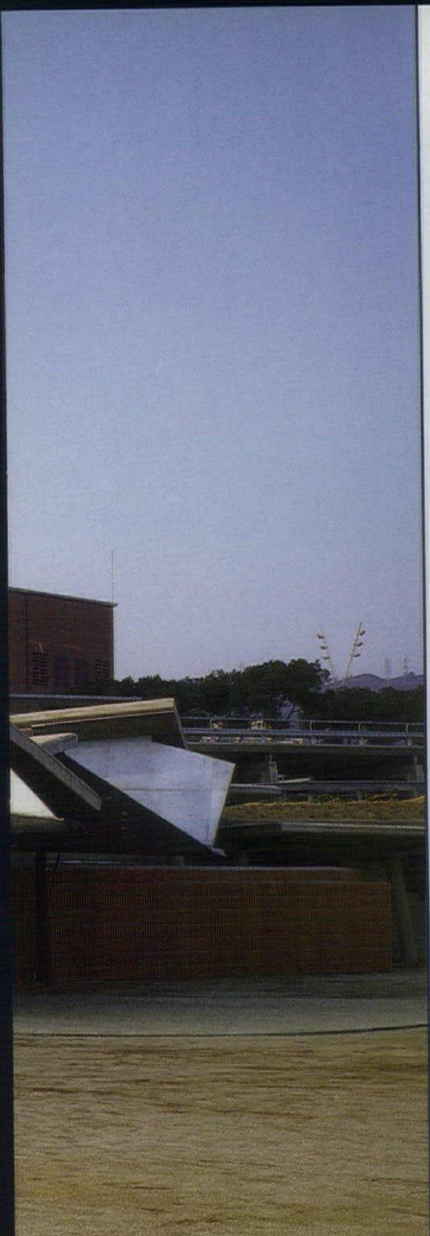
Pinós observes that the buried buildings are non-objects (their singularity notwithstanding), enabling the architects to "erase the limits . . . between our intervention and nature," a strategy shared by other projects each has under way. The interiors, thresholds between the subterranean and the outdoors, are different in each pavilion, conditioned by the the relation between the wall and the earth. In the brick pavilion, which flanks the training field, Pinós notes that "the building is the art under the slabs," and that the bounds between interior and exterior are rendered ambiguous by the plied walls. There's a pragmatic dividend to this aesthetic of overlapped forms: the roof slabs anchored in the berms shade athletes on the sidelines. The larger field, where they will compete, has pavilions of prefabricated concrete panels with curved integral roofs cantilevered from raking walls. Some of the panels are "containers" of earth; others, of locker rooms. The former have full "interiors," the latter have empty ones – the spaces used by the athletes. Their finishes are utilitarian, the lighting exceptional: daylight streams through angular channels that modulate the folded façade. The cranked passage is flanked by the earth on one side; opposite are curved walls of cerulean blue tile, silhouetted by the perforated concrete walls.

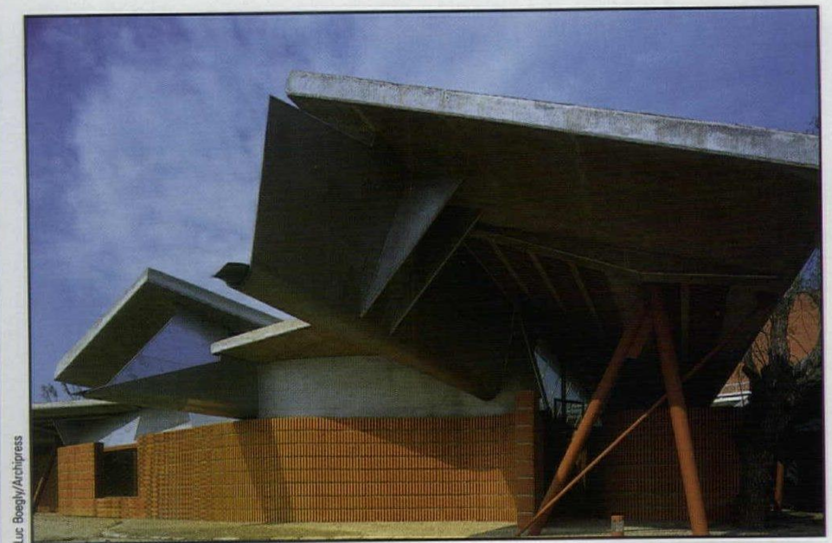
The architectural forms of both pavilions are vague, perhaps a comment on today's culture of indeterminacy. But Miralles demurs from social critique, and sees their massing simply as a way to liberate the design from any imposed geometry (a strategy shared, nonetheless, by today's polemical architects). He refers to the pavilions as squares inscribed within circles: the requisite spaces and programmatic functions are resolved within a loose-fitting enclosure inflected by broader relationships between architecture and nature.

Structure, for example, can be like calligraphy, tailored to specific design problems. The concrete pavilions that line the competitive field have an extroverted logic. They are retaining walls; the surface is the structure, a backdrop for the Olympic matches. In contrast, the locker rooms on the training grounds have brick walls that screen most of the braced columns. Because fewer people will know this pavilion by its exterior alone, the architectural highlights are inside: cantilevered roofs, diaphram-gutters, and hardwood collars are folded like origami above the serpentine walls.

The trabeated ceiling slabs shelter an extraordinary interior. They are massive enough to support the weight of the earth, yet are daylighted by large clerestories. One is unsure whether the space is subterranean or not. The columns, braced with sinewy struts, are eccentric to the beams (Miralles explains that the axis of rotation is effectively the same as in a conventional support; the column and beam are integral). The structure works like a limb; it also evokes the human figure. Miralles notes that the triangulated columns are the pavilion's perpetual inhabitants. Like bodies within a larger corpus.

Philip Arcidi ■





Luc Boegly/Archipress

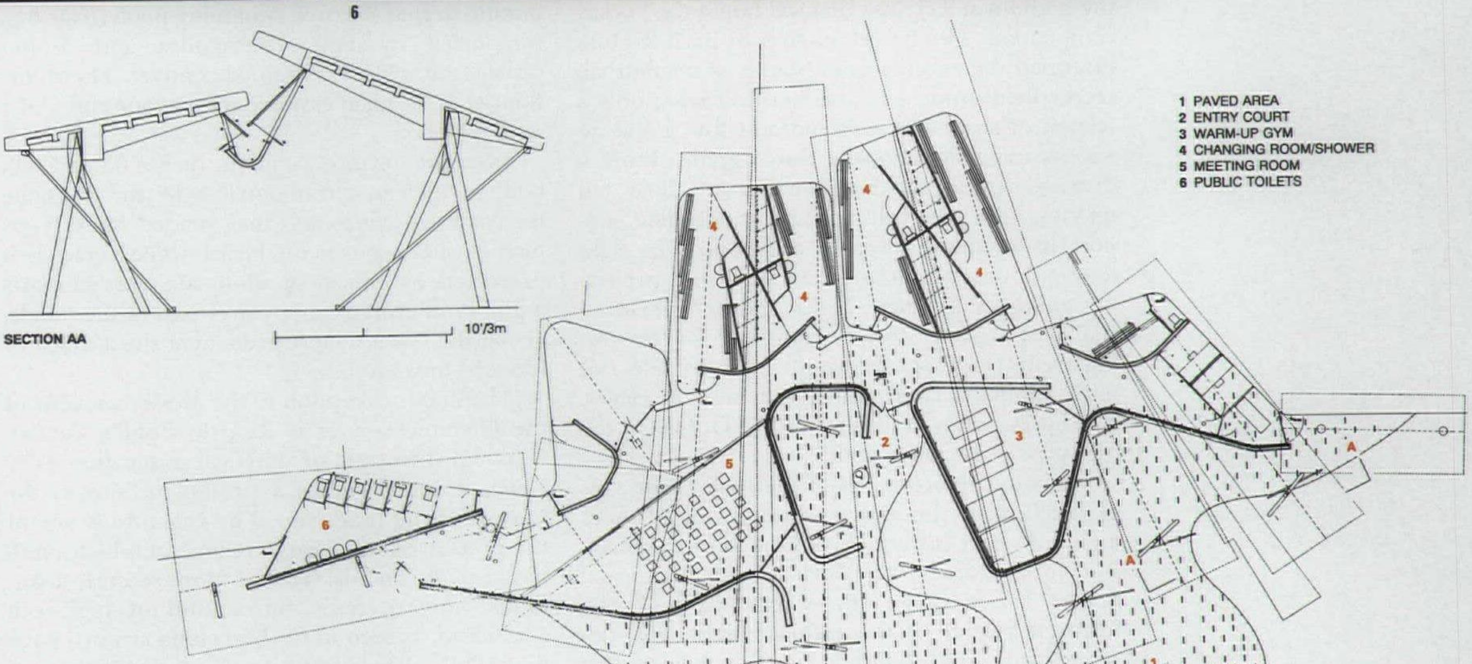
5

Hisao Suzuki

6

Project: *Olympic Archery Range Facilities, Barcelona, Spain.*
Architects: *Miralles & Pinós Architects, Barcelona (Enric Miralles, Carme Pinós, principals; Rodri Prats, Silvia Martinez, project team).*
Client: *Barcelona Olympic Committee.*
Site: *two bermed fields (25 acres total) in Vall d'Hebron.*
Program: *initially the site for Olympic archery training and competition; later public rugby and soccer fields. Pavilions house lockers, bars, and meeting rooms.*
Structural system: *Most elements are structural: precast façades with integral arched roofs for competition pavilion; steel and concrete columns with slab roofs for training pavilion.*
Major materials: *unmortared stone and concrete berms; precast and cast-in-place concrete pavilions; movable steel walls, brick veneer and concrete roof slabs with ceramic infill for training pavilion.*
Consultants: *Augusti Obiols, structural.*
Costs: *450,000,000 pesetas.*

The second pavilion, on the edge of the archery training grounds (4), will provide locker rooms for rugby players in the future. Overscaled gutters shelter the entrances, which are fissures in the sinuous walls (5). Inside, clerestories light spaces surrounded by earth and animated by triangulated columns (6).



SECTION AA

10'/3m

1 PAVED AREA
2 ENTRY COURT
3 WARM-UP GYM
4 CHANGING ROOM/SHOWER
5 MEETING ROOM
6 PUBLIC TOILETS

FLOOR PLAN, TRAINING PAVILION

N →

40'/12m

Body Language

The structural expression of Barcelona's Olympic facilities evokes images of athletes in action.

In Bach & Mora's hockey field at Terrassa (1, 2), most of the stands are buried behind an earth berm; light towers and a covered grandstand are emphasized.

While the bulk of Barcelona's pre-Olympic urban efforts has been focused on low-key urban planning and infrastructure issues, the Barcelona that the world will see on television this month will be its showy array of new athletic facilities. And while the city's urban interventions – most notably the Olympic Village – tend to display an almost excessive deference to tradition, the Olympic facilities are for the most part bold and Modern, with an attention to structural expression that is especially appropriate to the physical nature of the activities they will house. These structures stretch, strain, and lean as if in sympathy with the athletes performing within, giving new meaning to the term "structural gymnastics."

Among the most spectacular of these facilties is the stadium at Terrassa that will house the hockey competition. The Barcelona firm of Bach & Mora disguised the existing grandstands of a suburban soccer field inside an earth berm, leaving only a section of shaded grandstand and four great inward-leaning light towers above grade. From a distance the elegant sunshade seems to float, but up close, the steel columns and trusses that support its cantilever become apparent. The light towers double as entrance markers, with projecting canopies at their bases. Farther afield in Banyoles, Bach & Mora's grandstand for the rowing events (page 81) also employs a sunshade, this one supported from above with tension cables. The horizontality of the grandstand is offset by the oval glass press tower beside it.

At Vall d'Hebron, one of the four major sites of the Games, the archery facilities by Miralles and Pinós have justly received the most attention. But Jordi Garcés and Enric Sòria's Municipal Sports Palace (page 76), which sits atop the terraced hillside of the archery range, also deserves note. The building actually houses two major spaces, both rather spare but for the notable exception of their irregularly shaped skylights. From down the hill, the profile of these skylights seems to establish the angular rhythm picked up by the archery installations. The pavilion will house the Olympic volleyball competition.

Adjacent to the Vall d'Hebron site is the velodrome (page 80), built in 1985 by Bonell & Ruis. Like their basketball stadium at Badalona (page 70), the velodrome draws its form in part from ancient amphitheaters. But here the stands form a perfect circle, with thin rectangular piers around the circumference suggesting the rhythm of spokes. Inside the circle, the steeply banked cycling track takes the form of an oval.

On Montjuïc, the view is dominated by Calatrava's tower, the Olympic Stadium, and Arata Isozaki's Sant Jordi Sports Hall (P/A, April 1991, p. 78), but the Bernat Piscorell swimming pools (page 81), remodeled by Franc Fernández and Moisés Gallego, provide a restrained contrast. Their only flourish is the giant exposed truss at one end of the outdoor pool.

Even the Olympic Stadium (pages 63 and 65), built in 1929 in a traditional style (for the same international exposition that yielded Mies's German Pavilion), gets in on the act: while its façade is preserved, an enormous white box truss supports a thin cantilevered canopy over part of the stands, giving the Games' most prominent site a touch of Modern bravado.

The major exception to the Modernist bent of the Olympic venues is Ricardo Bofill's Catalan National Institute of Physical Education (INEFC), which occupies a prominent site in the Olympic Ring (page 65). The Institute is one of the precast-Classical monuments for which Bofill has become famous. (He has more recently abandoned this aesthetic for a kind of high-tech Classicism, as seen in his Barcelona airport, page 67.) While it will serve as a "sports university" after the games, its Olympic assignment is, fittingly, to house the Greco-Roman wrestling events. **Mark Alden Branch** ■

Photos: Lluís Casals

1

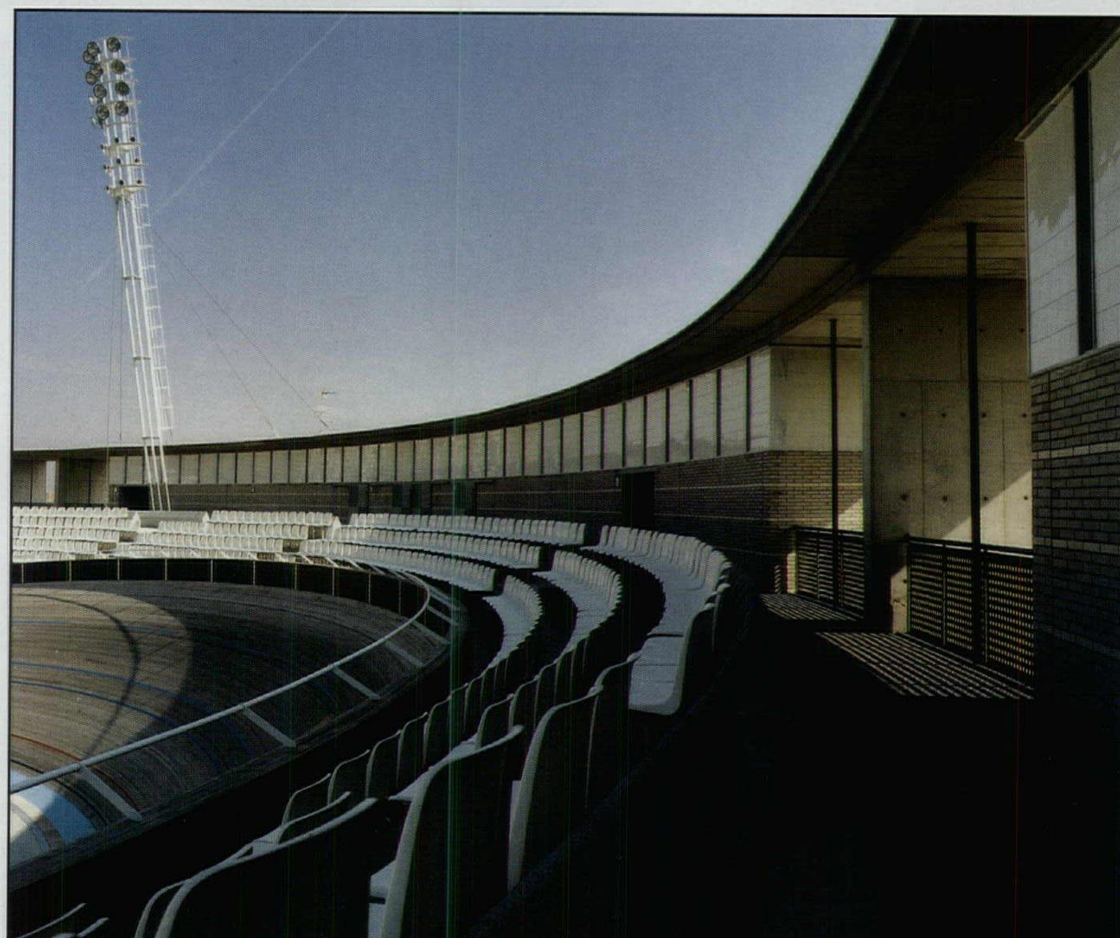
2

Lluís Casals

Photo opposite: Hisao Suzuki

3

Bonell & Ruis's velodrome (3, 4) imbeds an oval cycling track in a circular form. The Bernat Piscorell swimming pools (5) are among the quieter statements in the Olympic Ring on Montjuïc. The rowing grandstand at Banyoles (6) has linearity and rhythm that evoke its appointed sport.



Lluís Casals

Photo opposite: Ferran Freixa

4

5, 6

S. Couturier, Archipress

1

For the Expo city's new airport, architect Rafael Moneo has evoked a detached fragment of the old urban fabric.

Ever since airports became subjects of conscious design, it has been almost axiomatic that they show a visible kinship with aeronautics. This technological imperative, applied to necessarily large volumes, has produced some great Modernist landmarks, of which Norman Foster's new airport for London is one of the latest and best (P/A, Dec. 1991, p. 54). Architect Rafael Moneo, facing the need to represent Seville for crowds arriving for Expo '92, has challenged this wisdom with masonry structures under pitched roofs.

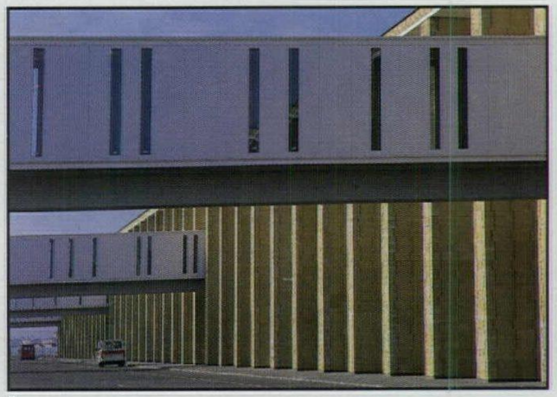
Moneo can use the most modern of building technology – and he does so here – but always with a sense of enclosure and a consciousness of gravity that suggest ancient construction. His overriding interest is in generating clearly defined spaces, proceeding in a clear order – in this case from the automobile to the airplane and back.

The scale of this airport favored the conventional two-level emplaning-deplaning scheme, with boarding gates in one neat line along the apron. Moneo takes particular care with the automobile end of the sequence, making the garage an integral part of the terminal building, as it rarely has been; arriving by car, one enters a closed precinct, bounded by garage and terminal, occupied by covered parking interspersed with planted courtyards like those of the city. The rationale for the roofs is protection from the intense Andalusian sun, but there is also a visual enclosure countering the expanse of highway and airport. (The previous terminal had only a few detached canopies to shade parked cars.)

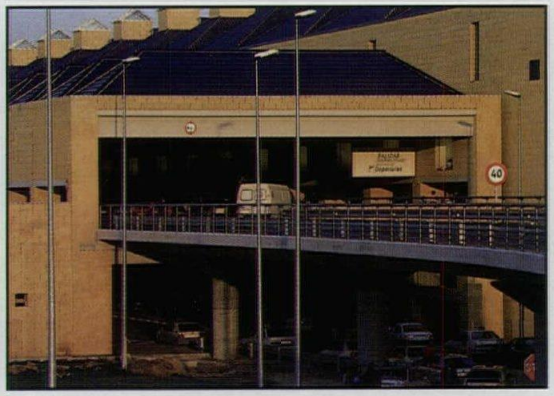
Displayed at close range here are the terminal's distinctive exterior materials – emphatically pre-aeronautic in character: large-scale concrete block, made with a local golden sand, and glazed roof tiles of a very intense blue. Also apparent is the way the functional layers of the terminal – vehicular porte-cochère, departure hall, etc. – are structurally independent, with visible gaps between (photo 3 and section on following pages). At some of these boundaries, functions such as utilities and stairwells are fitted within the separations.

A few steps from the drop-off platform one enters the basilica of the departure concourse.

The 900-foot expanse of the airport's boarding gates terminates at one end in a distinct structure (under the big sign) housing restaurant and offices. Jetways (2) extend from masonry fin walls that shade the boarding lounge windows. On the land side (3), the two levels of roadway are enveloped in a masonry-walled arcade. Extending from this porte-cochère are covered parking areas (4), bounding linear courts planted with orange trees. Cupolas crowning the glazed tile roofs light the vaults of the departure concourse inside.

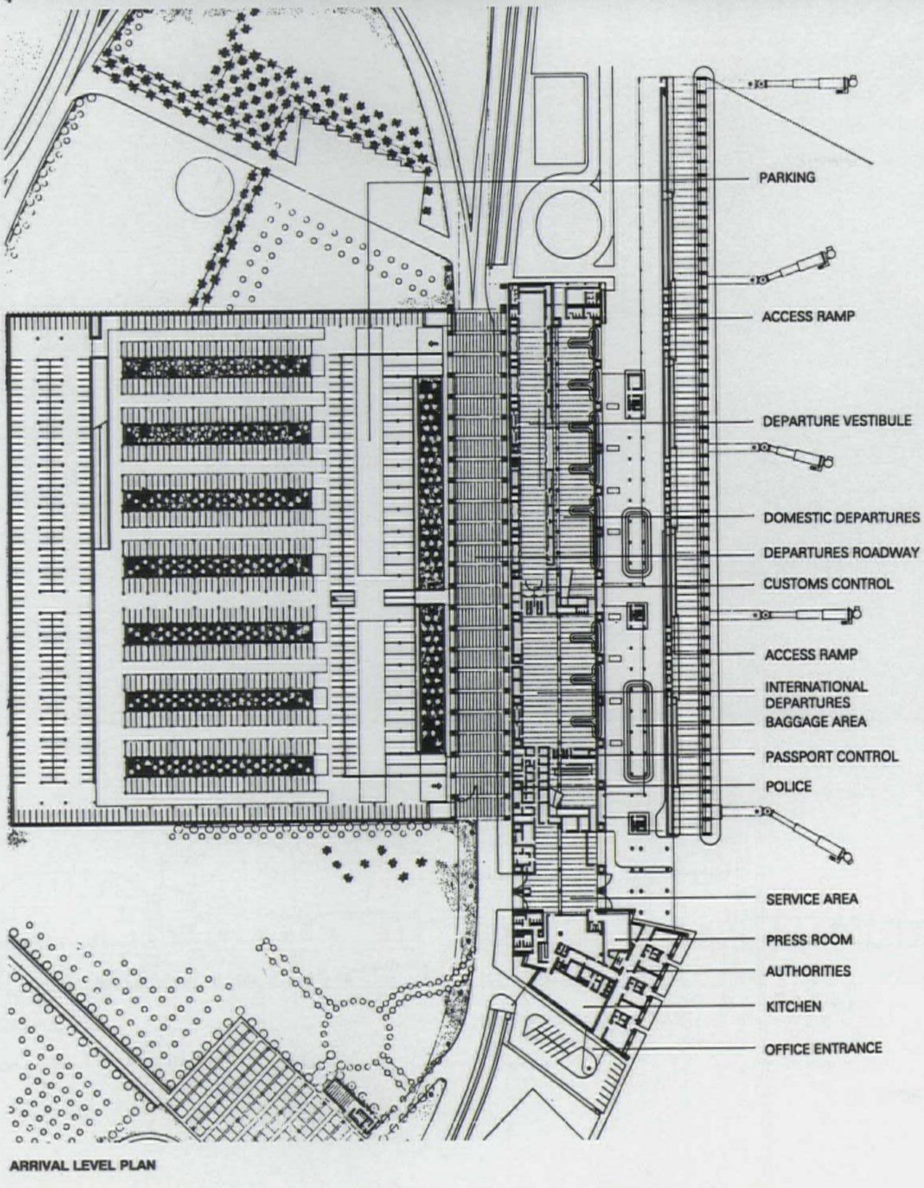


2

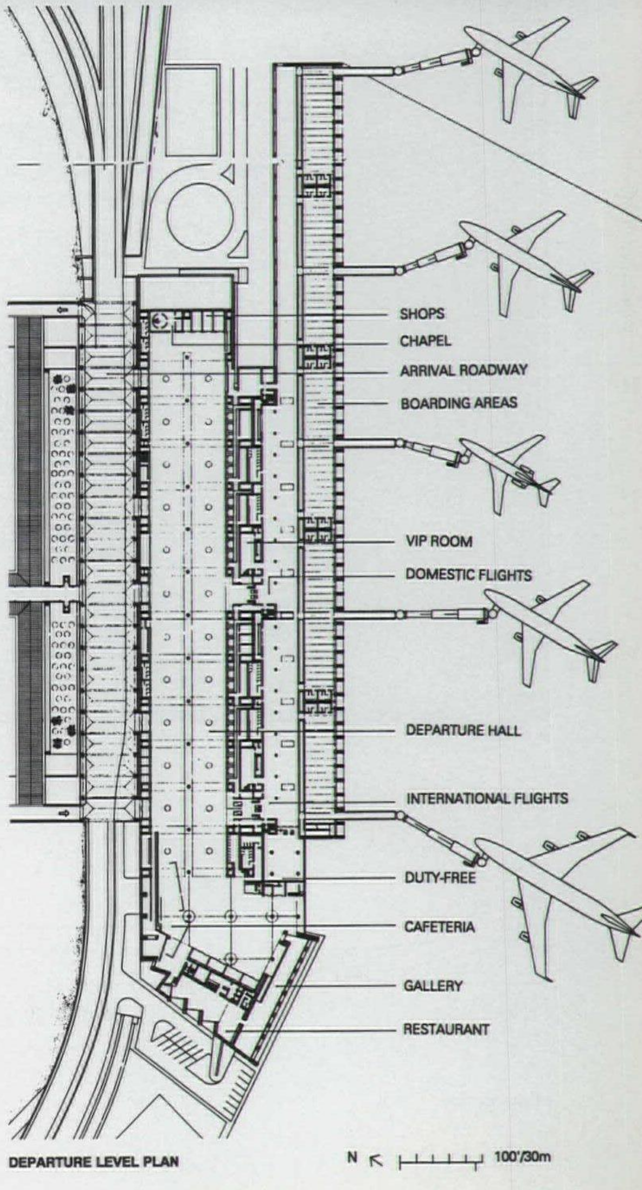


3

4

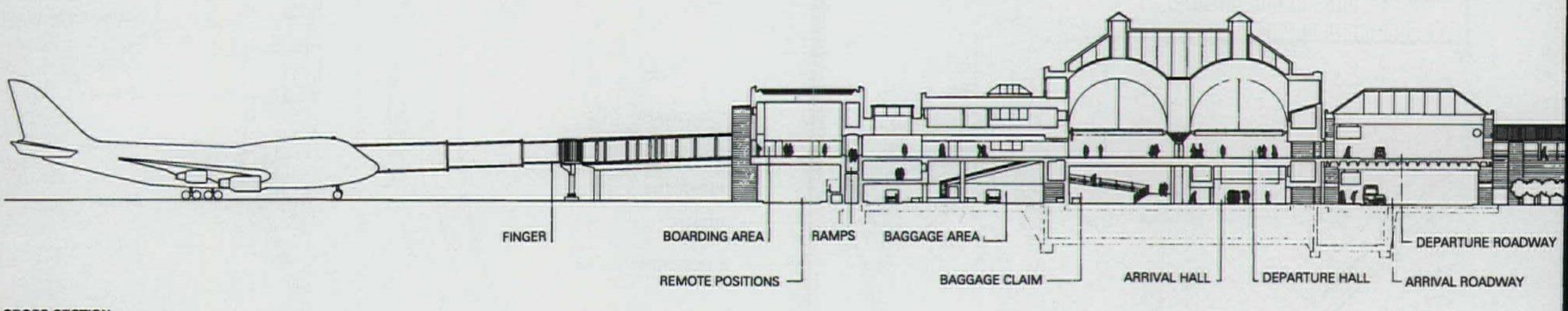


ARRIVAL LEVEL PLAN

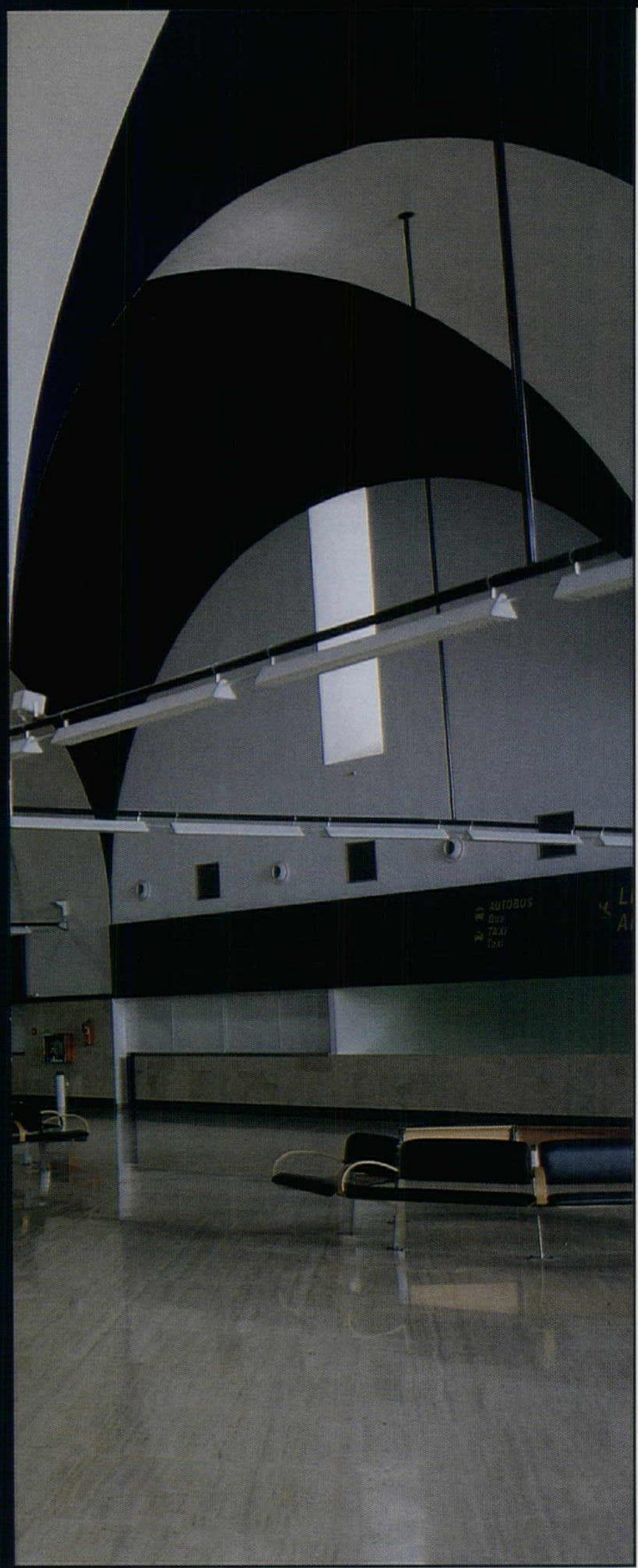


DEPARTURE LEVEL PLAN

5



CROSS SECTION



6

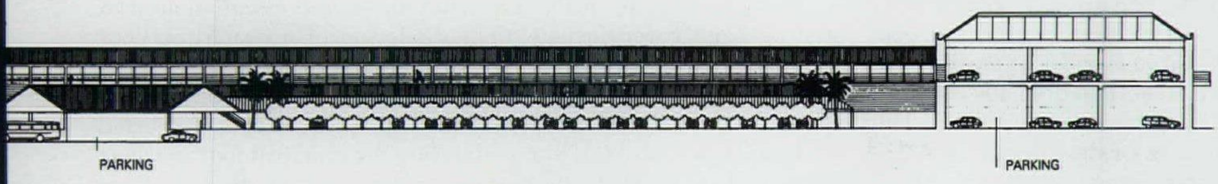
Here big half-circle arches bear on squat columns with surprising ruffed capitals. This room would look rather Romanesque were it not for the sharp color contrast of white arches against the vaults, painted a blue like that of the tile roofs above them. Most of the terminal's major interiors show some variation on the blue-and-white theme above door-head height, with neutrally colored stone and other materials below that line. Moneo speaks of calming travelers' anxieties and giving them a foretaste of the flying experience.

Compared with the departure level, the arrival spaces on the lower level are inevitably more crowded in this two-level scheme, and of course they lack top-lighted vaults. The arriving passengers' route to baggage claim, however, leads through pleasant glazed passages that run between and around boarding lounges (visible in photo 6 and traceable in the drawings).

While the new Seville terminal may not divert the course of airport design from its typical technological direction, it is an excellent reminder that there is an alternative. An airport is, after all, firmly connected to the earth and can offer a reassuring sense of shelter. **John Morris Dixon** ■

The vaults of the departure concourse (5) give it a churchlike quality. Suspended tracks for lighting and signs detract from the effect; the yellow italic lettering is unsympathetic to these serene spaces. A typical boarding lounge (6) offers a broad view from an emphatically closed volume; the precast structure visible here is typical of the terminal. Seating in circles, facing out, helps travelers to "avoid unsought contact," says Moneo. The section of the terminal (below) shows its resemblance to a monastery, complete with cloistered appendages.

Project: *Airport terminal, Seville.*
Architects: *Studio of Rafael Moneo, Madrid (Jose Rafael Moneo Vallés, architect; Fernando Iznaola Bravo, Luis Moreno Mansilla, Emilio Tuñon Alvarez, Aurora Fernandez, architects, collaborators).*
Client: *Ministry of Transportation.*
Program: *international airport terminal of 61,940 sq m (666,700 sq ft); parking for 1137 cars, 32 buses.*
Structural system: *precast concrete, some masonry bearing walls, cast-in-place vaults over concourse.*
Major materials: *concrete masonry units, glazed roof tiles.*
Consultants: *Mariano Moneo Vallés, structural; INTECSA, mechanical; Enric Satué, graphics; AKABA, with architects, furniture.*
Cost: *8,390 million pesetas (about $83 million).*
Photos: *Dida Biggi, except as noted.*



World on a Platter

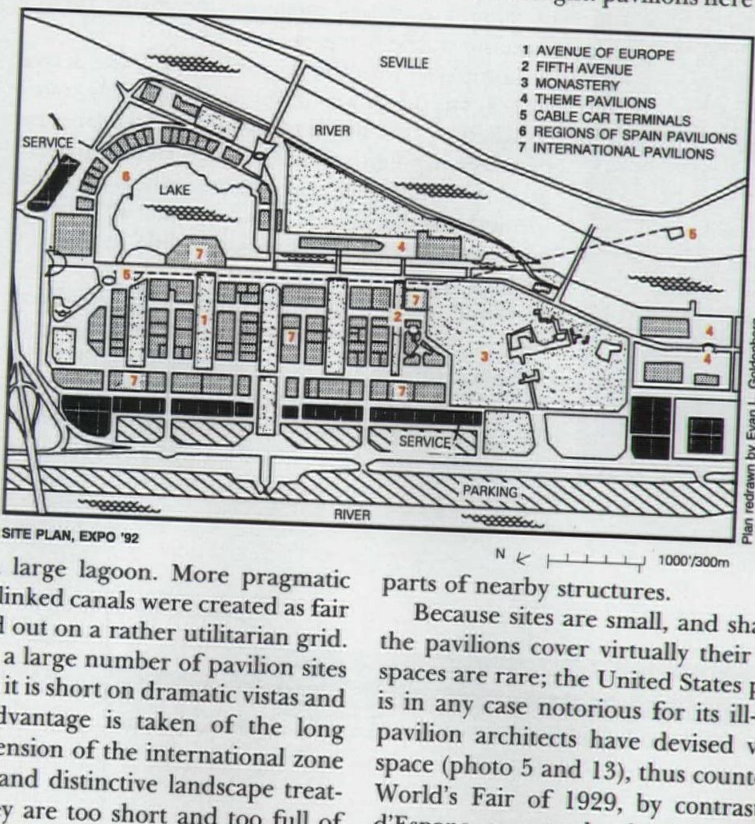
Seville's World's Fair – possibly an anachronism in the age of TV and jet planes – shows a few architectural high points in a banal context.

World's Fairs, which have been dazzling generations since the 1850s, appear to be losing out to other modes of communication and entertainment. In the past few years, Paris and Chicago, sites of the most influential expositions in history, have decided not to try again; Vienna has recently withdrawn from a proposed two-city fair, leaving Budapest to go it alone with a "specialized" fair in 1996.

The 500th anniversary of Columbus's voyage could not, it seems, go unrecognized by a major fair, and Seville has mounted the first "class 1" world's fair since Osaka's in 1970. Expo '92 boasts the largest international participation ever, with 110 countries represented in the exposition's 95 pavilions; its 7 million square feet of construction (about half by the fair sponsors, half by individual exhibitors) represents an investment of $1.8 billion. It is possible, however, that Genoa's less spectacular commemoration (see next month's P/A) sets a more applicable example for the future.

The motivation for a grand-scaled fair in Seville was to assert the reemergence of Spain as an economic and cultural power; Seville, long a backwater city in a backwater country, wanted to commemorate the powerful position it held for centuries after Columbus, when most of the Western Hemisphere was controlled from here. Now a charming city of 700,000, Seville is small for such an effort, even with national government support. Numerous infrastructure improvements were required, including a new airport terminal (p. 82), a fine new railroad station (which serves a new high-speed line from Madrid), and extensive highways and bridges.

The fair site – 530 little-used acres on an island in the Guadalquivir River just across from the city – was made appealing by removing some landfill that had blocked this channel of the river and by replacing a railroad along the city side of the river with miles of esplanade. The flat, river-bottom terrain was very adaptable. A competition-winning expo scheme by Emilio Ambasz (P/A, Sept. 1986, p. 43) envisioned floating pavilions on a large lagoon. More pragmatic heads prevailed; a modest lake and linked canals were created as fair amenities, and the dry land was laid out on a rather utilitarian grid.



SITE PLAN, EXPO '92

N 1000'/300m

Plan redrawn by Evan L. Goldenberg

The gridded expo plan packs in a large number of pavilion sites with roughly equal prominence, but it is short on dramatic vistas and visual orientation points. Little advantage is taken of the long riverfront. Spanning the short dimension of the international zone are broad avenues, with elaborate and distinctive landscape treatment to differentiate them, but they are too short and too full of construction to set off the pavilions along them or at their ends. And there is no memorable relationship between avenues to establish a sequence in the visitor's mind. Within this workaday grid, the rectangular pavilion sites, with short frontages lined up on straight streets, obviously cramp the aspiration of individual exhibitors to erect freestanding landmarks.

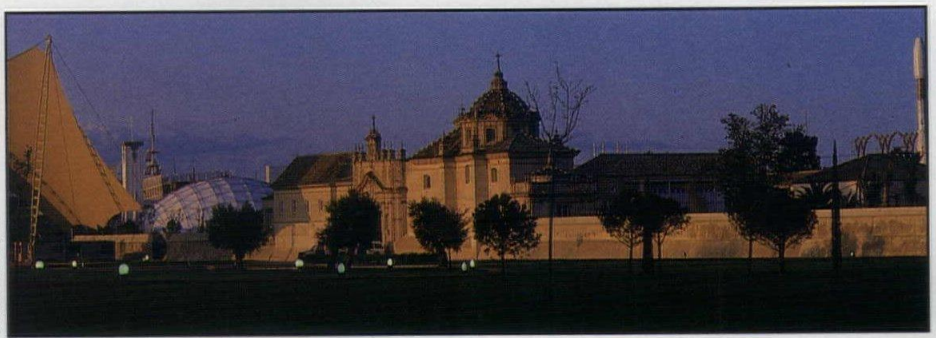
To the south, isolated by the green precinct of the island's 15th-Century monastery – restored as a historical display and royal pavilion – stand the large pavilions built by the fair to elaborate on aspects of its theme: "The Age of Discoveries." Though set on more exposed sites, these theme pavilions are as tamely rectangular as most of the international ones, as if the architects did not expect so much visibility. One of the largest of these, the Pavilion of Discovery, was gutted by fire in the spring, as exhibits were being installed, and – except for its separately entered "space cinema" dome – remains an unused scorched hulk. (Artifacts lost in the fire reportedly include the Red Baron's plane.)

The heat of the Seville summer has had a pervasive – perhaps inordinate – effect on the design of just about everything at this fair. Granted, summer days on this river-bottom site at the southern tip of sunny Spain will be sizzling. (Caliphs and kings wisely favored hilltop Granada.) One of the local ways to deal with heat is to celebrate at night: pavilions here are open till 10 p.m., fireworks over the lake follow, and the fair stays open for dining, drinking, and dancing until 4 a.m. nightly.

At any rate, strategies for dealing with heat have done much to shape both public spaces and individual pavilions here (see P/A, Dec. 1991, p. 18). All of the streets are shaded by pergolas crowned with vines, and these are equipped with nozzles that emit a cooling micronized mist (which does not fog up eyeglasses or camera lenses). Effective for shade and cooling, these pergolas also further confine the limited views that the site plan offers, so that strollers see mainly the lower parts of nearby structures.

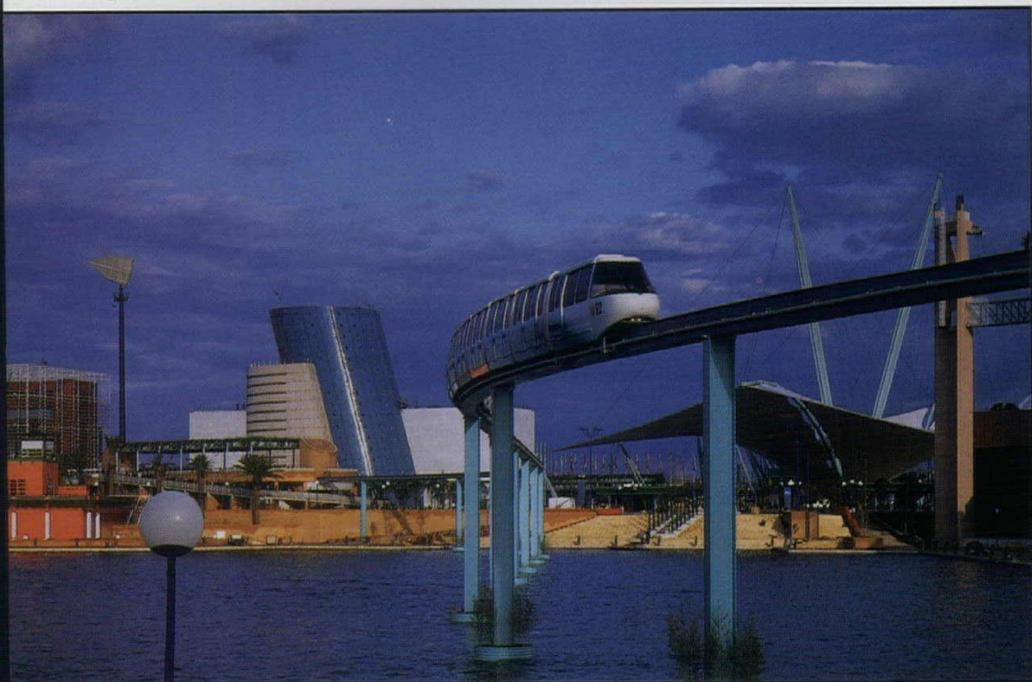
Because sites are small, and shade considered essential, most of the pavilions cover virtually their whole plot. Uncovered outdoor spaces are rare; the United States pavilion has a central plaza, but it is in any case notorious for its ill-considered design. Some of the pavilion architects have devised vast canopies over unobstructed space (photo 5 and 13), thus countering the cramped look. Seville's World's Fair of 1929, by contrast, culminated in the vast Plaza d'Espana–open to the sky though lined with arcades (p. 88).

For real and psychological cooling, water in every form of jet, The 15th-Century Monastery of La Cartuja (1) has been restored for Expo '92 use. A monorail (2) serves mainly to view the motley scene. The Avenue of Europe (3) features "reverse chimney" evaporative coolers and the multicolored EEC Pavilion.



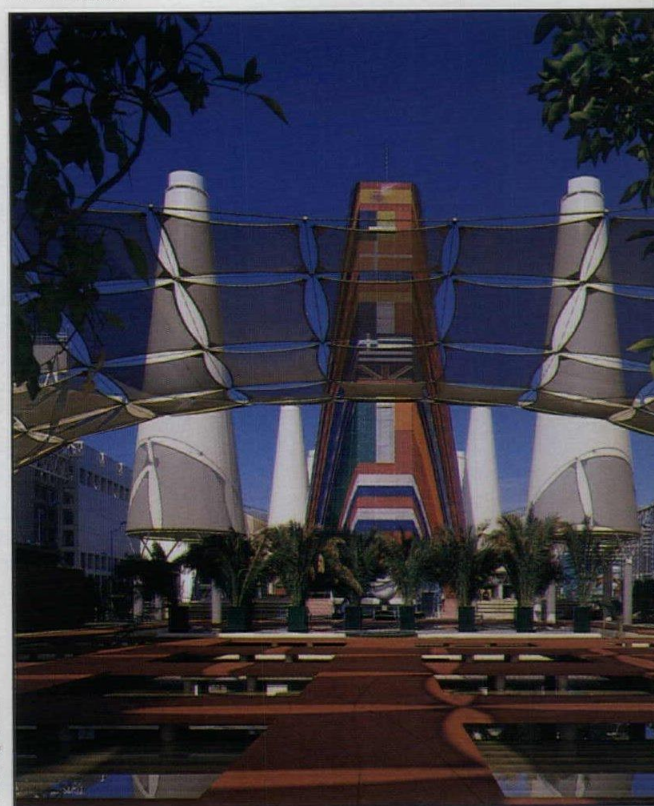
S. Couturier, Archipress

1



2

S. Couturier, Archipress

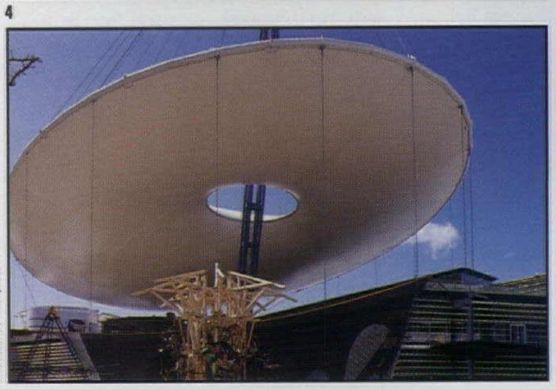


van der Vlugt & Claus

3

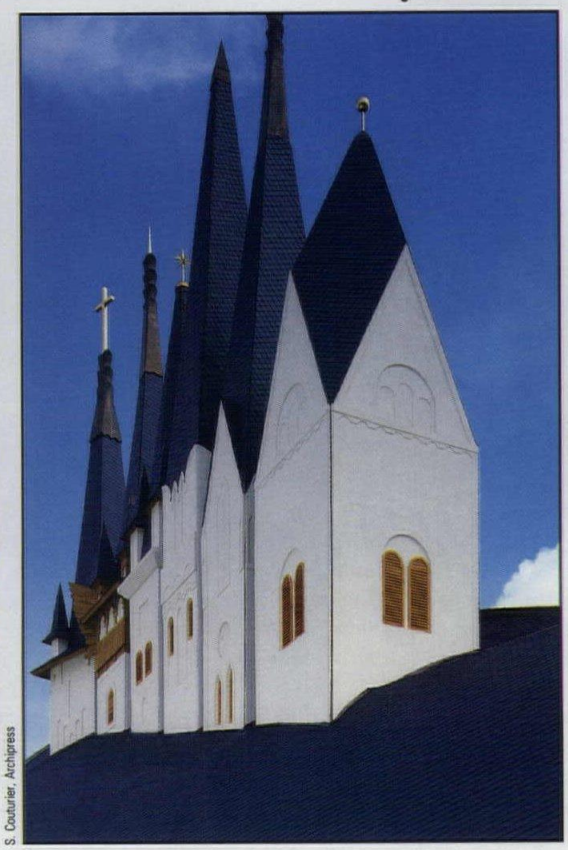
John Morris Dixon

4



S. Couturier, Archipress

5



S. Couturier, Archipress

6

John Morris Dixon

7

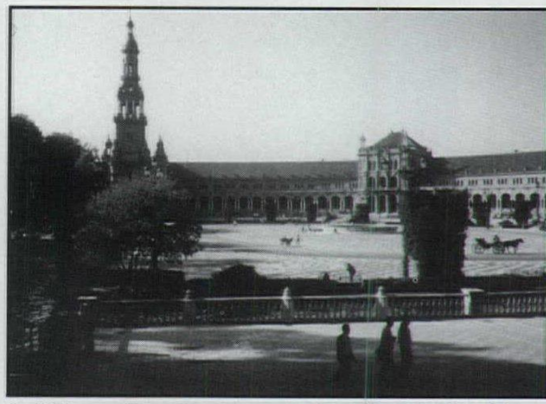
A typical street pergola (4) cools strollers with micronized mist. At the German Pavilion (5), designed by Lippsmeier, shade is cast by an inflated canopy on a single mast; the Hungarian pavilion (6) by Imre Makowecz recalls old churches, with a timber structure that is respectfully exposed inside. At the makeshift U.S. Pavilion (7) only the flag-sails remain from the Barton Myers design.

The heat of the Seville summer has had a pervasive – perhaps inordinate – effect on the design of just about everything at this fair.

cascade, or pool is featured in the pavilions. In some cases, water running over walls helps reduce air-conditioning loads – as do sunshades and fins attached to many structures; several low-tech pavilions have shading devices instead of air-conditioning. But one wonders how much power must be generated just to move all this water – and how much make-up water is needed to balance evaporation. Power is also used generously for lighting, audiovisual equipment, and escalators, which must number in the hundreds here. (Will they be re-used after six months at the fair?)

As a group, the buildings at Expo '92 demonstrate both the diversity of the world's architecture and its lack of geographical connections. Except for the Japan pavilion and a few kitschy expressions of national themes – South Sea Island primitivism or North African ornamentation – the pavilions are relentlessly international in character. Admittedly the impulse to respond to Seville's climate operated against regional expression.

Few national pavilions were designed by their countries' recognized architects. Those of Japan, France, and the United Kingdom (among pavilions featured on the following pages) are by internationally known designers; Saudi Arabia and Kuwait made good choices of established Western talents. In a few instances – notably the pavilions of Finland and the Castile La Mancha region of Spain – lesser known architects were chosen for outstanding competition designs. The U.S. has become notorious for selecting, through a competition, the well-known architect Barton Myers of Los Angeles, then trashing his design when appropriations were held up in Congress (P/A, Sept. 1991, p. 9). Our neighbors Canada and Mexico have more ambitious pavilions – as did, to make our embarrassment more acute, our own Commonwealth of Puerto Rico – though none of the three is particularly distinguished architecturally.


John Morris Dixon

Seville's vast Plaza España remains from the city's 1929 fair.

In almost every well-designed pavilion at the fair, however, the architecture has been seriously undermined by the work of the exhibition designers. Rarely is the fair visitor allowed to enter an interior space and savor its architectural qualities; almost all pavilions put the visitor through a prescribed labyrinth, dominated by slide shows, movies, full-scale re-creations, dioramas, etc., that erase any sense of orientation or relationship to the exterior volume. These are techniques learned from the Disney attractions and from the most recent preceding world's fairs, and today's exhibition designers must use them to earn their fees.

In their content, most of these exhibitions show an awkward split between high-minded explorations of serious themes and blatant displays of the country's products. This fair has very few whole pavilions sponsored by private industry. (One recalls fondly such landmarks as the Saarinen/Eames pavilion for IBM at the 1964 New York fair.) Instead, corporations have signed on as sponsors for the national pavilions, so the visitor sees a GM movie in the United States pavilion, displays of china at the United Kingdom, etc. In almost all cases, national products are sold on the spot. There are few of the full-service national restaurants found at earlier fairs. (The New York fairs of 1939 and 1964 had restaurants so well received that they relocated to Midtown and became institutions.) France has included a fine restaurant designed by Andrée Putman – probably the most expensive at the fair – but hidden underground as an apparent afterthought.

On a larger scale, some of the infrastructure improvements related to the fair are well designed. There is the dramatic Alamillo highway bridge across the Guadalquivir by Santiago Calatrava; the Barqueta pedestrian bridge by Arenas and Pantaleon is effectively festive, if considerably less inspired. The consolidation of Seville's railroad service in a single new terminal left two charming old stations to be recycled; one of them, just across the river from the expo site, will be a city exhibition hall functioning now as an extension of the fair.

New roads, bridges, exhibition halls, esplanades, and gardens will be part of the fair's legacy to Seville. The long-range intention is to exploit the infrastructure improvements to develop the site as a research and development park, and a few structures are to be retained for that kind of use. Seville's mayor talks about the fair as a catalyst for the development of the Andalusia region as a center of the electronics industry, and that seems plausible for this sophisticated university city (whose hinterland, incidentally, resembles the landscape of California's Silicon Valley). Architects who have worked in Seville, however, tend to be skeptical; the region of Andalusia has long been a "poor relation," they say, and will be treated as such by Spain's government and business leaders.

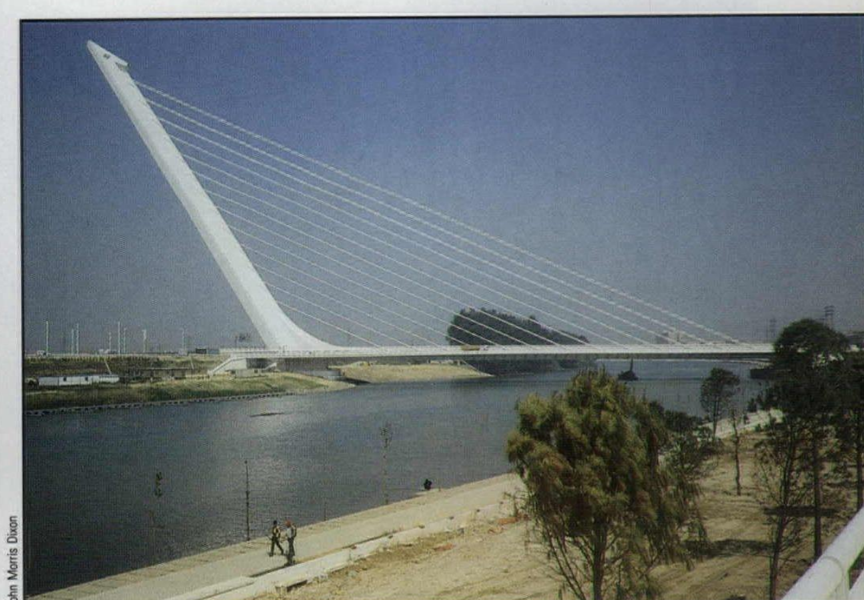
Whether or not the fair provides a big economic boost, Seville will have gained a number of civic improvements, but it will have acquired no world-class landmarks – no Eiffel Tower, understandably, or anything as memorable as Moshe Safdie's Habitat, which survives from Montreal's Expo '67, or even the Plaza d'España from its own 1929 fair. Among Expo '92's temporary structures, none will live in the collective memory as does, for instance, Wallace Harrison's magnificently silly Perisphere and Trylon from the New York fair of 1939. There are individual structures here worth examining for their design lessons (see the following pages). But Expo '92 is on the whole too mundane – too bureaucratic in its planning, too businesslike in its architecture – to stand out among the expositions of the World's Fair Age.

John Morris Dixon ■

Hisao Suzuki

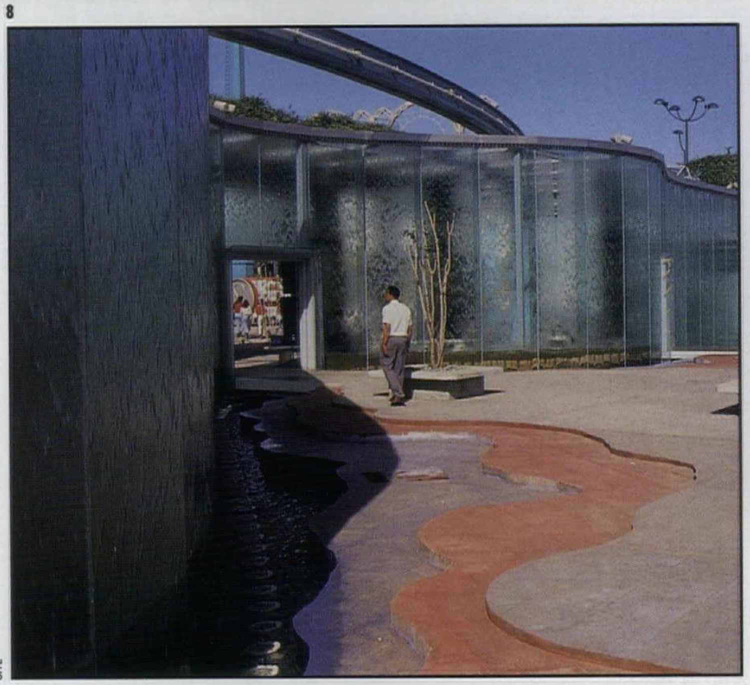
8

The Zurich-based Spanish engineer Santiago Calatrava has designed two characteristic structures for Expo '92. At his Kuwait Pavilion (8) wood-clad roof elements, which can be moved in electronically controlled patterns, suggest both the palm fronds and the traditional boats of Kuwait; under the stepped platform, and softly lighted through translucent stone flooring, is a large, simple exhibition gallery. Outside the fair proper, Calatrava has designed the strikingly asymmetrical Alamillo Bridge (9), which carries a peripheral highway from the city side of the river (in foreground with new esplanade) to the Expo '92 island.



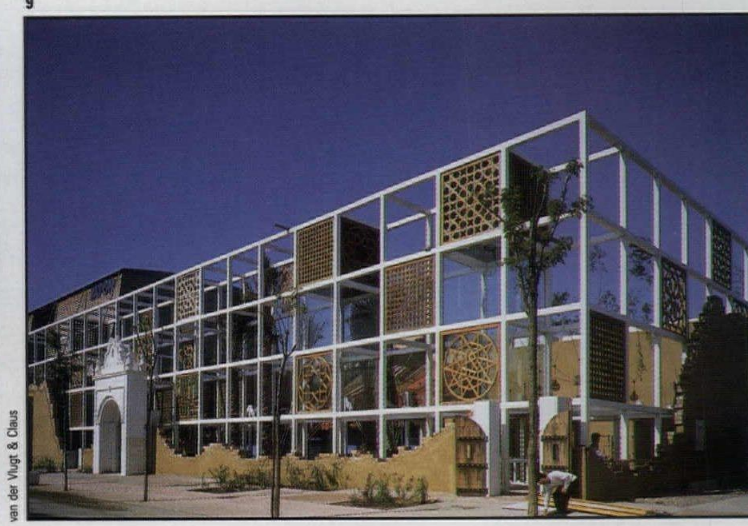
John Morris Dixon

9



SITE

10



van der Vlugt & Claus

11

SITE, the New York design firm, carried out two commissions at the fair. In their design for Fifth Avenue (10), one of the five specially designed boulevards in the international zone, water pours over a sinuous glass wall that extends almost 1000 feet; a contoured river at the base delivers the water to a fountain-pool at one end. Restaurants and vine-shaded rest areas are cupped within the wall's curves. The Saudi Arabia Pavilion (11), designed by SITE, juxtaposes a steel grid with portions of mud brick wall and replicas of Arabian wood screens. Behind the oasis-like entrance court, the main exhibition space is roofed with a huge quilt of colorful hand-crafted rugs. Interior and exhibitions, designed by Fitch of London, include a re-creation of a desert encampment, with real artifacts and real sand, but artificial rocks and scenic projections.

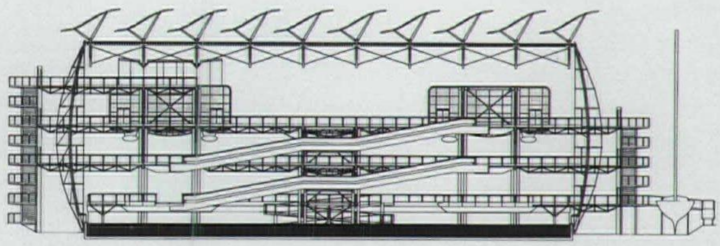
van der Vlugt & Claus

12

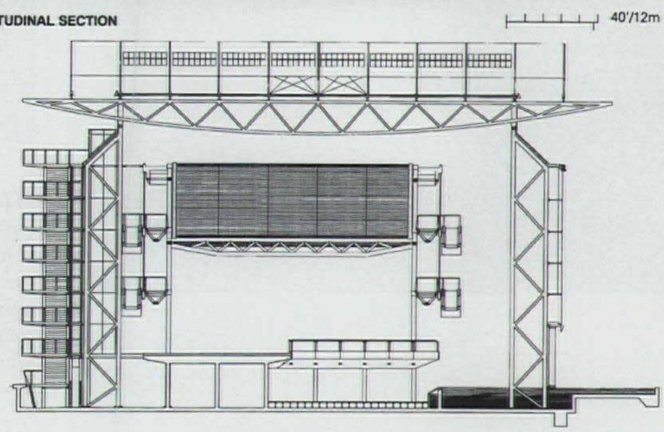
United Kingdom Pavilion

Prominently sited at the head of the Avenue of Europe, the U.K. Pavilion designed by Nicholas Grimshaw & Partners (with engineers Ove Arup & Partners) emphasizes British modernity and technology. The big, squarish enclosure, the winner of a limited design competition, features an array of climate-moderating devices: steel-framed rooftop sunshades that support solar cells; a 200-foot-long by 60-foot-high water cascade (powered by these cells) that forms its east-facing front (12). The end walls are steel-and-canvas constructions based on yacht technology, with sunshading sails at the south end; the back (west) wall is a stack of water-filled freight containers that act as a thermal flywheel. All structural parts were fabricated in Britain and pin connected on the fair site, so they could be dismantled for erection elsewhere.

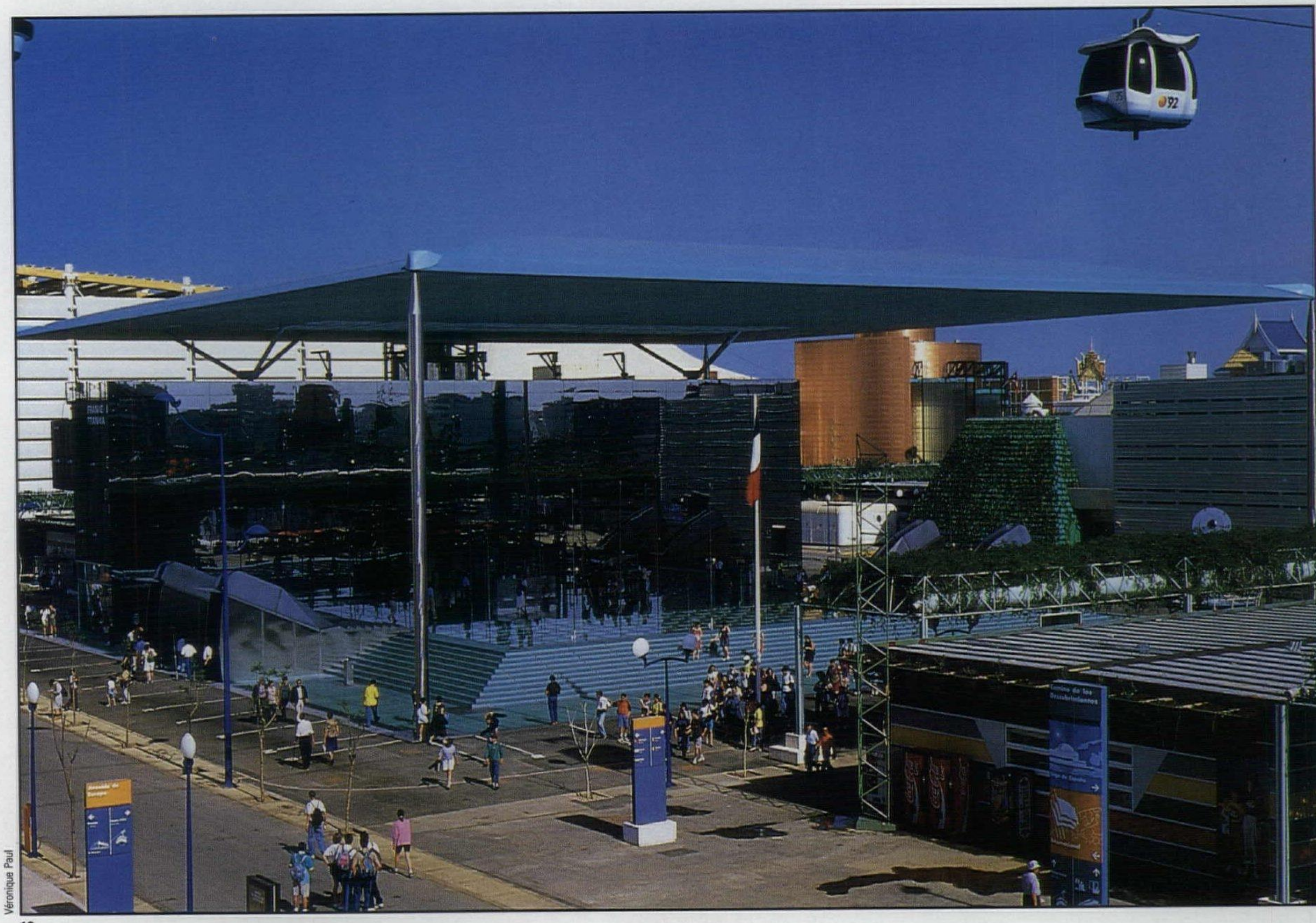
Inside, four stories of platforms stand free of the exterior envelope. Visitors rise by escalators to audio-visual theaters on the third level, then work their way down through various cultural and commercial displays arranged loosely in the loftlike spaces to a poolside bar at the base, where ales and beers are sold.



LONGITUDINAL SECTION 40'/12m



CROSS SECTION 40'/12m



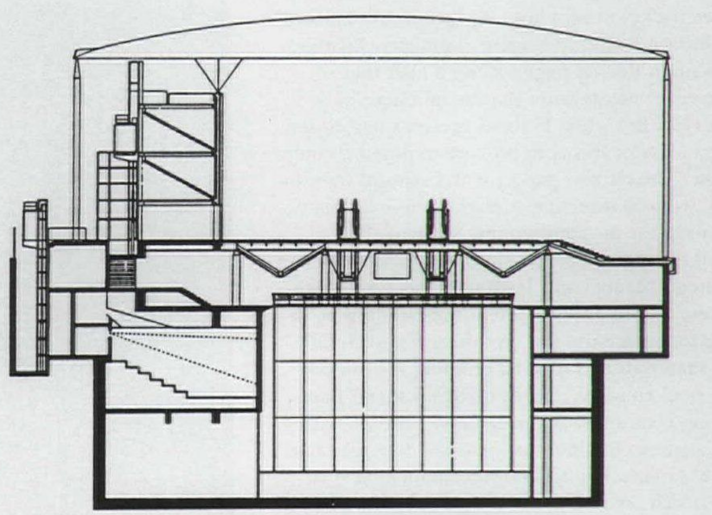
Véronique Paul

13

French Pavilion

Good-natured deception seems to be the theme of France's pavilion, designed by Jean-Paul Viguier/Jean-François Jodry & Associates, with François Seigneur. Its 160-foot-square open plaza is shaded by a canopy that appears paper thin, its humped top visible only from a great distance; mirrors on the stepped plaza and its back wall, along with the sky blue PVC cladding of the canopy, further disrupt perceptions of space and structure. Supporting the steel-framed canopy are needle-like stainless steel columns, 20 inches (50 cm) in diameter, filled with concrete.

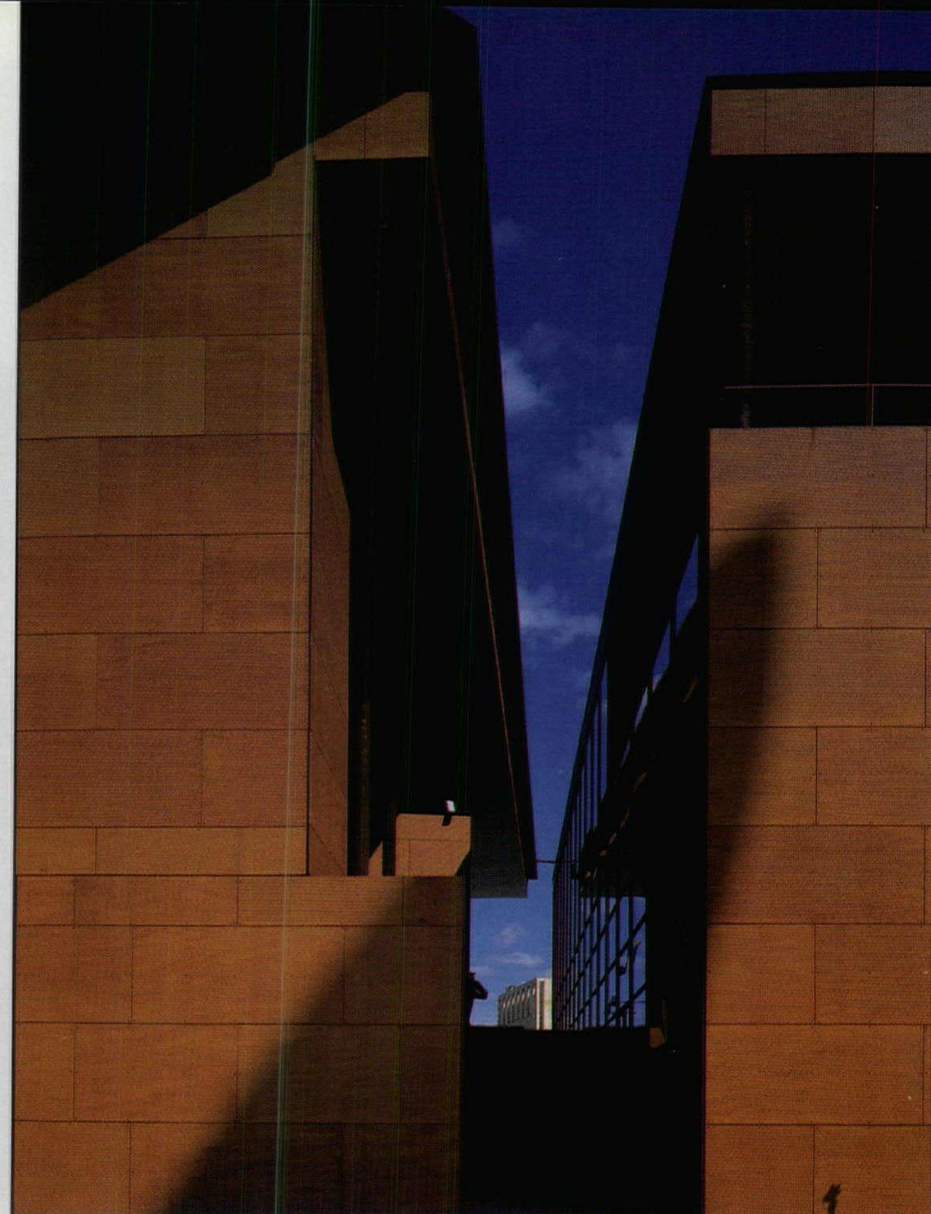
The biggest deception is the 55-foot-deep pit under this plaza, larger in volume than the covered void above. From moving walks that cross this pit just below the plaza (or alternatively from surrounding catwalks) visitors can view IMAX films (shot straight down) on the 5000-square-foot screen at the bottom; subjects include a Seville-Paris flight, artificial satellites, and elementary particles. An array of more conventional displays occupies underground levels and the visually suppressed above-ground structure. A luxury restaurant designed by Andrée Putman – an oasis of pale woods and beige textiles – is hidden underground on an adjoining site.



LONGITUDINAL SECTION

Hisao Suzuki

14



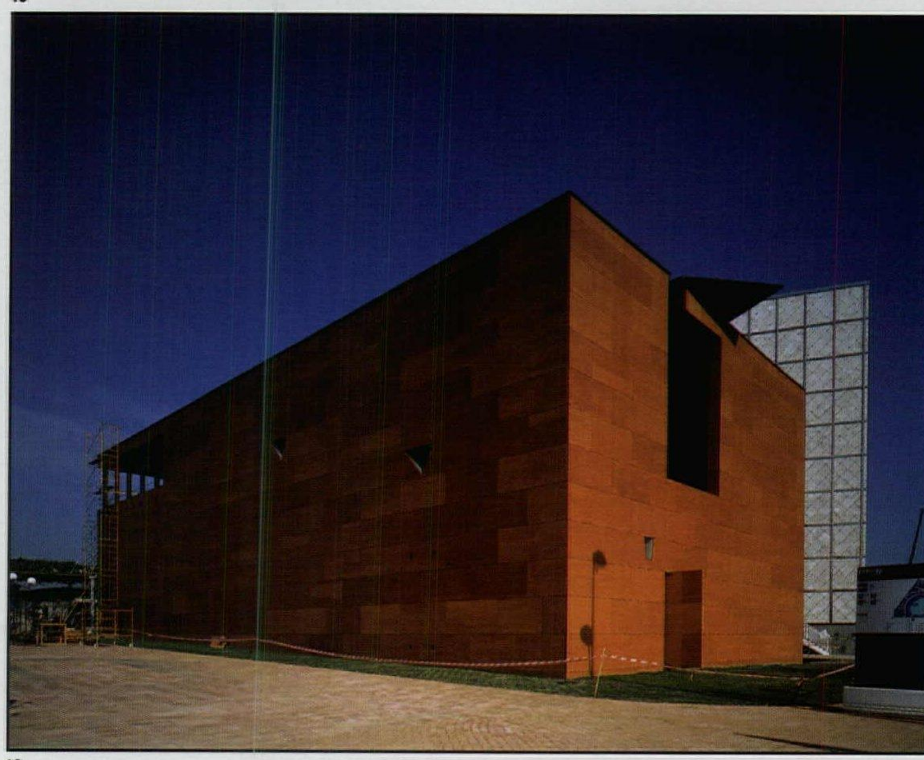
van der Vlugt & Claus

15

Castile La Mancha Pavilion

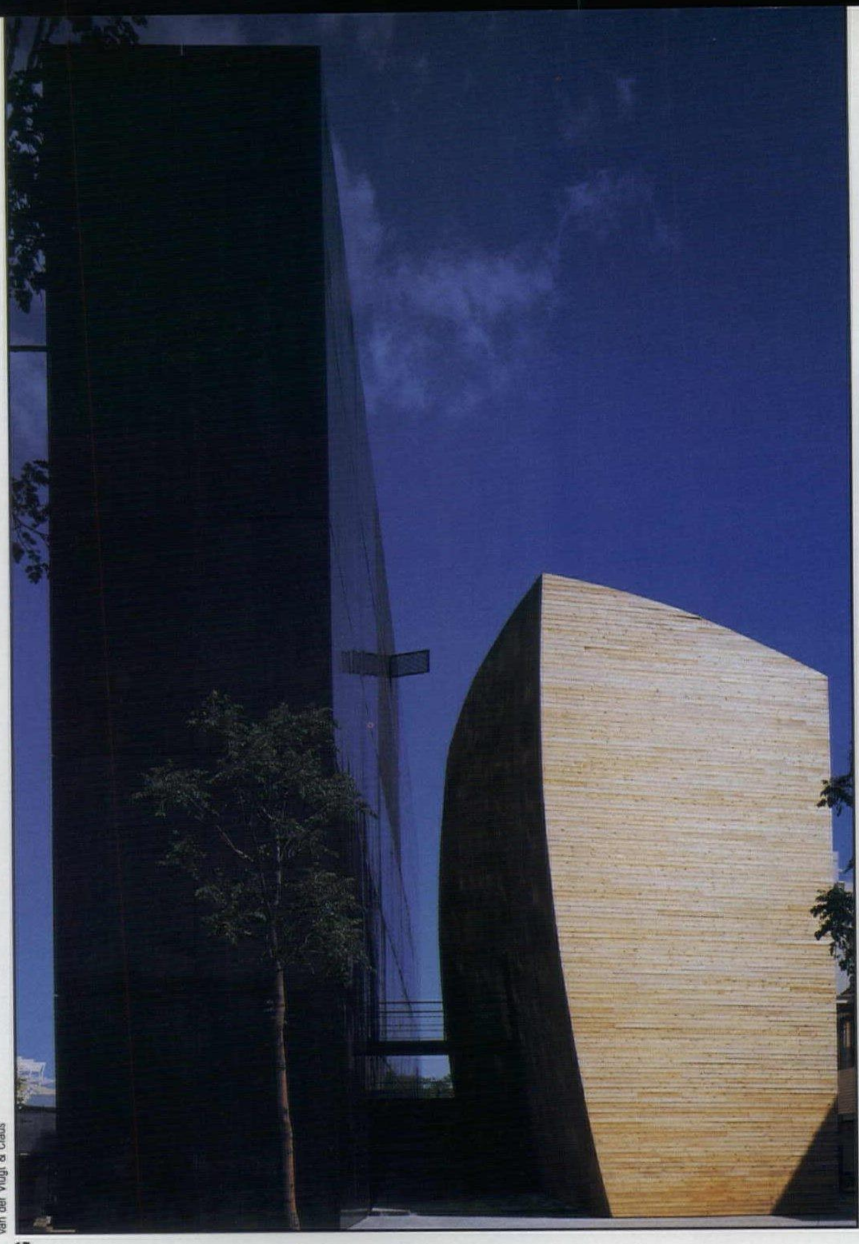
Set within an arc of 18 structures representing the regions of Spain, most of them gesturing wildly for attention (see background, photo 2), the Castile La Mancha Pavilion is a lesson in elegant simplicity. Like the Finnish Pavilion (facing page), it has a cleft that secludes entering visitors from the cacophonous surroundings (15). But while Finland presents two closed forms, the halves of this split box are exposed through glazed walls. The narrow gap provides natural light to both sides, without directing sunlight onto exhibits or overburdening the air-conditioning system.

Selected through a competition, the pavilion design is by architects Manuel and Ignacio de las Casas with Jaime Lorenzo. A requirement that the building be demountable for future use (not yet determined) influenced the materials and details. Framing is of wood, with eight steel columns clad in oxidized sheet. Exterior cladding is of a resin-impregnated plywood with a waffle-like surface. Exhibitions include a fine selection of oils by El Greco. The second-floor lounge (14) is lined with beech boards; a VIP mezzanine above this leads to a loggia, which affords a vantage point for the nightly fireworks over the lake and gives the minimal exterior a gracious, scale-setting relief (16).



Hisao Suzuki

16



van der Vlugt & Claus

17

Reto Halme

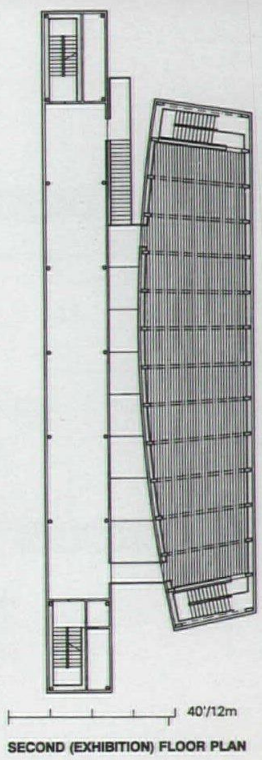
18

Finnish Pavilion

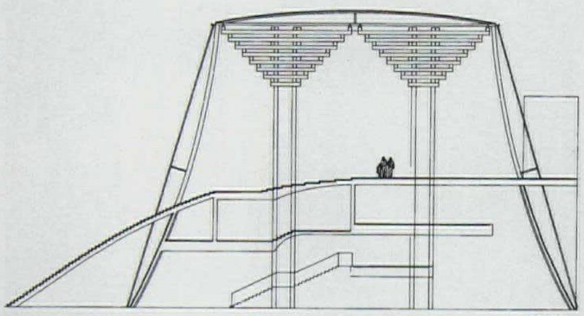
The bold minimal forms of the Finnish pavilion (17) were shaped by a competition-winning team of students, all under 30, who have since started a firm called Arkkitehtuuritoimisto 92. Its two minimal volumes, the steel-sheathed "machine" and the pine-clad "keel" represent the dualities of modernity and tradition or "high-level industrial development and care for the environment." The entry passage between them, 50′ high and narrowing to only 7′ wide, was inspired by a rugged gorge in central Finland.

Directed to the second floor by the ramp rising gradually through this passage, visitors enter a display sequence designed by the noted architect-curator Juhani Pallasmaa. In the "keel" (18) are commissioned artworks (sculpture by Kain Tapper, foreground, and kinetic work by Esa Laurema, far wall) among niches showing Finnish design; in the "machine" a 100-foot-long, 120-projector slide show on the seasons takes place above showcases for sponsoring industries. A suite at the top of the "machine" offers VIPs a panorama of the fair. Visitors exit through a first-floor shop selling the nation's products – a fixture of all national pavilions here.

CONCEPT SKETCH BY ARCHITECTS



SECOND (EXHIBITION) FLOOR PLAN

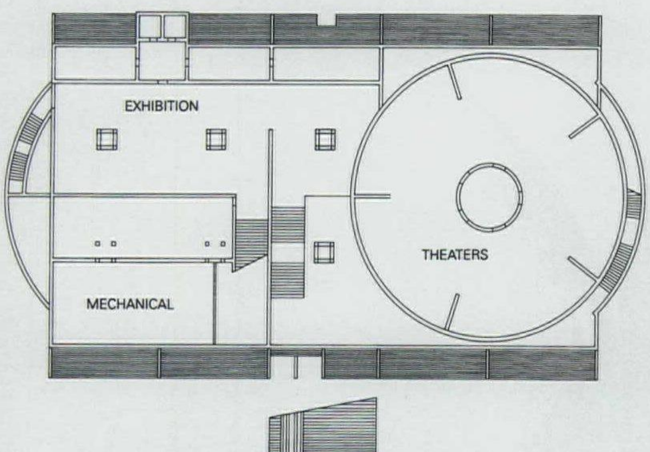


CROSS SECTION

40'/12m

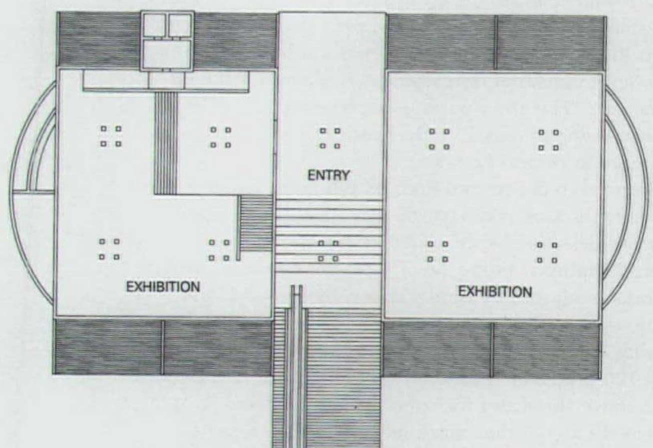
19

Photos: Mitsuo Matsuoka

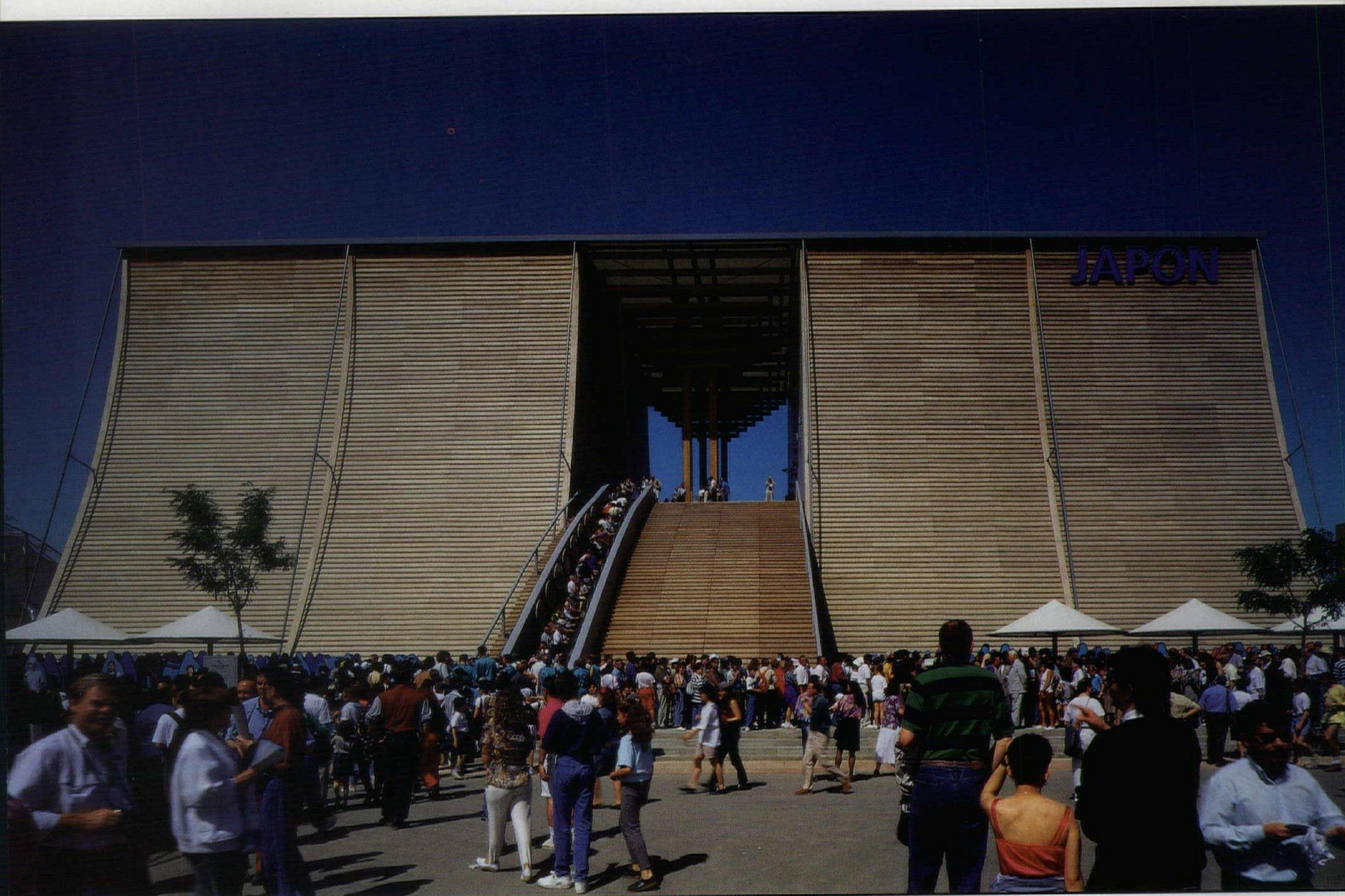


SECOND FLOOR PLAN

N 40'/12m



FOURTH FLOOR PLAN



20

Japanese Pavilion

The most powerful architectural statement at Expo '92, the Japanese Pavilion by Tadao Ando Architects & Associates boldly terminates the fair's Fifth Avenue axis (20). In a distinctly Japanese way, its 200-foot-long form is serene though imposing, its materials – bare wood and painted steel – unassuming yet elegant. At its central bay, mute enclosure gives way to a display of historical devices unprecedented in Ando's work: a stair that is an enlarged variation of the traditional curved garden bridge and, above it, a set of bracketed timber structural supports. Exposed only here but repeated in every bay, these wood piers are a virtuoso application of a material Ando has not previously used for structure. (Repeated press reports that this is the world's largest wood structure are baffling; it is not all wood and is greatly exceeded in size by the wooden Todaiji Temple, Nara, Japan.)

Right at the entry stair, however, we see an evident conflict between Ando's eloquent design and the exigencies of the fair. Getting people up into the inviting entrance portico has required an escalator, which slices through the stair's grand curve; ropes keep visitors off the unusually proportioned steps. At the top of the escalator, the design concept reasserts itself; the wood construction can be enjoyed at close range, and the 40-foot elevation of this platfom yields expansive views (including some open country surprisingly close by to the west), with foreground distractions below eye level.

As one enters the exhibition spaces, more conflicts become apparent. Inside, the structure is not organized into the two balanced halls suggested by the outer form, but contains a complex sequence of spaces on many levels to fit current exhibition practices. In the upper galleries that one visits first (19), the bracketed timber piers and outer wall materials are visible, but the exhibition designers have undermined their integrity with all manner of screens and enclosures. A replica of a rather gaudy historic palace contrasts ironically with Ando's present-day restraint. Down below, exhibits include an ingenious five-segment circular theater (second floor plan). (A curved projection in the concrete end wall to accommodate the theater is mirrored at the opposite end of the structure.)

Out in front of the pavilion, peopling what would otherwise be a severe stone plinth, are cutout figures representing Japanese from all walks of life. Front and center in this crowd – as if to compensate for this assault on the structure's dignity – is a full-size image of Tadao Ando himself (21).

21

Perspectives

Disney's brand of architectural patronage has been implanted in Europe, but the question remains: Can themed architecture be really good?

Disney Over There

No question: France was complete without Euro Disney. Yet once Disney decided to enter Europe, the French government lent extraordinary help with land assembly, public transportation, and other inducements to bring them to Marne-la-Vallée, 20 miles east of Paris. And now that the new Disney entertainment mecca is complete, it has been condemned by French intellectual leaders as American "imperialism" or even as a "cultural Chernobyl." The French love-hate relationship with American pop culture will continue, as a projected six million visitors per year tramp through, but Euro Disney can now be assessed – at least tentatively – in terms of architecture.

In concept, Euro Disney is meant to duplicate – for visitors from all over Europe – the public appeal of Disney World in Orlando. In fact, it is a "new, improved" version, with advances in planning. Some of these – notably the accessibility of the whole complex by rail and the Paris *métro* – have to do with its being in Europe; otherwise, its more coherent, less car-dependent layout seems derived simply from the chance to develop the whole thing over again from scratch – with the early participation of the architects in whom Disney chairman Michael Eisner has confidence. (See P/A, Oct. 1990, pp. 78–95.)

One of the most striking illustrations of European physical concentration, vs. Florida dispersion, is the placement of the top-of-the-line Disneyland Hotel literally astride the gates to the Magic Kingdom. By making the hotel a turreted Queen Anne extravaganza, the designers have effectively given an exterior face to Main Street, a strong image as one approaches the entrance (where the silhouette of Sleeping Beauty's Castle begins to be swamped by foreground elements). Designed by Walt Disney Imagineering with architects Wimberly, Allison, Tong & Goo, this hotel resembles their Floridian at Orlando, but here the gingerbread is salmon pink – an improbable color, but not too glaring in the French light. Inside, at rates starting around $350 per night, everything is ivory colored and prettily Baroque.

The Magic Kingdom here – the *raison d'être* of it all – differs from the Orlando version mainly in some modest shifts to European fantasy sources (Jules Verne, Lewis Carroll). The central castle (here dubbed "Le Château de la Belle au Bois Dormant," as a kind of linguistic initiation rite for Disney's Americans) has been given a storybook look that makes the Stateside originals look gray and earthbound. Taking cues from Medieval books of hours, the Disney designers have made this castle more attenuated and rosier in color, with more gilded accents; a conscious artificiality affects both the fake rocks and the real trees at its base.

The Festival Disney complex, the only element at Euro Disney not found in Florida, puts some adult restaurants, nightspots, and shops close to the Magic Kingdom gates and on the route to most of the hotels. ("Adult" means in part that its establishments serve alcohol – banned in even the French Magic Kingdom.) With this commission, Frank Gehry got the only opportunity at Euro Disney to do architecture unconstrained by a literal theme. Even here, there is an overall aura of the American commercial strip, but that developed largely out of the functional program; a central midway leads between Gehryish building forms that angle in to form a pleasantly ragged edge, with some porticoed stretches for inclement weather. Big illuminated signs – on buildings or freestanding – are not by the architect but fit in very well. Gehry's great success here is in the canopy of night lights and the stainless-clad pylons that support it; the simple grid of starlike lights and their shimmering supports lend Festival Disney a non-derivative enchantment.

Beyond Festival Disney, along the edges of artificial Lac Buena Vista and the "Rio Grande" that feeds it, are the other five Euro Disney hotels, with the bulk of the development's 5200 guest rooms. A decision to give all five American regional themes has turned out to be, on the whole, too limiting.

At the Orlando Disney World, Michael Graves seized the chance to design un-themed hotels; his Swan and Dolphin Hotels there stand out, in my view, for their invention of a new, exuberant resort imagery; his hotel here at Euro Disney struggles against its theme – New York. Suggesting the Manhattan skyline within imposed height limits (which keep the hotels from intruding on Magic Kingdom vistas) would be difficult at best, but it surely cannot be done by striping the building masses in Graves's characteristic Pompeian colors; bracketed projections and cylindrical volumes, virtually unseen in New York, don't help. Inside, a few artifacts do recall New York, but there is too much reliance on the red apple symbol, which always suggests to me some bucolic Hudson Valley spot. Outside, Euro Disney's only skating rink faintly recalls the one at Rockefeller Center, without the drama of the original's terraced, confined setting.

Facing this hotel down the length of the lake is another hotel with an identifiable silhouette – Robert A.M. Stern's Newport Bay Club. (Newport Bay's silhouette is also prominently visible from the approach road to Euro Disney.) As in his hotels with a New England resort theme in Orlando, Stern has captured the authentic formal qualities and details of the originals that inspire him. Among the interior features are a good Neo-Georgian grand stair and some nice lattice panels recalling Stanford White's Newport Casino. Outside, dormers and cupolas give too little animation to the vast 1098-room structure, which stretches some 900 feet. Stern would argue, accurately, that there were turn-of-century New England resorts built at this scale, but it is nevertheless daunting. Besides, the rather puritanical envelopes of those hotels were meant to complement some choice mountain or seacoast settings, and do not transfer well to the flatlands of France – or Florida.

Also on the lake is the only project entrusted (so far) to a European architect. Antoine Grumbach of Paris reports that his Sequoia Lodge had its genesis in a landscape scheme, on an American National Park theme, that he presented to Disney management. Maintaining some forest qualities, Grumbach has inserted 1011 hotel rooms in structures that mingle the rustic qualities of National Park hotels with forms and details from Frank Lloyd Wright's Prairie School period. The main lobby here has a fine colossally scaled stone fireplace and effective evergreen-filtered light spilling through clerestories; checkers and backgammon tables, along with old-fashioned letter-writing desks, evoke park resorts. But, like Stern's hotel, this one seems to stretch much too far, even though a few hundred rooms have been split off into two-story (rather barracks-like) structures embedded in the mini-forest.

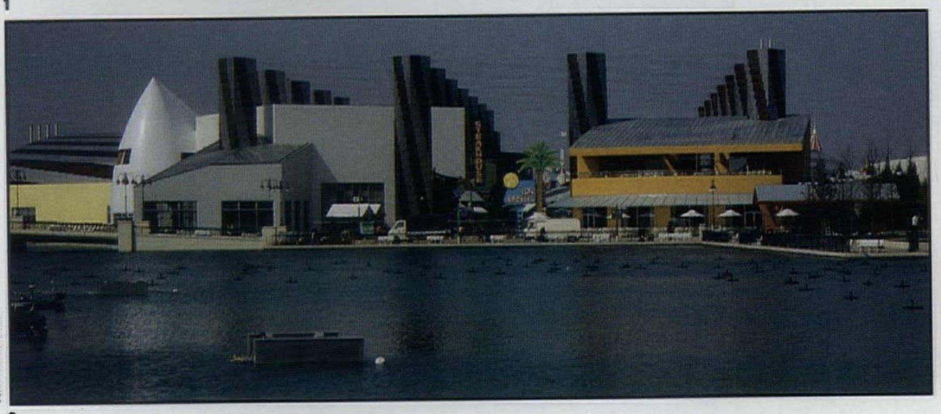
The architectural theming comes off more successfully in the two smaller-scaled hotels at the far edge of the development, Stern's Cheyenne and Antoine Predock's Santa Fe. Based on repetitive, motel-like two-story structures, these hotels will accommodate a family of four in a $100-a-night room (located a kilometer

All photo courtesy Euro Disney, except as noted

1

John Morris Dixon

2

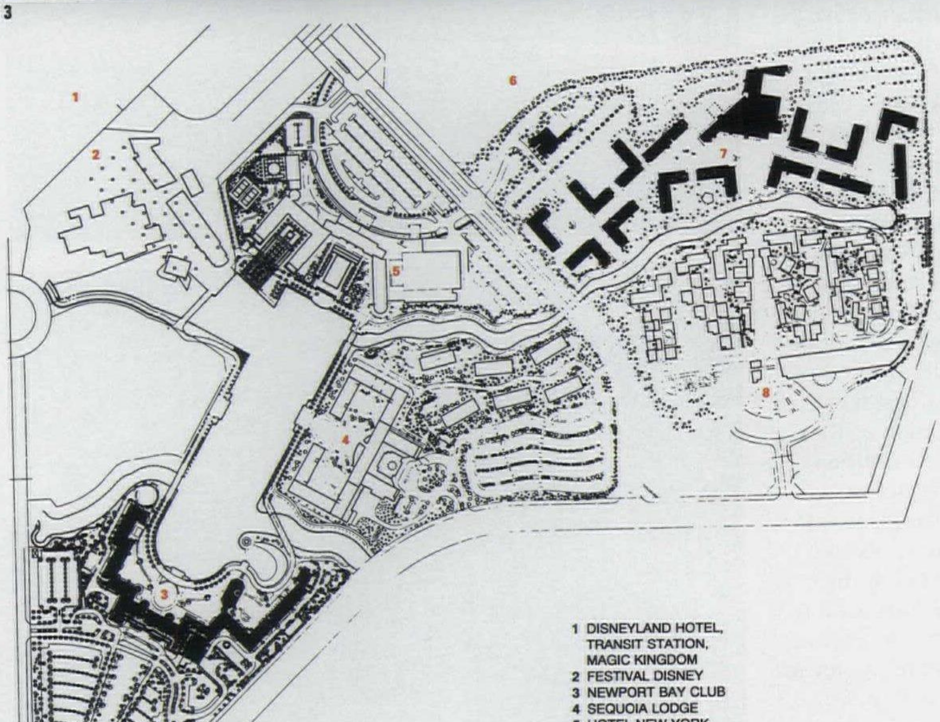


John Morris Dixon

3

4

Untrammeled by a literal theme, Frank O. Gehry Associates produced Festival Disney (1, 2), an adult-oriented entertainment midway where twisting stainless steel columns support a cable grid that becomes a twinkling canopy by night. Less realistic than the U.S. original, the Magic Kingdom's central castle (3) wisely adopts the imagery of Medieval art in a country dotted with real chateaus. A new device at Euro Disney is the placement of a luxury hotel, the Disneyland (4), above the Magic Kingdom's entrance; designed by Walt Disney Imagineering with architects Wimberly Allison Tong & Goo, it serves as a gateway symbol, visible straight ahead as one approaches from the autoroute.



1 DISNEYLAND HOTEL, TRANSIT STATION, MAGIC KINGDOM
2 FESTIVAL DISNEY
3 NEWPORT BAY CLUB
4 SEQUOIA LODGE
5 HOTEL NEW YORK
6 VISITORS' PARKING
7 HOTEL CHEYENNE
8 HOTEL SANTA FE

SITE PLAN – EURO DISNEY RESORT HOTELS

"Disney's executives may be dedicated patrons of design, but only when they loosen the thematic reins do they get good architecture."

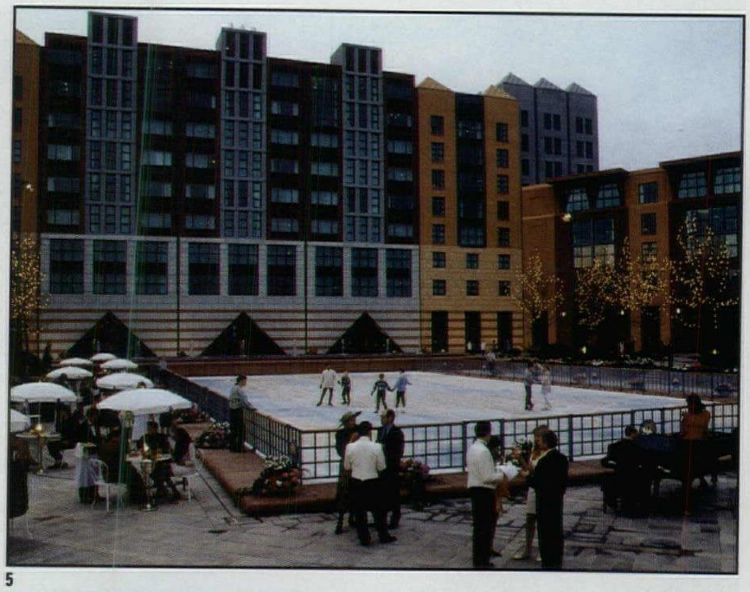
plus from the Magic Kingdom, but still a manageable walk). The Cheyenne is a rather uncomplicated evocation of a Western movie town, with bold signs on its vertical-boarded walls; pedestrian streets of packed earth bend, as backlot streets did, to block out unwanted views. Boardwalks with timber-framed canopies deal with rain, as they might have done in Wyoming. (A functional innovation here is the replacement of Disney's relentless two-double-beds-per-room formula – which crowds low-end rooms – with one double bed plus a two-tiered bunk for the little gamins.)

Far less straightforward is Antoine Predock's essay on Southwestern themes, a design that would defy the nostalgic design guidelines of its namesake, Santa Fe. Predock mixes some of the imagery of the historic pueblos (additive cubes with adobe-like surfaces) with 20th-Century roadside commerce. The entrance to the complex mimics a drive-in, with arcs of parking sloping down toward a screen-sized image featuring Clint Eastwood; the guest room buildings include wide picture windows punched through their pueblo forms, in the manner of a 1940s Albuquerque motel; little patios along the graveled walks display artifacts such as rusting vintage cars and a saguaro cactus in a climate-moderating glass cage. A playground takes the form of an abstract Anasazi ruin – somber, but intriguing to climb around on. Predock invokes his characterisic off-beat metaphors, giving his axial walkways such labels as "Trail of Legends," complete with artificial smoking volcano, and "Trail of Infinite Space," featuring a central yellow stripe on blacktop. While some of us enjoy Predock's complex imagery here, other observers liken his repetitive boxy structures to "the worst French public housing."

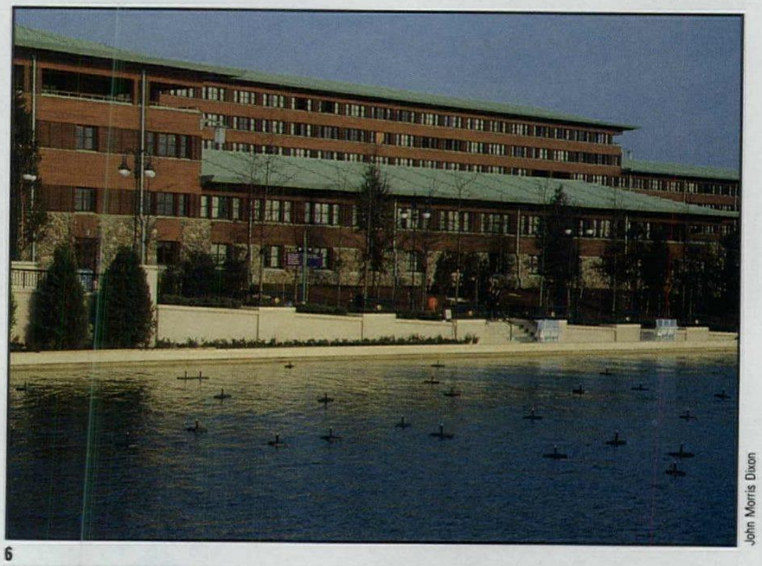
At all of these hotels, the theming extends beyond the décor to the food and even to the greetings extended by the cheerful pan-European staffs. The Santa Fe's dining rooms, for instance, are redolent of chili, the personnel ready with "buenas días" and "adiós." At the Cheyenne, it's barbecue and "howdy" (more typically "Audi"). The Sequoia serves choice meats on skewers, the Newport Bay features seafood and cranberries, the New York, delicatessen specialties.

Disney envisions more construction, of course, on its 4500 French acres. Soon to be completed is a golf club by Gwathmey Siegel Associates, who designed a similar clubhouse at Orlando. Arquitectonica is working on a 2500-room budget hostelry, lower in price than the Cheyenne or Santa Fe. Also in the offing are a Disney/MGM studio, a European corporate headquarters, and another convention center (the New York Hotel includes one).

Can themed architecture be good architecture? At best it can be no more than well executed themed architecture, akin to theater or movie settings. The design of fantasy settings is itself an art, and Disney Imagineering (with their hotel collaborators, Wimberly Allison Tong & Goo) are masters at it. Stern plays with themes in all his work, and in the Cheyenne Hotel he rivals the Imagineers. Antoine Predock goes a step beyond, bringing the qualities of avant-garde theater to the task, with some (arguable) success. But Gehry has done the best architecture here, unencumbered by literal theming, just as Graves and Isozaki gave Disney its best buildings – unthemed – in Orlando (P/A, Oct. 1990, p. 82, and April 1991, p. 70). Disney's executives may be dedicated patrons of design, but only when they loosen the thematic reins do they get good architecture. **John Morris Dixon** ■

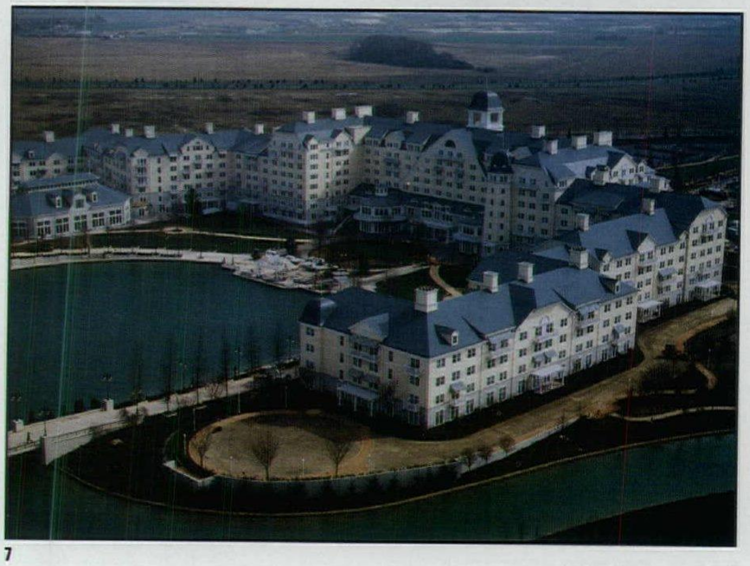


5



6

John Morris Dixon



7

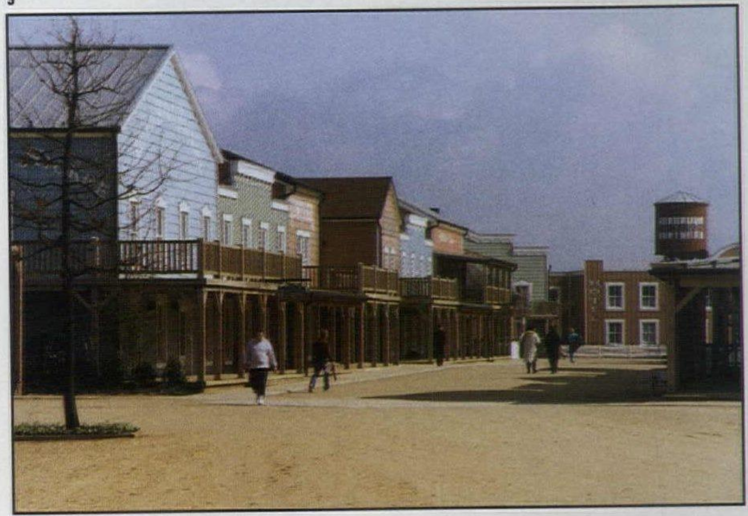
8

9

John Morris Dixon

10

Surrounding the lake at the center of Euro Disney's hotel zone (12) are the Hotel New York (5) by Michael Graves, the Sequoia Lodge (6) by Antoine Grumbach, and the Newport Bay Club (7) by Robert A.M. Stern. At the longest walk from Magic Kingdom (at left in aerial view) are the two low-rise, low-budget hotels (right in aerial). Antoine Predock's Hotel Santa Fe (8) recalls a drive-in movie (9), the pueblo-themed condos, and other artifacts of the 20th-Century Southwest; a saguaro cactus survives in a glass container (10). Stern's second Euro Disney hotel, the Cheyenne (11), is a cheerfully colored evocation of a Western movie set.

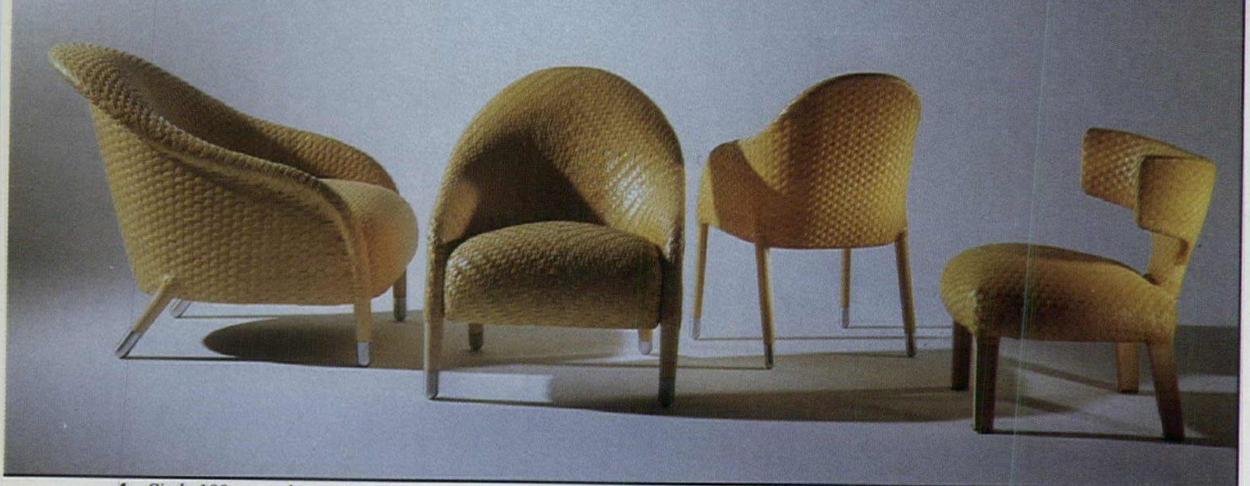


11

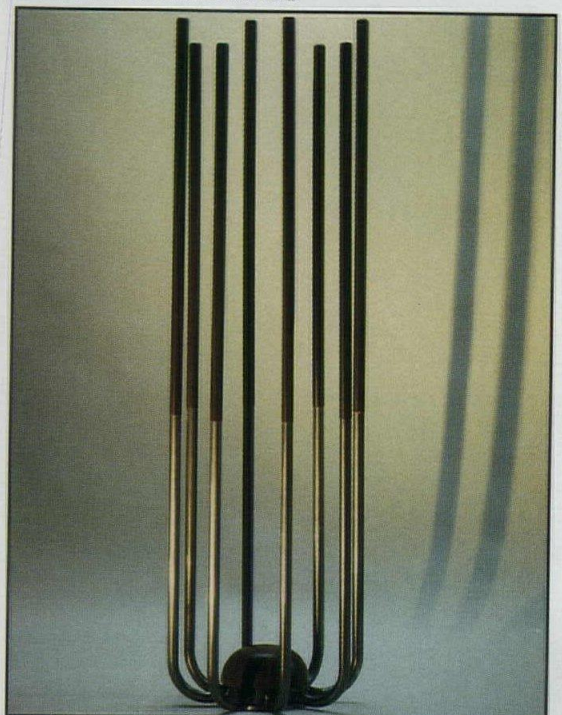
12

New Products and Literature

Milan's furniture fair makes a case for the rear guard.

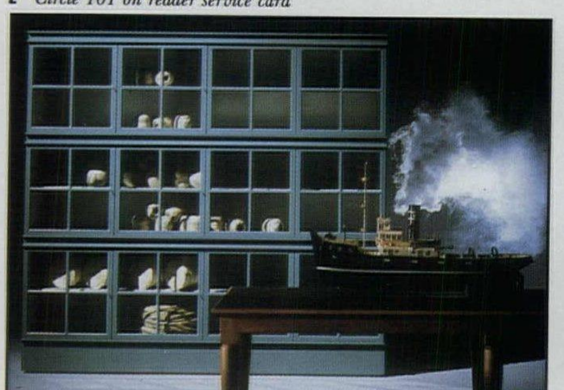


1 *Circle 100 on reader service card*

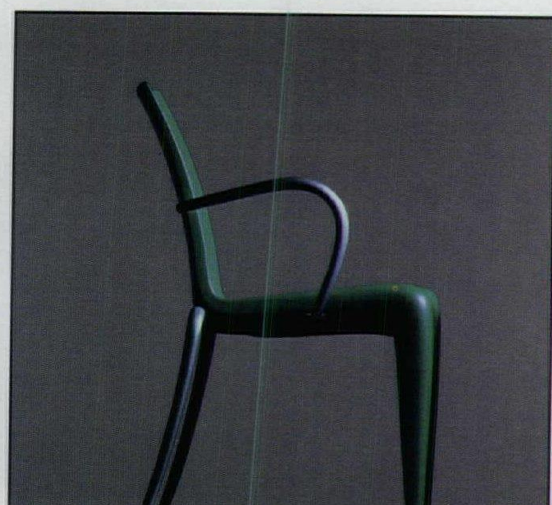


2 *Circle 101 on reader service card*

3 *Circle 102 on reader service card*



4 *Circle 103 on reader service card*



5 *Circle 104 on reader service card*

Hans Hansen

Compagnia delle Filippine rattan seating by Antonio Citterio (1), Pierino coat tree by Maurizio Peregalli (2), Carlo Mollino's wing chair (3), Piroscafo bookcase by Aldo Rossi and Luca Meda (4), Louis 20 chair by Philippe Starck (5).

Report from Milan

Moaning about the dearth of inventive new furniture was the "in" thing among habitués of the Salone del Mobile held in Milan in April. The complaints were valid to the extent that one valued newness: there was no shortage of good *old* news on display. In fact, a certain nostalgia prevailed, evident in reissues of modern classics – like Zanotta's resurrection of Carlo Mollino's wing chair – and at least a score of wicker introductions.

Best of show by far were Antonio Citterio's sumptuous rattan chairs for B&B Italia, under the label Compagnia delle Filippine. Made by hand in the Philippines, the seating is an enviable blend of modernity and tradition.

Striking a similar balance, the "Piroscafo" bookcase by Aldo Rossi and Luca Meda for Molteni & C is detailed like a building façade in miniature. Its refined metal features transcend the medium's often mute utilitarian mien.

The prize for lighthanded originality goes to Maurizio Peregalli's "Pierino" coat tree for Zeus. Made of epoxy painted steel tubes, its innovation springs naturally from the properties of its material and form.

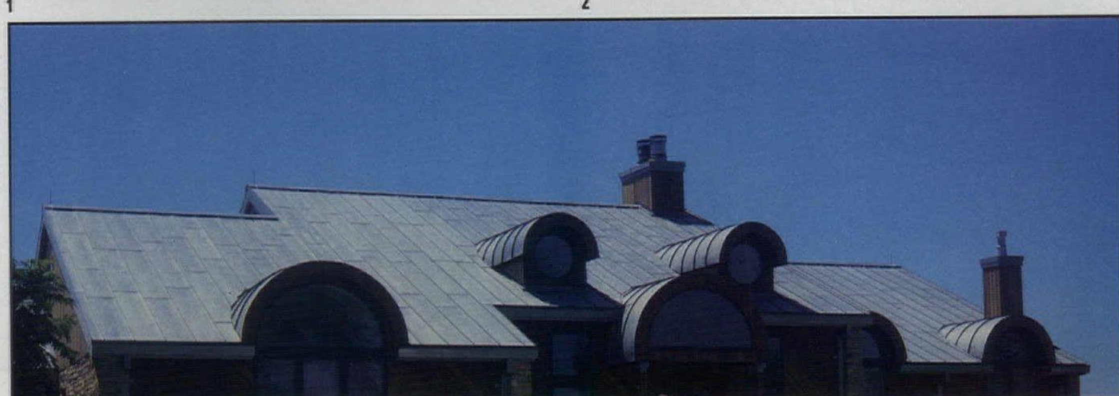
Philippe Starck's "Louis 20" stacker for Vitra is likewise ingenious. Made of only two pieces—a blasted polypropylene seat and aluminum tube hind legs—it achieves what so many pieces have set out – and have failed – to do: it truly integrates an industrial aesthetic with the exigencies of mass manufacture. **Ziva Freiman** ■

Technics-Related Products

The products and literature on this page complement the Technics article on preformed metal roofing (p. 33).

1

2



3

Preformed Metal Roofing

1 Roofing, Wall Panels
The "TL-22SSR" panel is a new concealed fastener standing seam structural roofing panel designed for installation over purlins. Panels are 8 to 24 inches wide, 1½ to 4 inches high, and 6 to 32 feet long. A ribless version, with stiffening beads at the pan bottom, is also available. N.A.T. Industries.
Circle 105 on reader service card

2 Custom Batten Roofing
The metal Batten Roofing system is installed via a mechanical interlocking system. Custom aluminum, copper, and stainless steel roofs and accessories can be produced for domed, barrel-vaulted, and pitched roofs. Overly.
Circle 106 on reader service card

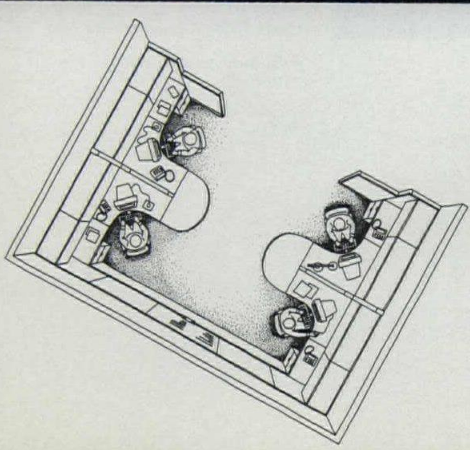
3 Natural Gray Patina
"Microzinc" is an architectural sheet metal for sloped roofing systems, fascia, and other accessories and is manufactured from a zinc-copper-titanium alloy. A gray patina forms within 6 to 18 months after installation; the patina is self-healing and will not "bleed" onto adjacent materials. Batten and standing seam systems are available. Hickman.
Circle 107 on reader service card

(continued on page 106)

FOOTPRINT TILES AND TRAXX, ATTACHED TO FIXED WALLS, ELIMINATE THE NEED FOR CETRA SYSTEM PANELS.

FOOTPRINT COMPONENTS ARE MODULAR, COMPLEMENTING CETRA'S OPEN PLAN VERSATILITY.

CETRA SYSTEM PANELS EASILY ATTACH TO TRAXX AT ANY POINT.



CETRA COMPONENTS INTEGRATE WITH FOOTPRINT.

BUILDING POWER AND COMMUNICATIONS ARE DIRECTLY ACCESSIBLE.

FOOTPRINT™ AND CETRA®. THEY INTERFACE. PERFECTLY.

FOOTPRINT TRAXX ATTACH TO EXISTING STUD WALLS, SUPPORTING TILES AND COMPONENTS.

COMPONENTS CAN BE PLACED ANYWHERE ALONG TRAXX.

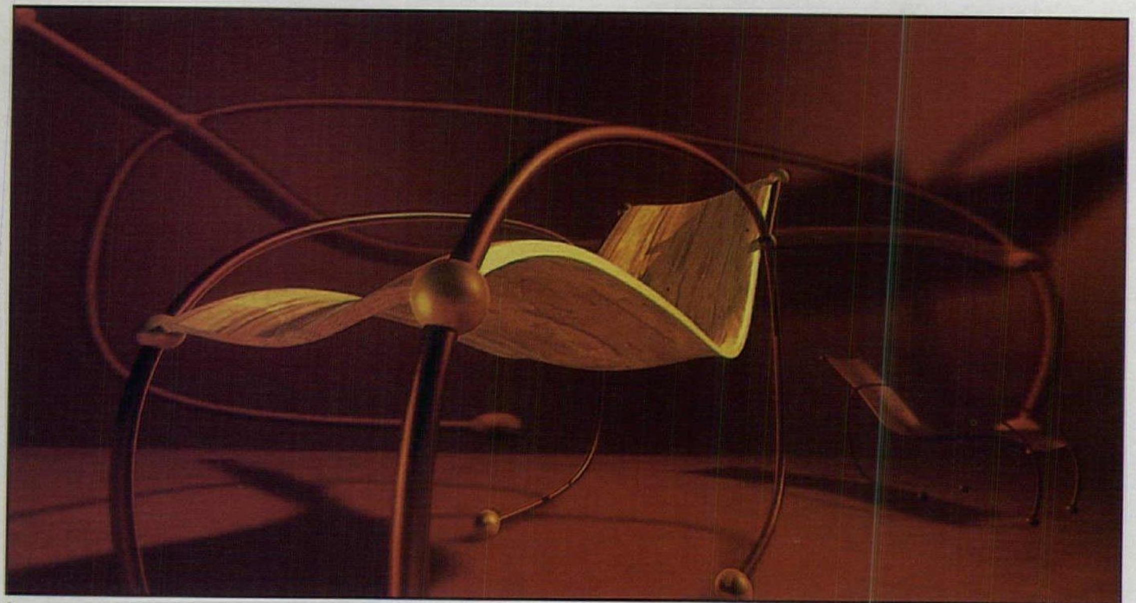
FOOTPRINT — AS INDIVIDUAL AS YOUR OWN!

KIMBALL®

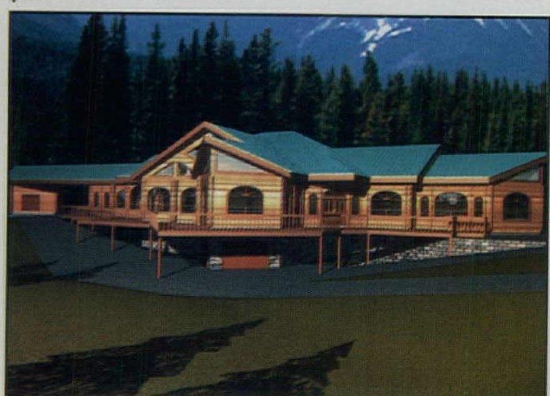
Kimball Office Furniture Co.
A Division of Kimball International Marketing, Inc.
Jasper, Indiana 47549
1.800.482.1616 Canada 1.800.635.5812

Computer Products

Items in this section complement the Practice article (page 55) by **Curtis B. Charles** and **Karen M. Brown** of Karisse Designers on presentation software for designers.



1



2

3

Graphic Design Tools

1 Computer Sketching
Alias Sketch! for the Macintosh allows a user to experiment with free-form curves, realistic textures, lighting sources, and colors. Users can manipulate 3D models to create multiple views. The software can also refine models created in other packages. Alias.
Circle 109 on reader service card

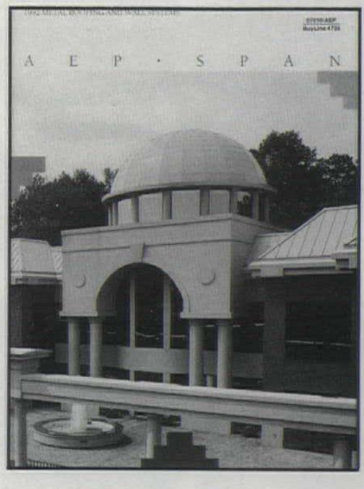
2 Image Editing
A computer-generated model can be combined with a scanned photograph of the site to create a finished presentation rendering. Software allows the designer to enhance and retouch both the original photograph and the model and to create color separations on the desktop. Two applications for image editing are Adobe's Photoshop and Letraset's Color Studio. Adobe.
Circle 110 on reader service card
Letraset.
Circle 111 on reader service card

3 Rendering
Models created in most 3D modeling packages can be imported into Renderman or MacRenderman as a Renderman Interface Bytestream (RIB) file to create a rendered image. "Shaders," such as those provided by the Valis Group (see next page) can be applied to create custom finishes. The software contains basic modeling and animation tools as well. A choice of export formats (PICT, TIFF, or EPS) allows a designer to use the finished rendered images with page layout software. Pixar.
Circle 112 on reader service card
(continued on page 106)

(continued from page 101)

Preformed Metal Roofing

Aluminum Roofing Literature
This 32-page brochure covers the complete line of metal roofing products. "PAC-CLAD" standing seam, flush, wall, and soffit panels of galvanized steel or aluminum are coated with PAC-CLAD Kynar 500® on top and an acrylic washcoat underneath; 23 colors are available. Petersen Aluminum.
Circle 200 on reader service card

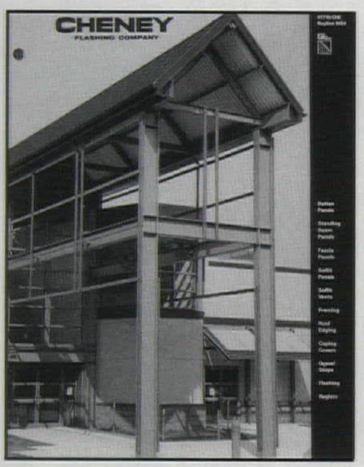


Roofing Brochure
This 28-page brochure includes photographs and drawings of Snap-Seam®, standing seam, batten seam, and curved roofing systems. Ten profiles are available in a variety of widths. AEP-Span.
Circle 201 on reader service card

Terne Roofing Brochure
"Terne Coated Stainless Steel" and "Terne" roofing metals are photographed in commercial, industrial, government, institutional, and restoration projects in this brochure. TCS does not require painting or any other type of maintenance. Terne, copper-bearing carbon steel coated with an alloy of tin and lead, will require repainting every 8 to 10 years. Follansbee.
Circle 202 on reader service card

Brochure and Design Guide
"Zip-Rib"® structural standing seam metal roofing – mechanically sealed, with a concealed anchor system – is illustrated and detailed in two complementary publications, a full-color brochure of recent applications and "Zip-Rib"® roofing and siding design guide. Merchant & Evans.
Circle 203 on reader service card

Panels, Standing Seam Brochure
Metal roof, wall, and fascia systems for industrial, commercial, educational, correctional, and residential applications are described in this new brochure. The "VersaLok™ SSR" system is, for example, available with both the "AP Series Architectural Panel" and the "Commercial Standing Seam Roof System." ECI Building Components.
Circle 204 on reader service card



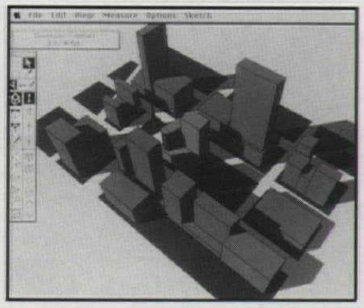
Flashing Brochure
Drawings and guide specifications on batten, standing seam, fascia, and soffit panels, framing, roof edging, coping covers, gravel stops, flashing, and reglets are in this brochure. Cheney Flashing
Circle 205 on reader service card

Flashing System
The Bilclip™ flashing system, now standard on all of the company's roof scuttles and fire vents, is designed with clips at six-inch increments on the integral cap flashing. Each 'Bilclip' is bent inward to hold the single ply roofing membrane in place. Bilco®.
Circle 108 on reader service card

(continued from page 104)

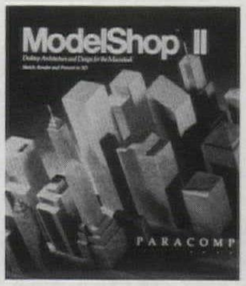
Macintosh Graphic Design Software

Texture Library
A three-volume catalogue of "shaders," or design elements, is offered to use with Renderman. The Valis Group.
Circle 113 on reader service card

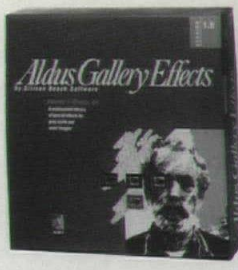


Design Tool
Upfront allows the designer to manipulate ideas in 3D. A sunlight simulator can position the sun at any time, day, and location on earth. A photograph of a proposed site can be imported into the program. Alias.
Circle 114 on reader service card

Present Professional
This is a 3D modeling tool with conceptual rendering capabilities using several different tools: "Digital Clay," which allows the designer to push and pull on handles to reshape elements; the program also adds depth to 2D images. Visual Information Development.
Circle 115 on reader service card



Model Shop II
Model Shop is an entry level modeling package that offers unlimited layers, Bezier curves, text capabilities, accurate measurements, rendering, and an unlimited number of light sources, including sunlight simulation capability. Paracomp.
Circle 116 on reader service card



Gallery Effects
This is an artistic design application that features 16 different effects to simulate "classic" art techniques including: charcoal, graphic pen, chrome, craquelure, emboss, fresco, and watercolor. Aldus.
Circle 117 on reader service card

Photoshop
A photograph imported into this application form can be edited electronically to show a computer-generated design in its context. Adobe.
Circle 118 on reader service card

MacroMind Three D
Allows the user to animate 3D renderings imported from other applications using DXF format files. An unlimited number of architectural elements and lights can be coordinated into an animation sequence. Macromind.
Circle 119 on reader service card

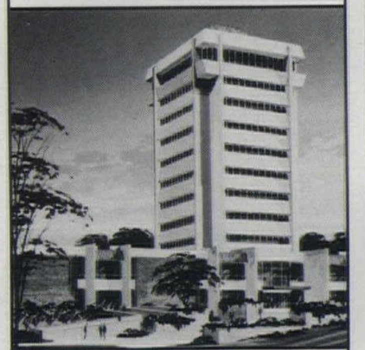
Powerpoint
A presentation tool allows a user to produce presentation graphics and slides with imported images and text. Microsoft.
Circle 120 on reader service card

P/A Classified

VIDEO TRAINING

SCHOOL OF PROFESSIONAL ART

ARCHITECTURAL RENDERINGS



• Home Study Course/Critiques

Send $5.00 U.S. for full color brochure and all information for the school's offerings. **School of Professional Art**, 200 Ocean Trail Way #106, Jupiter, FL 33477 (407) 744-8181.

FOR SALE

Simple technique extends, even doubles, the useful life of your technical pen points. SASE (#10). $10 check to Jay Seavey, AIA, 729 Chestnut Street, Manchester, NH 03104.

Don't Wait . . .
FAX YOUR ORDER NOW!

To reserve space, FAX your order to Penton Classifieds,

FAX: (216) 696-1267

REAL ESTATE

Extremely rare offering of one of the original sea ranch condominiums designed by Moore Lyndon Turnbull and Whitaker 1963-1965. Winner of recent A.I.A. 25 year award of excellence and one of the most significant and influential projects of this century. 29 foot high volume, lofted sleeping area, breathtaking whitewater views, in excellent condition. A truly unique opportunity for full time living or as second home and/or part time rental potential. Asking $320,000. Call for information and photos. 619-542-1192. Fax: 619-234-8925. Al Forster, owner.

Situations Open
Proposals Invited
Educational Opportunities
Services . . .

You can reach more qualified professionals in P/A Classifieds.

For more information, call Lynne McLaughlin

(216) 696-7000.

SITUATIONS OPEN

MANAGER OF DESIGN SERVICES

The Design Services department at the University of Missouri - Columbia provides A/E services for the construction and renovation of campus facilities. This is a position of high visibility which requires a results-oriented leader and an effective communicator, who will manage a staff of 15 FTE. Qualifications include a bachelor's degree in architecture, seven years of experience, and professional registration in Missouri. To apply, submit a letter of interest, resume and salary history to:

Mr. Donald J. Guckert
Director of Planning, Design & Construction
University of Missouri - Columbia
General Services Building, Annex B
Columbia, MO 65211

The University of Missouri is an Affirmative Action/Equal Opportunity Employer

Andrews University is seeking applicants for a full-time, nine-month **Visiting Professor** position to begin September 25, 1992 through June 5, 1993, teaching undergraduate design studios and theory/urban electives. Minimum qualifications is a M. Arch. Applicants should have design recognition from the profession, demonstrated experience in teaching design studio. Application must be made by July 31, 1992. For information contact: Stanley M. Bell, Assoc. Dean, Architecture Department, Andrews University, Berrien Springs, MI 49104 (616) 471-3309.

BUSINESS SERVICES

DISPOSING Of° LOOKING For EQUIPMENT

No Quicker, Better Way Than UEN

"USED EQUIPMENT NETWORK™"
An ON-LINE Computer Service

FREE ACCESS. Thousands of items. Hundreds of Categories.

NO CHARGE for Surplus or Wanted Equipment listings by end-users.

INDUSTRIAL • TELECOMMUNICATIONS
OFFICE • AUDIO VISUAL

UEN is a service of Used Equipment Directory, a monthly Penton publication listing thousands of items by hundreds of dealers in available equipment.

Use your modem now to **dial 201-625-2636** to find needed equipment or to list your wanteds. (or contact directly by fax or mail)

USED EQUIPMENT NETWORK™
P. O. Box 823, Hasbrouck Hts., NJ 07604-0823
201-393-9558 • 800-526-6052
FAX 201-393-9553
"UEN - *A FREE SERVICE for End-Users*"

P/A Consultants Connection

Lighting Design

Design Decisions, Inc.
35 Seacoast Terrace, #19L
Brooklyn, New York 11235

Jeffrey A. Milham, FIALD

718.769.7796
718.769.7868 Fax
212.420.0377

1972 - 1992
20
YEARS OF EXCELLENCE
DESIGN DECISIONS
LIGHTING CONSULTANTS

CIRCLE 400 ON READER SERVICE CARD

P/A ADVERTISERS' INDEX JULY 1992

Note: W after numbers denotes material that appears in Western editions only.

Advertising Sales Offices

Stamford, Connecticut 06904:
600 Summer Street, P.O. Box 1361
203-348-7531 *Fax 203 348 4023*
Robert J. Osborn
Vice President and Publisher
Paul McKenna
Assistant to the Publisher
Charles B. Selden
Sales Manager
James J. O'Brien, Thomas K. Healy
District Managers

Atlanta, Georgia 30326:
3400 Peachtree Road, NE-Suite 811
Lennox Tower
404-237-5528 *Fax 404 237 1372*
Harmon L. Proctor, *Regional Vice President*
Ronald L. Miller, *District Manager*

Boston, Massachusetts:
600 Summer Street, P.O. Box 1361
Stamford, CT 06904 *203-348-7531*
Thomas K. Healy, *District Manager*

Chicago, Illinois 60601:
2 Illinois Center Bldg, Suite 1300
312-861-0880 *Fax 312 861 0874*
Brian Keenan, Timothy Shea
District Managers

Cleveland, Ohio 44114-2543:
1100 Superior Ave.
216-696-7000 *Fax 216 696 8765*
John F. Kelly, *Western Sales Manager*

Dallas, Texas:
2 Illinois Center Bldg, Suite 1300
Chicago, IL 60601
312-861-0880 *Fax 312 861 0874*
Brian Keenan, *District Manager*

Denver, Colorado 80224:
3215 South Newport Street
303-753-1901 *Fax 303 753-1902*
Albert Ross, *District Manager*

Los Angeles, California:
16255 Ventura Blvd, Suite 300
Encino, CA 91436
818-990-9000 *Fax 818 905 1206*
Michael T. Grennan, *District Manager*

New York, New York 10168:
Chanin Building, Suite 900
122 East 42nd Street
212-867-9191 *Fax 212 867 5893*
Charles B. Selden, *Sales Manager*
James J. O'Brien, *District Manager*

Philadelphia, Pennsylvania:
Chanin Building, Suite 900
122 E. 42nd Street
N.Y. N.Y. 10168
212-867-9191 *Fax 212-867-5893*
Charles B. Selden, *Sales Manager*

San Francisco, California 94010:
840 Hinckley Road, Suite 233
Burlingame, CA 94010
415-692-1381 *Fax 415 692-7406*
Susan M. Werner, *District Manager*

St. Louis/Kansas City:
2 Illinois Center Bldg., Suite 1300
Chicago, IL 60601
312-861-0880 *Fax 312 861-0874*
Timothy Shea, *District Manager*

Australia:
Media Developments Australia Limited
26 Tower St., Suite 6
Vaucluco Sidney 3030
Telephone: 02-388-7482
Telex: AA-72566 *Fax: 02-337-4314*
Michael Soker, *Director*

Hong Kong, China:
China Consultants International (H.K. Ltd.)
Suite 905 Guardian House
32 OI Kwan Road, Happy Valley
Hong Kong, China
Telephone: 5-833-2181
Fax: 852-5-834-5620
Tom Gorman, *President*

Italy:
Publizeta
Via Corticella, 216/6
40128 Bologna
Telephone: 051/320309-325452
Fax: 051-320309
Roberto Zucchini

Paris, France:
58 Rue Pottier
Bell Air Building 331A
78150 Le Chesnay, France
Telephone: 331-34-62-00-03
Telex: 696-373 *Fax 331-34-62-95-07*
Yvonne Melcher, *Manager*

Spain:
IDG Communication France
Immeuble La Fayette
CEDEX 65 Paris La Defense 5
France
Telephone: 49-04-78-00
Fax: 0-11-33 149 047 878
Francois Xavier Chaussonniere
Claude Bril

Tokyo, Japan 101:
Bancho Media Service
Dai-Ichi Nisawa Bldg 5th Floor
3-1 Kanda Tacho 2-chome
Chiyoda-ku
Telephone: 011-81+3+3252+2721
Telex: J-25472
Fax: 011-81+3+3252+2780
Isao Murakoshi, *President*

United Kingdom:
Wood Cottage, Shurlock Row
Reading, RG10 OQE, England
Telephone: 0734-343302
Telex 848800 Techno G
Fax 011-44-734-343848
Malcolm M. Thiele,
Managing Director, U.K.

Subscription information: Send all subscription orders, payments and changes of address to Progressive Architecture, Penton Publishing, Subscription Lockbox, P.O. Box 96732, Chicago, IL 60693. When filing change of address, give former as well as new address and zip codes, and include recent address label if possible. Allow two months for change. Publisher reserves right to refuse unqualified subscriptions. Professionals include architectural and architectural-engineering firm personnel and architects, designers, drafters employed in allied fields. Subscription rates for U.S. professionals are $48 for 1 year ($65 in Canada, $130 for foreign); $90 for 2 years ($125 in Canada, $255 for foreign); U.S. student subscription for 1 year is $48. Single copies are $7.50 in the U.S., $8 in Canada, and $12 for foreign except Information Sources issue and two issues of P/A Plans, $10 in U.S., $12 for Canada, and $20 for foreign Can. GST #R126431964. Permission to photocopy is granted for users registered with the Copyright Clearance Center Inc. (CCC) to photocopy any article, with the exception of those for which separate copyright ownership is indicated on the first page of article, provided that the base fee of $1 per copy of the article plus $0.50 per page is paid directly to CCC, 27 Congress St., Salem, MA 01970. (Code No. 0033-0752/92 $1.00 + .50) Written permission must be obtained for other copying; contact Agi Muller at P/A, 600 Summer Street, Stamford, Ct. 06904, (203) 348-7531. Indexed in ArchiText Construction Index, Art Index, Architectural Index, Engineering Index. Second class postage paid at Cleveland, Ohio, and additional mailing offices. Editeur Responsable (Belgique), Christian Desmet, Vuurgatstraat 93, 3090 Overijse, Belgique. Volume LXXIII, No. 7. Printed in U.S.A. Copyright © 1992 by Penton Publishing, Inc. POSTMASTER: Send address changes to PROGRESSIVE ARCHITECTURE, 1100 Superior Avenue, Cleveland OH 44114-2543.