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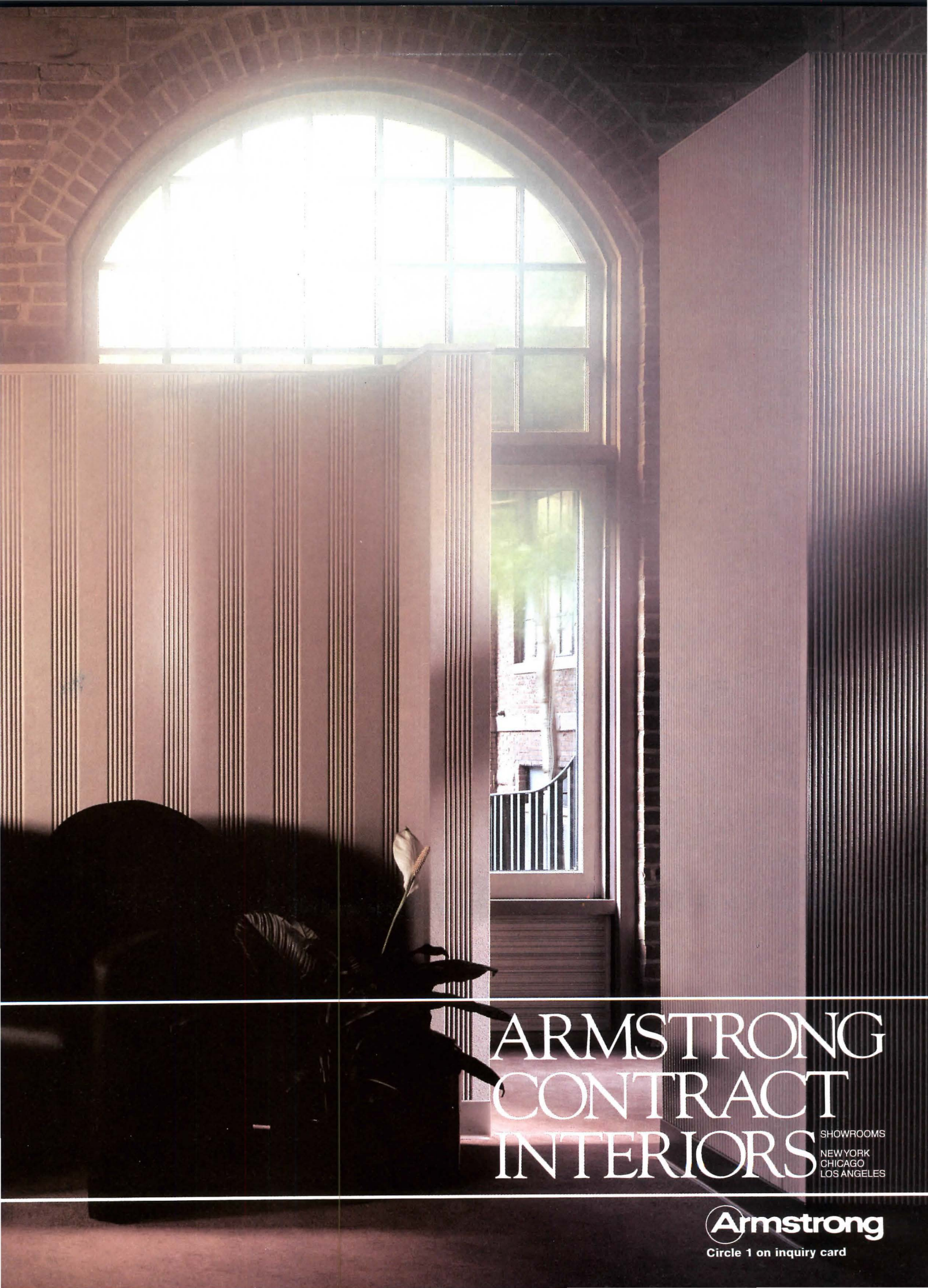

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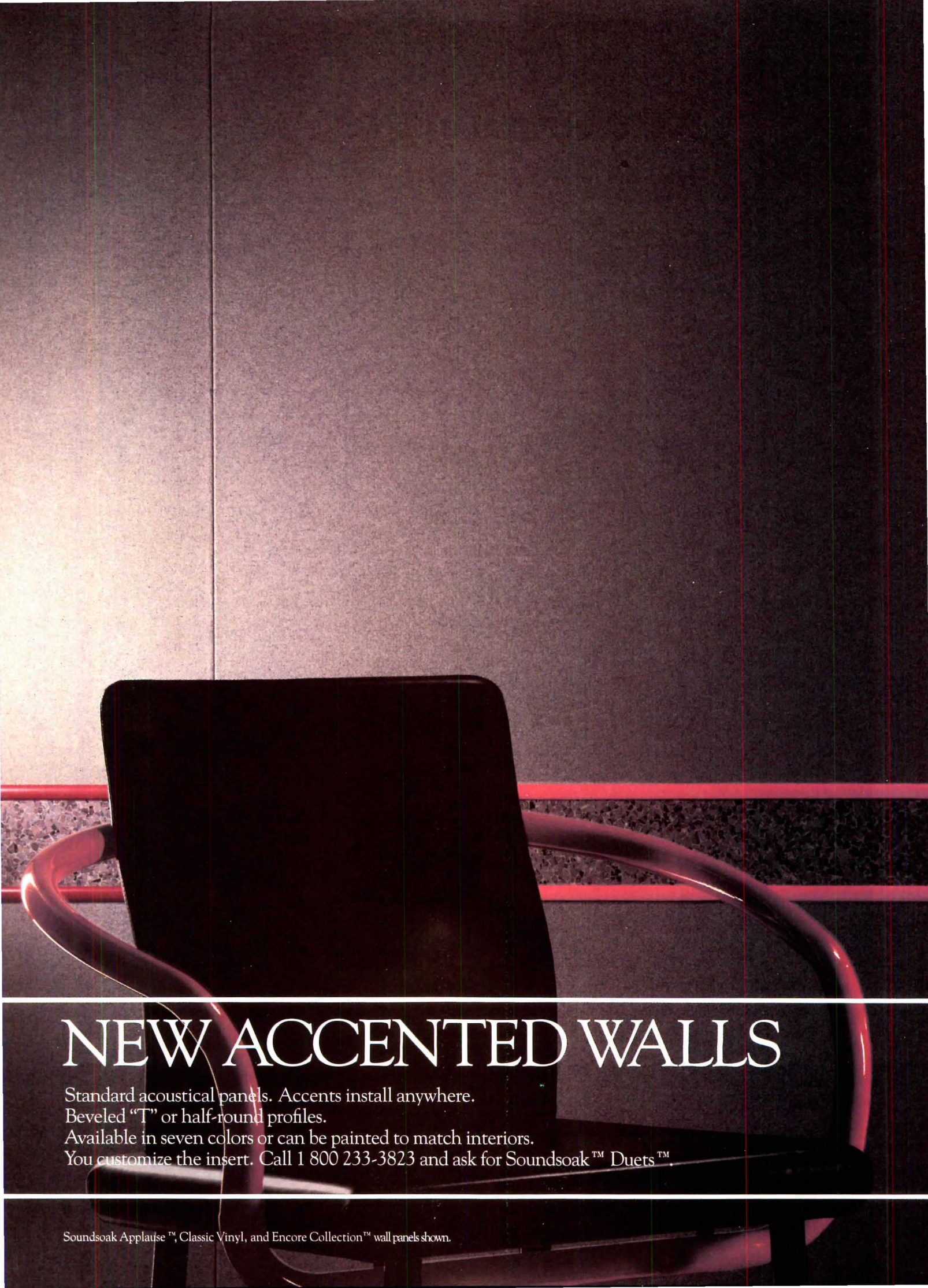

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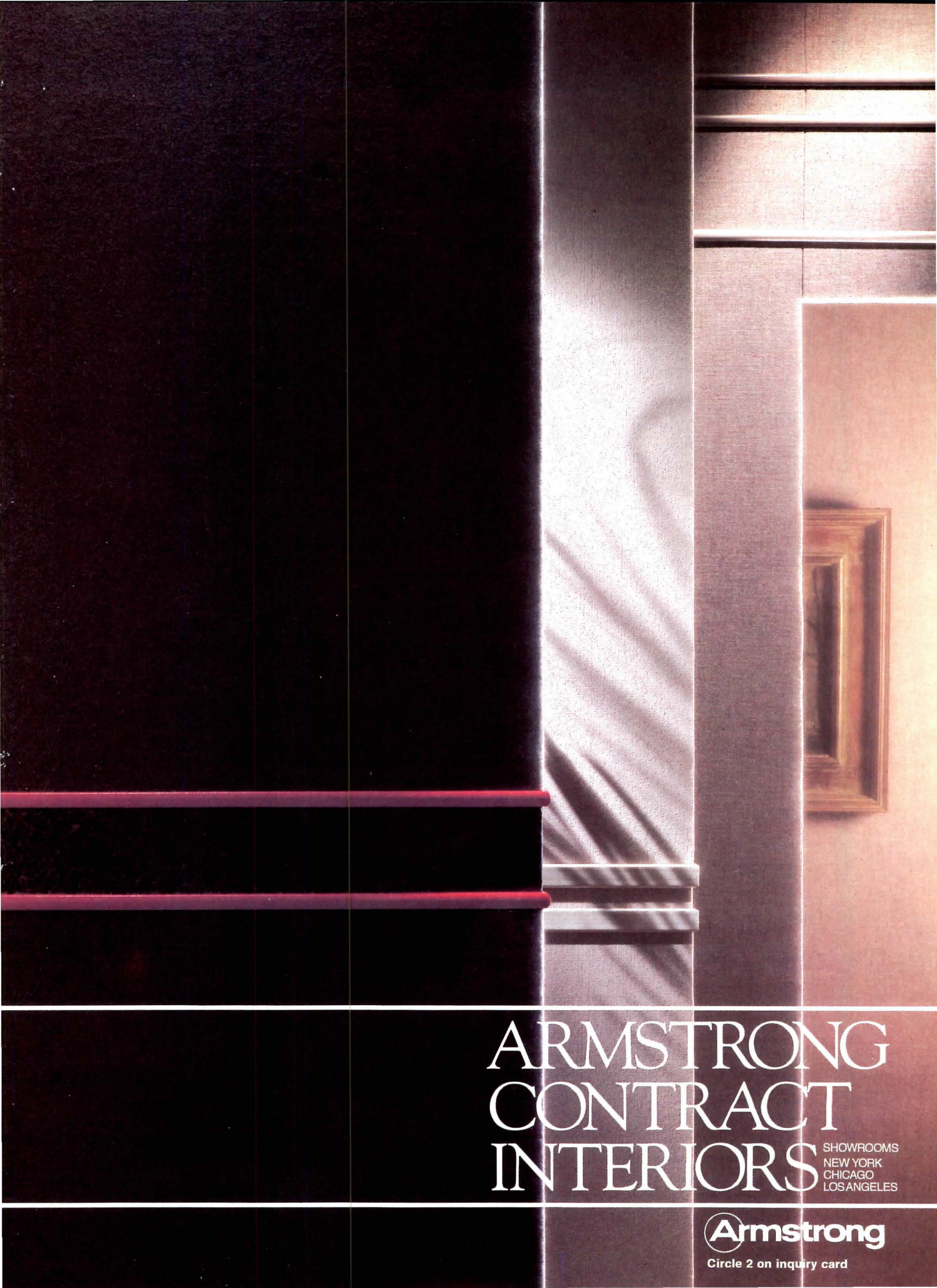

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It's Time . . .

Your Editorial "It's Time . . ." [ARCHITECTURAL RECORD, June 1990, page 56 et seq.] is great! I think it's exciting to see someone draw a line in the sand with a pen.

WILLIAM T. CANNADY
Cannady, Jackson & Ryan, Architects
Houston

I wanted to write personally to congratulate RECORD's new format, and also to comment on the "It's Time . . ." editorial. I think it is a terrific synopsis of the issues. I support the thoughts and ideas and couldn't be more in agreement with every single item listed. You can certainly count me in your camp, and I hope that we will have a chance in the future to work together on some of these issues.

M. ARTHUR GENSLER, JR.
Gensler and Associates, Architects
San Francisco

"It's Time . . ." to thank RECORD for its 16-point editorial in the June issue—the most cogent thing I've seen in an architectural magazine in years. You've managed to list the things I've been thinking about for a long time. As long as you intend to challenge obfuscatory architectural writing and to help repel the proliferation of *isms*, I'll keep on renewing my subscription. I look forward to the new RECORD.

THOMAS RAY HARDY
Hardy Architects
San Francisco

Bravo! I heartily congratulate RECORD's editorial "It's Time. . ." And I firmly believe that your sentiments will be endorsed by an overwhelming majority of the architectural profession.

Whether in the majority or not, please count me among your advocates.

JAY BANNISTER, ARCHITECT
Dallas

Bravo for your list of 16 issues that need to be addressed by the profession. I hope that ARCHITECTURAL RECORD and the AIA will attend to the spirit of your challenge. We must all be individually alert, keep our professionalism in line and our priorities in perspective.

EUGENE J. MACKEY, III
President
St. Louis Chapter, American Institute of Architects
St. Louis

Please accept my compliments on the June editorial. You sound like someone who has been very involved in the profession, and I admire your courage in speaking out about many issues so frustrating. I will look forward to even more than usual.

Again, my compliments and good luck.

HAL M. DEAN, AIA
Dean/Krueger and Associates, Incorporated
Albuquerque

Your editorial in the June 1990 issue is the best I can remember ever having read in any architectural magazine. It should be posted on the wall of every architectural firm in the country.

BESS BALCHEN URBAHN
Office of Max Urbahn
Stonington, Connecticut

Congratulations are in order for RECORD's June 1990 issue.

Having been upset with the superficial nature of architectural periodicals for the past decade, I find the June RECORD refreshing and relevant. The editorial "It's Time . . ." bodes well for the future of the architectural press, and your efforts will benefit the profession and its contributions to the built environment.

DAN PETER KOPPLE, ARCHITECT
Philadelphia

My June issue of RECORD was a most pleasant surprise! I had heard of many changes in the architectural press, and have indeed witnessed a few. But imagine my surprise to find that our old stand-by had also undergone major changes. Not surprising when one views the significant staff changes, especially in the Editor listing.

The "It's Time" editorial real-

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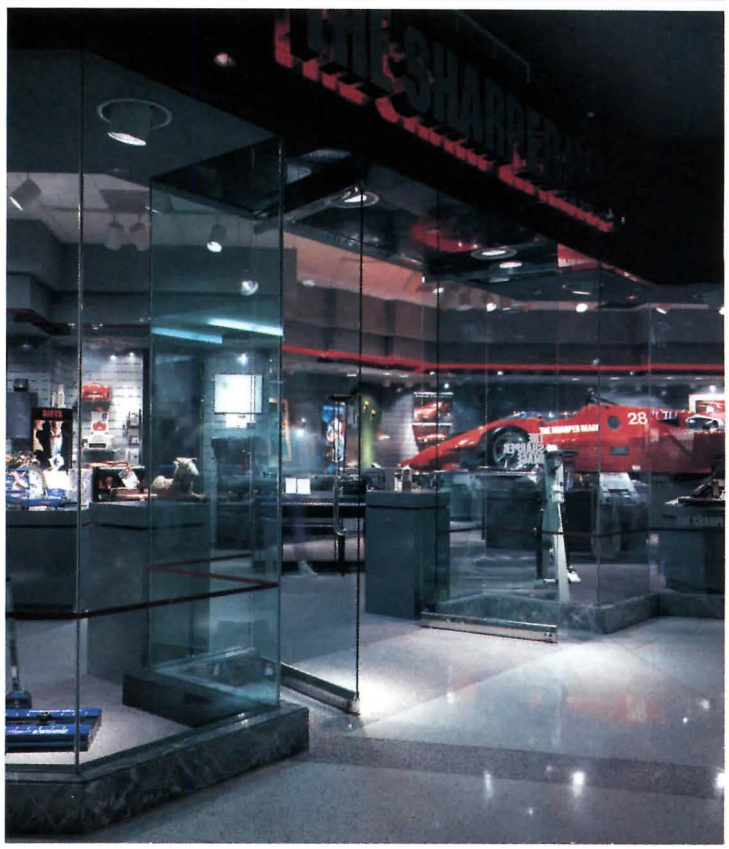

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Continued from page 4

ly caught my attention. I have had the pleasure of traveling and observing the real nature of architecture and, with great relief, have observed that "fashion" in the design of the large portion of architecture only goes so far (thank goodness!). I have heard that fashion is really only a journalistic trend and that it does not occur in the real world. And I have been told that without serious recognition of style and fashion, design may not be relevant to today's society.

You are correct when you say that we must guard against "ism-ism" and self-indulgence in design, but should we react with "rage" or should we simply continue doing our best work and select from fashion those elements most appropriate for our own palette?

Some look to fashion as a counterbalance to CADD. For myself, I never was convinced by the emperor's clothes. However, I welcome an architectural journal that can celebrate the large volume of our well-designed architecture, as evidenced by your June issue.

JOHN B. KELSO
Alexandria, Virginia

Regarding your editorial in the June issue of ARCHITECTURAL RECORD, may I offer a resounding "Bravo"!

For the past few years, my faith in my chosen profession has waned. The limited priorities of so many of my fellow professionals, and the view of the profession as presented by the trade journals, has left me sad and tearful when I consider the future of architecture. I began to lament the death of the profession.

Your editorial has helped breathe new life into my love of architecture. You have presented 16 points that have dominated lunch discussions and other meetings many times in the past, only these discussions too often end with, "Yes, you're right, but now how to change?"

You are in a unique position to help carry the flag, if you will, of a stronger, more relevant profession. Your voice and the voice of others like you will turn the tide of thinking toward the future, rather than the past, and toward the social and financial viability of the profession at large.

We in the trenches salute you!

GUY B. CORBETT
Ridgewood, New Jersey

Your becoming editor of RECORD is a development of great importance to architecture.

I hope RECORD will work on the economic status of the profession, and will attack the low level of compensation for architecture as compared to law, medicine, and almost any activity requiring advanced education. It was a live subject in the mid-1970s when we at the New York Chapter of the AIA put a lot of effort into quantifying and analyzing compensation and urging the Institute to focus some attention on it.

The reasons for architects' economic inferiority are not easy to figure out, but we can certainly look to these: the wide swings in construction cycles force severe competition, squeezing salaries, and the ingrained habit formed over many years whereby corporate clients and home builders alike have assumed that architects should not be paid much.

Everything you do will be important, and I very much look forward to it.

GEORGE LEWIS
New York City

It was with great enthusiasm and growing emotion that I read your editorial "It's Time." It is time we looked beyond the superficial whims of fashion to come to grips with architecture, the most important "social art," and with its responsibilities to improve the world for all of us.

It may have been hubris for the early Modernists to think that design could have an impact on the political nature of life. However, I prefer the lions of yesterday to our present exaltation of the mundane and acceptable.

I hope that RECORD follows through with thought-provoking pieces on work that seeks to enlighten and delight.

WILLIAM D'ELIA
Kaplan McLaughlin Diaz, Architects
San Francisco

I haven't been so encouraged and stimulated by an editorial in a long time. I wondered when someone would say what has long needed saying.

The points made are all very important, in my opinion, but I was particularly delighted to see points one, three, five (a good one), nine, ten, and fifteen. The industry badly needs a publication that will address these issues without fear or favor.

CHARLES R. CARROLL, JR.
Carroll Associates
Baltimore

The editorial comments in the June issue are well chosen, clear, and concise. Good work!

ARCHITECTURAL RECORD is better than ever. You are good practitioners of your philosophy.

CHARLES SAX
Sax Associates, Architects
Portland, Oregon

Hats off to you for having the guts to publish the "manifesto" of 16 points in June issue.

I am a practicing architect, grew up in Frank Gehry's neighborhood, watched him build his house, went to school with the Morphosis boys, and have been experiencing all the things in your editorial. It's refreshing to finally read an architectural magazine that now seems to be guided by a professional who understands what our profession needs.

RECORD now is truly useful to me, not just a set of glossy eyewash. I applaud the new emphasis on technical articles, such as "A Thin-stone Veneer Primer," the product information, and even the special AutoCAD "infotisement."

A comment on Point Number 9: one consequence of the smaller office size due to CADD and greater involvement in construction will be the future increase of architect-as-developer. As entitlements and building permits become more and more difficult to obtain, the architect's value goes up, and knowing which cities are favorable, which sites work, and how to build efficiently will open up opportunities for equity participation, joint ventures, and outright ownership of projects. We do it for developers, so why not do it for ourselves?

GREGOR JOVANOVICH
HGA Architects
Venice, California

L. A. : Two views

Your June 1990 editorial, "It's Time" reflects the sentiments and goals of most of the architects I know. Hooray!

But, on the very next page, you follow that grand statement with an article by Don Canty offered as a criticism but in reality a whitewash of the very things your editorial promised to condemn. The article "Core Concerns" about downtown Los Angeles [RECORD, June 1990, pages 58-66] actually looks like a promotion of "... architecture as fashion ...," of "... naked emperors...," and of "... philosophy dished out by resident gurus...."

"It's Time" you take a strong stand behind your convictions.

THOMAS H DOLE, ARCHITECT
Rancho Murieta, California

Don Canty's thoughtful and concise article well portrayed many of the concerns and questions that must be addressed before the goal of a vibrant downtown Los Angeles is fully realized. While I no doubt did say that the Community Redevelopment Agency's "activist days are over," I believe this was in reference to the type of urban clearance schemes that were popular across America in the 1960s, '70s and into the '80s.

Currently, with the assistance of a citizens' advisory committee and the oversight of the Mayor and the City Council, the CRA is undertaking a strategic planning effort to further define downtown's place, role, and form in the region. Additionally, the agency is continuing its work downtown with regard to the rehabilitation of single-room occupancy hotels, provision of affordable housing, revitalization of Los Angeles' historic core, and other efforts.

Perhaps it is more accurate to say that if central Los Angeles is now to become a place where people live as well as work, where new buildings co-exist with old, and where street life hums amidst opportunities for personal and social growth, the definition of the agency's activism and potential role as catalyst will necessarily evolve.

JOHN KALISKI
Community Redevelopment Agency
Los Angeles

More Letters on page 30

PRACTICE

A/E/C Systems '90: Don't be Afraid, Jump In

Falling prices, greater capabilities, ease of use, and more ability to use systems interchangeably were messages of A/E/C Systems shows and conferences held this year in Atlanta, June 13-15. More than 24,000 people who design and build buildings showed up to listen. The conclusion? There is less danger in making a mistake in buying systems now because flexibility allows you to pick and choose among the applications offered by different suppliers' systems.

Even so, what the buyers look for, according to show principal George Borkovich, is one-stop shopping. Hence, the trend among the almost 500 exhibitors was to group into clusters of integrated products. Auto-desk, Intergraph, and Apple hosted their own groups this year and more may emerge next.

As in previous years, the panel discussions and seminars helped attendees understand computers' current capabilities, what they might be, and what they might mean for you. And Page Highfill offered advice that might pertain to any conference: "When you get home, schedule some time to mull over what you've learned before the alligators jump out at you."

C. K. H.

Computer-assisted specifying (CAS) banks on big bucks

Computer-assisted specification writing is no longer a novelty, and its goals of better productivity and control over liability are well on their way. What's more, the next step, of integrating spec writing with CAD-generated drawings, is moving along, albeit slowly.

What slows progress is the great cost of operating and maintaining an integrated spec-writing system. For example, 24 percent of reference standards are modified each year, according to Robert Paul Dean, a Heery International vice president. Two to 4 percent of products in Heery's database change over the same period and "new products and standards are constantly being introduced that improve upon those in the database or that [call for] expanding the master specification."

Also, in the first six months of 1990, the SweetSpec database, which is linked to Masterspec, was updated 1,564 times, affecting 87.4 percent of the sections available, adds Dean.

The cost of a continuing program for verifying data (such as manufacturing names, product names and characteristics, and reference standards) and incorporating these changes is huge, and will depend on investment by independent companies, such as McGraw-Hill and Que, said Dean. We face not a technical obstacle to the rapid rise of CAS so much as the need to provide an attractive return on the investment.

To offset the high cost of incorporating changes in reference standards, some, such as Tim Kirby, chief of specifications at Thompson, Ventulett, Stainback and Associates, favor omitting reference standards and relying on a proprietary specification.

At the same A/E/C Systems session, specifications consultant Mark Kalin made available a listing of CAS software. It may be had by writing to Kalin at 68 Carl Street, Newton, Mass. 02161 (617/964-5477). **S. A. K.**

Architects cite payoffs from computer-integrated design

The ability to compare brick patterns and the integration of multiple hardware and software platforms were cited as payoffs of CID at a panel that included an architect from the Venturi Scott Brown office, a Harvard GSD computer director, and a professor from Kyoto Institute of Technology.

Using the computer to compare a wide range of brick patterns on 3-D drawings was illustrated by John Forney, an architect with Venturi Scott Brown. The office, which has seven stations, also uses CID to create 3-D wire diagrams, which are then rendered by hand.

Rather than segregating the stations, the Philadelphia-based firm purposely distributes them throughout the drafting room to encourage their use as an alternative to manual design and drafting, said Forney.

A centralized database and an integrated network have been developed at Harvard's Graduate School of Design to accommodate the many different types of platforms typically acquired by schools and some firms, reported Erin Hoffer, director of computer resources at the GSD.

Centralized databases require a high level of data management to attain high efficiency, said Hoffer [RECORD, June 1990, page 30].

Use of CID in the huge firms that mark Japanese practice was cited by Dr. Shigeyuki Yamaguchi, professor at Kyoto Institute of Technology's Department of Architecture and Design. Firms such as Nikken Seki, with 350 architects among 1,460 employees, use it almost exclusively. Some firms no longer use drawing boards, he said.

S. A. K.

Have CAD, won't travel

Merely having an operating CAD system in your office is no longer enough to win points when marketing services to a client. So says Joseph S. Brown, a principal at E. I. Brown Co. of Indianapolis, an A/E firm that has spent $6 million on computers, 75 percent of whose drawing capacity is on CAD. The firm writes its own applications software.

Large clients now expect their architect to be on CAD, said Brown as he listed four points to observe when marketing with CAD:

- Cite CAD as way to provide better design.
- Point out that CAD will provide more error-proof contract

documents—both yours and those of your linked consultants.
• Use CAD to market your credibility.
• Don't overpromise what CAD will do for the client.

Brown went on to offer these tips to firms using or planning to use CAD as a marketing tool:
• At moderate cost, set up a CAD-based desktop-publishing system to produce brochures, a newsletter, and other promotional materials.
• Be sure to differentiate your CAD system from your competitors'. Thus, if you have a facility-management package, you have a leg up with continuing clients who have a nationwide inventory of constantly changing facility demands, such as a McDonald's or the Baby Bell companies.
• Look into peripherals that let you make slides from the computer screen, or create a videotape. (Caution: video must be network quality.)

Also, explore portable workstations that will allow you to make presentations in the client's office, suggested Brown. **S. A. K.**

Care and feeding of CAD

Have trouble working with CAD departments in large practices? You are not alone, says Kristine Fallon, president of Computer Technology Management, Chicago. Some issues:
• Firms do not measure drafting-board productivity, but often do try to measure CAD productivity. This upsets CAD operators.
• CAD operators complain about lack of knowledge—that the office wizards, if there are any, often do not share information. There is also little money available for outside training.
• CAD operators are often physically separated from the rest of the office. Ten years ago, this was necessary because CAD screens required subdued lighting, and CAD computers required special air conditioning and power.
• It is little wonder, then, that CAD operators feel a great deal of stress, and are more likely than other staffers to be out with stress-related illnesses.

Fallon recommended several low-cost approaches for improvements. Most important, she said, is simply to make people feel better about themselves and their jobs. She asked everyone in the 100-person audience to pair off and praise each other for a full minute. That's more than enough time, usually. Participants were astonished to discover how long a minute really is.

She also suggested creating in-house user groups to discuss problems, and treating CAD users to lunch over take-out pizza on a regular basis. She also noted that firms often do not quite know how to deal with holders of new jobs created by CAD—jobs with titles like database manager and network manager.

"A good system manager never has a crisis," she said, "so he never gets to be a hero. Recognize people and praise them!" **S. S. R.**

Imaging, and imagination

The use of image scanners, desktop-computer image processing, and new graphic-output systems to visualize projects was described by Erin Hoffer of Harvard GSD. The audience was particularly interested in practical ways to animate images for presentations. The possible applications include modeling the shadow that a tall building would cast in a nearby park, to computerized walk-throughs of 3-D drawings.

A typical system combines input from CAD files, scanned images of existing sites, or even videotapes of existing sites. The output can be on a computer screen, in a printed brochure, on videotape, or in the form of color slides. Slides, in particular, are getting fairly inexpensive to produce. But videotaped animations are the logical future, Hoffer said. **S. S. R.**

Non-CAD uses turn your junk time over to computers

"If you are not using 70 percent and more of your firm's computer application in non-CAD uses, you're missing opportunities," said C. Page Highfill. While most of the excitement these days is over CAD, surveys show that many other architects agree with him. He urged information-management systems on the desks of decision makers. "If you have the capability to make decisions on your screen, you're through with them."

At the same time, computers let secretaries do much work, such as accounting and billing, that used to be done by higher paid professionals.

What specific decision-making programs does he find most valuable? Ones that tell how much fee to charge based on costs to produce similar projects and ones that let you tell a client how much his building will cost before you waste time on design beyond his budget. "Start with a simple electronic database and add only what you need," he advised. **C. K. H.**

Plan costs to suit the type of firm you want yours to be

"Even with computers, architecture is not a capital-intensive business," said Thomas Kvan of The Coxe Group. He showed the results of surveys that revealed that computers are typically a small proportion of a firm's overhead costs. They are a small proportion of capital costs, when the basic tools of the profession are considered, he added.

Nonetheless, the decision to move into computers requires shifting gears in the type of services a firm offers. "Successful firms moving into computers do jobs that require handling large amounts of information and offer such added services as facilities management to justify the added expense. The decision depends on what sort of firm you want yours to be."

So does the type of system you should buy. Firms that want to make money typically concentrate on two-dimensional drafting and speeding up production, while other firms may want greater capabilites. Make sure that you do not try to amortize costs over too long a period. "This makes people hang onto outmoded systems when they should be moving them down the scale of office functions." **C. K. H.**

Dolphin Flips into Disney World

"I gave it a mountain-coming-out-of-the-Everglades look," explained Michael Graves following the late-June dedication ceremonies for his Walt Disney World Dolphin hotel. The Dolphin, the second Graves hotel in the Orlando, Florida, fantasy resort complex (the Swan is directly across the lagoon), is already booked solid for the next three years.

"You're not renting a room, you're buying an experience," declared associated architect Alan Lapidus.

Graves, who has designed a third hotel—for EuroDisney (see page 72)—admitted there had been problems. "Everything you do has someone there who's a Doctor No," said Graves. When Graves decreed that the Dolphin fountains "should splash," joint-venture executives worried that stray breezes might pellet water on passing Dolphin guests. Installation of an anemometer to automatically shut off the fountains in high winds solved that particular problem.

Tishman Realty & Construction Co., one of the companies in the joint venture, served as development manager. Also involved were Aoki Corp. and Metropolitan Life. **C. D. K.**

DESIGN

Two Designs for Alzheimer's Patients

A new building type has emerged, reflecting the growing incidence of Alzheimer's disease among vulnerable elderly people. Physicians and health administrators now see that conventional nursing homes are not up to the treatment of the disease. And architects, with their insights into such matters as scale and circulation, have special answers to offer.

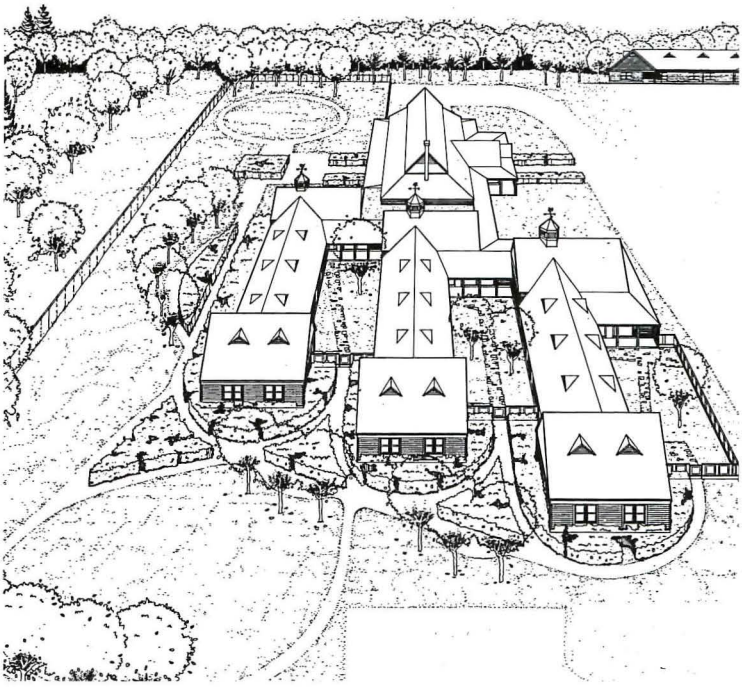
Two recent designs for long-term care and treatment include the Alzheimer's Disease Care Center in Belmont, Massachusetts (above), designed by Graham Gund Architects, and Woodside Place in Oakmont, Pennsylvania (right), designed by Perkins Geddis Eastman Architects, with Barbara Geddis as partner-in-charge. The Massachusetts facility, designed for Massachusetts General Hospital and McLean Hospital, will have 150 beds and research offices for the compilation of patients' records. The prototypical Pennsylvania facility, with 50 beds, will be built for the Presbyterian Association On Aging with funding from the Howard Heinz Foundation.

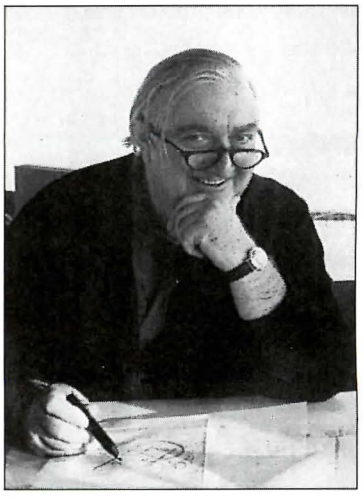
Though the two plans are distinguishable, they were in fact designed along similar principles. Both Gund and Geddis favor residential scale and finishes so that patients quickly become familiar with homelike surroundings.

Partly to allow them a measure of dignity and privacy, partly because they may be confused by sensory overload, patients are organized in small groups. At Belmont, nursing units are divided into 30-bed groups, while at Oakmont, units are organized in three buildings.

One of the Alzheimer's disease symptoms that especially challenges nursing staff is the patients' tendency to "wander"—at any hour of day or night and generally along repetitive routes. Gund's plan provides square "repetitive loops" at building corners, glazed to allow views of the garden, while Geddis's plan offers outdoor paths with unobtrusive but constant observation.

Both facilities will also have short-term patient rooms to allow families respite from stressful care-giving.





James Stirling

Stirling wins Praemium Imperiale

British architect James Stirling will receive the 1990 Praemium Imperiale for architecture, a fairly new but already prestigious prize for the arts that was established last year by the Japan Art Association. The award carries a cash prize of $100,000 and a commemorative medal, which will be presented later this year in Tokyo.

Announcing the award, the Praemium Imperiale prize committee hailed Stirling as "a truly international architect of international acclaim."

The prize is meant to counter the scientific orientation of the Nobel prizes. Suggested by the late Prince Nobuhito Takamatsu, the Praemium Imperiale honors artistic accomplishment, specifically in the fields of painting, sculpture, architecture, theater and film, and music. In addition to Stirling, 1990's honorees included Spanish painter Antoni Tapies, Italian sculptor Arnaldo Pomodoro, Italian film director Federico Fellini, and American composer and conductor Leonard Bernstein. (I. M. Pei received the first Praemium Imperiale for architecture last year.)

As with the Nobel prizes, members of the nominating panels for specific categories are anonymous. After field committees complete their searches, they offer their nominations to the prize committee, which this year included former British prime minister Edward Heath, former West German chancellor Helmut Schmidt, former French prime minister Jacques Chirac, former Italian premier Amintore Fanfani, and American banker David Rockefeller.

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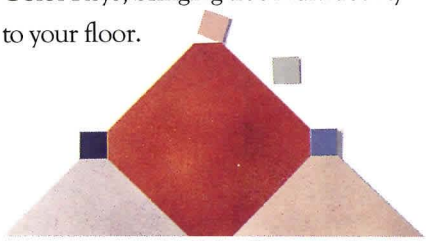

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Briefs

Two architectural deans were appointed this summer. A new school of architecture at the University of California, San Diego, has selected Adèle Naudé Santos as its founding dean ; a practicing architect in Philadelphia, Santos was chairman of the Department of Architecture at the University of Pennsylvania from 1981 to 1987. Donald Watson becomes Dean of the School of Architecture at Rensselaer Polytechnic Institute in Troy, New York; Watson was most recently at Yale University as head of the Master of Environmental Design program.

George Nakashima died at age 85 on June 15 at his home in New Hope, Pennsylvania. An architect by training and early practice, Nakashima became better known as a master woodworker and was called by the American Craft Museum in New York City "a living national treasure."

Putting a landmark to use, the Engineering Center Education Trust of Boston has bought the Phillips Winthrop House, designed by Charles Bulfinch in 1803 and built on Beacon Hill. The building will become headquarters for the Engineering Center, a consortium of New England engineering societies.

The Bard Awards, presented yearly by the City Club of New York to honor architecture and other services to design, cited Kevin Roche John Dinkeloo and Associates for the Central Park Zoo, Conklin Rossant Architects for the restoration of Brooklyn Borough Hall, Buttrick White & Burtis for St. Thomas Choir School, and Hoberman & Wasserman for the Columbus Town Houses on West 89th Street. Another award went to former Mayor John V. Lindsay for his "enlightened concern for planning and urban design."

Architectural commissions: Gunnar Birkerts, a Latvian by birth now practicing in Birmingham, Michigan, will design the Latvian National Library, to be built in Riga; Graham Gund Architects, of Cambridge, Massachusetts, will redesign a 1942 building as an opera house and rehearsal hall for the Virginia Opera Company in Norfolk.

Justice on a Grand Scale

Architects aimed to achieve a "regional feel" when they designed the government center in downtown West Palm Beach, Florida. The Palm Beach County Judicial Center in Mediterranean Classic style is marked by an imposing entrance arch, a street-scale colonnade, and light-colored precast-concrete surfaces—typical features of South Florida architecture, said Michael LeBoeuf, project designer with Hansen Lind Meyer's Orlando office. Michael A. Shiff & Associates, West Palm Beach, designed the judicial center in association with HLM.

The center might be one of the largest of its kind in this country. It consists of three buildings totaling 875,000 square feet. A six-story building that houses offices for court-related functions sits adjacent to the 11-story courthouse. The complex also includes a central energy plant.

The courthouse entrance is located within a four-story portal. Building materials for the building include architectural precast concrete panels on the facade and polished granite at the base.

HLM architects intended to capture a similar Florida feeling in their design for a courthouse in Orlando. The 23-level Orange County Courthouse tower is clad in light-colored materials. The plaza area enhances the complex's regional character with fountains and tropical planting. **Susan R. Bleznick**

New Quarters for State Civil Service

Since trees loom large in the economic life of Washington state, architects Leonard Parker Associates used them both literally and figuratively as symbols at the state's offices for the Department of Labor & Industries. The design was the subject of an architect/developer competition that was won by Parker and the Opus Corporation, both of Minneapolis, and it will be built in Tumwater, Washington, about seven miles outside Olympia.

The most emblematic appearance of "tree" in the government building is the entrance rotunda—a tall cone taking the form of an evergreen. The rotunda, intended as both civic meeting place and lobby, commands a view of Mount Rainier. Other components will include a five-story office building and a curved two-story dining-cum-conference pavilion.

The literal use of the symbolic trees, as designed by landscape architects EDAW, Inc., of Seattle, includes an allée of cypress and Western red cedar bestriding the entrance drive, while a wildflower meadow sown with grasses, clovers, and perennials creates a view from the dining pavilion.

Metal-Based Mode in a Masonry Town

Given Cincinnati's recent notoriety for artistic conservatism, the proposal that Murphy/Jahn recently unveiled for Fountain Square West is bound to raise a few local eyebrows. Located along the western edge of Fountain Square, the historic heart of the city's central business district, the 648-foot tower will be the tallest building in town, rising 75 feet above Carew Tower, the current champ. But beyond its lofty stature, the 1.7-million-square-foot project departs radically from Cincinnati's brick-and-stone building tradition with an unusual metal curtain-wall whose glass is fritted in various light-diffusing patterns and textures — a technique that the architects applied on their United Airlines Terminal in Chicago. According to project architect Martin Wolf, the building is wrapped in "liners" that are gradually peeled away as the tower rises until the steel-frame structure is revealed. The complex will house 736,000 square feet of offices, a 248-suite hotel, four floors of shops and restaurants along a skylit galleria, and parking for 750 cars.

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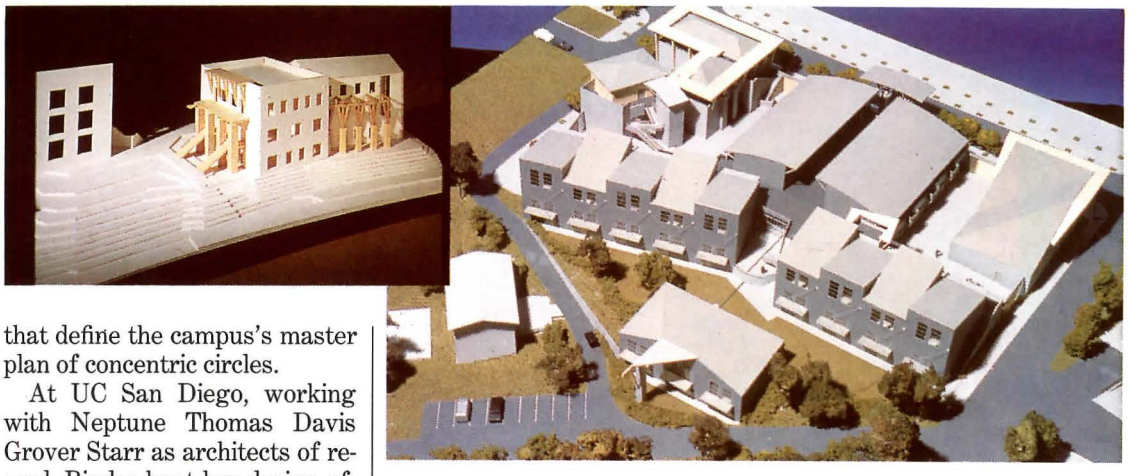
Buildings Contrast Art and Science

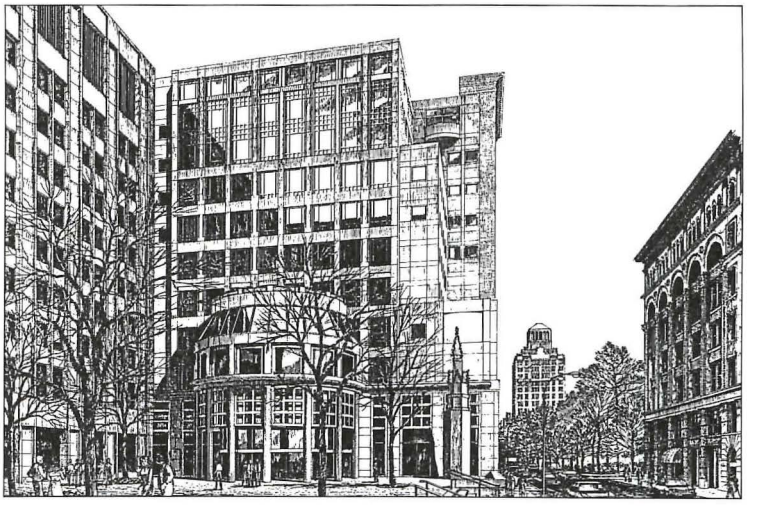


Designing for two campuses at the University of California, the firm of R. L. Binder, AIA, in Playa del Mar, California, also dealt with two major academic disciplines: art and science.

For UC Irvine, the firm designed a small research facility—16,000 square feet in a three-story building that will house a flexible assortment of dry labs and small offices (inset). The Information Computer Sciences building constitutes Phase III of the school's Engineering Research Facility, and will complete the Engineering and Computer Sciences quadrangle. Moreover, a timber arcade on the building's angled facade will mark one of the walls that define the campus's master plan of concentric circles.

At UC San Diego, working with Neptune Thomas Davis Grover Starr as architects of record, Binder bent her design efforts to the slightly larger, considerably more diverse Visual Arts Facility. The mini-campus enacts two major roles. On the outside, the front facade presents rather a formal unity to the street. On the inside, however, the buildings define informal courts meant for circulation and outdoor work spaces. At the heart of the complex, graduate-student studios under a bowed roof present a formal street facade. The studios are flanked on one side by a building for a public gallery and performance space and on the other by a small shop. On the opposite side of the site, the complex offers a less formal presence: a curved row of faculty studios with shed roofs (directly above), which edge a canyon to mediate the natural and built environments.

Two into One



New York University's graduate school of business is preparing for a merger of sorts. It will relocate from the Wall Street district to a new building, the Leonard N. Stern School of Business, situated on NYU's Greenwich Village Campus.

The new building directly adjoins Tisch Hall (left in drawing), which houses the undergraduate program. Stern School of Business Associate Dean Paul Affuso said the "driving force" behind building the facility was to consolidate the business school faculty at one location and create a strong sense of campus community.

The Stern building mediates between two adjacent structures from different periods—Tisch Hall, built in 1967, and Shimkin Hall (right on drawing), which dates back to the 1890s.

"It was really an exciting project to place the building between buildings of such different generations," said David Helpern of Helpern Architects, New York City. He and Robert Geddes, of Geddes Brecher Qualls Cunningham in Princeton and Philadelphia, are co-designers of the project.

The architects intended the Stern building to be sensitive in scale to the neighborhood, with setbacks in the form of terraces. The cornice of the new business-school building will match the 11-story height of Tisch Hall. And four floors of Shimkin Hall will merge with the new building. "We married the three buildings in terms of scale and proportion," Helpern said.

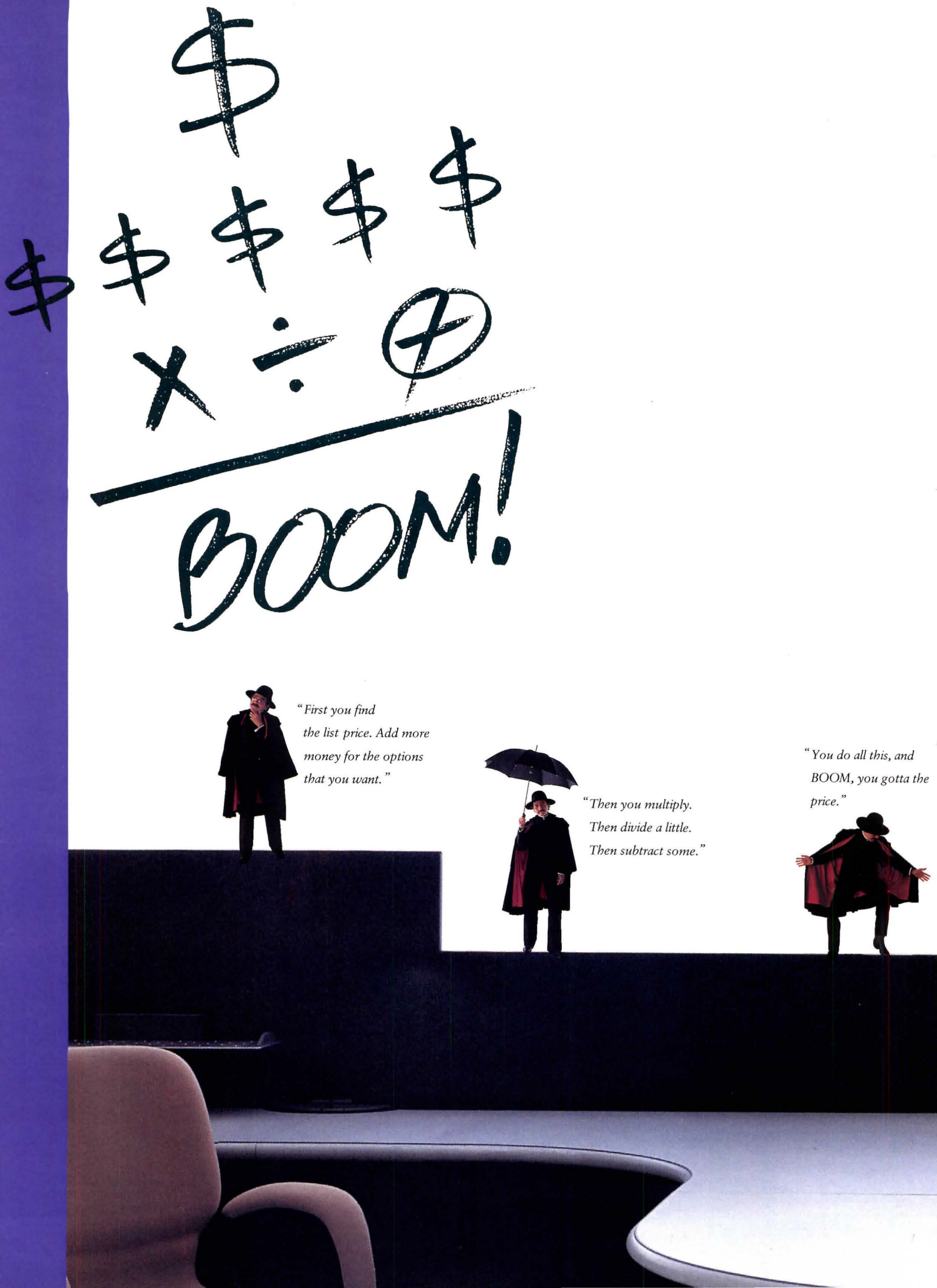
A four-story rotunda with glass walls on the upper two floors marks the building's entrance. Major classroom galleries are likewise glazed. **S.R.B.**

Competition Calendar

• An international competition to design "the reorganization and/or restructuring of the Piazzale Roma precincts in Venice" is sponsored by the Venice Commune, with the Ente Autonomo La Biennale di Venezia. The winner will receive about $12,500 and the commission, and nine runners-up will each get about $4,200. Written notice of participation and a 35,000 lire ($30) entrance fee must be received by September 15; the project is due by October 27. Jurors will include James Stirling, Rafael Moneo, and I. M. Pei, and Prof. Kurt Foster, plus Italian officials. For information: "Concorso di progettazione 'Una porta per Venezia' per la sistemazione Piazzale Roma," Segretaria del concorso, Settore Architettura del'Ente Autonomo la Biennale di Venezia, Ca' Giustinian 1364/a, San Marco, 30124 Venice, Italy (39-41-52-26-514).

• An International Competition for Ideas on the Ulugh Beg Cultural Center in Samarkand, USSR, as part of a larger project intended to revitalize the city's core. Cosponsors include the USSR Union of Architects, the Aga Khan Trust for Culture, and the Uzbek SSR Union of Architects. Jurors are Charles Correa, Abdelwahed El-Wakil, Zaha Hadid, Arata Isozaki, and Ismail Serageldin, as well as S. R. Adilov, Yuri Gnedovski, Yuri Platonov, and Nematjan Sadikov. Five winners will share $150,000 and will be invited to participate in the second phase. Registration and a $120 fee are due by September 30 and the design entry must be sent by April 30, 1991. For information: Samarkand Competition Secretariat, 32, Chemin des Crêts-de-Pregny, 1218 Grand-Sacconex, Geneva, Switzerland (41-22-798-93-31).

• The American Wood Council seeks entries in its ninth annual Wood Design Awards Program. Buildings must have "a dominant wood character," and may be either residential or nonresidential, new or remodeled. For information: The American Wood Council, 1250 Connecticut Avenue, N. W., Washington, D. C. 20036 (202/833-1595).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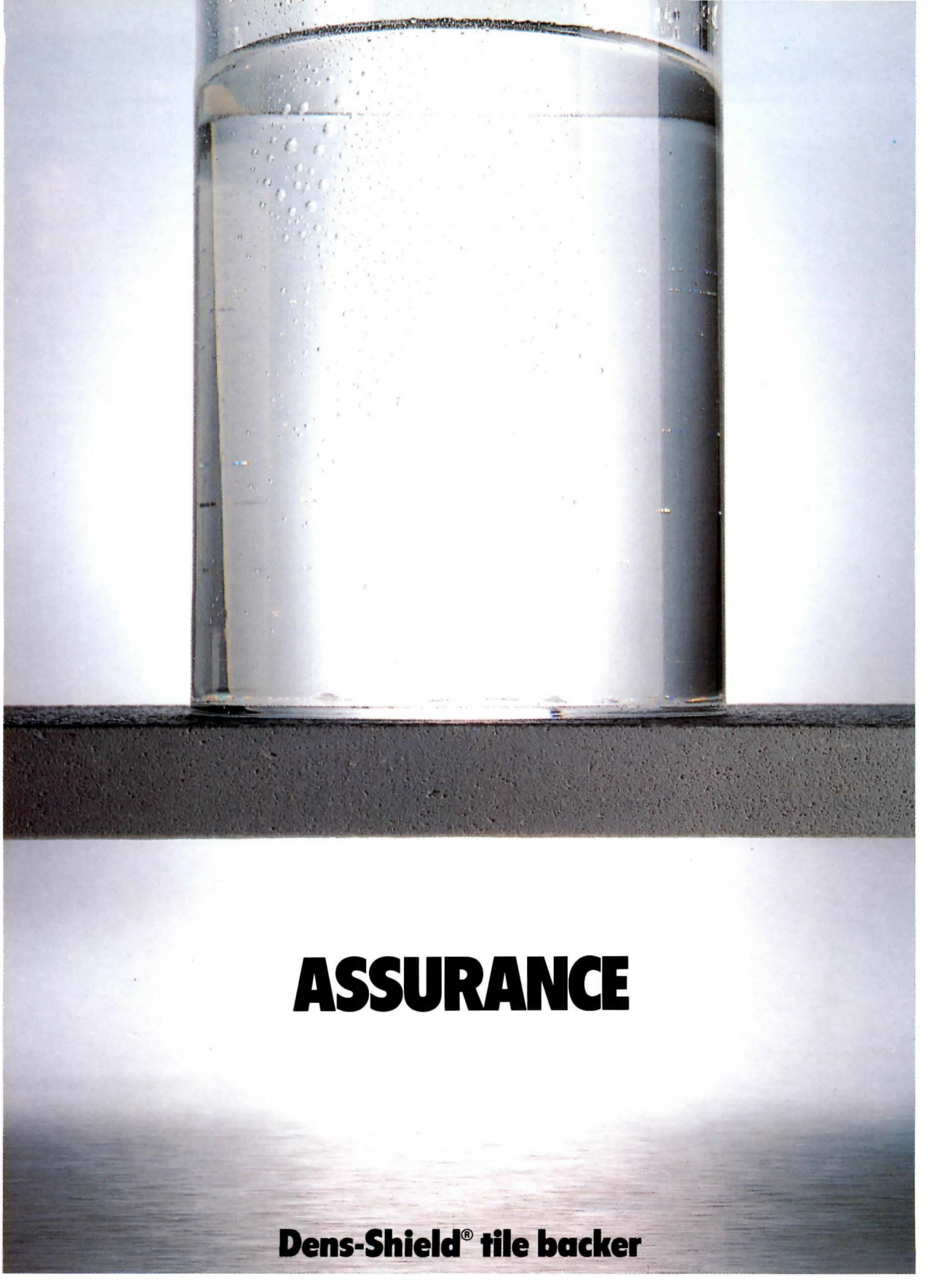

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Continued from page 6

Health-care design

I was disappointed in the lead article for your June 1990 Building Types Study on Hospitals, "Targeting Treatment" [pages 87-89]. I hope that those of us practicing health-care planning and design do not fall into the trap of just designing for today's "New Conceptual and Physical Models." As an in-house coordinator of architecture and construction services for a 1.1-million square-foot facility, I have to live with the inflexible hospital designs of the past. Do not give me more of the same for the future.

The best way that we can respond to changes in the health-care climate, technologies, and delivery systems is to design flexibility in all aspects of the building. How to balance the demands of flexibility and cost control is the greatest challenge we have to face.

WILLIAM S. MOSES
Director, Architecture and Construction Services
St. Luke's Episcopal Hospital
Houston

The Canadian Chancery

For years, I felt badly for Washington architects, and your magazine's recent coverage of Washington buildings has done little to help [RECORD, "The Best and Worst of Washington, D. C.," February 1990, pages 98-103, and the story on the Canadian Chancery, March 1990, pages 58-65]. In your February issue very little coverage is actually given to the work of accomplished local designers, and the work presented takes a back seat to an outsider's building of questionable merit. Then, in the March issue a building that proves the "worst work in Washington" cliché is your cover story!

The best Washington work reflects the best aspects of (for lack of a better label) the Postmodernist approach, subtly deferring to the urban context and creating structures that have maintained a street-level environment with scale and character unlike those of most American cities. This is not a modest achievement, and the work of such architectural firms as Hartman Cox, David Schwarz, the Washington office of SOM, Keyes, Condon & Florance, Shalom Baranes, and others deserves a more detailed and thoughtful discussion than was offered. There are important and complex lessons about the relationship of architecture to urban design to be learned in Washington; your readers are sold short by the brief overview in the February article and the noncritical description in the March issue.

While Postmodernism among Washington architects has been a thoughtful and responsible approach to architectural and urban design, it appears to have been merely another stylistic fashion for many outside this city. Perhaps because Washington is fortunate enough to have a well-defined public realm and is a city where "meaning in architecture" is a very real fact, not just a theoretical conceit, out-of-towners who ignore its precepts or fall prey to the classicizing impulse without regard for either the subtleties of Classicism or the demands of context fall flat. Compared to the work of local architects, the visiting stars' work ranges from weak and embarrassing to strong and inappropriate, often cloaking Modernist anti-urban sensibilities in classicizing forms and details without regard for context, scale, or appropriateness. At other times, visiting architects ignore the urban context completely.

There are exceptions, of course: Hardy Holzman Pfeiffer and Don Hisaka are out-of-towners who have brought good urban architecture to their Washington commissions.

The Canadian Chancery by Arthur Erickson is a good case study. An architect with an impressive portfolio of breathtaking buildings decided to suppress his own Modernist impulses and reinterpret Washington. The resulting building is thin, poorly proportioned, and ill suited to its prominent site. Its referential gestures are tacked on in a way that is downright sil-

ly. None of the ease with which Washington architects reflect their urban context is found here. For all its wrenching effort and good concrete work, the building is simply not a good piece of urban architecture—it does not seem to understand its context. For instance the architect was to provide an enclosing wall for the adjacent John Marshall Park—and he did not, choosing instead to create a parallel open entry court, and an opportunity for a great outdoor space was lost.

Good urban architecture defers to, and works with, the public realm, rather than gathering all the goodies to itself.

How is it that another immensely talented international figure has created his worst work in Washington? The answer does not lie in another recitation of the shortcomings of the bureaucracy (although that is a long list indeed), or in praise of a great architect's intentions without recognizing the shortcomings of the final product. Rather the answer lies in a thoughtful analysis of the skillful work of Washington architects and urban designers.

I look forward to seeing such a discussion in your fine journal.

RONALD EICHNER
The Eichner Group, Inc.
Chevy Chase, Maryland

The writer was a member of the design and planning staff of the Pennsylvania Avenue Development Corporation from 1974 until 1984.
—Editor

Correction

In ARCHITECTURAL RECORD's Observations article in April 1990, the photograph on the left at the top of page 59 was misidentified. The building shown is Block 4A of a complex in Riyadh designed by the Saudi Consulting House/Leo A Daly for the Pension Fund of the Kingdom of Saudi Arabia.

Through August 17
"Competitions x 3," an exhibition of prize-winning designs in three competitions for monuments—the Korean War Veterans Memorial, the National Peace Garden, and the Women in Military Service for America Memorial, all to be built in Washington, D. C.; at the gallery of the National Institute for Architectural Education, New York City.

Through August 18
"Cassina I Maestri & Glasgow School of Art," showing furniture by Le Corbusier, Rietveld, Asplund, and Mackintosh; at the Glasgow School of Art, Glasgow, Scotland.

Through September 16
"The Art Museums of Louis I. Kahn," showing drawings of the Yale University Art Gallery, the Kimbell Art Museum, the Yale Center for British Art, and the unrealized Menil Museum for Houston; at the San Francisco Museum of Modern Art.

October 10-13
Designer's Saturday 1990, including "Cross Currents," a program of seminars for the design community, and exhibitions in showrooms at the International Design Center, Long Island City, New York. For information: Joanne Markowitz, IDCNY, 2910 Thomson Ave., Long Island City, N. Y. 11101 (718/937-7474).

October 28-31
"A Decade of Leadership," the 11th annual conference and exposition of the International Facility Management Association; at the Baltimore Convention Center. For information: IFMA Education Department, 1 Greenway Plaza, Houston, Tex. 77046 (713/623-4362).

October 31-November 4
"Rivers and Cities," the annual New Orleans Architecture Symposium, sponsored by Tulane University's School of Architecture, the Preservation Resource Center, and the Center for Palladian Studies in America; at the Tulane Architecture School, New Orleans. For information: The Preservation Resource Center, 604 Julia St., New Orleans, La. 70130 (504/581-7032).

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Contractor: CampRigby Roofing-Sheet Metal, Inc.

PIGGYBACKING IS GOOD BUSINESS

Integrating your public relations with clients' brings cost benefits, more punch, and client good will. By Jane Cohn and Dianne L. Frank.

Although piggybacking public-relations efforts has gone largely untapped, the firms that do practice it demonstrate the benefits. One reason for such coordination is to get both parties more for less. Synergy is the key: If architect and client work together, both may receive a greater return for the time, energy, and money—and avoid duplicated efforts and possible conflict.

Speaking from the client's perspective is Angela Kimble, director of corporate communications of Kojaian Properties, Inc., a real-estate and development organization: "We cannot emphasize enough how important it is for us to have architects work in concert, rather than at cross purposes, with us. Our principals are constantly out in the marketplace seeking tenants. Architects who are responsive to those needs are the ones who establish long-term relationships with us. Architects who do not try to understand our business let good opportunities pass them by."

In a marketplace where it is becoming increasingly difficult for clients to differentiate among design firms, the ability of an architect to contribute to the promotion and success of a client's project may make a critical difference in getting work. This ability bolsters the perception of a firm's level of service.

Too often, a design firm's marketing exists solely to secure new commissions, then disappears from client view. Public relations should be woven throughout the life of relationships with clients if you want to keep them. Collaborative promotion is a compelling way to do this.

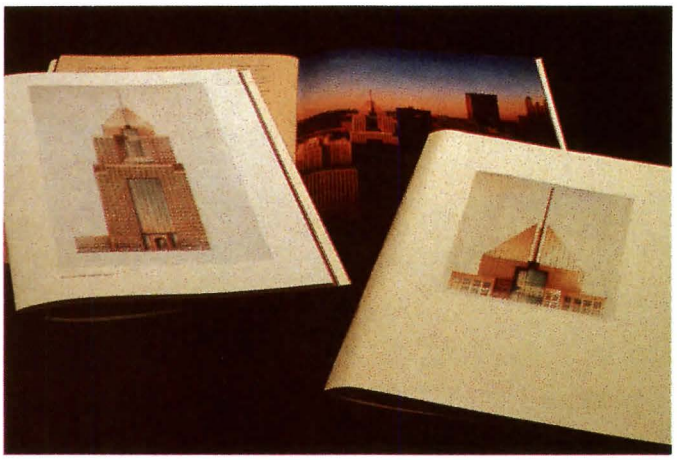
Bringing strengths to the table

An important part of the piggybacking process is understanding what each party can bring to the coordinated effort. Architects may have to educate a client on the value of a public-relations program and how they can contribute.

The value to a client in promoting a well-designed project is obviously in building up the client's image in competition with others in the same field. Visual presentation materials, project descriptions, and technical expertise, which architects are best able to provide, do this for a client's audiences (and for the architect's as well).

In addition, architects may well have a network of contacts within the client's market sector, the construction industry, the general community, *and* the media. Having a track record in awards programs, publication, and media coverage will give credibility that may further convince clients to join in a cooperative effort.

The client, on the other hand, may have a budget for advertising and promotion that is considerably more than the architect's. And the client too has contacts that may be sources of new business for the architect.



A leasing brochure developed cooperatively by The Stubbins Associates and client The Hillman Co. for an office building in Pittsburgh.

"Too often," says Kimble, "architectural firms, while getting their thoughts and ideas on paper and in models to complete a design, neglect other uses for this material that could benefit us in our promotions."

Taking the initiative

Timing is critical in public relations. Once an article the client has initiated appears without credits, it is too late to remedy the omission. As soon as possible after contract signing, hold a strategy meeting with the client to coordinate plans for project publicity.

Discuss both parties' goals and expectations for project promotion. Each side should speak frankly of individual interests, as well as mutual benefits. Decide who will do what. Key individuals representing all interested parties (which may include others besides the client and architect) should be identified. You may wish to take the lead in contacting the design press, whereas the client may lead in contacting the press in the client's field.

The planning meeting may make the client think about what is wanted out of promotion for the first time. Public-relations strategies include developing a message about what sets the project apart, targeting audiences, and selecting appropriate vehicles for communication—which type of publications to approach, for instance.

The public-relations planning meeting should address:

- Strategies of mutual benefit.
- Project milestones and opportunities.
- Roles and responsibilities.
- A timetable.
- Procedures for communicating developments among all parties.
- Clearance procedures and lines of approval.
- Handling and sharing of costs.
- How credits will read.
- Priority or nonpublishable information and sensitive concerns.

Be sure to reassure the client that you intend to respect his goals, needs, and approval requirements if you want to get a maximum contribution toward the effort's costs.

Credit where credit is due

All too often, failure to get credit from a client is due to your own failure in stating your rights and expectations, and following up on them. Like anyone, clients have their own agendas, and often, despite the best intentions and good will, your needs are simply not on their minds.

Part of getting credit is knowing the copyrights and other legal rights you hold. Many firms have gone through years of trial and error in attempts to protect their rights. Some firms have developed special clauses in their standard contracts to address such issues as credits and publications. For example, architects, engineers

and planners Haines Lundberg Waehler have incorporated the following clause in their standard contracts:

In the event the Owner publishes or causes to be published renderings, photographs, or other representations of the Project during or after completion of the services called for under this Agreement, the Owner agrees to include reference to the Architect as designer.... Furthermore, the Owner shall not release material for publication incorporating the designs of the Architect (whether for marketing or public-relations purposes) without first consulting with the Architect so to avoid conflicts of publication exclusives in the design, architectural, and client's industry press and to best service the Owner.

Such clauses, inserted with the advice of a lawyer, provide legal recourse for lack of credit in printed representations of your work and protect architects from being victims of clients' whims.

But inserting the clause may not be enough. Call attention to them to everyone on the client's team. Many times, the client's public relations is not handled by the same people who signed the contract. Finally, any materials that are transmitted from your office—photographs, plans, renderings, plans, drawings, models—should be properly labeled and identified to insure proper credit *and* return of the materials. Copyrights with dates should be included in the identification.

Just as you expect to receive credit, by the same token, give it to others when due. "Nothing aggravates us more than an architect's submitting projects to a design-awards program or to the media for publication, and then not identifying us as the owner/developer," notes Kimble.

Consideration and courtesy

Do not just promise to clear promotional materials with a client. Do it. Client approvals are mandatory for any material used for publicity. Subtle leasing negotiations, political climate, shareholder issues, and other corporate matters may not be readily apparent to you, but may be factors that are vital to the client. While publicity can enhance a client relationship, so too can it destroy that relationship if handled without regard.

Some firms develop a basic package of materials applicable for several types of activities (speeches, awards submittals, news releases), and submit it for one-time client approval and comment. However, new developments, constraints, and time factors arise that may change a client's decision regarding promotion after the initial approval. Project costs can be a particularly sensitive subject.

Whenever possible, it is best to submit materials and specific explanations of use for approval before you use them, even if you have received a one-time approval. If consent is denied, that restriction must be observed. Public relations has its own code of behavior.

While joint participation in promotional materials may save costs, take care to communicate such agreements to those who execute the promotional services. Photographers, in particular, have stringent requirements regarding rights to photography which may be complicated by not knowing of your arrangements.

Piggybacking with other team members

The principles of piggybacking with a client also apply to associations, joint-venture partners, and consultants. Credits, plans, and guidelines for promotion need to be fully explained and agreed upon among the members of the project team. Here, again, contractual clauses are necessary for ensuring that credit goes to the association or partnership, rather than individual firms, and for spelling out the obligations each associate, joint-venture partner, or consultant has to the promotion of the united effort.

A building-dedication pamphlet developed by Stubbins and client Erie Insurance Group also helped the City of Erie to promote downtown development.

Coordination with associates augments the firm's resources and contacts, and, in the case of national practice, provides a base for local representation and visibility.

Another route to cooperative promotion is joining forces with contractors and others in the building trades. This not only expands your network to another sector, but strengthens liaison between members of the design and construction industry. There are numerous building-trade magazines and award programs that can bring recognition and visibility to architects, yet many are neglected.

Material suppliers are more than happy to give visibility in their sales materials to a firm's project in which their product is specified. As substantial advertisers, manufacturers' representatives are usually familiar with what publications are looking for and may be valuable resources of publications' interests.

Piggybacking for the small firm

In a small or relatively unknown firm, principals usually bear more of a personal burden for marketing and promotion. The resulting personal contact may be used to great advantage in cooperative public relations. The small firm benefits from a streamlined process: one person overseeing the client's project—from idea, to design, to delivery, to promotion—and has a clear idea of a project's aspects best used to public-relations advantage.

Piggybacking with a client's public relations may provide the resources, time, and funds that a small firm lacks. For instance, there can be quality photography otherwise prohibitive on a small firm's budget.

It becomes even more important for the small firm to establish priorities, and focus on getting the most for available funds, especially if the client is small with limited means. The effort may well pay off for the small firm more than for the large because publications always look for fresh talent.

Types of integrated campaigns

Integration of promotional efforts can take many forms and achieve a wide variety of results. Some of the best ways to use integrated promotions are placing feature articles, news releases, or coauthored articles. Project milestones such as groundbreakings, topping-off ceremonies, and dedications are ideal opportunities. Credit on construction-site signs and cornerstones should be incorporated into project agreements. Piggybacked advertisements and preleasing brochures are current trends in marketing commercial space and acknowledge the contribution of good design to real-estate sales. Videos are another opportunity for cooperative effort.

Joint submissions to awards programs can be particularly effective in both design and industry-sponsored programs. The client's own publications and annual reports offer the architect an expanded audience, and themselves benefit by the incorporation of information on the architecture of the client's buildings.

Ms. Cohn is the director of communications at Haines Lundberg and Waehler. Ms. Frank is a public-relations consultant with offices in Cambridge, Mass. and Birmingham, Mich.

The authors are frequent speakers on public-relations planning at national seminars and conferences.

WHY GO FOR CONVENTIONAL PROJECT DELIVERY

Architects about to be assigned a general-contractor construction manager may want an argument against the idea. Here it is. By Carl Sapers

Carl Sapers explores the virtues of the traditional process by which buildings have been built in America over the last 100 years. Using the specific example of a major university, he suggests ways that process can be made to work better.

In contrast, he observes the current tendency to substitute construction management for the traditional process. In particular, he describes the current practice of engaging a general contractor to serve as the construction manager and points out the problems inherent in the process.

At this hour, the AIA and the Associated General Contractors of America have joined forces to produce a new contract that recognizes the GC/CM process. It can only be hoped that the new document will address Sapers' concerns.

I write more in sadness than in anger as a venerable academic institution begins a major building program convinced that engaging a general contractor to provide construction management should replace the traditional project-delivery system that has served it so well for so long.

How one client made the traditional system work better

I had always intended to write about the virtues of the traditional system as carried out by this particular university because it seemed such a satisfactory way to traverse the valley of construction where the shadow of disaster stalks a project owner. Twenty-five years ago, this university hired a seasoned project manager from a major construction company. He became chief of the university's construction-facilities department and supplied all the project management needed.

By the traditional system, I refer, of course, to design, then build; to a fiduciary architect engaged by the owner under a variant of B-141; and to a general contractor engaged by the owner under a variant of A-101, the lump-sum contract. Here, however, major trades were bid in advance of the general-contractor's bid, a process often described as filed sub-bidding. Each general contractor who bids a project must take the lowest sub-bidders from that process.

- Major Clients have benefitted from employing their own facilities staff or professional construction managers to assure that new facilities meet client objectives.
- This has enabled some to realize cost advantages by taking their own bids for subcontracts, while making the general responsible for their performance.
- It has also eased the clients' ability to get input on cost reductions from those contractors.
- These advantages have led some blindly into the belief that the contractors can take over the construction-management process, even though they may not necessarily have the client's interests at heart.
- The matter becomes particularly critical as the AIA and the Associated General Contractors of America work on new documents to recognize the GC/CM process. **C. K H.**

The virtues of the traditional system as practiced at this university are manifest: In 25 years there has been only one legal action against the owner. The buildings are well built and, measured by other construction costs in the region, inexpensive.

> The rush to new ways of doing things is a weakness in us all.

These are not cookie-cutter projects; many involved the rehabilitation of historic monumental structures and other design complexities.

In short, a lot could have gone wrong. It is useful to examine why it did not.

The university, with the guidance of its in-house construction chief, carefully programmed its project needs, involving the users at an early stage. Mock-ups of faculty offices, for example, might be authorized during design development, notwithstanding the additional expense, so that persons with little capacity for visualizing a space from two-dimensional architectural drawings might see and feel their future work environment.

The architect was expected to produce complete construction documents, including abundant details, and given adequate time for the process. If there was a complex aspect to the design that the client wanted to see in more-than-normal detail, the architect might be paid as an additional service for preparing special drawings and specifications. Both the university's chief and its architect carefully reviewed the design decisions and the final documents.

Cost advantages in this particular form of the traditional process

The above steps, while adding to the cost of the design phase, reduced construction-phase change orders dramatically — and made the lowest bid a fair representation of what the project would actually cost. An owner pays for change orders at retail; the initial lump-sum price is wholesale.

Electric and mechanical work on every project was prebid. On projects having other trades comprising a substantial portion of the work, those trades were also handled by prefiled sub-bids. On average, half of a general contractor's price comprised such sub-bids. Filed sub-bidding gives the economic benefit of the bidding process to the owner, not the contractor.

But the general contractor's price will not survive for long if he is litigious or practices sandbagging (i.e., carefully scrutinizinig the contract documents to find the owner's vulnerable points — bidding low and then exploiting those points by demands for change orders).

A client, such as a private university, reduces this risk enormously by carefully vetting the generals and the subs it invites to bid its work. (Of course, such exclusivity won't work on public construction.) An owner needs someone on its side, such as the university's chief, who keeps careful records of the performance of contractors. A promising contractor is invited to bid a small job and, by proving himself, moves up the eligibility ladder to larger ones.

By limiting the invitations to bid to, say, three contractors, each knows he is in final contention and takes his opportunity seri-

ously. This exclusivity yields another benefit. If the lowest aggregate bid is still too high for the budget, the construction chief goes to the three bidders (assuming the three bids were reasonably close together, as they usually are) and requests free value engineering from each.

"How would you take a half million out of the job?" he asks them, and it is typical for all three to respond. The architect and the owner process the suggestions and rebid the project with the value engineering they are willing to accept built into their revised construction documents.

This value-engineering advice comes from contractors who have just completed a close examination of the project. They are willing to give the advice freely because they know that rebidding will be confined to those in the first bidding and because they want to stay on the client's favored list.

I have observed this highly developed version of the classical project delivery system, and it works. Why then has this university decided to abandon the classical project-delivery system in favor of construction management as it launches a major construction program?

Neil Sheehan observed in his book on Vietnam, *A Bright Shining Lie,* that we were, in large part, propelled into the Vietnam catastrophe by misunderstanding an earlier limited success in the Philippines. Something similar is at work here: Someone had one success in construction management and is an uncritical champion of the process ever after.

How construction management began

Construction management was born in the 1960s out of some quite specific exigencies. Inflation was increasing construction costs at a rate of 1 1/2 percent per month. But, if an owner could start procurement one-third of the way through a design process anticipated to take 18 months, he might save 18 percent on heavy-cost items such as steel.

It was feasible for the architect to package construction documents for segments of the project. Foundation and structural steel, for example, might compose a first-bid package when design-development documents were still in preparation for the balance of the project.

But who would coordinate a project being bid in segments? If the owner was a public agency, it was probably not capable of doing so and, in most states, barred by law from negotiating this role with the general contractor.

Thus was born the professional construction manager [who often, in latter years, might indeed be an architect] and who would coordinate on the owner's behalf the multiple-segment process. The professional CM was subject to the same laws as an architect or engineer and could be retained by negotiation, rather than by bidding.

General contractors seize the day

The private sector was similarly affected by inflation in construction in the 1960s, but was free of laws inhibiting negotiated contracts with contractors. General contractors saw the opportunity in the private sector to take on the coordination role themselves. There was a new fee to be earned in the process and, if the owner could be persuaded to make direct contracts with the subs in each segment of bidding, the GC/CM would have no financial responsibility for failures of the segment contracts.

These contractors could do even better if the private owner accepted that the cost of purchasing in segments to defeat inflation was not to know the final price until the bids came in on the last segment. This meant in essence that the GC/CM never gave a price commitment.

> "We were propelled into Vietnam, in part, by misunderstanding an earlier limited success in the Philippines."

As the parties to the process became more experienced, however, the owners began to deny GC/CM's that advantage. After all, these new GC/CMs were only lately transformed from conventional general contractors with the experience and knowledge that enabled them to estimate costs. Owners expected a Gross Maximum Price at the time the first segment went out for bid — not when the last segment bids were received. This was not an unreasonable demand by owners who, of course, wanted their costs capped early. But, in practice, this aspect of the GC/CM's role has caused great mischief.

The basic conflict of interest

I have observed architects taking positions on behalf of their client-owners or even on behalf of the building itself (when their client-owners were willing to have it cheapened) which were often contrary to the financial interest of the architect himself. These include comprehensive redesign, extended negotiations, or — when circumstances warranted — just saying no. That possibility is inherent in the fiduciary responsibility that the architect customarily undertakes. The general contractor, however, is historically a vendor who has no performance obligation beyond his contract obligations.

With these thoughts in mind, examine what happens when the GC/CM is asked for a GMP at the beginning of design development. He wants, of course, ultimately to build the project and knows that a GMP beyond the owner's pocketbook may terminate the project altogether or, at least, cause the owner to engage a new CM. But he has an out. He can claim that the final documents materially embellished the GMP documents; in short, the profligate architect was at fault. This conflict frequently arises and makes many architects unhappy with the GC/CM process.

When a project is bid in phases, there are other risks including possible dispute when the responsibility for work falls between bids in two phases. In the conventional system, there is a general contractor who must perform the work no matter the disputes of subs. But when there is, in effect, no general contractor (because he is now the CM), that responsibility goes up to the owner or the architect for failing to bundle the work with the appropriate subcontractor's responsibilities.

When inflation is at less than 1/2 percent per month, bidding in phases makes very little sense. Yet there are GC/CMs who will still recommend it.

A GC/CM's fee may be no more than an owner might pay a conventional contractor. But it is often a great deal more. One leading GC/CM demands 20 percent of all value-engineering savings it produces and 40 percent of the owner's contingency fund not spent. Frequently, there is no maximum on the amounts which a GC/CM charges for time and materials.

A clear listing of the construction administration duties of a CM differentiated from an architect's has yet to be written. When two independent parties are assigned the same job, it has been my experience that the job doesn't get done — each party blaming the other.

The rush to new ways of doing things is a weakness in us all. As architects advise their clients on whether or not to abandon the classical project-delivery system, they should at least have in mind its virtues and some of the perils of the construction-management system when it is not carried out by persons with impartial interests.

Perhaps the last word on all of this is that an honorable owner, a devoted and skilled architect, and a contractor of integrity and capacity will build successfully no matter what system is used.

Mr. Sapers is a partner in the Boston law firm of Hill & Barlow. His clients include architects around the world. He is adjunct professor at the Harvard Graduate School of Design, where he teaches legal problems in design. In 1975, he received the AIA Allied Professions Medal and, in 1988, was elected Honorary AIA. □

TWO MODERN MASTERS AND LAST YEAR'S LATEST STYLE

Eames Design: The Work of the Office of Charles and Ray Eames, by John Neuhart, Marilyn Neuhart, and Ray Eames. New York: Abrams, 1989, 456 pages, $95.

Reviewed by Gerald Moorhead

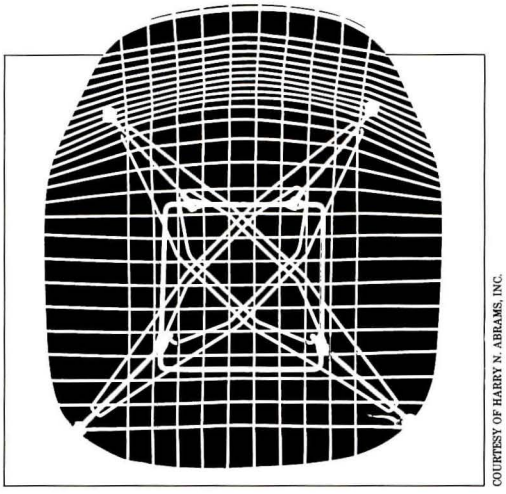
Just a glance at this finely wrought volume will bring to mind the deep and lasting impact that Charles and Ray Eames and their many associates had on the visual culture of the last 40 years.

The breadth of Charles's interests, beginning with architecture and furniture design and expanding into graphics, photography, film, and exhibitions, brought an interdisciplinary approach that enriched the possibilities of each design solution.

Designed by Eames associates John and Marilyn Neuhart, in collaboration with Ray Eames, the book itself is an act of Eames design. The book is graphically composed as a timeline, an exhibition format frequently used by the Eames office.

A perceptive introduction is followed by a biographical sketch of Charles (born 1907) and Ray (born 1912) up to 1941. Many tantalizing questions about this period, however, are left unanswered. Why, for example, did Charles leave architecture school after two years? Why did he return to study at Cranbrook at age 31, when he had established himself as a professional architect? Finally, why did he leave Cranbrook for California at a time when he was involved with the school and collaborating with the Saarinens?

Projects are arranged chronologically, rather than thematically or by type, giving a sense of the interrelationship among the Eameses' diverse design activities. The top of each page is struck laterally by a datum line. The zone above contains the list of the staff that year, office activities (awards, lectures, etc.), and snapshots of friends, clients, and behind-the-scenes glimpses. Below the line, each project, whether it is a piece of furniture, a house, or a film, receives a full page (often more) of informative text and color illustrations. While the concise project descriptions invite casual, random readings, the projects are not isolated as self-contained events but rather are unified by the flow of ideas, continuing interests, and recurring themes.

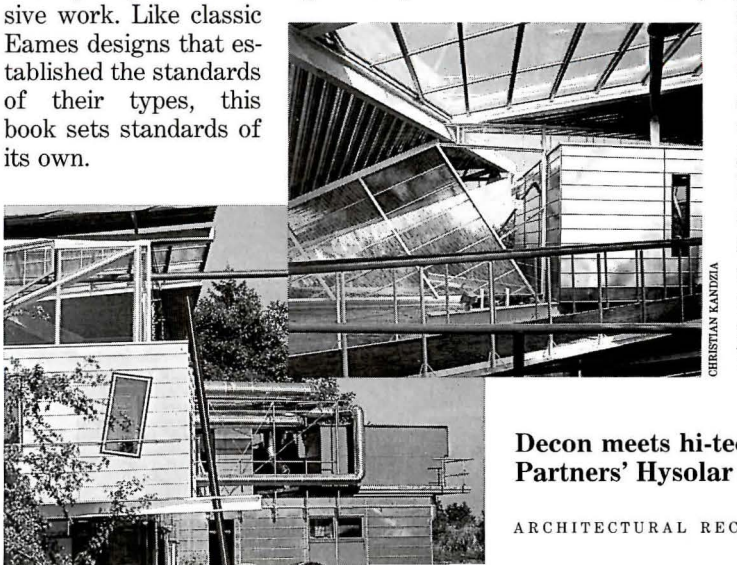


COURTESY OF HARRY N. ABRAMS, INC.

An Eames classic: spare but sensual.

Even in today's manic publication market, few American designers have had their work so completely documented as the Eameses do here.

To make a complete catalog of the Eameses' work from 1941 (the year they moved to California) to 1978 (the year Charles died), the authors, along with Ray and the publisher, agreed to "do a definitive, factual record solely of the work and not to attempt a critical assessment of either the work or Charles's place in the history of design." Begun in 1982, the monumental task of researching each project and selecting images took six years, barely to be completed before Ray's death in 1988 (10 years to the day after Charles died). The inclusion of several essays of the type intentionally omitted would have made this already impressive catalog a comprehensive work. Like classic Eames designs that established the standards of their types, this book sets standards of its own.



CHRISTIAN KANDZIA

Decon meets hi-tech in Behnisch & Partners' Hysolar Institute.

Deconstruction: The Omnibus Volume, edited by Andreas Papadakis, Catherine Cooke, and Andrew Benjamin. New York: Rizzoli, 1990, 264 pages, $75 (hardcover).

Reviewed by Aaron Betsky

For those who have always thought of the shredded world of Deconstructivism as an *Alice-In-Wonderland* of conceits and textual revenge, Rizzoli has published the ultimate compendium, a kind of 1,001 tales of Decon. Editors Papadakis, Cooke, and Benjamin have gathered the results of a symposium at London's Tate Gallery in 1988, added some articles from the British magazine *A.D.* and commentaries from newspapers, then topped it all off with selected works by Decon's main perpetrators (Eisenman, Tschumi, Tigerman, et. al.).

The format of the book is perfect. Deconstructivism is a response to a world so complex and incomprehensible that we have all but given up on finding a unifying explanation for the whole. Thus the latest *zeitgeist* is represented by this book's gathering of shards, some incomplete, some referring to each other, and some self-sufficient snippets of wisdom.

Yet a traditional structure peeks through the book, as it does in most Deconstructivist projects that have actually been built. First Cooke provides a historical basis for the movement by analyzing Russian Constructivism, Suprematism, and other revolutionary "isms." Next several critics offer a philosophical basis for the movement by appropriating the methods of French Post-Structuralism in a section featuring an article by and interview with their guru, Jacques Derrida. The book then presents an overview of the field, ranging from Tschumi's touchstone Parc de la Villette to Tigerman's indeed stumbling "Failed Attempt

to Heal an Irreparable Wound." True to its exaltation of complexity and contradiction, the book even includes some rather vicious criticism of the whole phenomenon.

What emerges from all these projects is neither a style nor a school, but an attitude of communication, a way of telling a story with architecture. As critic John Griffiths points out, Deconstructivism is a continuation of Modernism's attempt to become the master narrative of the contemporary world. Deconstructivism claims it merely mirrors the world. Just as MTV presents the world in quick-cut, highly energized visual bites, so Deconstructivism presents a rock-opera's worth of heavy-metal power chords. Just as our urban planning policies create homelessness at a vast scale, so Deconstructivism poses the lack of home, center, and place at the core of its discourse.

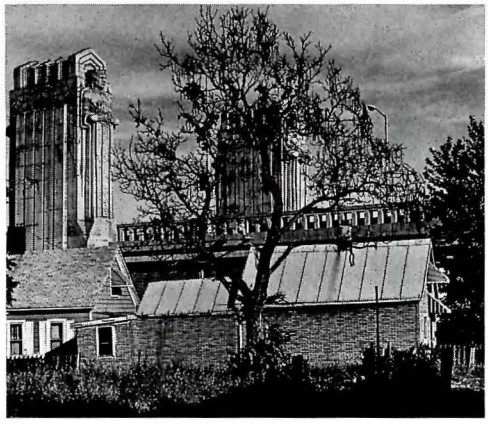
Columbus, Indiana: An American Landmark, by Balthazar Korab. Kalamazoo, Michigan: Documan Press, 1989, 168 pages, $33.
Cleveland, Ohio, by Cervin Robinson. Cleveland: The Cleveland Museum of Art, 1989, 106 pages, $45.
Modern Architecture, Photographs by Ezra Stoller, by William S. Saunders. New York: Abrams, 1990, 228 pages, $60.
Looking at Architecture by G. E. Kidder Smith. New York: Abrams, 1990, 168 pages, $35.

Reviewed by Clifford A. Pearson

Capturing a three-dimensional art on a sheet of paper is the challenge facing every architectural photographer. That some images transcend the mechanics of the medium and breathe with the spirit of their subject is a testament to the skill of a handful of photographers. Luckily, four such artists have recently published collections of their photographs.

Balthazar Korab has not just created images that we often conjure up when thinking of buildings by various architects affiliated with the Cranbrook Academy, he also has become linked to an entire town of great buildings—Columbus, Indiana. Not surprisingly, his book on Columbus includes a fine sampling of photographs he has taken there over the course of three decades. Less expected, though, is the excellent text Korab has written to accompany the pictures. Informal and occasionally impressionistic, the writing offers Korab's observations on the prairie, the Saarinens, and J. Irwin Miller.

While Korab covers Columbus as virtually a native son, Cervin Robinson looks at Cleveland through the eyes of an outsider. Detached and often bathed in a cool light, his photographs examine the city as a place of fascinating objects—whether they are buildings on the skyline or great



©CERVIN ROBINSON

Cervin Robinson captures the eerie beauty of Cleveland, Ohio.

industrial structures along the lakefront. Like Korab, Robinson proves to be nearly as good with words as he is with images, contributing a well-crafted essay on how he developed his photographer's eye.

Ezra Stoller's photographs in William Saunders' book form a selective history of Modernism as seen by a man who has helped shape the way we look at and remember architecture. Ranging from the work of Greene & Greene to buildings by Aalto and Meier, Stoller's camera captures special moments when light or people bring architecture to life. A shot of SOM/Gordon Bunshaft's Beinecke Rare Book Library at Yale, for example, shows light filtering through the thin layers of stone that take the place of windows. The photograph seems to be proof of Goethe's assertion that architecture is "frozen music."

Kidder Smith's *Looking At Architecture*, due out in October, features subjects as varied as the Great Pyramids at Giza, Angkor Wat in Cambodia, and Louis Kahn's Salk Institute in La Jolla, California. These rich black-and-white photographs have the look of the best photographs of the 1930s, exhibiting superb control over light and shadow. The text by Kidder Smith is straightforward and informative, if occasionally a bit dull.

Briefly noted

Ornamental Ironwork: Two Centuries of Craftsmanship in Albany and Troy, New York, by Diana S. Waite with a foreword by Margot Gayle. Albany: Mount Ida Press, 1990, 144 pages, $19.95.
A well-researched history of 19th- and 20th-century metal detailing with a chapter by John G. Waite on preserving and restoring ironwork.
Architectural Detailing in Residential Interiors, by Wendy W. Staebler. New York: Whitney Library of Design, 1990, 248 pages, $49.95.
A useful grab-bag of details (from archways to window walls) illustrated with color photographs and working drawings.
Lighting Design Handbook, by Lee Watson. New York: McGraw-Hill, 1990, 458 pages, $69.95.
Everything you need to know about lighting shopping malls, office buildings, churches, and landscaping, as well as a lot of things you might never need to know about lighting Broadway musicals and puppet performances. □

"Whaddya mean a public menace? Don't you know Deconstructivism when you see it?"

NO PENCILS ALLOWED?

CAD thrives, but it's too early to bid farewell to the old drawing board.

Spring and early summer are the days of the great trade shows, and this year's batch brought out some eye-opening developments on the computers-for-architects front.

Lower prices for hardware, increasingly specialized software (but interfacing with a growing number of platforms), more flexible 2-D/3-D presentation packages, improved integration of vendors' software with network software, declining differences between networked PCs and workstations, and the marketing of detailing packages linked both to generic and brand details and, soon, to specifications—all these and more are bringing close the day when the architectural office will be using pencils strictly for early schematic sketching (perhaps) and as a tool for opening soda cans [be sure to read Steve Ross's report on the A/E/C Systems megashow in Atlanta beginning on page 106].

Indeed, some of the big Japanese firms are now totally computerized, from early design through as-built drawing files, with all consultants as well as the client and facilities manager having access to appropriate layered drawings linked to the same database.

We aren't there yet. Larger firms such as E. I. Brown in Indianapolis, and some SOM offices, are close. Other firms (around 50 percent) are testing the water, and finding that coming up to productive speed (by that I mean the ability to produce a drawing at no more than the cost of manual input, augmented by the amortized capital cost of the computer) calls for some serious management planning (even such simple procedures as placing CAD terminals in the drafting room instead of clustering them in a separate room).

The future, as a brilliant politician once remarked, lies ahead. The future for CAD in the architect's office is promising, with virtually all architecture-school graduates CAD-literate by the early '90s and no longer tied to the drawing board by the umbilical pencil.

It's an exciting age. **STEPHEN A. KLIMENT**

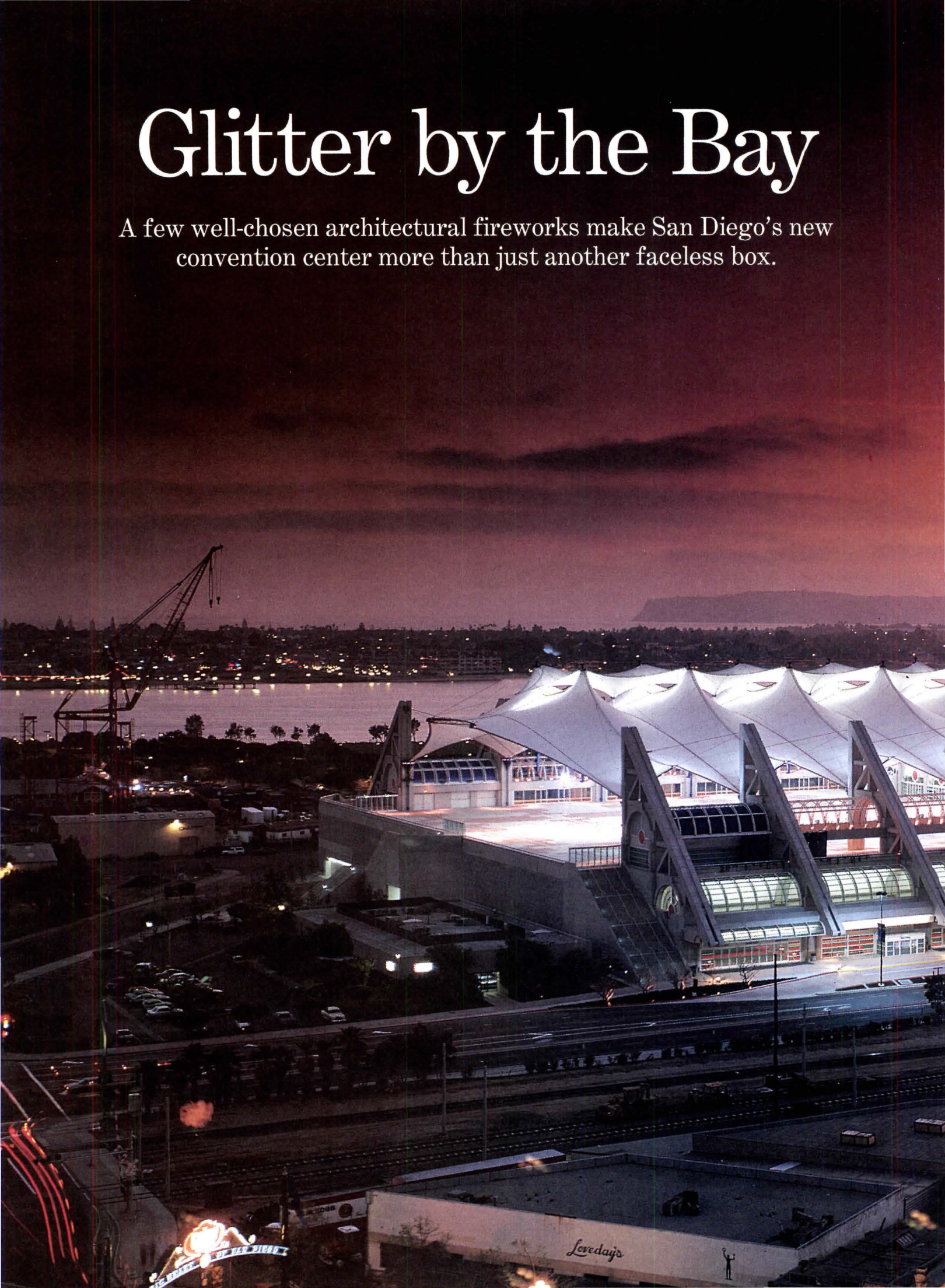
Why hit the small guy?

As we were going to press, the news broke that the Justice Department had settled a new suit with the American Institute of Architects for alleged price fixing. Citing some guidelines published and later withdrawn by the Chicago chapter in early 1985, Justice is, once more, harassing a profession whose incomes compare unfavorably with those of assembly-line workers and plumbers and whose members face hard times due to the drooping construction economy.

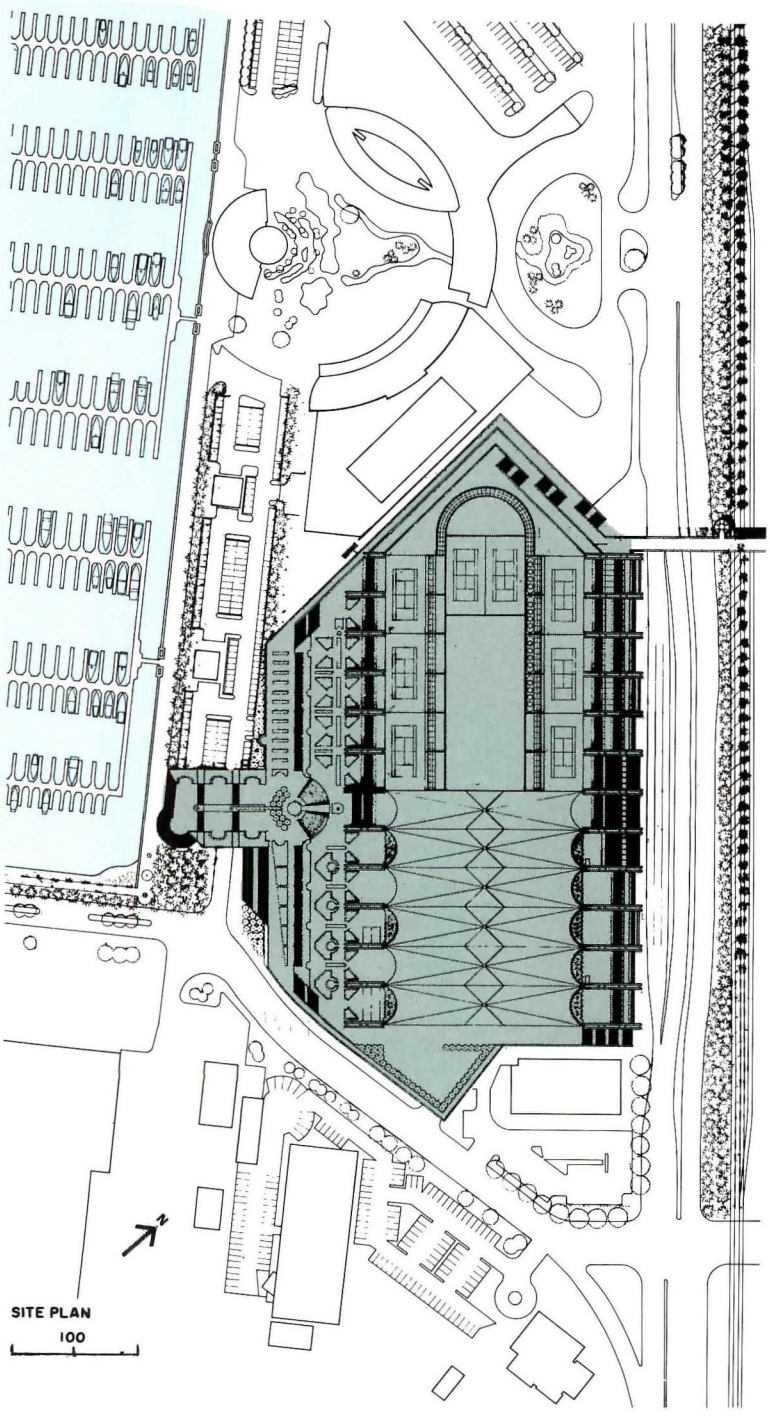
Invoking the Sherman Antitrust Act is fine, but surely the Justice Department with its (we assume) limited staff can put it to far better use by going after the big guys. **S. A. K.**

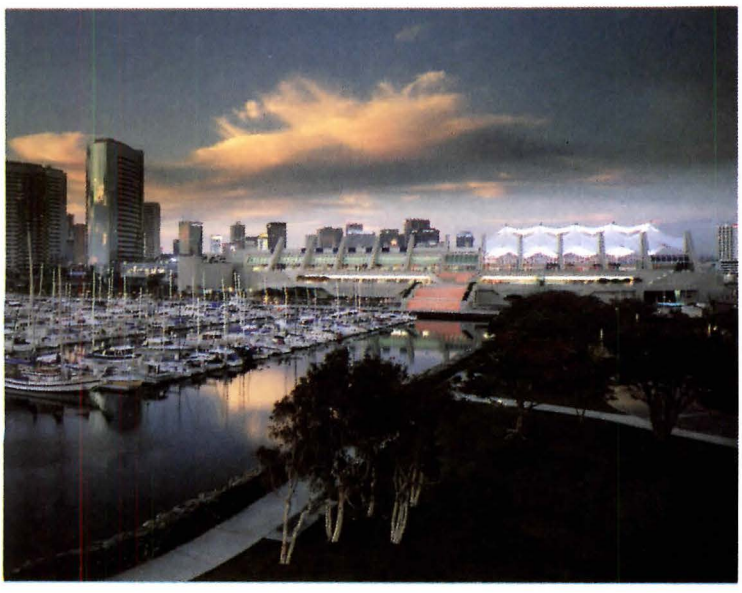
Glitter by the Bay

A few well-chosen architectural fireworks make San Diego's new convention center more than just another faceless box.



San Diego Convention Center
San Diego, California
Arthur Erickson Architects;
Deems Lewis McKinley, with
Loschky, Marquardt & Nesholm,
Joint-venture Architects





As RECORD recently reported in a building types study of four new convention and exposition centers [March 1990, pages 99-113], the focus of current convention-center architecture and planning is on public space and on the relationship of the facility to the community it serves. Now that architects have mastered the technical problems of providing flexible, long-span spaces for meetings and exhibitions with easy access for large objects and equipment, their concern has shifted to matters of competitive amenities and public image.

Less than a year after it opened, the San Diego Convention Center has emerged as the very model of this unique yet ubiquitous building type. The working parts of the $165-million facility at the edge of San Diego's burgeoning downtown are impressive though hardly exceptional in this day of increasingly imposing exposition facilities: buried within the 1.7-million-square-foot center are a 250,000-square-foot exhibition hall at ground level, with movable partitions on 75-foot centers; 100,000 square feet of mezzanine and upper-level meeting rooms, which can be subdivided into 35 separate spaces of 1,000 to 40,000 square feet (the latter for service as a grand ballroom); and underground parking for 2,000 cars.

What sets the San Diego center apart from less distinctive buildings of the same type is the exuberance of its architecture—a billowing glass-and-concrete superstructure that comes across as a high-tech, late 20th-century version of the 19th-century crystal palace. Sharing the upper level with the meeting rooms, moreover, is an unusual 100,000-square-foot open-air space, topped by a tensile fabric roof, that exploits Southern California's benign climate and the center's prominent site at the edge of San Diego Bay. (Other bows to San Diego's celebrated weather are a series of sweeping terraces and a stairway-turned-amphitheater, both located on the building's bay side, and meeting rooms and prefunction areas that open to smaller landscaped terraces).

Keeping the bayfront open

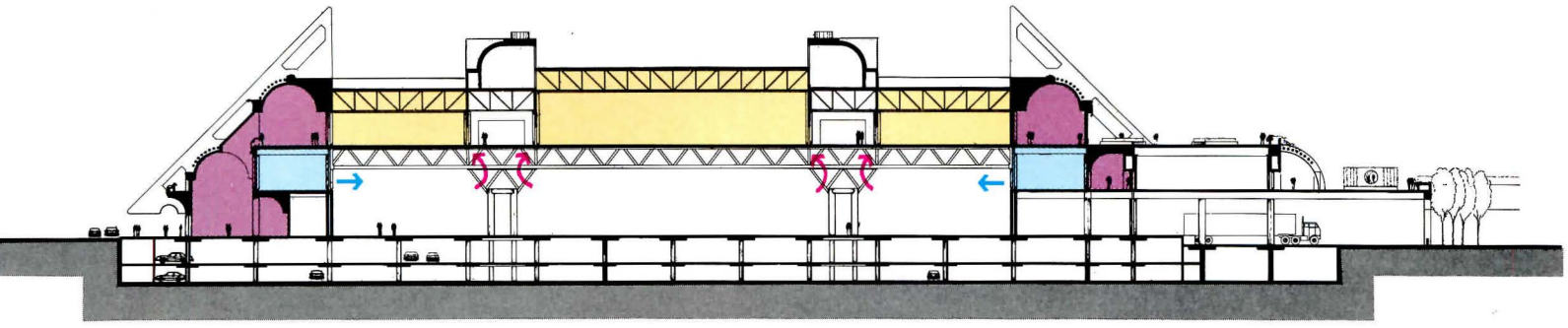
The challenge of the 11.2-acre waterfront site, according to design architect Arthur Erickson, was "to accommodate the massive requirements of the center without cutting off access to the bay and the awareness of the bay's immediate adjacency. Every effort was made to keep the structure as low as possible and to distribute the accommodations in a stepped form."

The result is a long building whose most distinctive architectural elements are glass vaults cascading outward as they descend to the street on one side and the bay on the other. The vaults are held in sharply angular, sand-colored concrete structural fins (originally designed in riveted steel to give the center more nautical character, but changed for reasons of cost and fire protection). The vaults terminate in square concrete plates with circular windows holding bright-red medallions at their centers, one of many primary-color accents that enliven the building's 1,100-foot-long mass.

The first vault on the center's city side covers the lobby, which extends the full length of the building along Harbor Drive with continuous entry doors. A pedestrian bridge will link the building with a proposed linear park and an extension of the city's trolley system across the street. The vaults above house circulation and prefunction spaces, bringing them light and fine views of the city and bay—a relief for those sitting in meetings much of the day.

These spaces are connected by a great transverse vaulted gallery, marked on the building's exterior by canted quarter vaults that the architects call "bubbles." Opening from the gallery on the bay side is a dramatic atrium containing escalators, with huge concrete circles and arches forming two walls and the rounded back of the bayside amphitheater forming a third. Much like I. M. Pei's Javits Convention Center in New York City, the architects' lavish use of glass in San Diego gives a sense of lightness to what otherwise could have been an

Above: the center meets Harbor Drive like an airline terminal. Below: tensile fabric roof covers an open-air exhibit deck.



SECTION A-A

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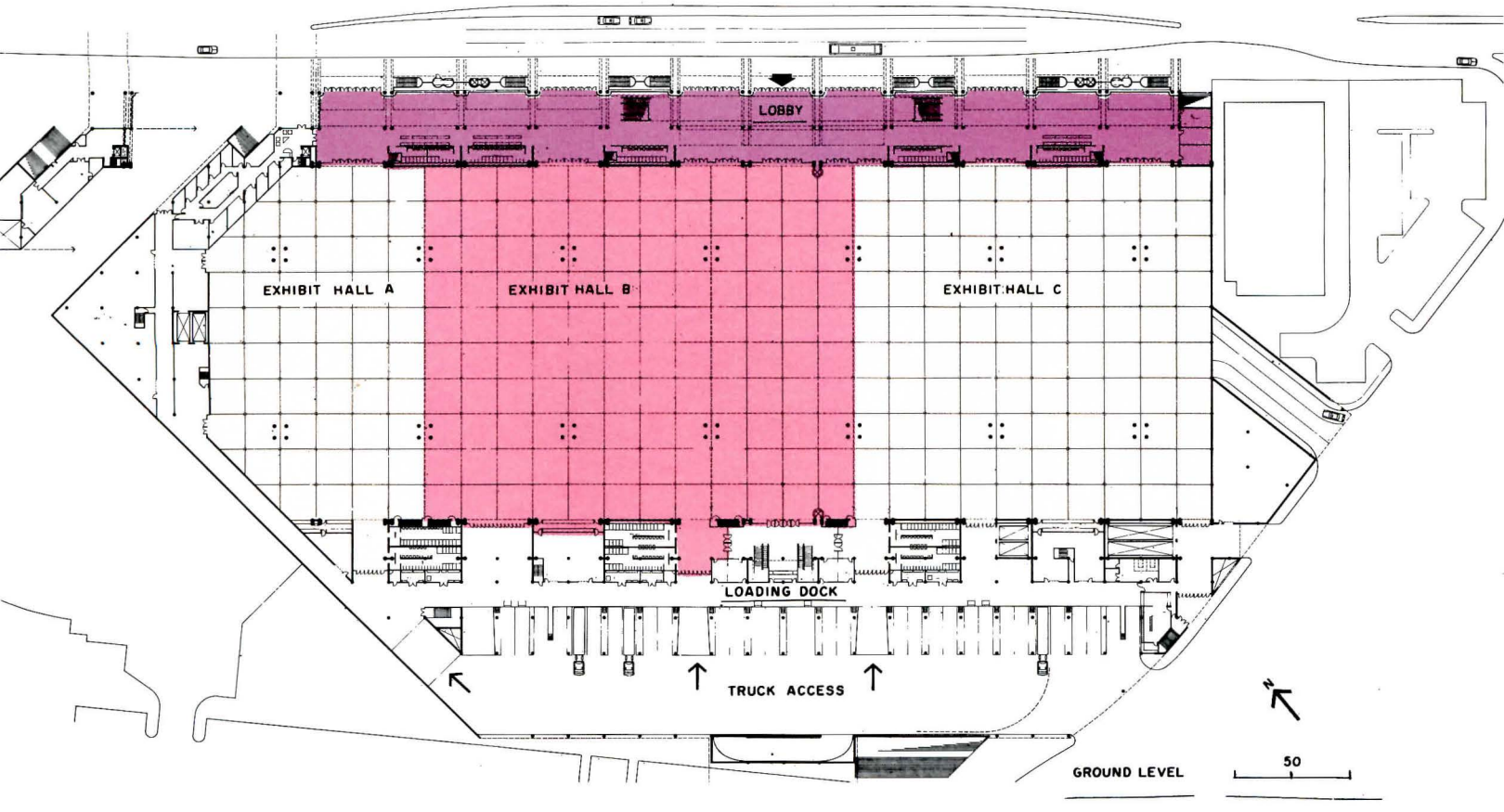
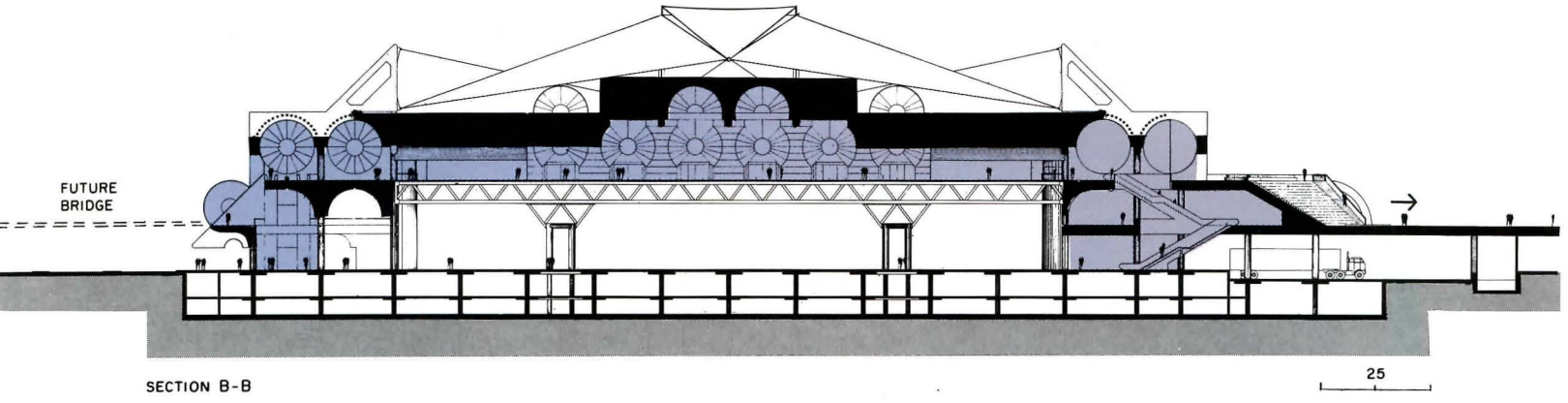
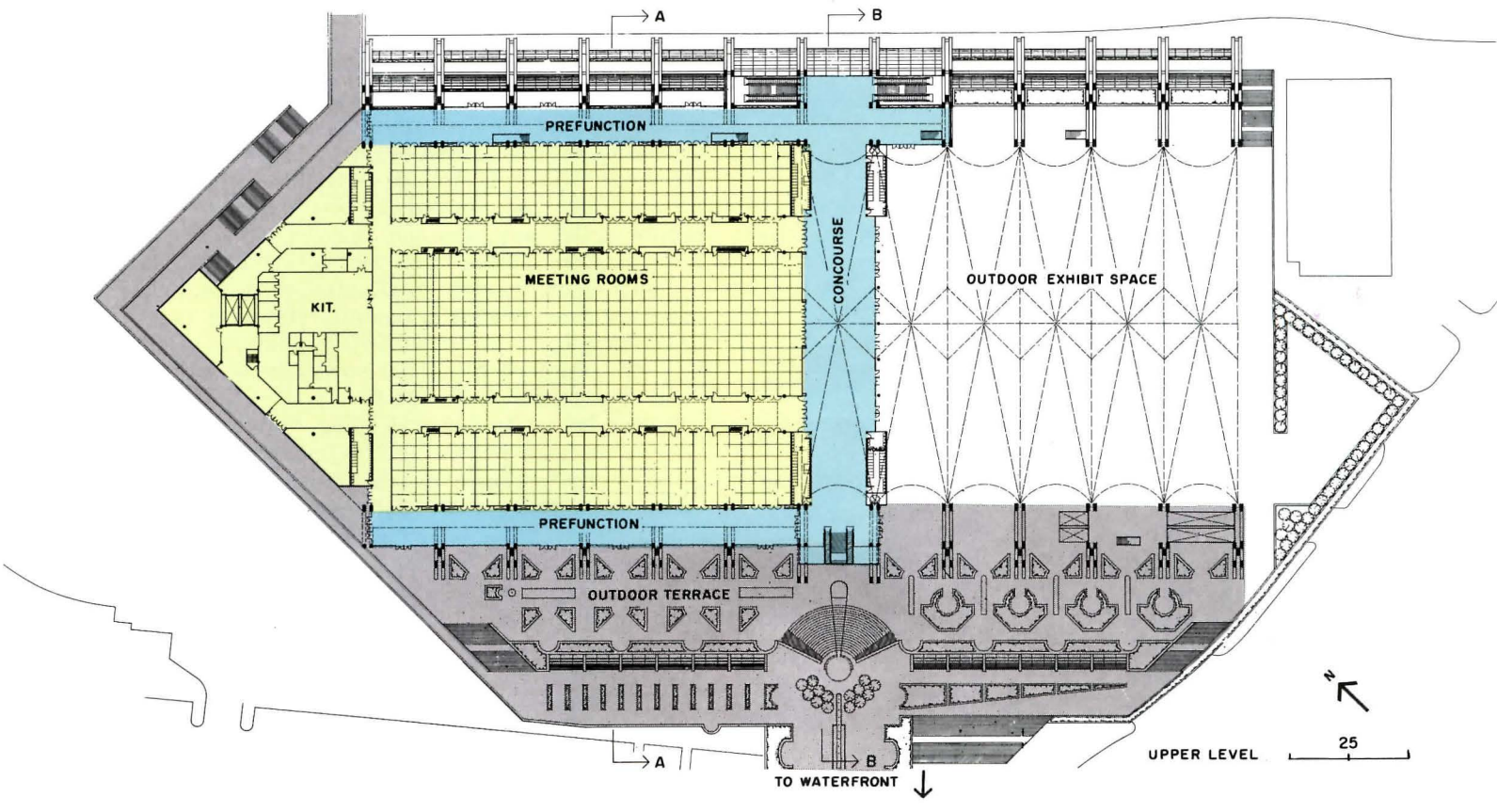


Although the center's mammoth main exhibition hall dominates the ground level, this 250,000-square-foot arena has virtually no exterior presence. Visitors enter the center through continuous doors facing Harbor Drive into a vaulted lobby running the building's entire length. Exhibit materials and other freight are brought into the building along the bay side. Large trucks can come directly into the exhibit hall on ramps. Huge transverse steel trusses in the hall are held on diagonal arms of column clusters, which also contain air return vents. The trusses were originally to be sheathed in drywall, but because of budget cuts most are left exposed. Live loading on the floor of the main hall is 350 pounds per square foot; the hall is 30 feet from floor to trusses, 40 feet from floor to floor.

The building is air conditioned by distributed air-handling systems. The systems, either constant or variable volume, have 100-percent outside air capability to allow the operation of the economizer cycle. Chilled and heated water is provided by gas-fired absorption chiller/heaters with a total capacity of 3,600 tons. Forced-draft roof-top cooling towers provide the condenser water. Underground cables



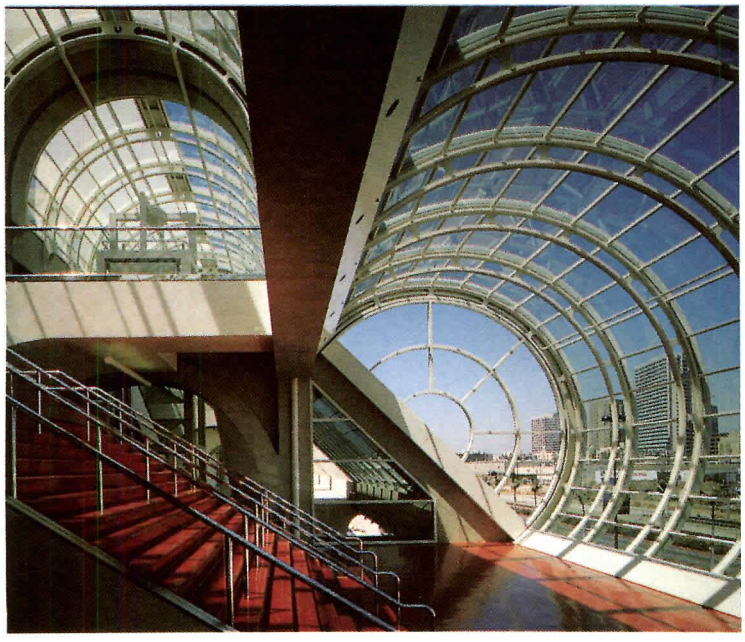
SECTION B-B

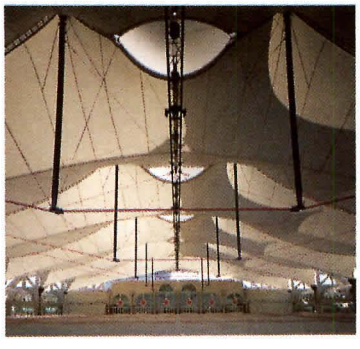


and ducts supply high-voltage electricity. Domestic hot-water systems are supplied by electric water heaters located near the areas served. A combined sprinkler and standpipe system provides interior fire protection, while the roof-top exhibit area is protected by eight high-flow water monitors triggered by cross-zoned smoke detectors. On the upper level, a transverse gallery separates meeting rooms from open-air multiuse space. The gallery terminates on the bay side in an atrium housing vertical circulation. A large space in the center of the meeting rooms may be opened into a single 330-foot-long ballroom. Generous service corridors lead from the food-preparation areas to the ballroom, meeting rooms, and open-air space.

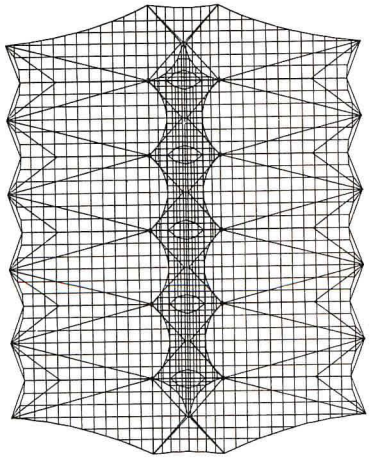
Prefunction areas are topped by glazed vaults and open onto landscaped terraces. Large paved terraces face the bay. Underground parking below the level of the bay required an elaborate dewatering system. Vaults on either side of the outdoor space serve as wind barriers and boast trellises that will eventually bear flowers.

Right: a column cluster in the main exhibition hall. Below: the bayside termination of upper-level concourse, with canted "bubble." Opposite: stairs, escalators, and a glazed elevator interrupt the vaulted ground-level lobby.





The tensile roof (right) comprises five fabric modules. Valley cables spanning between pairs of concrete fins form the modules' long edges. Suspension cables in the center line of each module carry two flying poles or struts. Toward the ends of each module, the cables fork just above the membrane to reach the top of the two adjacent fins, where they are anchored.



unattractive behemoth along the waterfront. The building's transparency not only affords outward views but also gives passers-by glimpses of the activity inside.

Another relieving element is the tensile fabric roof system high overhead, which is illuminated at night. The Teflon-coated glass-fiber roof covers an outdoor space that is used for special exhibits, concerts, and banquets (the center can provide food service for 6,000 at a sitting). The sail-like roof, held 30 to 90 feet above the deck by an elegant web of cables, has 15 percent translucence to let in light with minimum heat gain. Glazed, vaulted trellises on two sides of the space, to be filled with bougainvillea, shelter the deck from offshore winds.

Public access and a critic's letter of thanks

Fittingly for a building erected by the San Diego Unified Port District and operated by the City, the center is entirely open to the public. Visitors who have nothing to do with whatever convention or exhibition is in progress may enjoy all of the center's indoor and outdoor public spaces. What's more, they can come in the Harbor Drive entrance and use the concourse as a corridor to the waterfront.

Once inside, they are made as welcome as users of the convention-related facilities. Center employees carry a handbook defining the "San Diego Spririt," complete with 10 commandments for dealing with the public. Manager Tom Liegler, a dean of the convention business, believes that the users of the center should be treated—and fed—like passengers on a luxury cruise ship. Toward this end, there are uniformed doorpeople at the entrances and "guest-relations representatives" who roam the lobbies to answer questions and offer advice.

The community, from local architects to taxi drivers, seems to have a genuine pride in the facility. Shortly before it opened, *The San Diego Union* published a review of the structure, written in the form of a thank-you letter to Arthur Erickson by architecture critic Kay Kaiser.

Kaiser began by acknowledging that Erickson, caught between "the sour politics" of the mayor and port district and given a site too small for the program, had faced a difficult task. She recalled that efforts were made to eliminate the building's distinctive concrete fins and fabric roofs, and substitute opaque panels for glass in the vaults. She also remembered Erickson's telling the port commissioners that his intent from the start was "to make the city and landscape an integral part of the convention center, both inside and out." She had special praise for the generous 107,000 square feet of terraces facing the water. "With these terraces," she concluded, "you gave back as much of the waterfront to the San Diego public as you could while accommodating the needs of conventioning outsiders."

DONALD J. CANTY

San Diego Convention Center
San Diego, California
OWNER: *Port of San Diego*
ARCHITECTS: *Arthur Erickson Architects, design; Deems Lewis McKinley, management and construction documents; Loschky, Marquardt & Nesholm, programming and facilities planning—Arthur Erickson, Ward Deems, George Loschky, partners-in-charge; Alberto Bertoli, project architect; Francisco Kripacz, interiors; Jim Glymph, project manager; John McKinley, partner-in-charge of construction; Rick Webb and George Shaw, construction administration*
ENGINEERS: *John A. Martin & Associates and Atkinson, Johnson, Spurier (structural); Syska & Hennessey (mechanical, electrical, plumbing); George S. Nolte & Associates (civil); Horst Berger Partners (tent structure)*
CONSULTANTS: *William Lam Associates, Inc. (lighting); Van Dyke & Associates (landscape architect); Purcell & Nappe (acoustics); DesignPoint (graphics)*
GENERAL CONTRACTOR: *Tuto-Saliba-Perini*


Harbor Drive
Parking Garage
Exhibit Hall B
Exhibit Hall A

A Tale Of Two Cities

SHIN AND ERICH KOYAMA

Often overlooked in the search for the cutting edge, Minneapolis and Milwaukee have quietly become two of the most livable cities in the U.S. Without forsaking the past, each has infused new life into its downtown.

Schlitz may be the beer that made Milwaukee famous, but today the Wisconsin city is developing a reputation for progressive urbanism that is rapidly dispelling its image as America's brewmaster. In a similar transformation Minneapolis is capitalizing on its strength in the health-care industry to forge beyond its traditional role as port city to the country's breadbasket. But instead of tearing down the old to make way for the new, both of these cities are reusing their industrial structures and reinforcing their historic urban fabrics. Rather than destroying their heritages, Milwaukee and Minneapolis are using new projects to heal wounds inflicted in the past.

Both cities are once again turning to their rivers for energy. In the past the Milwaukee and Mississippi rivers powered mills and electrical generators; today they form the backbone for downtown redevelopment that includes new office buildings, transit facilities, and cultural institutions.

Like many Midwestern cities, Milwaukee suffered through a number of lean years in the 1970s. But as a result, many of its fine old buildings were saved from the wrecker's ball. Romanesque Revival office blocks still stand cheek-by-jowl with early skyscrapers dressed in the local interpretation of Flemish Gothic. One landmark that didn't survive, though, was the 1892 Pabst Building, whose flamboyant gables and prominent location along the Milwaukee River earned it the status of a local icon. After the original developer failed to get his project off the ground, Faison Associates stepped in and commissioned Clark Tribble Harris & Li to design a 35-story office tower that would recapture at least the spirit of the Pabst. The new building, 100 East Wisconsin Avenue, does indeed display some of the quirky charm of its predecessor. What is more, it helps the river serve as a unifying element downtown by contributing a handsome walkway along the water.

Two blocks away, the Milwaukee Repertory Theater has brought new life to two old power stations and in the process helped keep local residents downtown after dark. One element in a mixed-use complex master-planned by Beckley/Myers, the Rep acts as a critical link between the city's past and its present, between its river and its culture.

In Minneapolis three projects in the historic warehouse district, just outside the city's central business area, treat the past as a building block for the future. Converting a grain elevator into an office building may not be easy, but Ellerbe Becket did it, albeit with mirrors. The project (left) stands as a symbol of change in the Midwest, all the more dramatic for a facade that only hints at the transformation taken place inside (pages 70-71).

The region's evolution from blue-collar to white-collar industries is also reflected in the adaptation of a varnish factory into the Valspar paint research facility. Architects Meyer, Sherer & Rockcastle deftly inserted new elements into the existing brick building fabric, playing the old off the new. The architects also introduced a welcome sense of energy into the no-nonsense old structure by exploiting color to its fullest.

Fitting large public structures into precariously balanced downtowns is a challenge that more often than not results in damage to a city's urban fabric. Stageberg Partners, however, rose to the occasion with its Minneapolis transit station/garage. Not only does the brick-clad facility rest comfortably with the surrounding architecture, but it actually serves as a critical bridge between two parts of the city. Spanning Interstate 394, which had long divided the city's thriving central business area from a neglected warehouse district, the structure is a unifying force helping to heal an old wound. **CLIFFORD A. PEARSON**

BOB HARR, ©HEDRICH-BLESSING PHOTOS

The 35-story building in downtown Milwaukee features an international collection of materials, ranging from Texas limestone to French window glass, Korean mullions, and German metalwork for the arches. Vaulting in the lobby was pieced together from preformed fiberglass-reinforced gypsum (above and right).

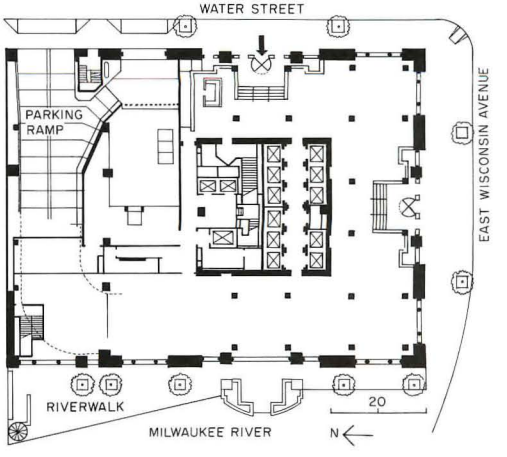
100 East Wisconsin Avenue
Milwaukee, Wisconsin
Clark Tribble Harris & Li, Architects

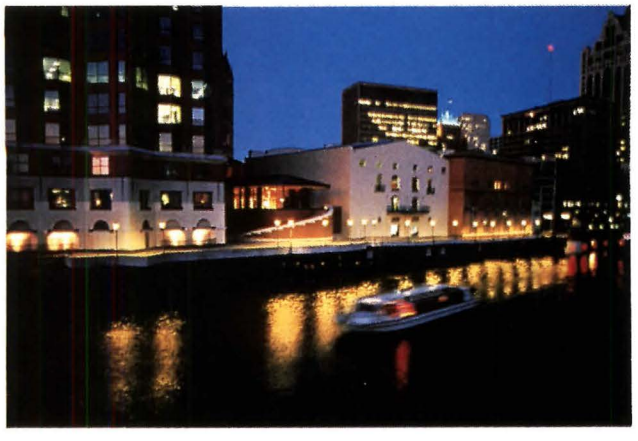
With its base extending onto a public terrace along the Milwaukee River and its shaft topped by Flemish gables that echo those of Milwaukee's historic City Hall two blocks away, 100 East Wisconsin Avenue is an office tower with good connections. The 35-story post-tensioned concrete-frame structure occupies the site where the city's first skyscraper, the 14-story Pabst Building, stood from 1892 to 1980. Demolished by a previous owner despite protests by preservationists, the Pabst Building inspired the new building's 42-foot-high entrance arch as well as its pyramidal tower and cupola.

The 620,000-square-foot office building includes seven levels of parking at its base with retail shops on the second story where skywalks will connect the tower to neighboring structures to the east and west. Clad in Cordova-cream limestone on the lower seven floors and cast concrete above, the building incorporates lightweight spandrel panels made of ceramic polymer and fiberglass backings that are glazed directly with the curtainwall.

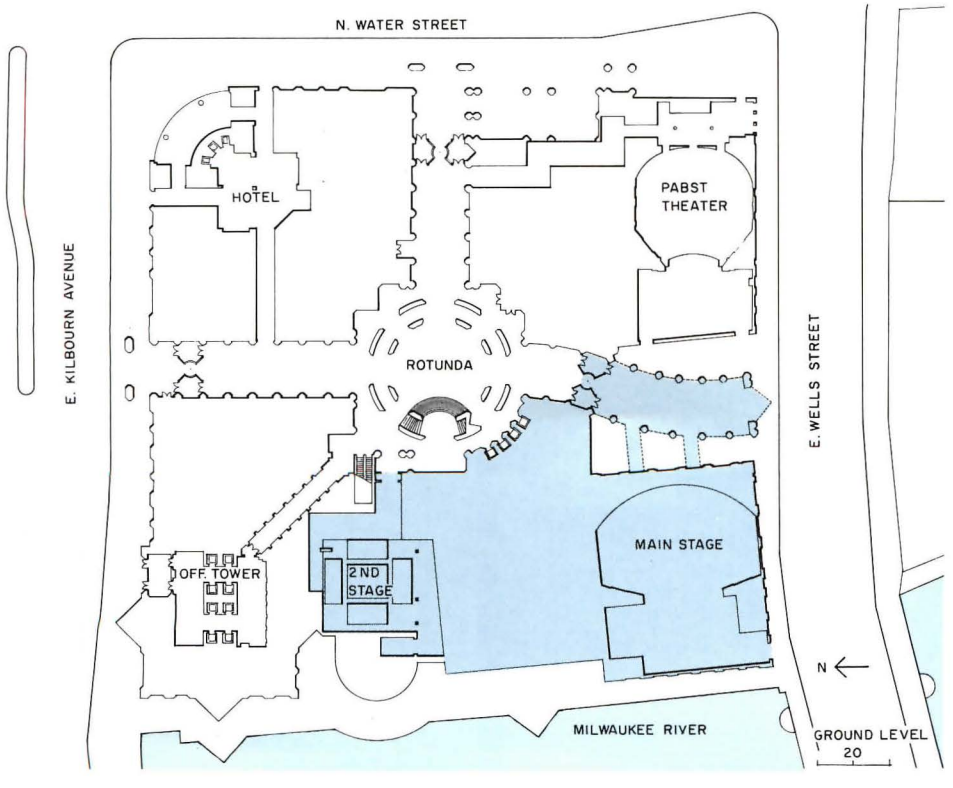
Inside the lobby, the building's arches are expressed in barrel and groin vaulting made of preformed elements of fiberglass-reinforced gypsum. **C. A. P.**

100 East Wisconsin Avenue
Milwaukee, Wisconsin
OWNER: *Northwestern Mutual Life Insurance and Faison Associates*
ARCHITECT: *Clark Tribble Harris & Li Architects—Michael J. Murray, principal-in-charge; D. Patterson Campbell, project designer*
ENGINEERS: *King Guinn Associates (structural); Benner & Fields (mechanical); Bullard Associates (electrical)*
CONSULTANTS: *Craig A. Roeder Associates (lighting)*
GENERAL CONTRACTOR: *M. A. Mortenson*





The East Wells Street facade (above) shows the Repertory Theater in the foreground, a new arcade, and the existing Pabst Theater in the background. Night view of the complex from across the Milwaukee River (left) reveals the SOM-designed office tower on the left, the power stations-cum-theaters on the right, and a public walkway along the river.



Milwaukee Repertory Theater
Milwaukee, Wisconsin
Beckley/Myers Architects

Having outgrown its quarters at a modern performing-arts center, the Milwaukee Repertory Theater found a more spacious home in a pair of hundred-year-old electrical power stations. With the participation of the Milwaukee Redevelopment Corporation, architects Beckley/Myers transformed two city blocks between the Milwaukee River and City Hall into a special theater district incorporating the existing Pabst Theater and three new theater spaces carved out of the power plants' masonry shells.

To make the project work financially and bring 24-hour activity to the downtown location, the Rep brought in Trammell Crow to build a new office tower and hotel. Tying all of the components together are two intersecting arcades and a central rotunda designed by the Houston office of Skidmore, Owings & Merrill.

On the second level of one arcade, Beckley/Myers used SOM's trussed space as a theater lobby and connected it to the powerhouse with two new glass-and-steel bridges. The two main theaters are clearly modern creations with metal railings and exposed catwalks, while the small cabaret sports columnlike lamps that give the space a subtle period feeling.

The complex includes offices for the theater company, rehearsal rooms, dressing rooms, and shops for costumes, props, and sets. All of these spaces feed off a three-story "hub" that serves as the heart of the Rep's backstage activities. A new skylight, exposed trusses, and overhanging balconies establish a series of levels that seems to have grown within, instead of having been inserted inside, the power plants' walls. To enhance this sense of layering, the architects retained the old walls' irregular interior surfaces, incorporating patches and abrupt changes from glazed to rough brick in their design. "We felt a certain amount of archaeology on the inside would be nice," says Sherrill Myers, the partner in charge of the project. **C. A. P.**

Milwaukee Repertory Theater
Milwaukee, Wisconsin
OWNER: *Milwaukee Repertory Theater*
ARCHITECT: *Beckley/Myers Architects—Sherrill Myers, partner-in-charge; Scott Georgeson, Steve Greiczek, Bill Williams, Gary Johncox, project team*
ENGINEERS: *Harwood Engineering (structural); Ring & DuChateau (mechanical); Dolan & Dustin (electrical)*
CONSULTANTS: *Yerges Acoustics (acoustical); Richard Hays (theater); Rugers & Zenoni (theater technology)*
GENERAL CONTRACTOR: *Morse Diesel*

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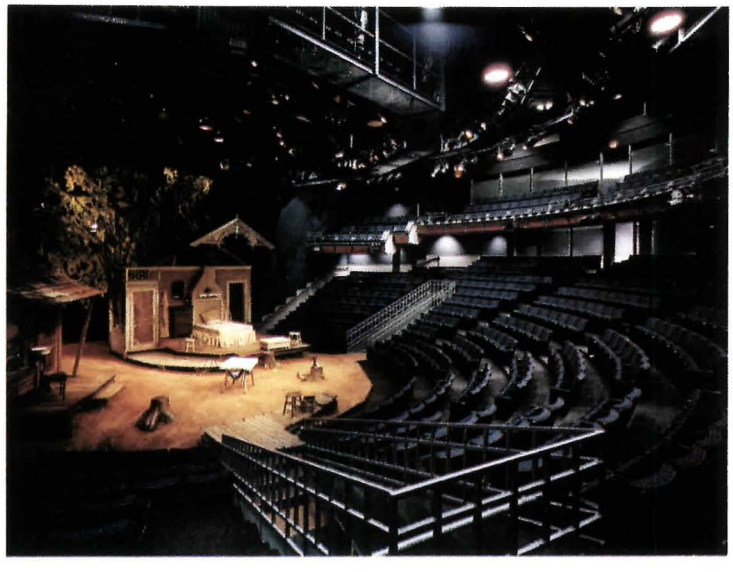
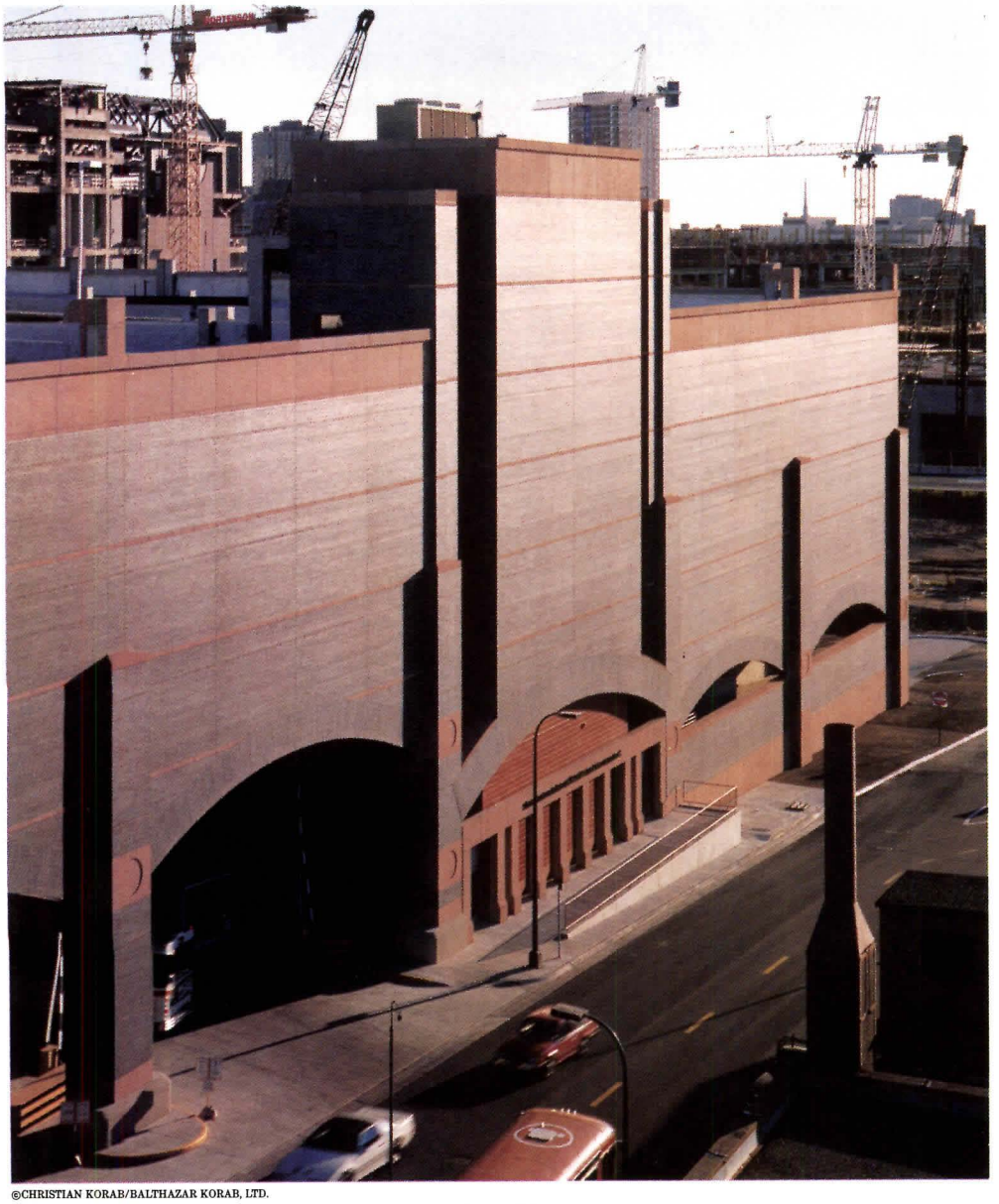
The lobby to the Main Stage occupies the second level of a serpentine section of arcade (above). The hub of backstage activity is a three-level space (below left) that offers access to all stages, rehearsal rooms, and costume and prop shops. The thoroughly modern Main Stage (below right) seats 720, while the Second Stage (not shown) seats 220. A cabaret seats 120.





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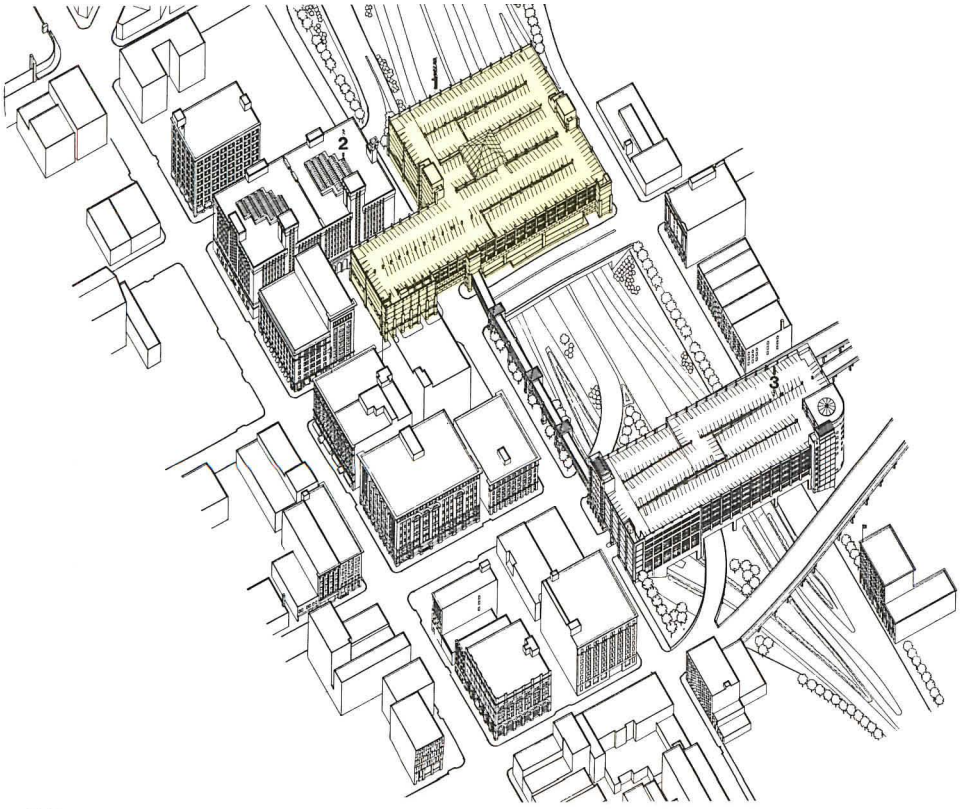


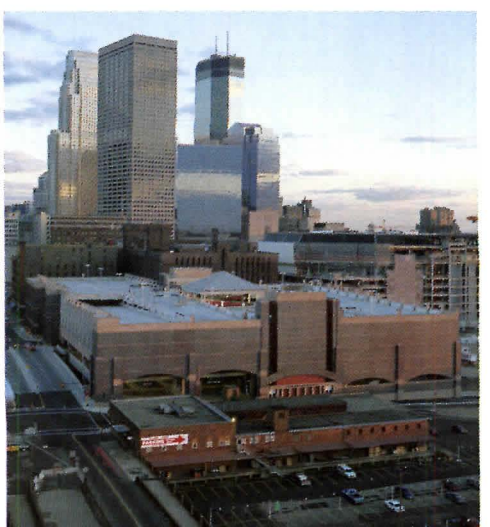
5th Street Parking/Transit Facility
Minneapolis, Minnesota
The Stageberg Partners, Architects

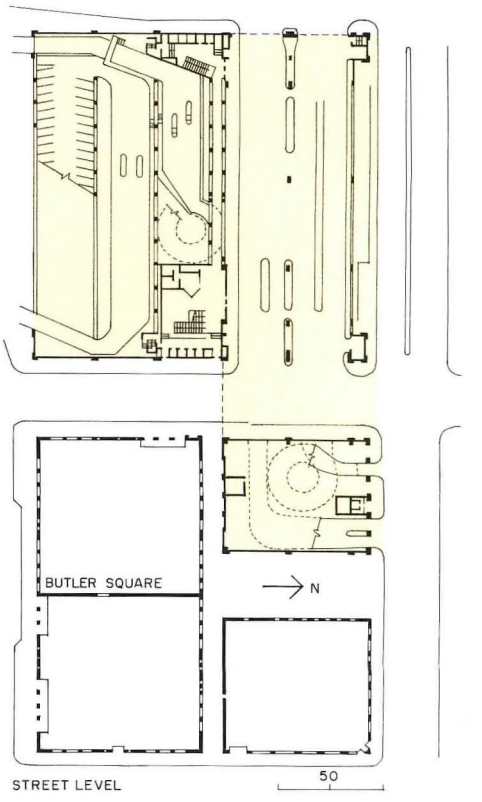
The opening salvo in Minneapolis's fight against gridlock and pollution, the 5th Street North garage is the first of three such peripheral structures meant to siphon traffic from Interstate 394 before it strangles city streets. To lure commuters from their cars short of the downtown grid, the building provides parking with direct access to and from the highway—and priority spaces and rates for car pools. But the garage also serves as a major bus transfer facility and waiting station, and offers convenient connections to a shuttle-bus loop and the city's web of skywalks.

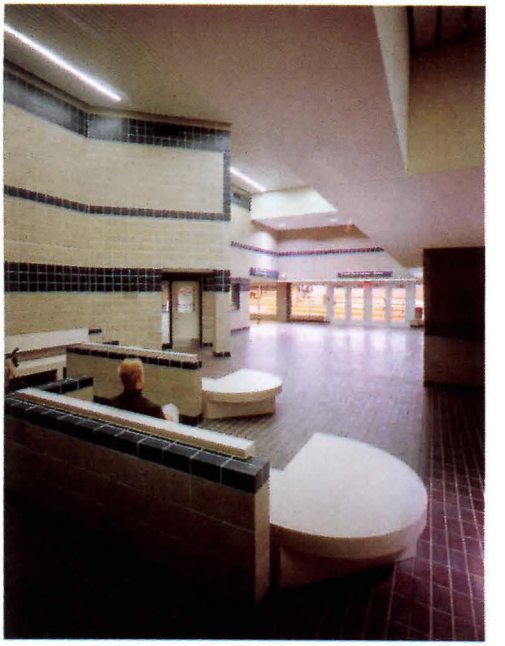
In addition to the complex circulation of vehicles and people, and the engineering of long-span transfer beams to bridge the highway, the building was required to deal gently with its setting in the historic warehouse district, and particularly with the registered Butler Square Building, around which it angles. Clad in stone-accented brick, the post-tensioned cast-in-place concrete structure meets surrounding streets with the robust dignity—and spare ornament—of its near neighbors, forging a link between the old district and downtown. The sides overlooking the highway, however, where federal regulations dictated a shield against dropped objects, are veiled with close-set vertical steel rods.

M. F. G.

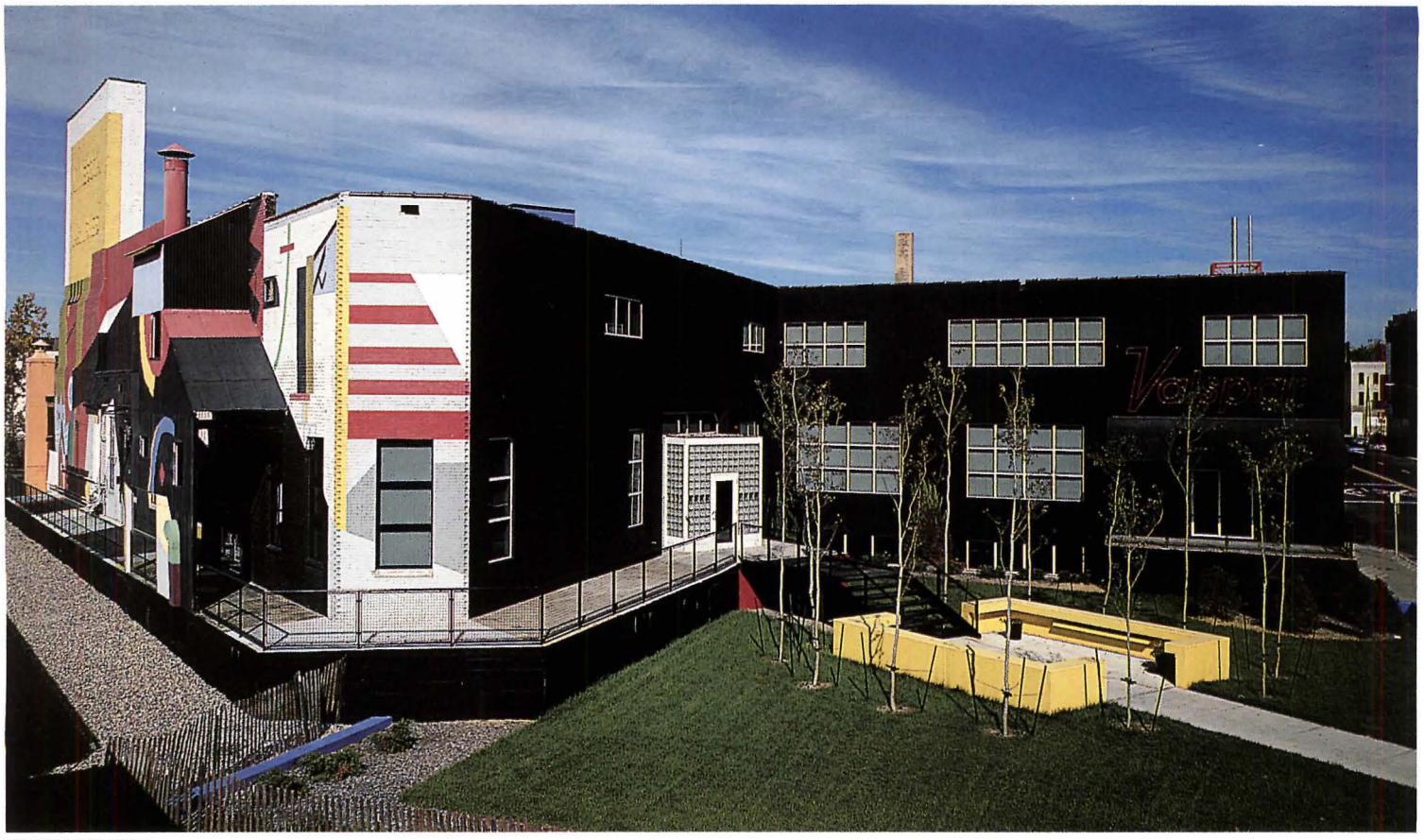
5th Street Parking/Transit Facility
OWNER: *City of Minneapolis; Minnesota Department of Transportation*
ARCHITECT: *The Stageberg Partners—James Stageberg, partner-in-charge; Dennis Sachs, project architect; Richard Merrill, Richard Delap, Tom Findlay*
ASSOCIATE ARCHITECT: *Williams-O'Brien Architects*
ENGINEERS: *Strgar Roscoe Fausch (structural); Erickson Ellison (mechanical/electrical)*
CONSULTANTS: *T. Y. Lin (structure); Barton-Aschman Associates (traffic)*
GENERAL CONTRACTOR: *Bor-Son*



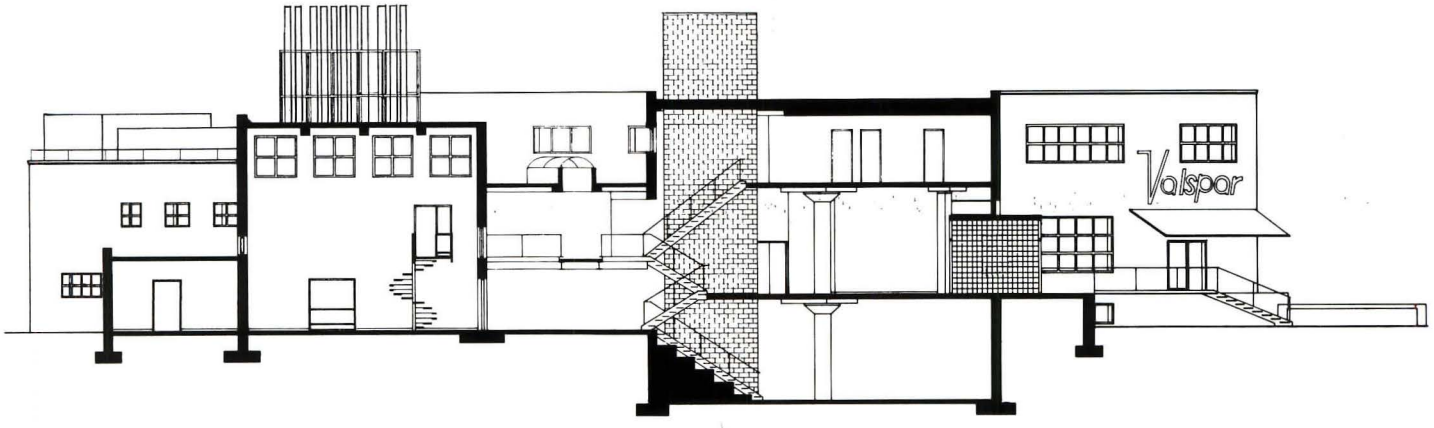




In its massing and modeling —and in such niceties as the use of scale-giving modular facebrick—the garage and transit facility's facades refer to both its historic neighbors and its own varied inner functions. Well-planned public spaces include a through-block arcade and comfortable waiting rooms (above), but among the most striking is a skylit helical ramp well through the parking levels.



GEORGE HEINRICH PHOTOS

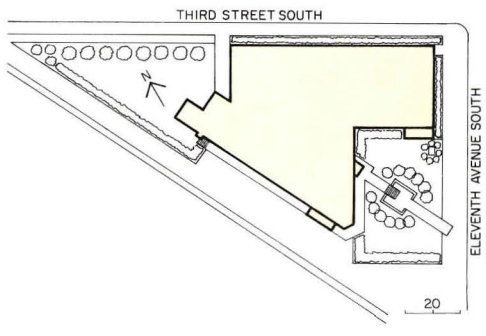


Valspar Varnish Factory Renovation
Minneapolis, Minnesota
Meyer, Scherer & Rockcastle, Architect

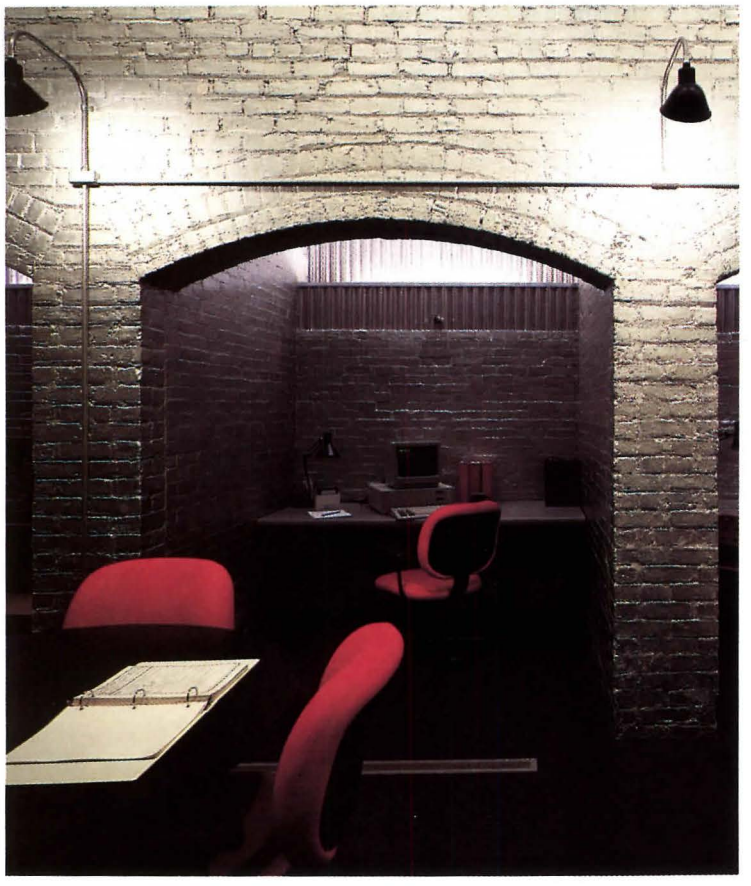
To expand its research facilities, the Valspar Paint Company's unlikely candidate was a derelict varnish factory opposite its headquarters in an old Minneapolis industrial area. To transform it, the architects worked from outside in as well as inside out, taking as their basis a fundamentally sound concrete and masonry structure, a two-part plan skewed to fit a triangular lot, and, not least, a colorful mural which the building's diagonal turned to the adjacent freeway and downtown area beyond.

A point-and-paint exterior renovation further differentiated the facades, contrasting businesslike red brick and green trim on the street sides with the self-effacing black-painted brick walling a corner courtyard. Crossing the lawn, an entry walkway punctuated by an aspen-rimmed patio establishes a diagonal axis that continues into the building, culminating in the circulation lobby where the structure's diagonal and rectangular grids meet.

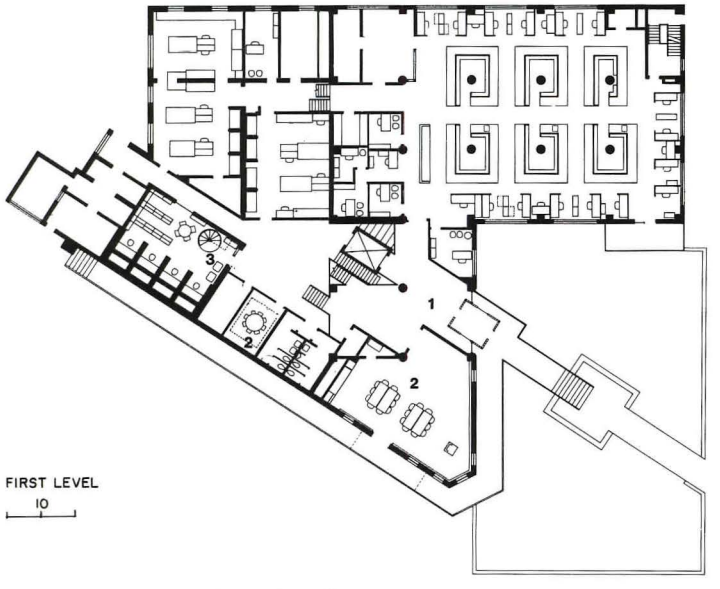
Although structural changes were few and concentrated at the lobby (e.g., the insertion of a mezzanine lunchroom), such new elements as the vestibule, elevator, stairs, and mechanical systems are clearly distinguished from the preserved "fragments" that recall the facility's factory heritage—exposed mushroom columns, brick walls, chimneys, skylights. New and old alike, however, are enriched by vivid color that recalls the mural—and salutes the company's wares. **M. F. G.**

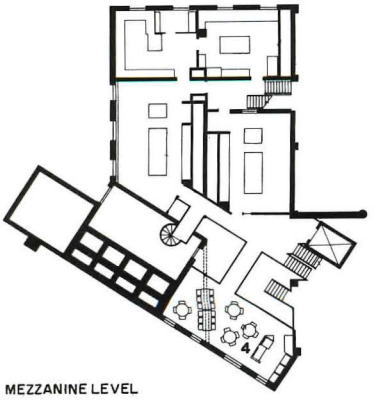


Valspar Varnish Factory Renovation
OWNER: *The Valspar Corporation*
ARCHITECT: *Meyer, Scherer, & Rockcastle, Ltd.—Thomas Meyer, Jeffrey Scherer, John Cook, Garth Rockcastle, Lynn Barnhouse, Barry Petit, David Richards, Greg Abnet, project team*
ENGINEERS: *Meyer, Borgman & Johnson (structural); Lundquist, Willmar, Schultz & Martin, Inc. (mechanical/electrical)*
GENERAL CONTRACTOR: *McGough Construction Company*

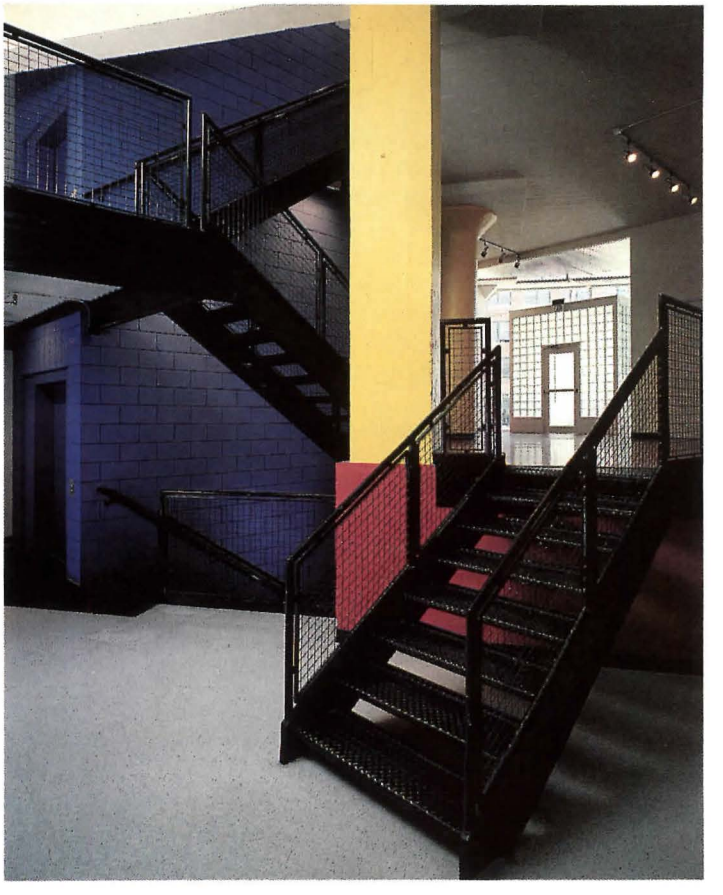


Paintbox primaries offset black and white in such public areas as the circulation lobby (above right and below). Among the found spaces is a two-story-high library (above left) where carrels fill brick hearths once used for boiling vats of varnish.





1. Lobby
2. Conference/meeting
3. Library
4. Lunchroom



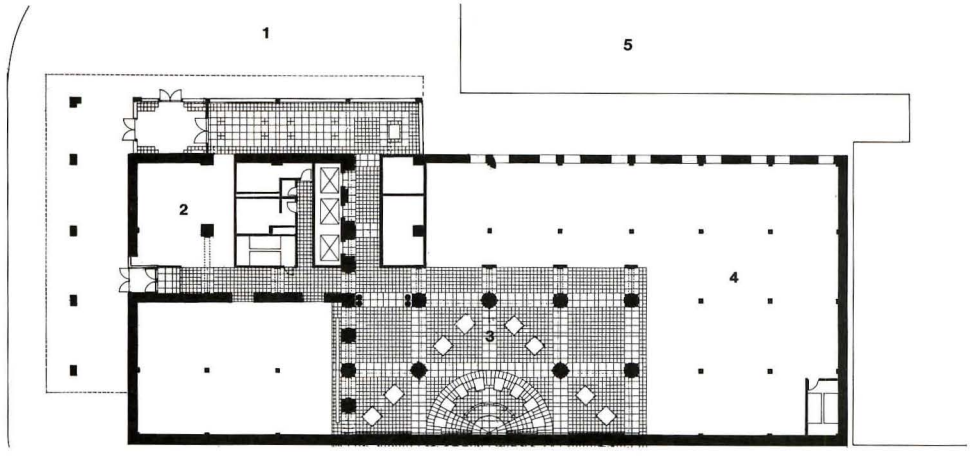
The Ceresota
Minneapolis, Minnesota
Ellerbe Becket, Architect

Now an office building, the Ceresota looks from the outside much as it did some 80 years ago, when it served the Whitney Mill complex (then known as "the largest flour milling machine ever built") as a grain elevator—a massive shell of brick and concrete honeycombed with storage silos and topped by a tall narrow workhouse. Although the building was windowless on three sides—and as a protected historic structure destined to remain so—the conversion to office space was accomplished with exterior changes limited to a few more openings punched in the already windowed north side and the addition of a metal-framed wraparound canopy and lobby derived from a once-adjacent train shed.

To do so, the shell was hollowed out by demolishing the interior concrete bins and replacing them with a new steel structure that echoes the rotated concrete and steel framing of the original, combining overlapping rotated columns with hefty beams that shift from orthogonal cross spans to diagonal braces at every other floor. The abundant natural light brought to the inside offices through a skylit atrium is reinforced by a fully mirrored south wall, which also visually doubles the apparent space of the atrium and captures the color and activity of the office floors. Lounge areas share the atrium's base with a canted "square" of slender cypresses that frame the semicircular granite portal of a cascading fountain made round by its mirror image. **M. F. G.**

The Ceresota
OWNER: *CitySide Development*
ARCHITECT: *Ellerbe Becket, Inc.—Richard Varda, design principal; Ted H. Davis, interior design; Mike Gordon, project architect; Mary Anderson, John Rova, Randy Manthey, Paula Lee*
ENGINEERS: *Meyer, Borgman & Johnson (structural); Lundquist, Willmar, Schultz & Martin (mechanical/electrical)*
GENERAL CONTRACTOR: *Kraus-Anderson*

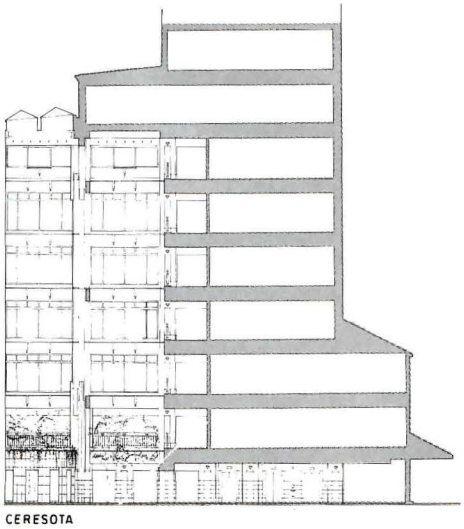
EXTERIOR PHOTOS BY SHIN AND ERICH KOYAMA



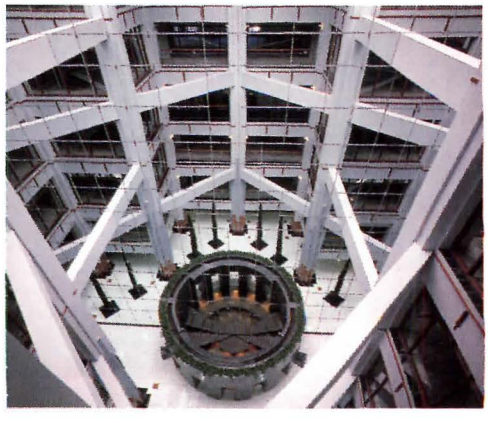
GROUND FLOOR

1. Plaza
2. Retail
3. Atrium
4. Office
5. Mill/hotel

The Ceresota's plain-Jane brick exterior (bottom left), embellished only by an entry canopy (above)—and a replica of the original mural—conceals a Cinderella interior with a mirror-walled atrium that features a walk-through "water wall" (opposite).



CERESOTA

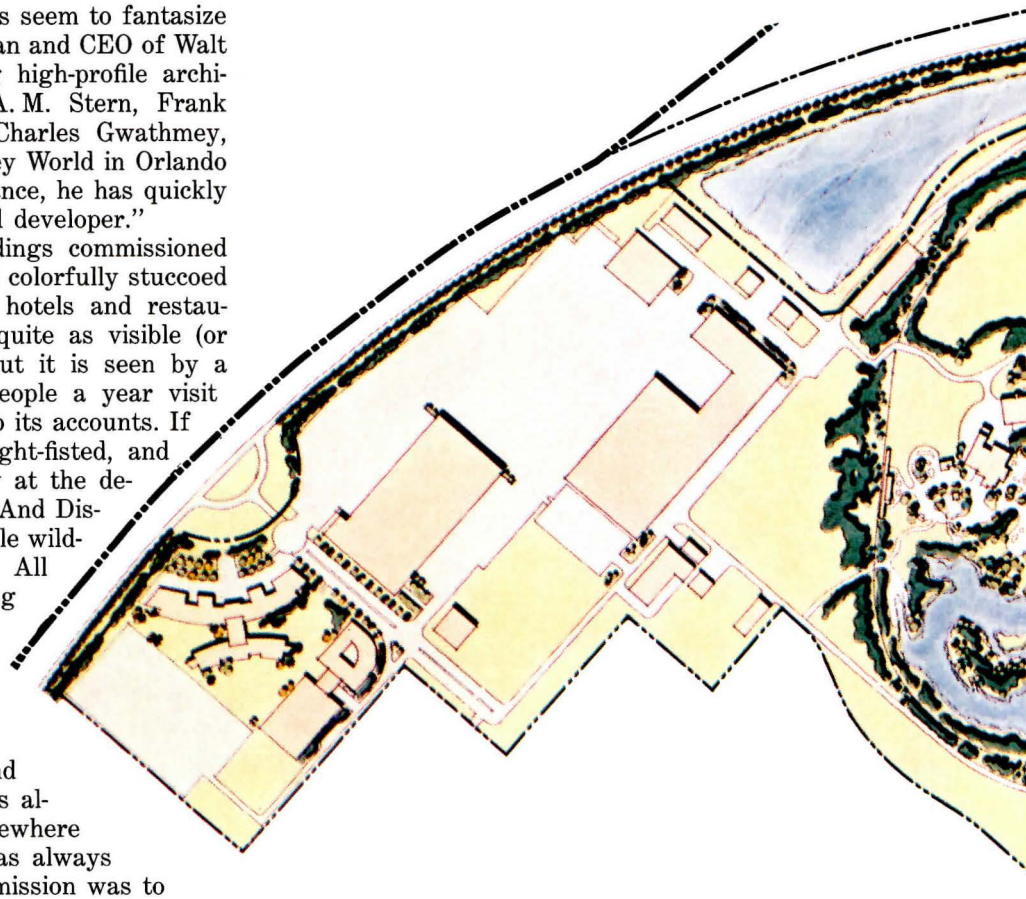


INTERIOR PHOTOS BY © PETER AARON/ESTO

Michael Eisner is the client architects seem to fantasize about these days. Since the chairman and CEO of Walt Disney Company started enlisting high-profile architects such as Michael Graves, Robert A. M. Stern, Frank Gehry, Antoine Predock, Arata Isozaki, Charles Gwathmey, and Robert Siegel to design for Walt Disney World in Orlando or Euro Disneyland in Marne-la-Vallée, France, he has quickly become today's answer to the "enlightened developer."

Instead of granite-clad spec office buildings commissioned from Gerald Hines, we now hear about the colorfully stuccoed "entertainment architecture" of Disney's hotels and restaurants. Disney's architecture may not be quite as visible (or expensive) as Hines's urban high-rises, but it is seen by a *really* large audience—over 22 million people a year visit Walt Disney World in Orlando, according to its accounts. If one hears that the Disney company is tight-fisted, and Eisner's henchmen anxious to chisel away at the designs, the same holds true for developers. And Disney's architects are encouraged to get a little wilder and have more fun with the program. All they have to do is come up with a compelling and accessible "theme." It sounds so free, even creative. Or is it?

There are certain considerations with which the architects working for Disney must grapple. Disney's utopian environments have always been about fun and fantasy, where life is clean, the good guys always win, and the intellectual age is somewhere under 11. For its own part architecture has always been cast in a more problematic role. Its mission was to upgrade reality in a grittier, less morally clear-cut context.



That's Entertainment

The pursuit of fantasy can easily lead to the frivolous and the kitschy—the nemesis of "good" architecture.

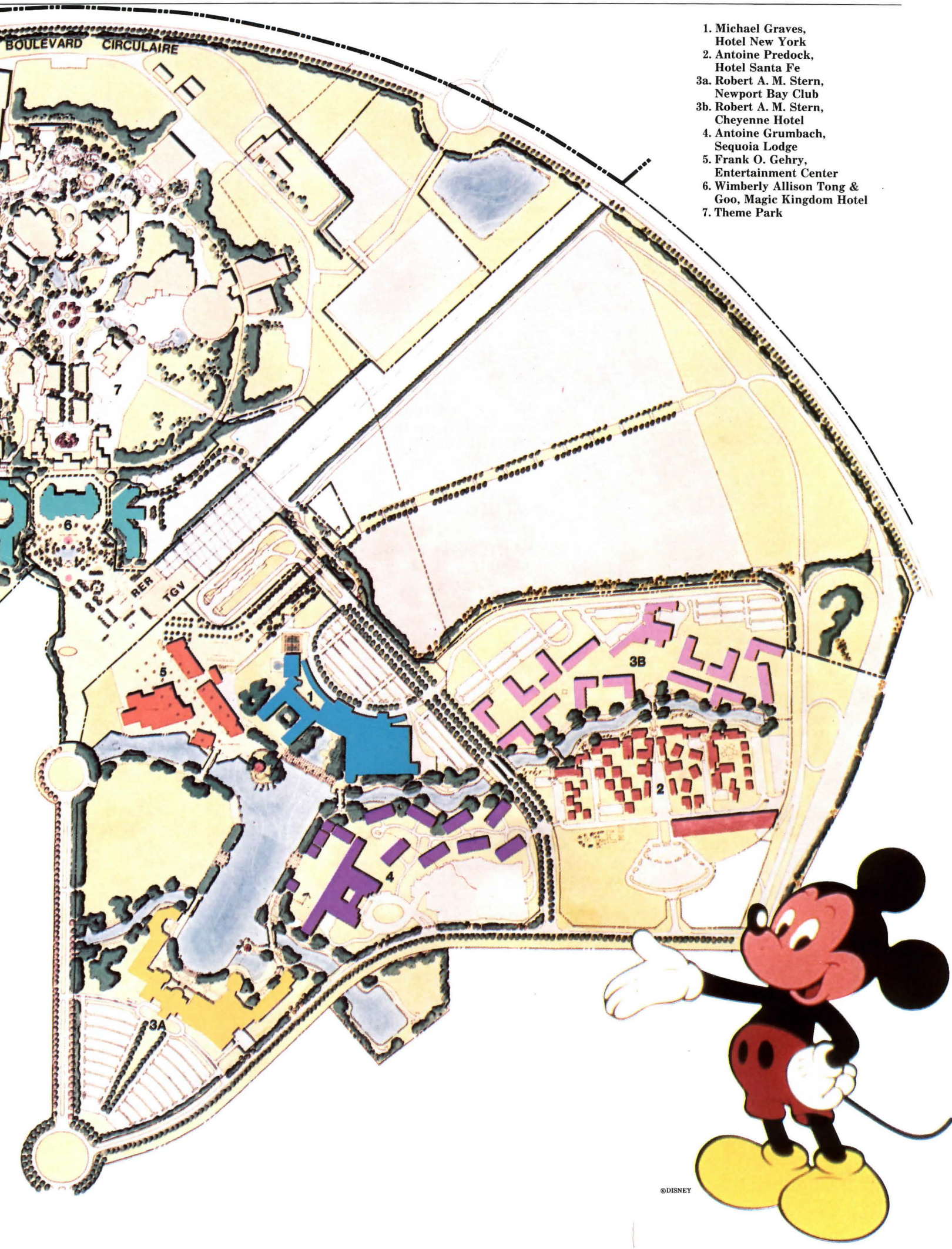
To be sure, these high-profile architects are not being solicited to create Disney's aggressively picturesque parks, such as the Magic Kingdom or Disney-MGM Studios. Main Street and Hollywood are still the province of the Imagineers, Disney's in-house designers. But whereas the Imagineers also used to "theme up" the surrounding Disney-operated hotels and entertainment complexes (in association with architectural firms of a less-defined design image), now Disney is hiring name-brand architects to come up with different resort treatments.

Of all the building types in which to try out fantasy settings, the resort hotel, where people go to get away from it all, seems the most appropriate. And the architect-designed hotels being built at Euro Disneyland or in Disney World at Orlando [RECORD, March 1988, page 59], are meant to be more abstract than the condensed and idealized Disneytopia of the Magic Kingdom.

But the architect must still tell a story simple enough for everyone to get, yet one no one will easily tire of. And in designing these imagined oases, the architect must create a setting that holds up under extended scrutiny. With film and stage sets, the audience may be more willing to pretend that an aluminum "plank" wall is actually wood, that pressed fiberboard is clapboard. But hotels aren't meant to be experienced for only two hours and at a comfortable distance. Thus craftsmanship and use of materials are still very much a part of the overall effect. Just how closely Disney's self-stated program of entertainment architecture can meet the expectations established by less-entertaining architecture will depend on how Disney and its designer-collection architects resolve these

The Walt Disney Company enlisted a roster of architectural luminaries—Michael Graves, Frank Gehry, Antoine Grumbach, Antoine Predock, and Robert Stern—to build hotels and an entertainment/shopping complex for its European debut at Marne-la-Vallée, a suburb of Paris. A multibillion-dollar venture, Euro Disneyland will be the largest theme park in Europe. Is Disney CEO Michael Eisner the current client of choice and will Disneytopia be the dystopia of the 1990s?
By Suzanne Stephens.

Suzanne Stephens writes on architecture and design for Architectural Digest *and* The New York Times. *She is editor of* Oculus, *the newsletter of the New York City Chapter of the American Institute of Architects.*


BOULEVARD CIRCULAIRE
7
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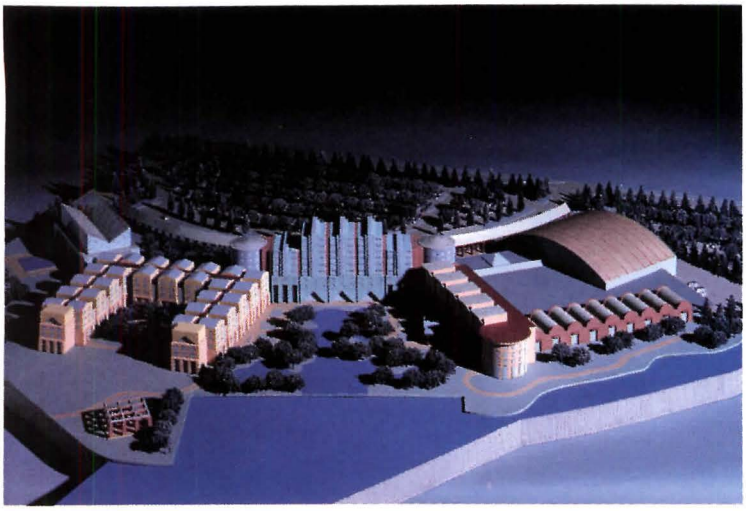
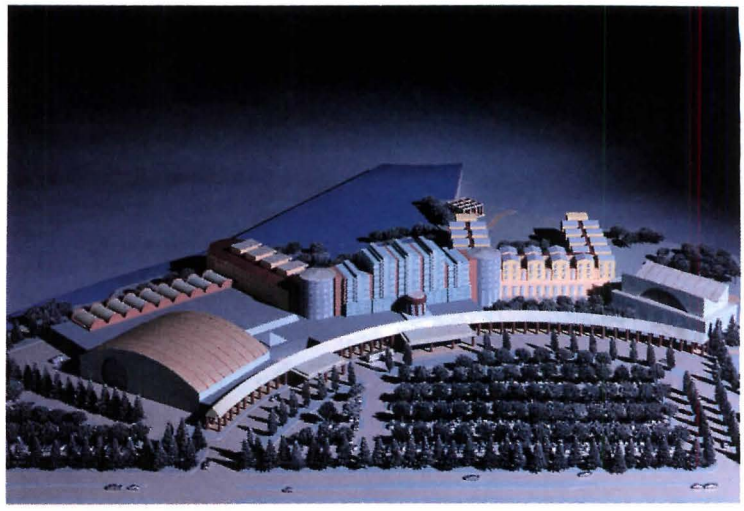
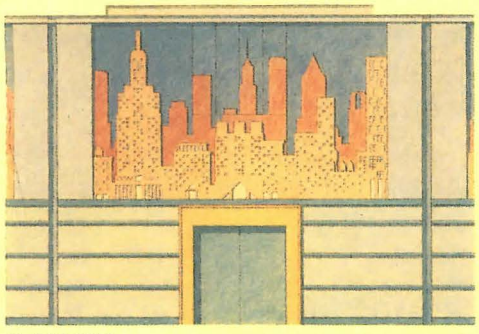
3A
1. Michael Graves, Hotel New York
2. Antoine Predock, Hotel Santa Fe
3a. Robert A. M. Stern, Newport Bay Club
3b. Robert A. M. Stern, Cheyenne Hotel
4. Antoine Grumbach, Sequoia Lodge
5. Frank O. Gehry, Entertainment Center
6. Wimberly Allison Tong & Goo, Magic Kingdom Hotel
7. Theme Park
©DISNEY

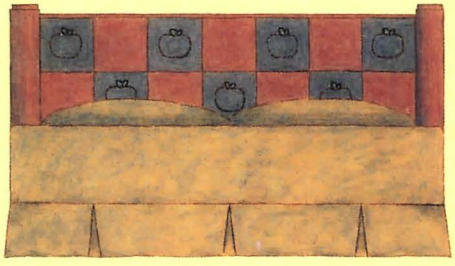


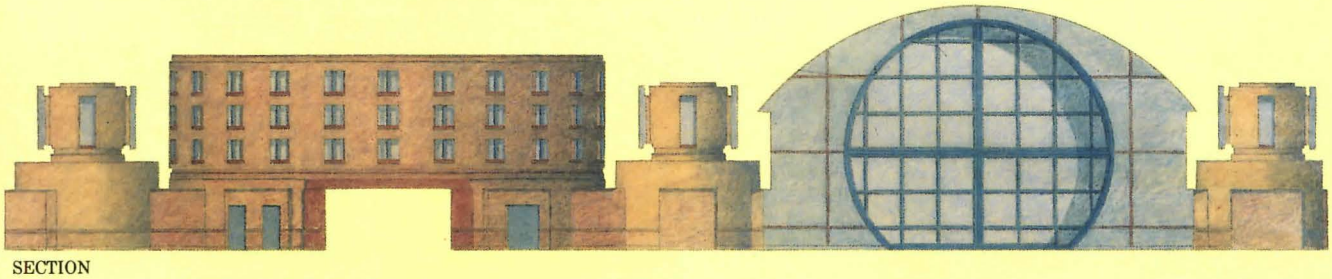




BALLROOM

Michael Graves's Hotel New York comprises typical Manhattan buildings, including the skyscraper, midrise, and brownstone. The interiors, also by Graves's office, feature a backlit silhouetted skyline in the ballroom (left) and custom headboards in the guest suites (right).





SECTION

******HOTEL NEW YORK**
DESIGN ARCHITECT: *Michael Graves, Architect—Patrick Burke, senior associate*
PRODUCTION ARCHITECT: *McCary-Menu (SCAU)*
INTERIOR DESIGNERS: *Michael Graves, Architect; Interart (production)*
ENGINEERS: *Sechaud et Bossuyt & Cie (structural and mechanical)*
LANDSCAPE ARCHITECT: *EDAW, Inc.,*
LIGHTING CONSULTANT: *Fisher-Marantz (exterior); The Lighting Design Partnership (interior)*
CONSTRUCTION MANAGER: *Cotéba*
SITE SIZE: *21 acres*
BUILDING SIZE: *480,000 sq ft (576 rooms), convention facilities, two restaurants, four shops*
STRUCTURE: *Poured-in-place concrete load-bearing walls, floor slabs*
MAJOR MATERIALS: *Colored metal roofing, stucco, brick and stone*
ILLUMINATION: *Fiber-optic grid of stars in lobby; ballroom has silhouetted skyline with "windows" of light*
SECURITY: *Sprinklers, smoke detectors (both California and French codes being followed)*

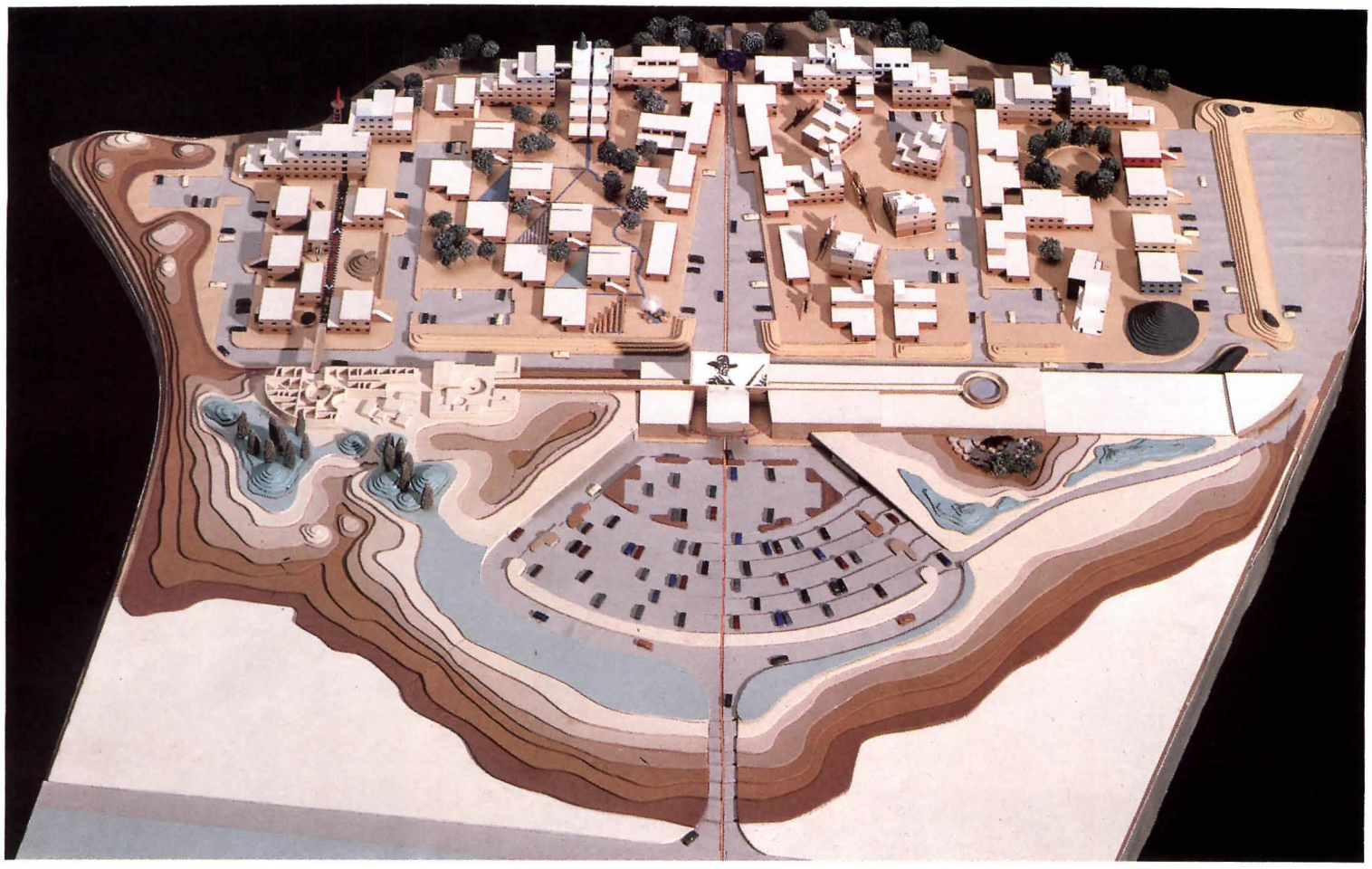
issues. Euro Disneyland, where the architect-designed buildings are planned as part of one large enclave, should provide a superb test case. But the final judgment must still await completion of its first phase in 1992.

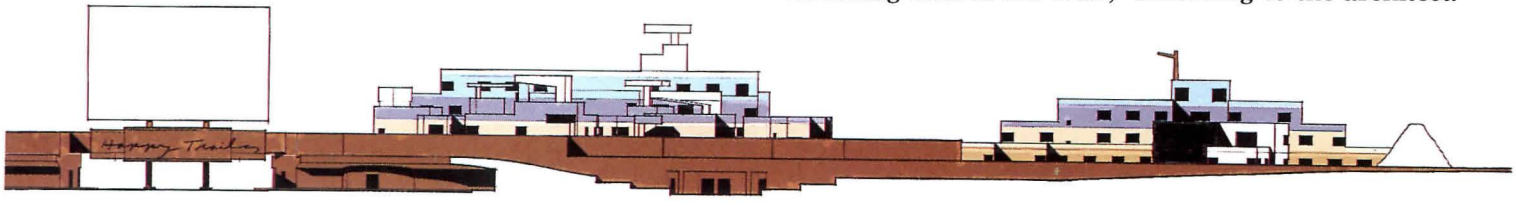
Euro Disneyland, now under construction, sits on some 4,800 acres of land 20 miles east of Paris. In establishing its presence in Marne-la-Vallée, Disney wisely arranged to have its park, heavily financed by several European banks, reached by a new stop on the TGV (the high-speed train), which connects France to the Channel Tunnel, Brussels, and northeastern Europe, and the long-distance metro line. The road to the international airport already goes right by the complex.

The work of the high-design architects shouldn't be too difficult to find, since the five hotels and entertainment center are arranged around the mandatory man-made lake situated by the entrance to the Magic Kingdom. While the hotels vary from budget accommodations (or what the French designate as a two-star hotel) to moderate (three-star) to "upscale" (four-star), the only five-star hotel in the first phase of construction won't be by the lake. It will straddle the main entrance gate to the Magic Kingdom. In fact, this 450-room piece of teased and turreted Victoriana was designed by the Imagineers and hotel architects Wimberly Allison Tong & Goo, the team that gave Orlando the gleamingly white, floridly grand Grand Floridian Beach Resort [RECORD, February 1990, pages 118-121].

Not surprisingly, Disney likes a strong image for its architecture. It was decided early on that the hotels around the lake would be American in theme and allude to geographical locations or regional building types. It was deemed highly unlikely by the powers-that-be at Disney that Europeans would choose to go to Disneyland to stay in a faux-chateau when the real thing was in France's own Loire Valley.

Choosing the architects was a more complicated tale. Had it been a movie, it could have





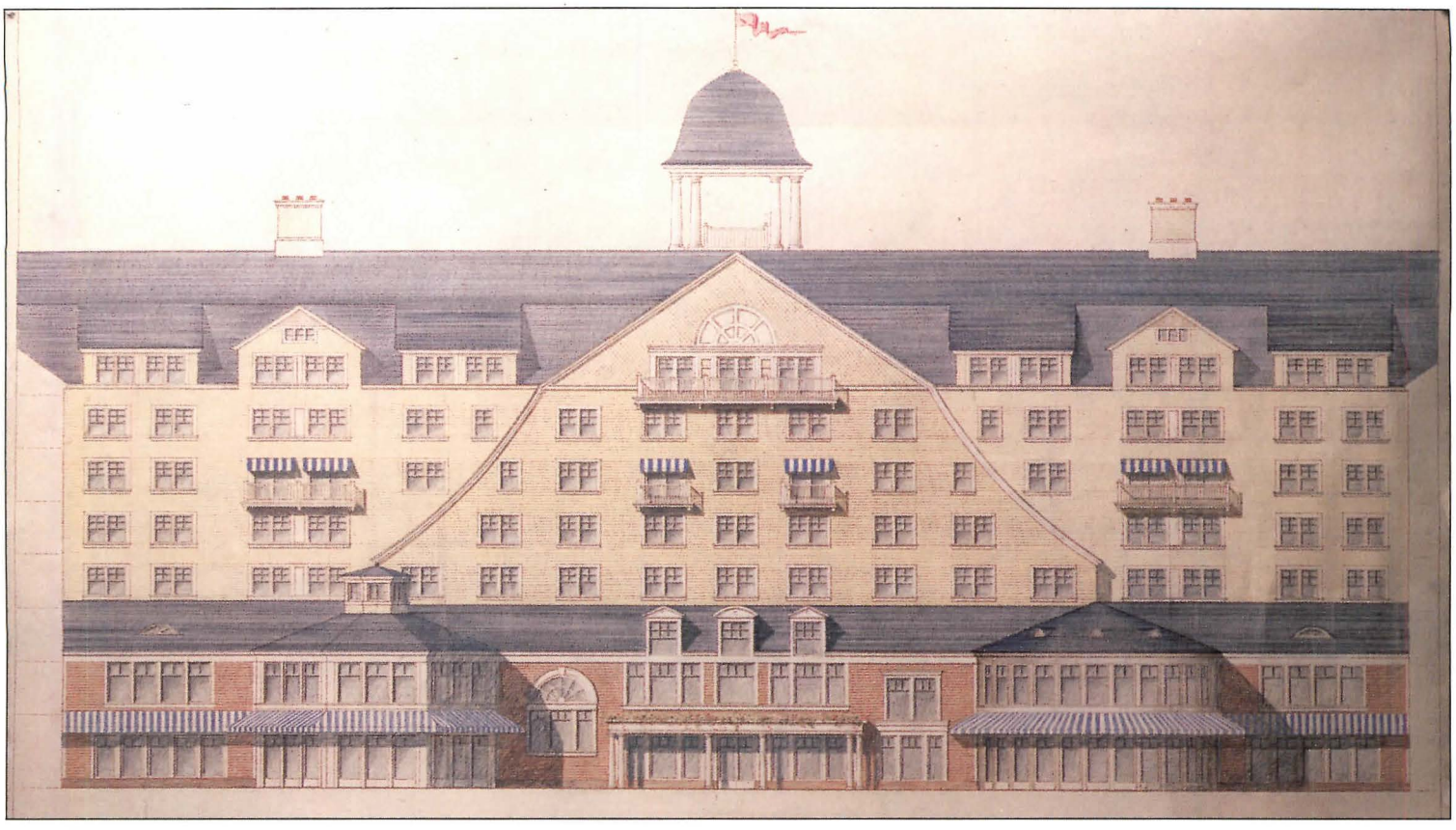
The terraced clusters of Antoine Predock's Hotel Santa Fe are arranged on both sides of his "Trail of Infinite Space." A drive-in movie screen (below left) stands as a "vanishing icon of the West," according to the architect.

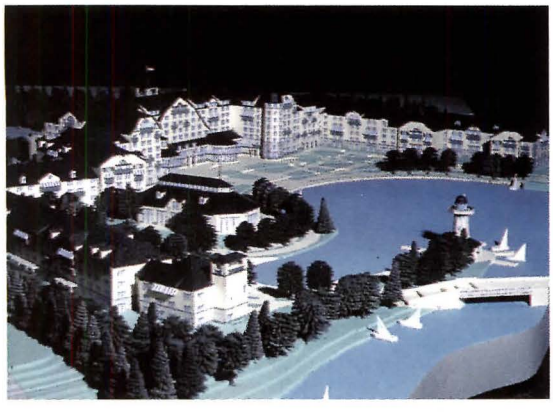
been called "Cinderfella." And a lot of architects found the shoe didn't always fit. Graves, Stern, and Gehry had been involved in early master-planning charrettes with Stanley Tigerman and Venturi, Rauch and Scott Brown (now VSB). But in the end, Tigerman and VSB were put on hold, with VSB designing a hotel for Euro Disneyland's second phase. Predock was then brought in, and Antoine Grumbach hired as the sole French architect working on the lake.

Les Disnées, as they are (sometimes) affectionately called—Eisner, Robert Fitzpatrick, chairman of Euro Disneyland, Peter Rummell and Wing Chao, president and senior vice-president for master planning, architecture, and design, respectively, at Disney Development—had also looked over a group of high-profile European architects that included Rem Koolhaas, Hans Hollein, Aldo Rossi, Jean Nouvel, Christian de Portzamparc, and Bernard Tschumi. All these architects were given sites around the lake and then competed for the commissions with an assortment of schemes. In the end, however, the Europeans seemed too outré for Disney. (Rossi's New Orleans Hotel was selected, but he backed out, some say, because of too many threatened changes to his design.) Grumbach, who had originally designed a park at the lake's edge, came up with an idea for a hotel sitting among tall trees, like the mountain lodges he saw on holidays to the American West following his teaching stints on the East Coast. A theme was born and it became the Sequoia Lodge.

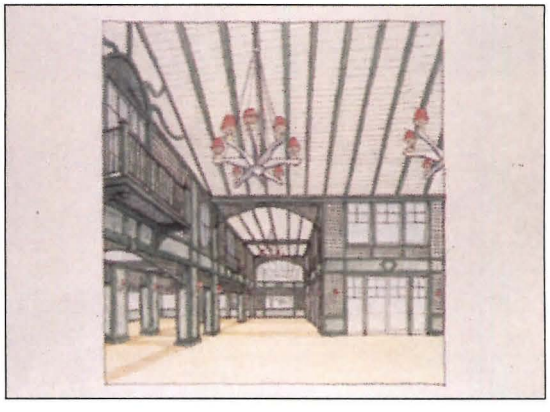
Occupying the central position on the lake is the only four-star hotel, the Hotel New York, designed by return Disney architect Michael Graves. Graves has created a "village" of discrete but attached units, each of which refers to different places or types of architecture in Manhattan. A midtown skyscraper motif dominates the eight-story central entrance block; one wing is meant to conjure up brownstones, another wing Gramercy Park. There is even a Rockefeller Center skating rink and a Rainbow Room-like restaurant.

****HOTEL SANTA FE:**
Design Architect: *Antoine Predock, Architect—Jon Anderson, project architect*
Production Architect: *Fernier & Associates*
Interior Designers: *Wilson & Associates; Interart (production)*
Engineers: *BET Vilanova (structural); Gerba 7 (mechanical)*
Landscape Architect: *EDAW, Inc.*
Construction Manager: *Cotéba*
Lighting Consultant: *Fisher-Marantz*
Site Size: *29 acres*
Building Size: *1,000 rooms, one restaurant, 575 parking slots*
Structure: *Poured-in-place concrete, including roof and floor spans*
Major Materials: *Integrally painted stucco over walls*
Illumination: *Industrial galvanized "new" west reflectors, typical American street lights*





Dormers, striped awnings, and shingled gable roofs are some of the elements Robert Stern incorporated in his Newport Bay Club to recall turn-of-the-century estates along the East Coast of the United States. The interiors (right), designed by the Atlanta-based firm of Design Continuum, further elaborate the three-star hotel's nautical theme.

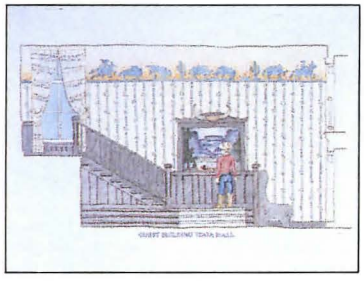


*****NEWPORT BAY CLUB**
DESIGN ARCHITECT: *Robert A. M. Stern, Architects—Paul Whelan, project architect*
PRODUCTION ARCHITECT: *Macary-Menu (SCAU)*
INTERIOR DESIGNERS: *Design Continuum; Pascal Desproz (production)*
ENGINEERS: *BET HAC (structural and mechanical)*
LANDSCAPE ARCHITECT: *EDAW, Inc.*
LIGHTING CONSULTANT: *Fisher-Marantz*
CONSTRUCTION MANAGER: *Cotéba*
SITE SIZE: *25 acres*
BUILDING SIZE: *581,250 sq ft (1,101 rooms), two restaurants, three shops, meeting facilities*
STRUCTURE: *Concrete frame*
MAJOR MATERIALS: *Pressed fiberboard for siding; composite shingle roof*
ILLUMINATION: *Lighting along portico colonnade, custom rotating lighting in lighthouse tower*

While each section has a different character and scale, the look is still very much more Graves's than it is New York's. This absence of literal mimicry holds true for the architecture inside as well. However, as if to make up for this more abstract narrative, Graves has deployed an artillery of signs and symbols of New York—its iconography—throughout the hotel. Armoires and beds in the guestrooms are decorated with big-apple patterns, the desk lamp is in the form of a skyscraper, and baseball and apple logos are embedded in the lobby floor. The playful motifs call attention to the make-believe aspect of this world, and could provide the right ironically corny touches that would appeal to European, as well as American, sensibilities. The New Yorkerish sophistication some visitors may expect, however, could well be lacking in the final product. But then again if you go to Disneyland expecting the Carlyle Hotel, you are a little *fou*.

In the Hotel Santa Fe, Antoine Predock, of Albuquerque, has bent over backwards to make his two-star (budget) accommodations a highly poeticized, abstracted vision of the Southwest and Santa Fe, in particular. In the non-Disney parts of the U. S., a hotel where guests drive to their rooms is usually called a motel, but in Marne-la-Vallée it's different. "The great thing about a two-star hotel," says Predock, "is that it is not burdened by room service. The decentralization made possible by the dispersal of buildings allowed us to create an imagined setting analogous to the landscape of the Southwest." The guest rooms are separated into various terraced clusters that resemble the configuration of mesas and buttes. Much of the landscaping and the earth-and-sky color scheme of the stuccoed buildings refer to the Southwest's colors.

While Predock is not trying to be site specific to France in his imagery, he points out certain characteristics that address the problem of the hotel's actual location in a cold, often rainy climate. The rooms with generous windows and adjoining courtyards face south; at the rear of



Robert Stern's two-star Cheyenne Hotel is based on more modest American vernacular imagery than the lavish Newport Bay Club (opposite). Western films were the source of inspiration for this complex of small-scale lodgings—as is apparent in the design of facades (right), which will be constructed of pressed fiberboard, and the rustic interior (left).

the complex, the buildings form a wall ("like a mountain range") to buffer the hotel against the wind.

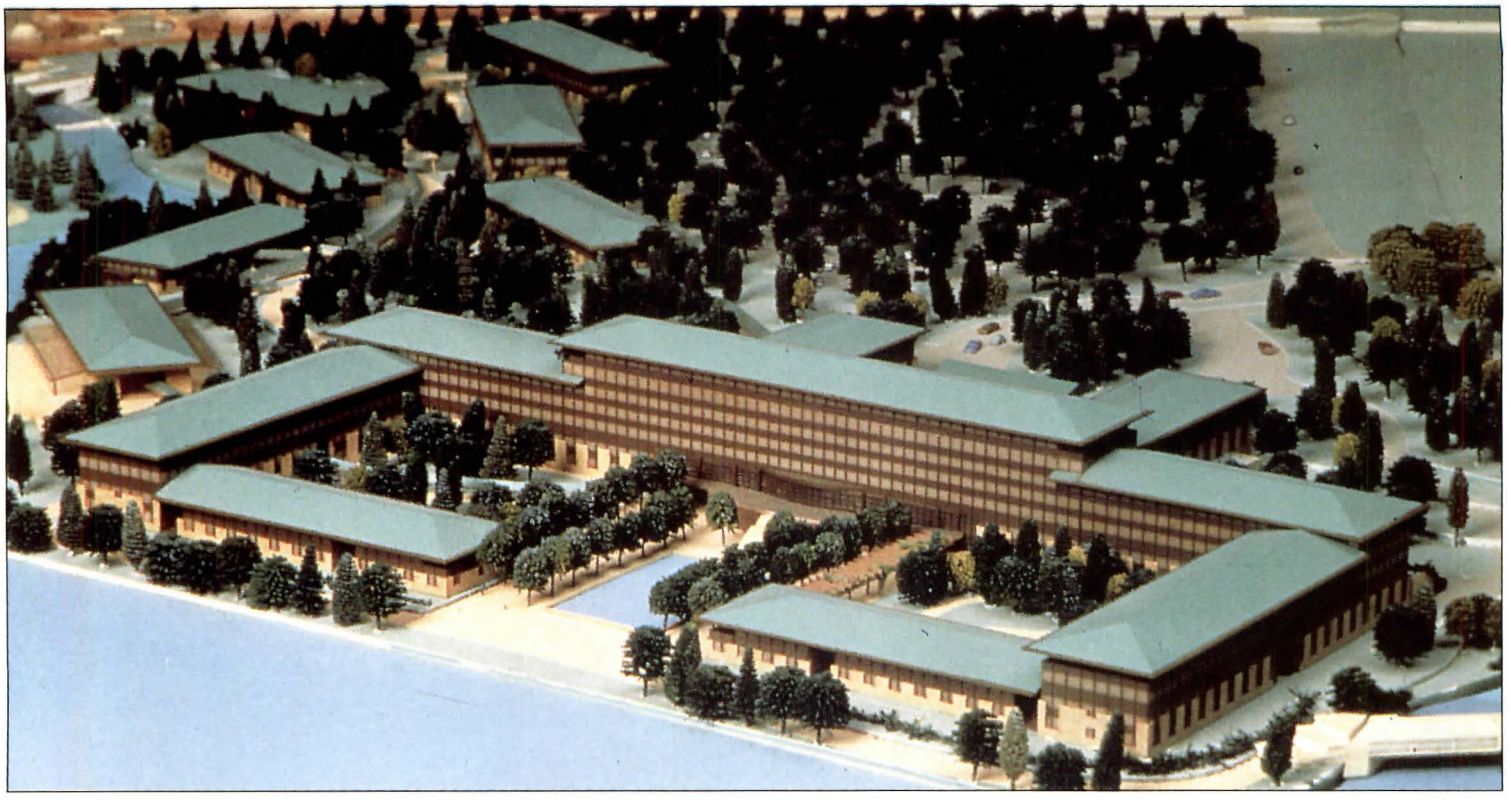
The Commons building where guests check in is actually two structures, connected by a canopy on which a drive-in movie screen ("a vanishing icon of the West," explains Predock) sits. In this manner two lobbies are created, one for tour groups, the other for individual guests, which also connects to the restaurant and bar. Predock calls the entry drive that bisects the Commons the "Trail of Infinite Space." This path, marked by a yellow stripe, continues beyond the building, where it gradually is narrowed by the guest wings placed on an angle to create a forced perspective.

Other trails abound to evoke the history and myths of the far-off place, but they are more conceptual. With names such as the "Trail of Artifacts," "Trail of Legends," "Trail of Water," and "Trail of Monuments," these "trails" are formulated in the mind, pieced together by certain buildings and artifacts appearing and reappearing throughout the complex. "Here the site of the imagination expands into a cinematographic realm. This is a healthy form of escapism," Predock maintains.

Guests will probably notice that the interiors of the Santa Fe refer more explicitly to the decorative arts of the Southwest. Designed by Wilson & Associates, they include "banco" seating in the lobby, plus Navajo blanket patterned bedcovers, lamp bases adorned with cactus and galloping horse motifs, and distressed wood furniture. As James Flick of Wilson & Associates puts it, "We're trying to bridge the gap between Predock's metaphoric ideas and Disney's desire to be figurative." If Predock is thinking of the films of director Wim Wenders, Disney seems to be thinking of Clint Eastwood. How the two merge remains to be seen.

Robert Stern's interpretation of themes is much simpler and more in the tradition of an old-time Hollywood movie—sets in which the guests/actors should have no trouble figuring out their assigned roles. His Newport Bay

****CHEYENNE HOTEL**
DESIGN ARCHITECT: *Robert A. M. Stern Architect—Alex Lamis, project architect*
PRODUCTION ARCHITECT: *Viguier Jodry and Associates*
INTERIOR DESIGNERS: *Wilson & Associates; Interart (production)*
ENGINEERS: *Gerba 7 (structural and mechanical)*
LANDSCAPE CONSULTANT: *EDAW, Inc.*
CONSTRUCTION MANAGER: *Cotéba*
SITE SIZE: *29 acres*
BUILDING SIZE: *351,000 sq ft (1,000 rooms), one restaurant, 900 sq ft of retail space*
STRUCTURE: *Concrete frame*
MAJOR MATERIALS: *Pressed fiberboard cladding*
ILLUMINATION: *Klieg lights*
SECURITY: *Sprinkler, smoke alarm*



The design of the Sequoia Lodge by Paris-based Antoine Grumbach was inspired by such American vacation spots as Yellowstone National Park.

*****SEQUOIA LODGE**
Design Architect: *Antoine Grumbach—Françoise Sogno, project architect*
Production Architect/Engineer: *Alexandre et Sandoz*
Interior Designers: *Hirsch/Bedner Associates; Wilson & Associates*
Landscape Architect: *EDAW, Inc.*
Lighting Consultant: *Fisher-Marantz*
Construction Manager: *Cotéba*
Site Size: *25 acres*
Building Size: *513,1019 sq ft (1,011 rooms), two restaurants*
Structure: *Concrete columns and walls; timber roof framing*
Major Materials: *Stone base, wood, green aluminum roofing*
Illumination: *Exterior lighting on facades and under eaves*
Security: *Smoke alarm, sprinklers*

Club, like the Disney Yacht Club and Beach Club currently under construction in Orlando, is conceived in the tradition of the rambling shingled and gabled summer retreats built at the turn of the century. You expect to see Ronald Coleman, spiffed up in a navy blazer and white slacks, strolling through the lobby.

Since this three-star inn charges moderate prices, however, one has to wonder if enough money will be put into the set to sustain the grand illusion. Moreover, because the hotel faces north, the architects and interior designers decided to make the interior finishes and furnishings light, airy, and summery. Wood, painted and stained in pale colors, along with large windows, are intended to make one think there is more direct sunlight than is actually possible. Stern is optimistic about the psychological effect, but it may be time to invest in some artificial "sun" lighting.

The Cheyenne Hotel suggests a back-lot version of a cowboy town, as portrayed in every shoot-'em-up film made in the last 60 years. With this two-star hotel, Stern designed the decentralized blocks of rooms as if they were scenic backdrops for various main streets in the wild and woolly west. The ironic metafantasy may be made more tongue-in-cheek by the kleig lighting to be used at night.

The movie-set imagery continues inside in a two-story lobby with massive wood trusses, plus a two-story restaurant housed in a barn-like structure. A "scramble" (a.k.a. food court), contains more stagesetlike structures that evoke a farmhouse, stable, etc. The home-on-the-range look reaches a fevered pitch in the guest rooms, which actually seem more directly inspired by 1950s Western roadside motels than, say, John Wayne's celluloid bedroom. Covered-wagon friezes, gun and saddle motifs on headboards, cowboy-boot lampshades, and bunk beds faithfully serve up a thick pan-fried slice of kitsch (but authentic kitsch) Americana.

The Sequoia Lodge's theme is clearly more grownup. It is meant to evoke a Western retreat that might exist at *Yellowstone* National

Frank Gehry's entertainment and shopping complex will include the Key West, Chicago, and California restaurants, and Rodeo, a combined dinner theater, disco, and saloon. Outdoor lighting will be provided by a steel grid of fixtures perched atop 40-foot-high columns, which will be wrapped in brightly colored metal.

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Park. In describing sources of inspiration, its architect, Antoine Grumbach, of Paris, talks of the houses of Frank Lloyd Wright and Greene and Greene. Actually, the statically constrained, classical organization of the rectilinear wood and stone forms suggests rather a large unadorned Swiss chalet.

The rooms, also designed by Wilson & Associates (incorporating suggestions from Grumbach), use Stickleyish Arts and Crafts-style furnishings to create the proper mood. "This is not chi-chi," says Grumbach of the moderate-price hotel. "Nor is it a decorated barracks."

Of all the contributions to Disney's program of entertainment architecture, Frank Gehry's Entertainment Center is clearly the least conventional. Even if an interiors firm is actually designing the dinner theater where one watches a rodeo while eating barbecued ribs, Gehry's personal stamp is all over the outside. The chunky geometric forms are wrapped in a colorful metal skin. Forty columns, 65 feet high, support a grid of reflectors bouncing light from fixtures concealed in the columns. The whole ensemble should provide a highly reverberant trill from the architect the French have dubbed "la diva Californienne."

But the Gehry commission did not come without suspense. According to unofficial reports, when Disney asked Gehry to design the complex, it also asked another firm to come up with a second scheme in case Gehry's was too abstract. Fortunately Gehry's submission appealed to Eisner and "won" the secret contest. "Fifty Disnoids say 'no,'" says one architect, about the approval process, "And then Eisner says 'yes.'" Eisner is surrounded by Disney Development staff members who willingly play the heavies (Wing Chao, 18 years with Disney, also has a Master of Architecture in Urban Design and Planning from Harvard's Graduate School of Design). But the architects quickly discover that in addition to the many levels of "clients" overseeing their work, they have many layers of consultants—even more than

Continued on page 121

ENTERTAINMENT CENTER

DESIGN ARCHITECT: *Frank O. Gehry and Associates—Robert Hale and Bruce Simons, project architects*
PRODUCTION ARCHITECT: *Saubot et Jullien*
INTERIOR DESIGNERS: *Morris Nathanson Design (restaurants); Brand and Allen (retail)*
ENGINEERS: *INEX Ingenierie (mechanical); O.T.E. Ingenierie (structural)*
LANDSCAPE ARCHITECT: *Frank 0. Gehry and Associates*
CONSTRUCTION MANAGER: *Bovis Copra*
SITE SIZE: *12.4 acres*
BUILDING SIZE: *230,000 sq ft; five restaurants and retail space*
STRUCTURE: *Poured-in-place walls and floor slabs, with timber roof trusses; 40 steel columns on concrete pedestals; steel-framed lighting grid*
MAJOR MATERIALS: *Metal skin on walls, roof, columns; plaster over concrete or masonry on "out" buildings*
ILLUMINATION: *Grid of cables and reflectors*
SECURITY: *Fire lanes for access*

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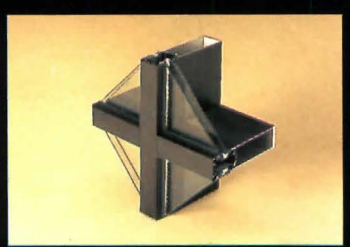
Thermally Isolated — Interior aluminum is thermally isolated from the exterior by a removable and reusable combination injection molded XPN-1378 nylon and plated spring steel clip. CRF rating of 72 as tested in accordance with AAMA 1502.7-81 and 1503.1-80.

Labor Savings — Shear block or screw spline joinery. Straight in glazing. System has split vertical mullions which allows for shop fabrication and assembly with panel type field installation. System accommodates both 1" and ¼" glazing infills.



Horizontals — All intermediate horizontals receive a rigid vinyl internal flashing for positive water control of infiltrated water. Choice of screw spline or shear block joinery of horizontals to verticals.

Exterior Covers — Exterior snap-on face members may be different finish than interior sections for aesthetics and economy. Framing depths may vary from 1¾" x 2½" up to 1¾" x 8⅝" to meet a wide range of windload and aesthetic conditions.

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Extracurricular Education

Classrooms, labs, and libraries may be campus staples, but many college buildings have only a tenuous connection with formal schooling.

As every grown-up knows, a good education involves a lot more than book-learning, and most graduates—at least the smart ones—admit that they learned as much from extracurricular conversation with their peers and their teachers as they did from reading textbooks and attending lectures. The four buildings featured on the following pages manage to assimilate a variety of unconventional but fruitful educational tools—primarily outside the classroom.

The most orthodox of the buildings in this study is Vanderbilt University's psychology building (pages 88-89), which is filled with the usual laboratories, faculty offices, and classrooms. But since psychology is a society-oriented science, concentrating on behavior and culture, the building recognizes conversation as a learning mechanism, and provides a 50-foot-high atrium to encourage "collegial exchange" among students and faculty.

At Brown University, in Providence, Rhode Island, the Salomon Center for Teaching (pages 84-87) recognizes the value of learning by listening—listening not only to scholars with their intellectual edge but to men and women engaged in the world's social, political, cultural, and economic affairs. To honor guests from these fields, the center offers not opulence—that would be unseemly at a serious, rather sober-sided New England academy—but rather, a dignified setting.

Still another educational method is learning by doing—a technique nowhere more effective than in the performing arts. At the Westminster School, a private secondary institution in Simsbury, Connecticut, the new Centennial Performing Arts Center (pages 90-91) offers students not only a stage but also practice rooms—and offers them to students of an age most likely to benefit from the kind of rigorous physical discipline required in the world of the performing arts. (The only possible drawback to this handsome red-brick facility is that the small theater, with its unusually intimate audience/actor relationship, may spoil the students' enjoyment of more ordinary theaters.)

The least conventional of these buildings for education is the ambitious Price Center at the University of California at San Diego, a mixed-use campus hub that allows almost every type of learning experience *except* didactic lectures (pages 92-95). Among the nonacademic but nonetheless important skills taught at this new student center: social grace, whether eating or ballroom dancing or just hanging out; using books just for fun, whether reading or browsing, whether philosophy or thrillers; observing and enjoying one's fellows, whether they're social butterflies, campus politicians, or independent solitaries.

All of these buildings offer useful lessons about architecture to both laypeople and to professionals.

GRACE ANDERSON

Westminster's theater brings romance to the campus.

New towers that flank Rogers Hall mimic older towers on nearby buildings.

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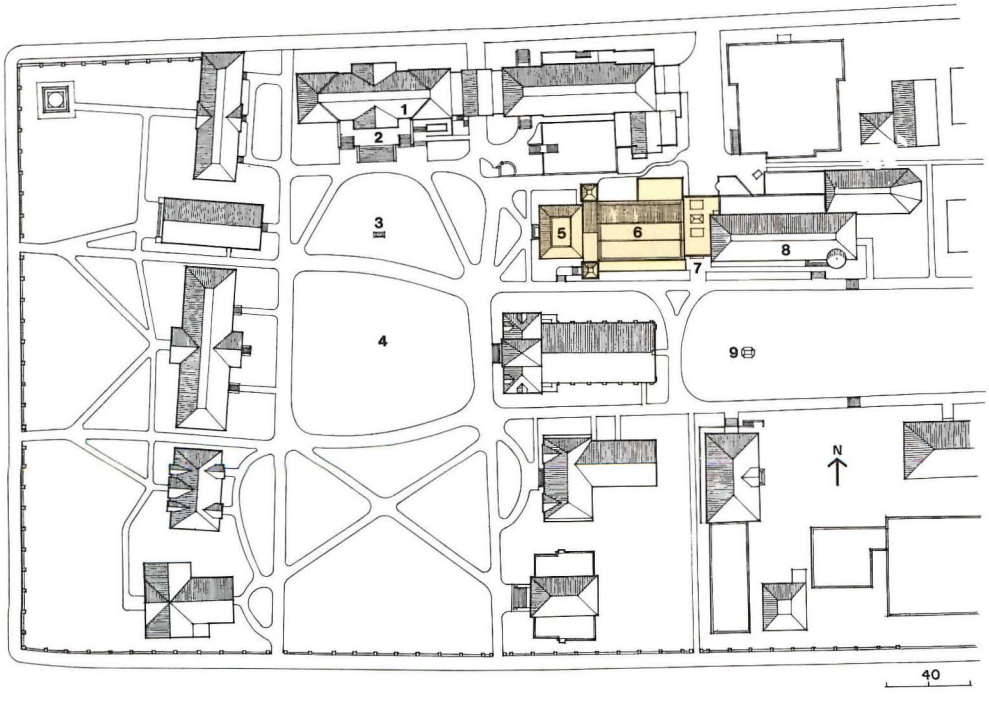


1. Faunce House
2. Faunce Terrace
3. Sculpture by Henry Moore
4. College Green
5. *Rogers Hall*
6. Auditorium
7. Leeds entry
8. Lyman Hall
9. Statue of Marcus Aurelius

A PROPER DIGNITY

An auditorium at Brown rejuvenates an old hall, filling a "nonexistent" midcampus site.

Salomon Center for Teaching
Brown University
Providence, Rhode Island
Goody, Clancy & Associates, Architects

In its New England fashion, Brown University has always favored high thinking and plain living. But high thinking mandates speeches to the student body by such imposing figures as heads of state, and plain living seems merely dowdy when it entails folding chairs on the gym floor. The school therefore wanted a dignified auditorium near the heart of the campus.

The most logical location for the facility, thought the university and its architects, Goody, Clancy & Associates of Boston, was Rogers Hall, a 19th-century brick building facing the college green. Its graceful proportions give the building a strong presence even among its larger, more elaborate neighbors. The building itself, however, was clearly too small for an audience of any magnitude.

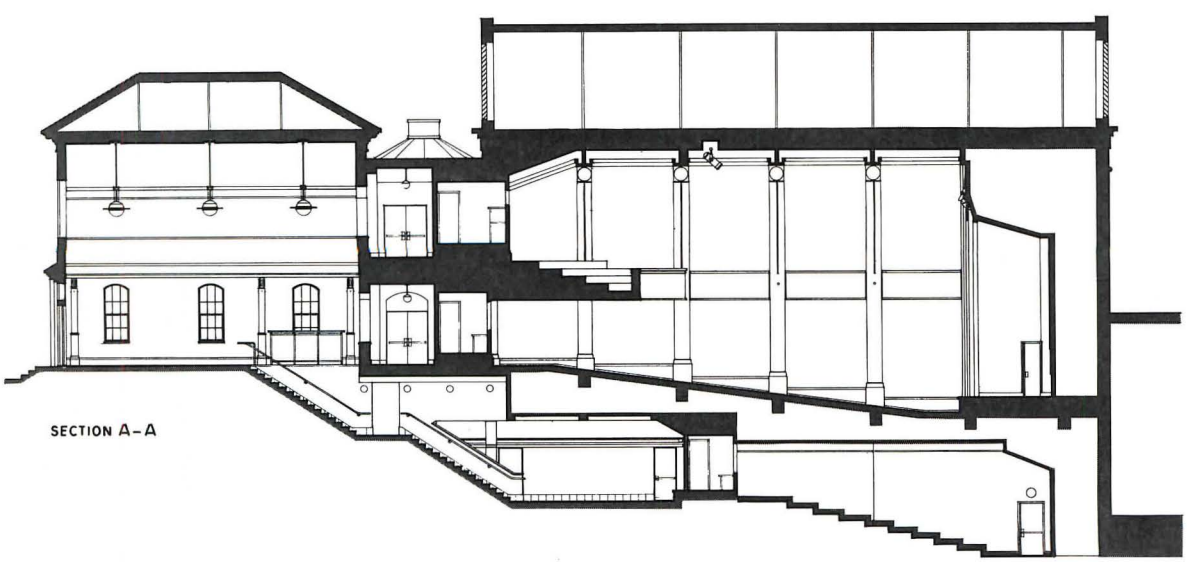
Behind the building, on the other hand, the campus offered a long, skinny, sloping site adjoining Lyman Hall, which houses the Leeds experimental theater and other performing-arts facilities. This plot, which Joan Goody terms "a nonexistent site," required the demolition of a 1911 building. Nevertheless, it had some serendipitous advantages. The slope accommodated the raked floors needed for auditoriums—a primary 600-seat auditorium upstairs for visiting and faculty lecturers and a 224-seat teaching auditorium below. Moreover, its adjacency to Lyman Hall afforded semiprivate access for guests who might require special security precautions.

Rogers Hall itself, after thorough renovation, became the foyer for both auditoriums. The face presented to the green by the remodeled hall maintains its familiar appearance, altered only by a pair of flanking towers for fire stairs.

At the same time, the added side walls, which enclose the auditoriums, introduce a conceivably boring, not to say intimidating, scale. One of these walls borders a major thoroughfare across the campus (opposite), and because of the windowless auditoriums within, tends to be bulky and

SOUTH ELEVATION

Striped brick walls and columns humanize the scale of the windowless auditoriums, which border a much-traveled walkway. The designers confess that the pinned concrete capitals were quoted almost verbatim from a Mies van der Rohe sketch seen in a recent exhibit. The architects designed a new entry for the Leeds experimental theater inside Lyman Hall (elevation above).



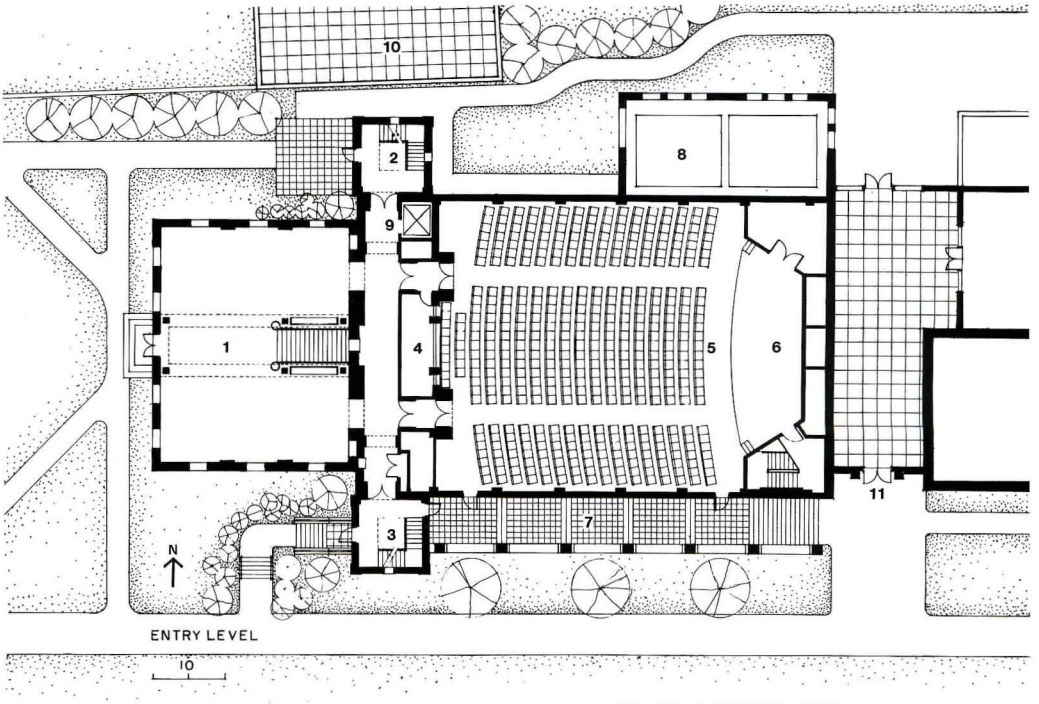
Though both of the auditoriums in Rogers Hall will serve as teaching space, the more formal upper hall (above) is the more handsomely finished as a gesture of hospitality to guest speakers. The gold and silver wood sun and clouds at the top of the proscenium arch were carved by James R. Jones, who used the attributes of Brown's coat-of-arms. The lower hall (far right) is more workaday in appearance. In the foyer (directly right), the custom-built Saturnlike light fixtures were designed by architect Walter Aurell.

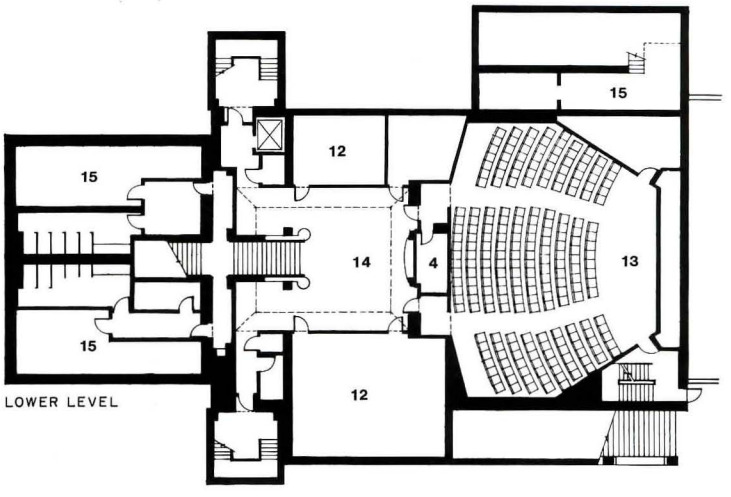
featureless. To offer passers-by a friendlier expression, the designers enclosed the lower auditorium with a stepped striped brick wall. On the second level, a colonnade of brick columns defines a loggia, which acts as a break-out area at intermissions as well as an exit route from the upper auditorium. The architects hope that the outdoor balcony will assume a major circulation function at classtime, with students entering the relatively small foyer (directly below) bit by bit and leaving en masse via the loggia.

Décor and coloration differentiate the stacked auditoriums. The upper hall (opposite), in deference to the expected guests, is somewhat more elaborate than the lower, with a beamed ceiling, paneled walls, and a proscenium arch surrounding the speaker's platform. The lower hall (below right) has a simpler projection screen with a Mondrianesque surround on the front wall. The predominant colors upstairs are blue and a rich dark red, whereas the lower hall is gray and a dark sea-green.

The foyer of Rogers Hall bears little resemblance to the earlier building, in which small rooms had been converted to offices. Instead, the interior of the older building was demolished, a barrel vault added overhead, and a stairway inserted descending to the downstairs auditorium. **G. A.**

Salomon Center for Teaching
Brown University
Providence, Rhode Island
OWNER: *Brown University*
ARCHITECT: *Goody, Clancy & Associates, Inc.—Joan E. Goody, principal-in-charge; Robert J. Pelletier, consulting principal; Erin S. Palmer, project architect; Walter C. Aurell, project designer; Neil E. Nott, James S. Norris, project team*
ENGINEERS: *Souza, True & Partners, Inc. (structural); Bard, Rao + Athanas Consulting Engineers, Inc. (mechanical/electrical)*
GENERAL CONTRACTOR: *Frank N. Gustafson & Sons, Inc.*





1. Lobby
2. North stair tower
3. South stair tower
4. Projection booth
5. Auditorium
6. Stage
7. Loggia
8. Mechanical
9. Elevator
10. Faunce Court
11. Leeds entry
12. Classroom
13. Lecture hall
14. Lobby
15. Mechanical

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BEHAVIOR MODIFICATION

New look marks a venerable Modernist firm.

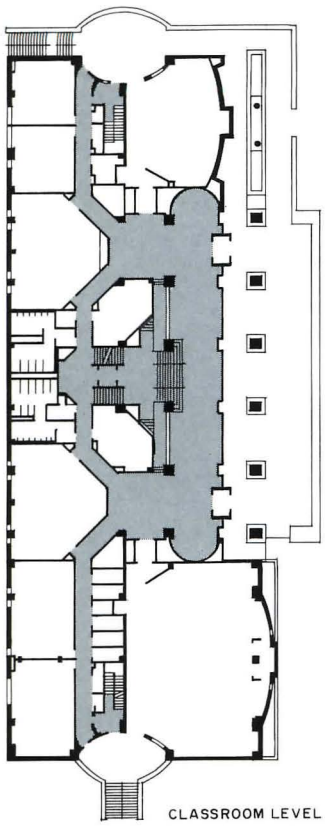
Psychology Building
Vanderbilt University
Nashville, Tennessee
The Stubbins Associates, Architects

The program called for a new academic building that would consolidate the previously dispersed classrooms, offices, and laboratories of Vanderbilt University's psychology department. The building was to close off the open end of Curry Field, forming a new quadrangle for informal student gatherings. And its architecture, recalls project designer Ronald Ostberg, had to "pick up the spirit" of Kirkland Hall, a pleasingly idiosyncratic Sienese Gothic Revival structure, situated just across Curry Field, that is Vanderbilt's oldest and most beloved building.

Toward these ends, The Stubbins Associates departed from the sleek Modernism of its most celebrated work and produced a five-story, 110,000-square-foot structure whose rusticated Indiana limestone base, red-brick skin, and strongly projecting precast cornice are direct, if stylized, references to Kirkland Hall. The imposing colonnade and second-story loggia of the building's Curry Field elevation (above) form a photogenic backdrop for the university's annual graduation ceremonies.

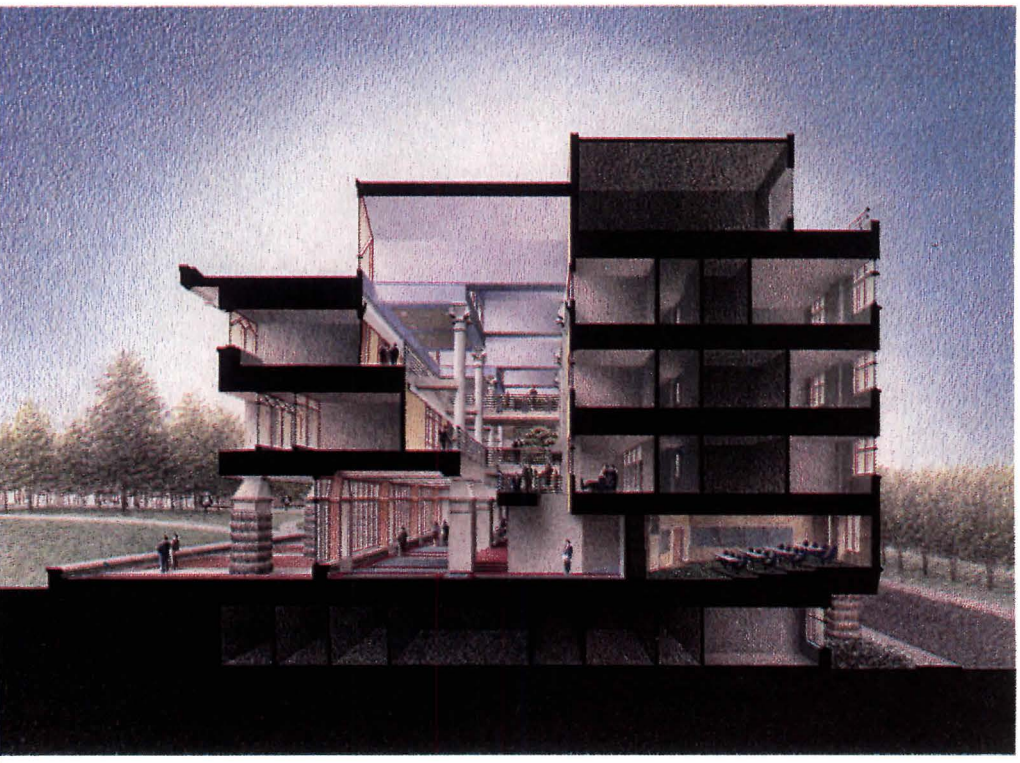
Inside, the architects devised a plan that places animal labs at the lowest level ("to maximize security and minimize their impact," says Ostberg), classrooms at the ground-floor level, and offices and behavioral labs on the three top floors. The interiors are organized around a 50-foot-high, skylit central space (opposite) that effectively isolates laboratories from faculty offices, at the same time encouraging a "collegial exchange," in the architects' words, among departmental professors and their students. **P. M. S.**

ARCHITECT: *The Stubbins Associates—W. Easley Hamner, Howard Goldstein, principals-in-charge; C. Ronald Ostberg, project designer; Cheryl Keown, project manager; William E. Ralston, Claudia Russell, Sara Castle, Peter Ching, Dominic Vecchione, Charles Kessler, Tangelea Gillon, Tetsuo Takayanagi, project team; Karen Fox, Amy Semmes (interiors); Mary Guinan, David Kenyon (specifications); Michael Gilligan, Jeanne Zilligen (landscape)*
ENGINEERS: *John Carpenter and Associates (structural); I. C. Thomasson (mechanical/electrical); MCI (civil)*
CONSULTANTS: *BBN Laboratories (acoustical); Schweppe Lighting Design (lighting); Geologic Associates (soils)*
CONSTRUCTION MANAGER: *The Parent Company*



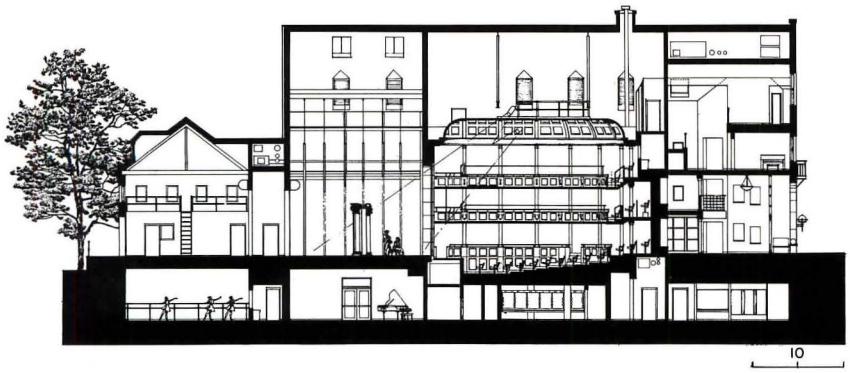
CLASSROOM LEVEL

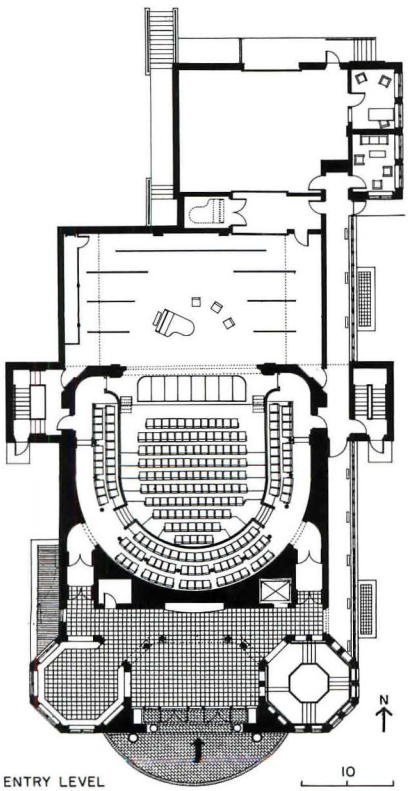
Classrooms and lecture halls occupying the building's ground floor are linked to Curry Field through a portico (plan above). Broadening as it rises, a central atrium (right) separates faculty offices overlooking the field (left in section below) from laboratories along the building's street-facing side.



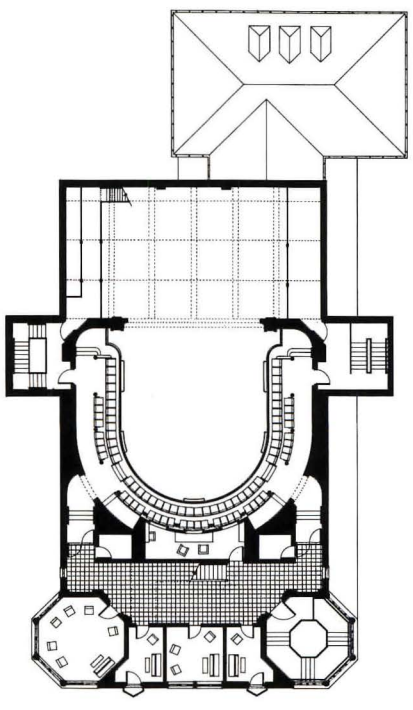
A grand stair (above) is meant to give a sense of ceremony to a lobby that frequently accommodates university-sponsored social events.

Towers and balconies romanticize a school performing-arts center.





ENTRY LEVEL



BALCONY LEVEL

THEATRICAL ROMANCE

Turrets and balconies invest a former parking lot with a sense of theatricality at a private school in Connecticut.

Centennial Performing Arts Center
Westminster School
Simsbury, Connecticut
Graham Gund Architects

For its hundredth birthday, the Westminster School, a private coed secondary school, gave itself a new performing-arts center. The facility consolidates a great many activities that had taken place in whatever spaces the participants could find—drama at one end of the gym, dance on the gym floor, chorus in the basement of the chapel.

The design of the exterior is deliberately theatrical and romantic, says architect Graham Gund. The towers, the Juliet balconies, the large arched portal, even the jumbo sand-cast brick, set the building apart from its neighbors.

What really sets the center apart, however, is its audience chamber, discernibly different from most present-day theaters. Called by its designers a "courtyard" theater, it takes its inspiration from open-air Shakespearean theaters, with the audience closely surrounding the players. At Westminster, about half the 400-member audience "peoples the walls" in shallow balconies—two seats deep on the sides, three deep at the back. The chair legs are graduated in height so that spectators behind can easily see over heads in front. No seat is farther than 40 feet from the apron of the thrust stage, and at the front corners of the stage, actor and spectator are nearly eyeball to eyeball. Thus, the designers feel, the audience becomes part of the theatrical experience.

In addition to the auditorium, the building provides a number of workrooms—dance studios, music practice rooms, and a scenery building loft. What's more, since performing-arts centers at schools tend to become ad hoc clubhouses for both performers and technicians, window seats in small rooms around the lobby (bottom opposite) provide informal spaces where devotees can discuss present and future productions.

Balcony fronts and the blue-domed ceiling are made of glass-fiber reinforced gypsum molded to resemble painted wood and

Audience members seated on shallow paneled balconies "people the walls" of an intimate theater.

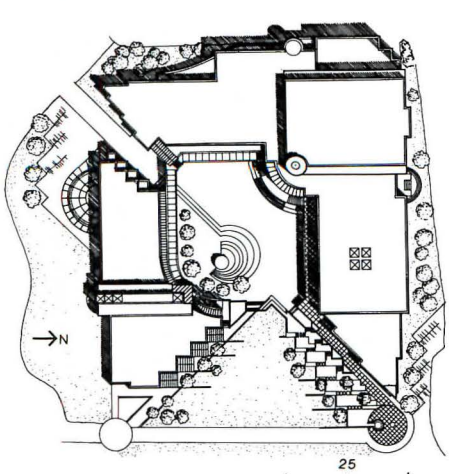
The corners of the lobby contain informal chambers for conversation.

to offer complex reflective surfaces for good music acoustics. Balcony soffits are painted concrete cantilevers, eliminating the weight of a ceiling so that columns can be quite thin. **G. A.**

Centennial Performing Arts Center
Westminster School
Simsbury, Connecticut
OWNER: *Westminster School*
ARCHITECT: *Graham Gund Architects—Graham Gund, principal-in-charge; John Prokos, project architect; Robert Arthur, Paul Demosthenes, David Eisen, George Warner, Alec Holser, project team*
ENGINEERS: *LeMessurier Consultants (structural); Zade Company (mechanical/electrical); Cavanaugh Tocci Associates (acoustical)*
CONSULTANTS: *Theatre Projects Consultants, Inc.*
GENERAL CONTRACTOR: *Daniel O'Connell's Sons, Inc.*

GOOD-GUY MODERN

Changed assumptions mark student center.



Price Center
University of California at San Diego
San Diego, California
Kaplan/McLaughlin/Diaz Architects

Although the 16,000-student University of California at San Diego has been attracting increasing attention for its academic excellence, its architecture, a motley collection of old military buildings in suburban La Jolla, lagged far behind other campuses in the UC system. An ambitious expansion plan, begun during the late 1980s and designed by a variety of well-known architects, is beginning to change the university's aspect for the better—witness the recent completion of the new Price Student Center, designed by the San Francisco firm Kaplan/McLaughlin/Diaz in close consultation with a university-based committee of end-users.

"We purposely set out to bust the iconography of the student center as a business building or something shoehorned into a remodeled classroom or lab building," says Herb McLaughlin. "We totally changed the assumptions about the gestalt of a building, its feeling and character."

Price Center is a 164,000-square-foot mixed-use structure comprising a ballroom, a theater, dressing rooms, lounges, alumni offices, automatic teller machines, a pub, food-preparation areas, a coffee shop, bookstores, reading and meeting rooms, a library, medical and counseling services, traffic-generating shops, and rooms devoted to crafts, games, table tennis, and billiards. But beyond specific functions, recalls McLaughlin, "the students wanted life, warmth, intimacy, activity, brightness, sparkle, a sense of hustle and bustle, community, and exuberance"—none of which was in the written program but all of which were crucial in coming up with an appropriate architecture.

To help carry out the students' program of almost round-the-clock activity in a space that accommodates 4,000 but must be equally alive holding only 40, KMD called upon traditional European academic forms that McLaughlin says have been neglected in American campus architecture:

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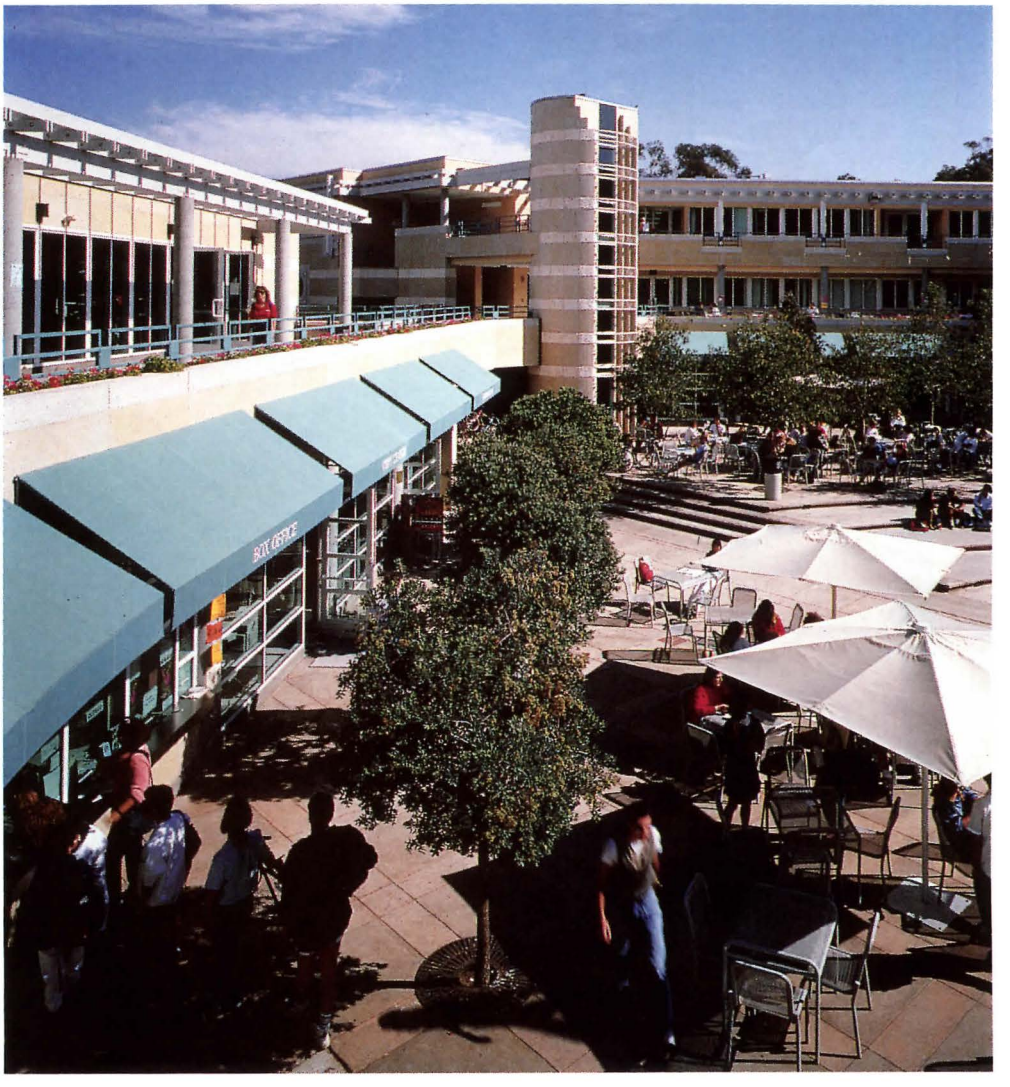
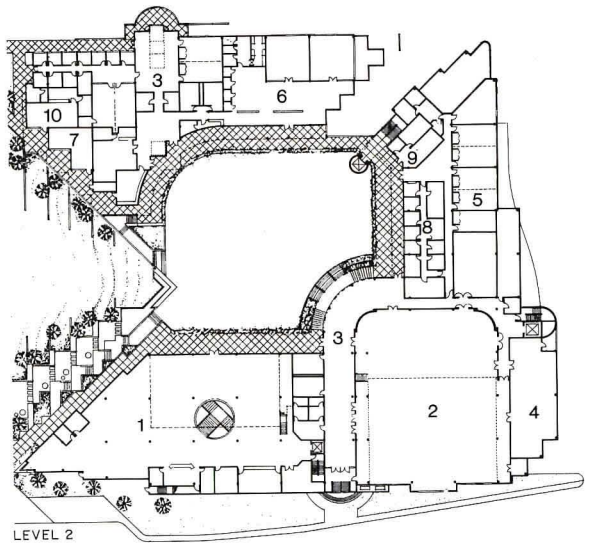
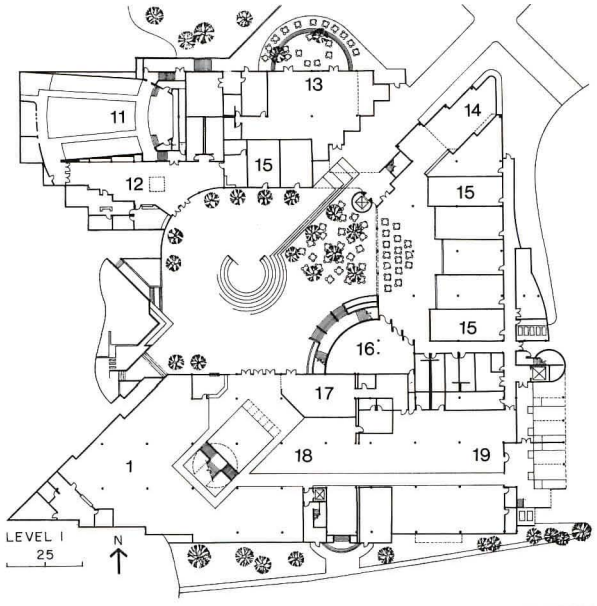
A curving storefront glazing system encloses a two-story student coffee shop (above and page 95).

A spacious multilevel plaza cuts a broad diagonal path between the Price Center's two major components, forming a new central focus for the UCSD campus. A two-story wing (far left in left and bottom photos) houses a 500-seat theater and other student recreational facilities, while a three-story building (right in photos) accommodates a food court, 12,000-square-foot ballroom, university bookstore, and offices for campus organizations. Wood and concrete trellises on upper-level terraces (below) evoke San Diego's arcadian architectural past.



1. Bookstore
2. Ballroom
3. Lounge
4. Kitchen
5. Meeting room
6. Recreation
7. Retail
8. University events
9. Women's resource center
10. Crafts center
11. Theater
12. Lobby
13. Pub
14. Coffee shop
15. Shop
16. Dining/meeting
17. Convenience store
18. General merchandise
19. Shipping and receiving





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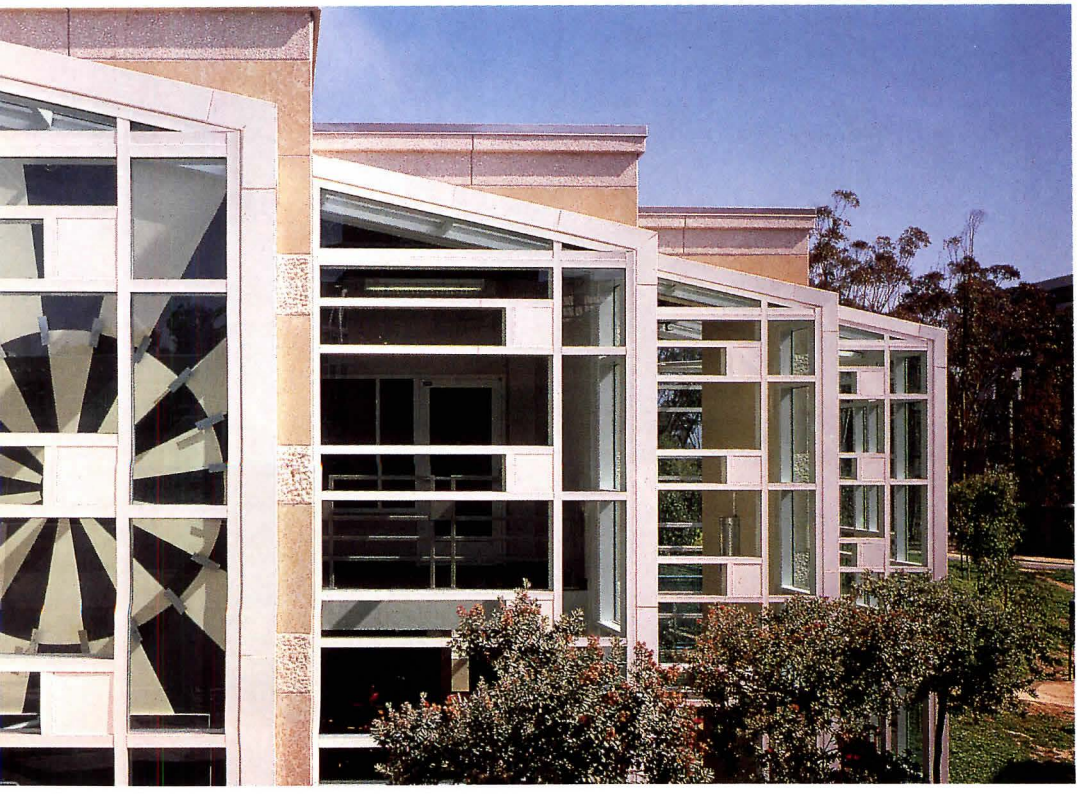


Sleek white-painted metal and glass walls (below and opposite) contrast with polychromed bands of Jerusalem stone and Portuguese marble used elsewhere on Price Center.

the piazza and the cloister. At Price Center a triangular swath of lawn slopes down into a main courtyard enclosed on three sides by two asymmetrical three-story buildings. Water courses along one side of the lawn, following the jagged lines of an architecture that deliberately gathers discrete parts and forms rather than imposing a monolithic theme.

A synthesis of glass and stone

The building is clad in a polychromed skin of Portuguese marble and Jerusalem stone, with movable glass garage doors that dissolve the barrier between outdoor dining areas and indoor fast-food service. Structural trellises create a soft play of shadow and light that reminds McLaughlin of Victorian verandas and, by proving once again that structure can be its own ornament, underscore McLaughlin's belief in the values of Modernism—or, as he describes this project, "good-guy Modern."

The cloister role at the Price Center is played both by the sweep of lawn and by what has become known affectionately as "Nerd's Walk," a heavily used mezzanine walkway around the courtyard where students can observe the action without feeling forced to participate.

Since UCSD is gradually replacing many of its older buildings, KMD's project needed to relate to few structures or cultural symbols, beyond the traditional main pedestrian artery that diagonally cuts the Price Center into two buildings, and the central library that towers over it to the north and whose floor plan is echoed in the Sullivanesque "rose window" of the center's ballroom.

The building's cost was $16 million, or $97 a square foot, including interior partitions, projection booths, and theater seating; the retail concessionaires were responsible for their own décor.

MARY KATE KELLY

Mary Kate Kelly is a New York City-based freelance writer.

Price Center
University of California at San Diego
San Diego, California
OWNER: *University of California*
ARCHITECT: *Kaplan/McLaughlin/Diaz—Herbert McLaughlin, principal-in-charge; Ryan Stevens, project designer*
ASSOCIATED ARCHITECT: *Austin-Hansen Group—Randy Robbins, principal-in-charge; Jeffrey Parshalle, project architect; Bartey Topjian, Donna Taylor, Bridget Soyka-Smith, interior design*
ENGINEERS: *Cygna (structural); Practicon Associates (mechanical); Semenza Engineering (electrical); Boyle Engineering (civil)*
LANDSCAPE ARCHITECT: *Land Studio*
GENERAL CONTRACTOR: *Blake Construction Company*

BUILDING TECHNOLOGY

Book Briefs

The Vertical Building Structure, by Wolfgang Schueller. New York: Van Nostrand Reinhold, 1990, $55.95.
The volume pulls together such disparate subjects as massing and vertical transportation determinants with an in-depth treatment of structural engineering.

Building Engineering and Systems Design, by Frederick S. Merritt and James Ambrose. New York: Van Nostrand Reinhold, 1989, $54.95.
This recently revised textbook is not just for engineers. It's an excellent quick review reference on just about any functional building design issue, from zoning to interior finishes.

Timber Design and Construction Sourcebook, by Karl-Heinz Goetz, Dieter Hoor, Karl Moehler, and Julius Natterer. New York: McGraw-Hill, 1989, $69.95.
Comprehensive, with many, many details and examples. Standards referenced, are, unfortunately, European, not U. S.

Building Design and Human Performance, N. C. Ruck, Ed. New York: Van Nostrand Reinhold, 1989, $44.95.
Up-to-date articles on design criteria for acoustics, air quality, and lighting.

Standards: *Energy Efficient Design of New Buildings* is offered by the American Society of Heating Refrigerating and Air Conditioning Engineers and includes software programs for analyzing the building envelope and lighting performance. ASHRAE (404) 636-8400, $65 members, $98 nonmembers.
ASTM Standards on Building Economics helps in evaluating the economic performance of building investments. ASTM, 1916 Race Street, Philadelphia, Pa. 19103 (215) 299-5585, $19.00.

Retardant Plywood Sheathing Under Fire

Manufacturers of fire-retardant treated plywood (FRTP), roof sheathing used in over a million housing units in the last decade, are currently embroiled in litigation due to rapid loss of structural strength in some products. The sheathing was used in townhouse-type developments to stop the spread of fire in lieu of parapets between units. Manufacturers' testing methods apparently failed to show that the same acid-catalyzed reaction that resists fire may also attack the basic chemical bonds that afford wood its structural strength under the *gradual* heat increases and sustained high temperatures encountered in many actual installations. Litigants have received national publicity, claiming thousands of roofs are unsafe.

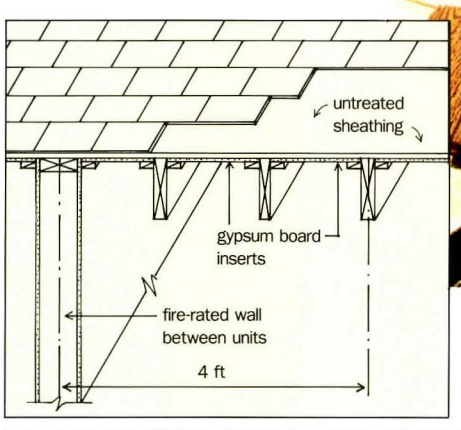
In New Jersey, where hundreds of homeowners are facing replacement of defective roofs at an estimated cost of $2,000 to $4,000 per unit, the state legislature is considering the creation of a $30-million superfund to underwrite the costs. The Attorney General is continuing to pursue civil litigation to secure reimbursement by insurance companies. The state's guidelines for replacement call for an assembly of untreated plywood and gypsum board similar to that currently accepted on the West Coast (below left).

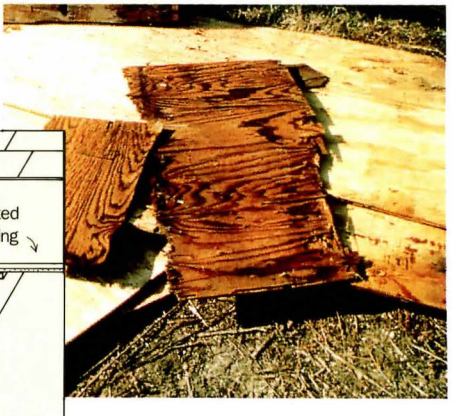
It is still unclear which formulations of FRTP are reliable since proprietary formulas are not subject to testing by federal agencies. Distinctions are made among different generic categories of FRTP, though. Experts will only agree that organic treatments, which are typically less acidic than inorganics, such as those containing ammonium phosphates, appear to be far more durable.

Although the National Association of Home Builders and The U. S. Forest Products Laboratory acknowledge better performance of some organic products, neither group is ready to endorse any FRTP as a replacement for the deteriorating materials.

Meanwhile the U. S. Forest Products Lab is developing an emergency test procedure that will permit non-destructive on-site evaluation of extant FRTP roofs. Long-term quality-control procedures, developed in collaboration with manufacturers, are expected to be incorporated into an ASTM standard in two to five years.

RACHEL HOFFMAN





Deteriorated sheathing sometimes turns dark in a short time (above). An accepted remedy (left).

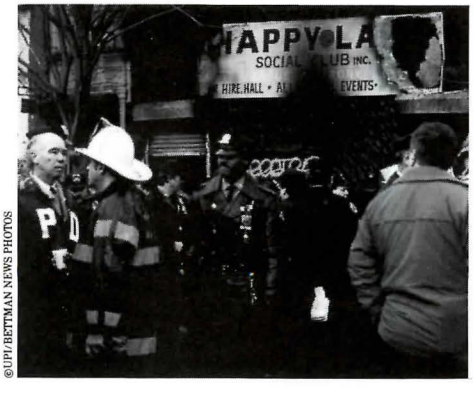
Commentary: Bronx Fire

The irony of the Happy Land social club fire, which killed 87 people in an illegal Bronx bar last March 25, is that it fell on the 100th anniversary of the Triangle Shirtwaist factory fire, the disaster that paved the way for today's annoying, cumbersome, but essential life-safety codes.

The larger tragedy is the collapse of the regulatory process. Basic provisions were lacking: there were no windows, no emergency exit, no exit stair from the upper level. City officials had padlocked the club numerous times, only to find it promptly reopened.

The owners were never brought to trial because the city's court system is gridlocked by drug-related crime cases. New York City's failure is uniquely appalling, but in many cities code enforcement is increasingly falling victim to budget cuts and toothless sanctions. Some even argue that clubs serving poor communities should not have to meet codes. Architects need to lead the way in complying with codes, but more importantly, *explaining* their value to often skeptical clients and the public at large.

J. S. R.



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DELINEATING WATERPROOFING

Two intricate restorations show that it takes all kinds of drawings to fully explain flashings.

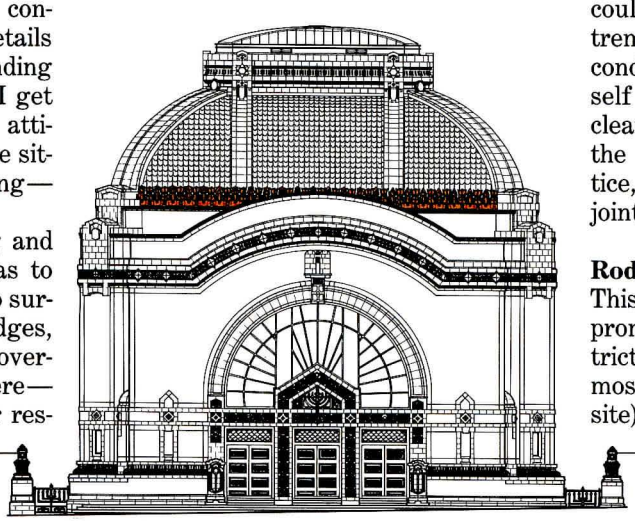
A set of construction drawings often reveals little about the process of design. Drawings of historic preservation work by New York City-based Ehrenkrantz, Eckstut & Whitelaw are an exception (see also RECORD, July 1990, pages 95-97). Details from two of the architect's projects suggest not just the thoroughness and clarity of presentation characteristic of their drawing sets, but express an organic extension of design-stage queries and sketches. For each condition, someone asked how the details could be drawn for greatest understanding rather than merely asking, "How do I get this done as fast as possible?" This attitude seems to apply especially to those situations that can be most daunting—flashings.

It is conventional to draw flashing and waterproofing details in section, so as to reveal each material from substrate to surface. But tough issues at corners, edges, and penetrations are then easily overlooked. In the projects featured here—both of them for demanding exterior restorations—the firm used many section drawings, then amplified this information through axonometrics, even perspectives, to describe the interactions of materials that are variously new, existing, and existing-but-reinstalled. Flashings, because they are turned up at sides, and slide under, between, or penetrate other materials, were sometimes drawn separately (page 102) so that shapes and coverage could be visually checked. (Because the details are presented somewhat smaller than originally drawn, some notes have been omitted. They have also been redrawn from the contract set for production reasons).

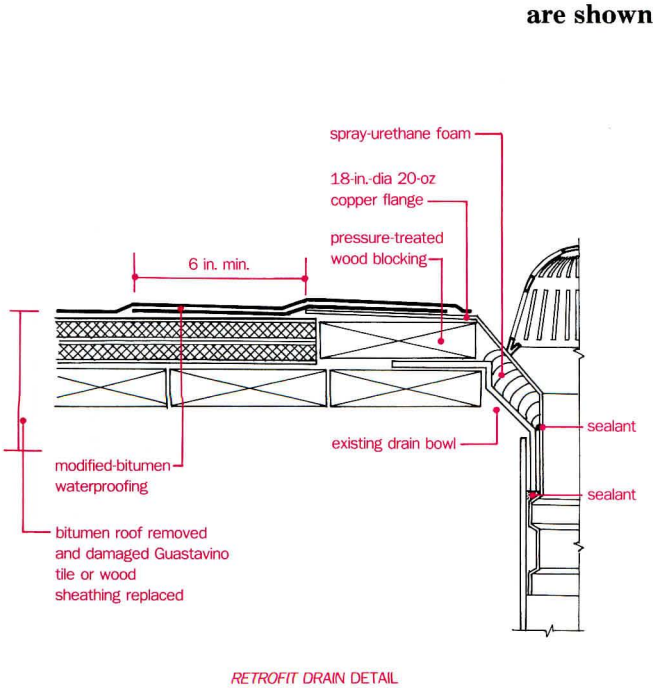
Modern materials had to be melded with assemblies that are now unfamiliar to us, even though they are less than 90 years old, such as masonry arches and an inner dome of Guastavino tile (a rare technique of building load-bearing curves out of thin layers of overlapping tiles). Such drawings could not have been made without extremely detailed surveys of the existing conditions, the preparation of which is itself a learning experience. But it is also clear that the architects have learned from the mistakes of early 20th-century practice, and sought greater backstopping at joints and penetrations.

Rodef Shalom Synagogue

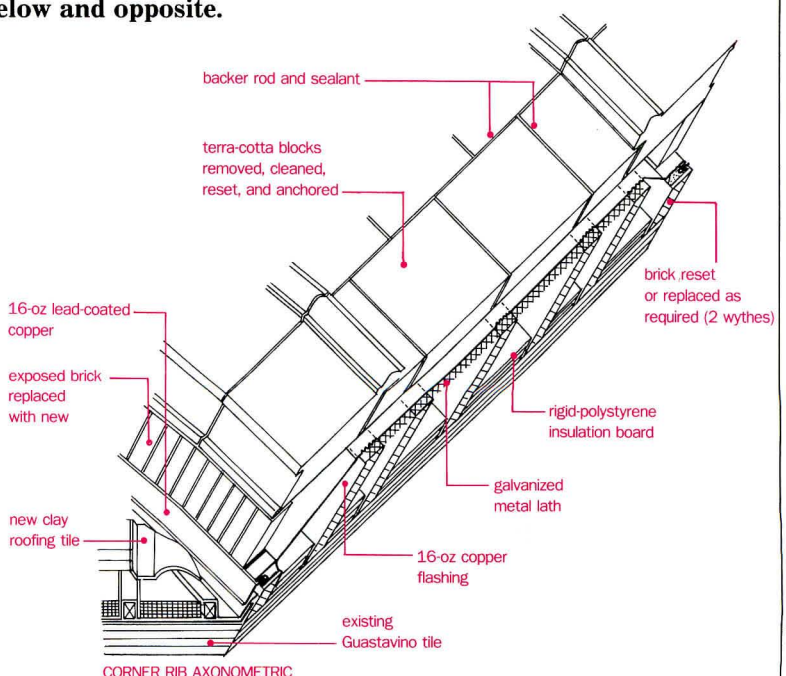
This monumental structure is set in a prominent site in Pittsburgh's Oakland district, and is among Henry Hornbostel's most ebullient designs (this page and opposite). The congregation has raised funds



Cheneau details of synagogue (shaded) are shown below and opposite.



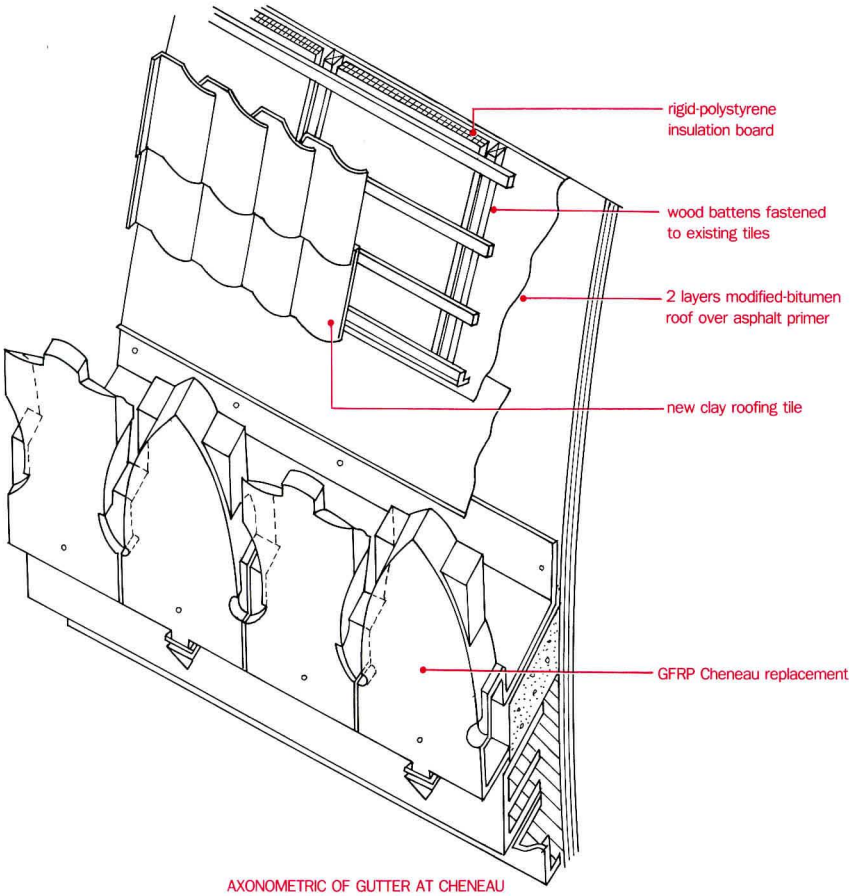
RETROFIT DRAIN DETAIL



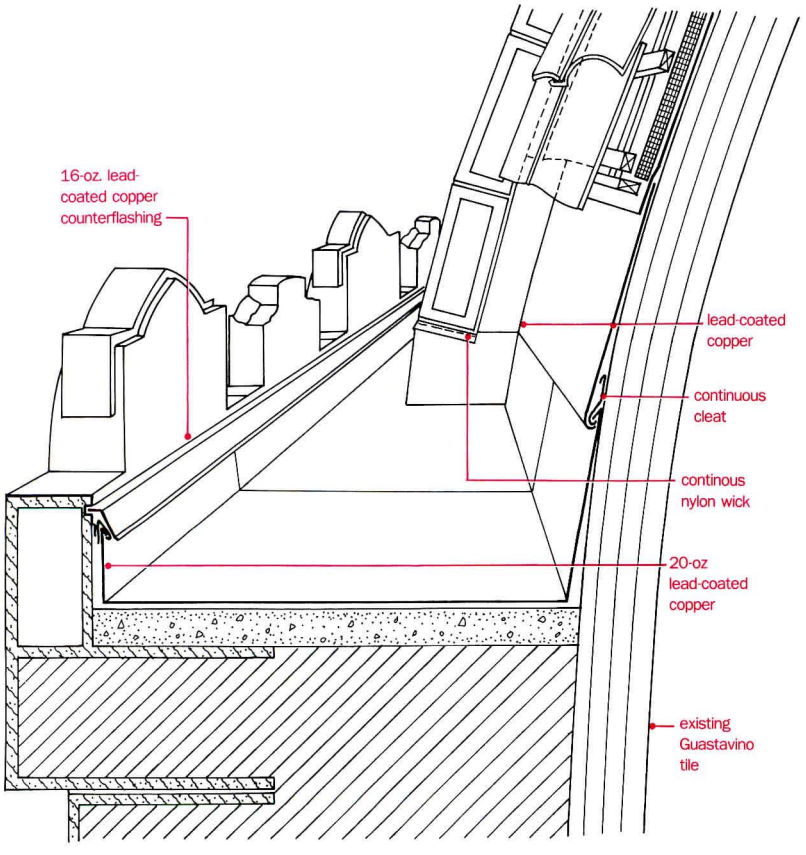
CORNER RIB AXONOMETRIC

Rodef Shalom Synagogue
Pittsburgh, Pennsylvania
Ehrenkrantz, Eckstut & Whitelaw, Restoration Architect

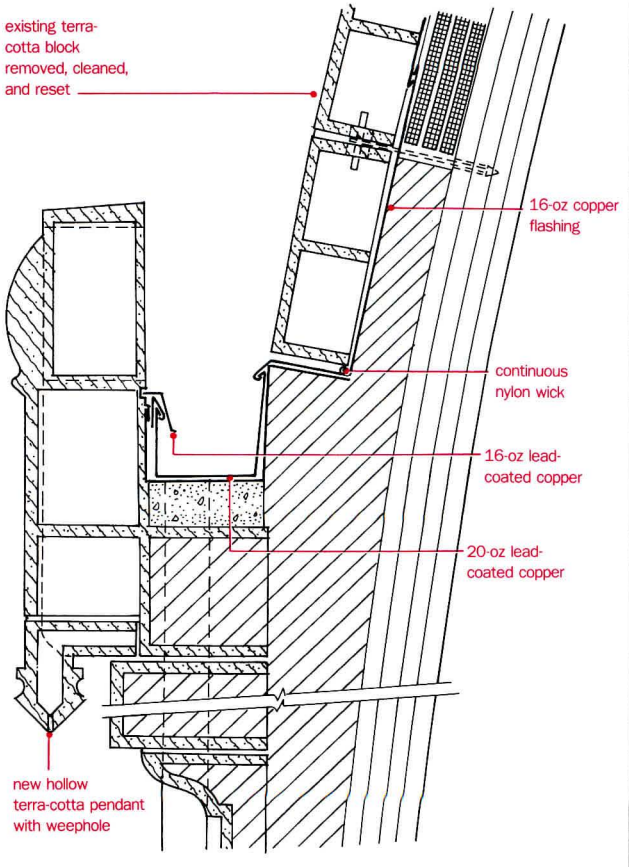
With a recent survey in hand, the architects integrated traditional details with new materials. Polystyrene insulation, modified-bitumen roofing, and stainless-steel pins are all used under or within traditional terra-cotta, lead-coated copper, and clay tile. Cheneau replacement, roof-rib repairs, and clay-tile installation are described in axonometric (left and opposite). A section-perspective shows both the field of tiles at the dome and the way flashing wraps a terra-cotta roof rib (bottom left). New materials on the existing substrate are most clearly shown in section (below).



AXONOMETRIC OF GUTTER AT CHENEAU



SECTION PERSPECTIVE THROUGH CHENEAU



SECTION THROUGH CHENEAU AT INTERMEDIATE RIB

for a thorough restoration of both the exterior and interior of the 1907 terra-cotta-clad structure. The scope of the work is large, involving repairs to skylights, stone, brick, terra-cotta, and interior repairs to decorative plaster, paint, and fittings.

Among the most challenging detailing tasks in the project is refurbishing the synagogue's ribbed dome and cheneau, where roof runoff is conveyed to inlets behind a decorative crest of terra-cotta (shaded area on elevation page 100). The architects have called for complete replacement of the tile roof of the dome, setting it on new wood battens over the "new" technology of modified bitumen roofing (which acts as waterproofing and a shield to backed-up snow and ice).

Dome ribs of terra-cotta blocks were subject to extensive environmental damage over the years. A few units have had to be replaced, but as many as possible were saved. These have been removed, cleaned, repaired, and reset over restored short piers of brick (drawing page 100). Existing through-wall and exposed flashings have all been replaced with new lead-coated copper. The cheneau is shown from several vantage points (page 101), so that the handling of flashing around the complex shapes is fully described. Most of this work has now been done, and the entire project will be completed this fall.

Baltimore Gas & Electric Building

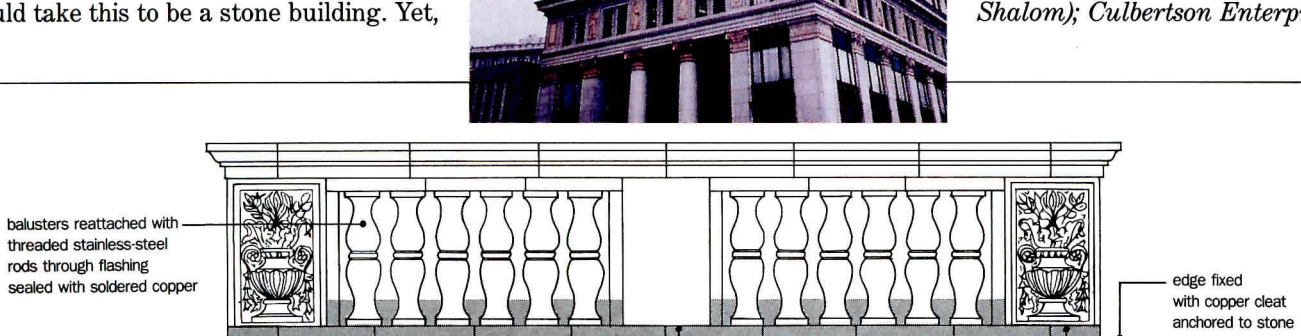
It is a testament to early 20th-century terra-cotta craftsmen that most observers would take this to be a stone building. Yet, like many commercial structures erected at that time (1916), only portions of the lowest four floors are actually clad in granite; the remaining floors of the steel-framed building are faced in matching terra-cotta. The client, the building's original owner, engaged the architects to stabilize leaking and loose architectural elements while a full-scale survey was undertaken and a restoration plan developed.

Details of replaced 19th-floor balconies at the headquarters of Baltimore Gas & Electric are shown below; a new scaffold-anchor system (opposite) was installed on the roof's projecting cornice.

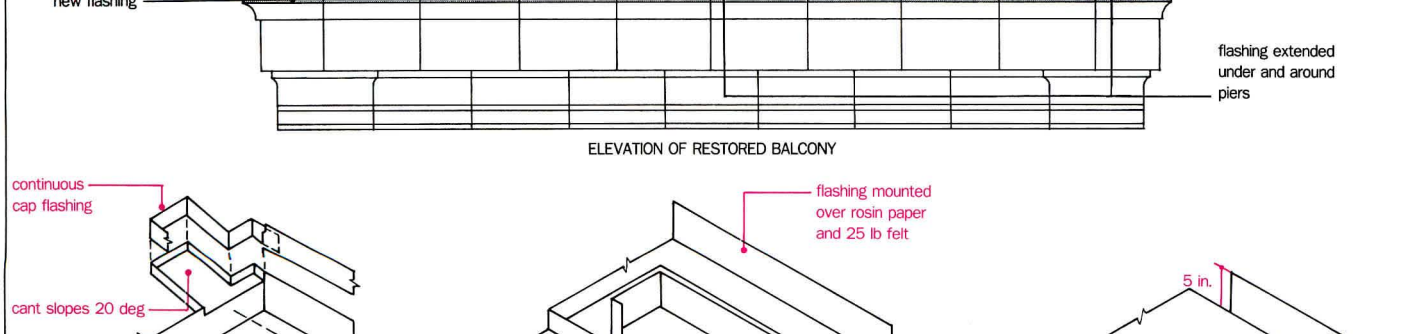
Although alternatives to terra-cotta were explored, new terra-cotta was chosen to replace pieces damaged beyond repair. Decorative balconies, which project from the 19th floor of the 20-story structure, required the most attention. New molds were made both from existing pieces and from original drawings still retained by the client. To protect the balconies, new flashing extends from the plane of the exterior wall, under the balusters, and over the lip of the balcony edge, "bathtub" style (shaded area in elevation below). Linked axonometric drawings were used to design and fully describe the flashing (bottom).

An unusual feature of the building is its scaffold-anchor system, which allows periodic maintenance and inspection of the facade (opposite). The existing device was replaced with a new stainless-steel system, and anchorage details, which are exposed to the most severe weathering, were carefully studied so as not to become conduits for new water leakage. **James S. Russell**

Rodef Shalom Synagogue
Pittsburgh, Pennsylvania
Baltimore Gas & Electric
Baltimore, Maryland
Architect: *Ehrenkrantz, Eckstut & Whitelaw—Denis Glen Kuhn, principal-in-charge; Kate Burns Ottavino, project manager*
Engineer: *Wiss, Janney, Elstner Associates (BG&E)*
General Contractor: *Jendoco (Rodef Shalom); Culbertson Enterprises (BG&E)*



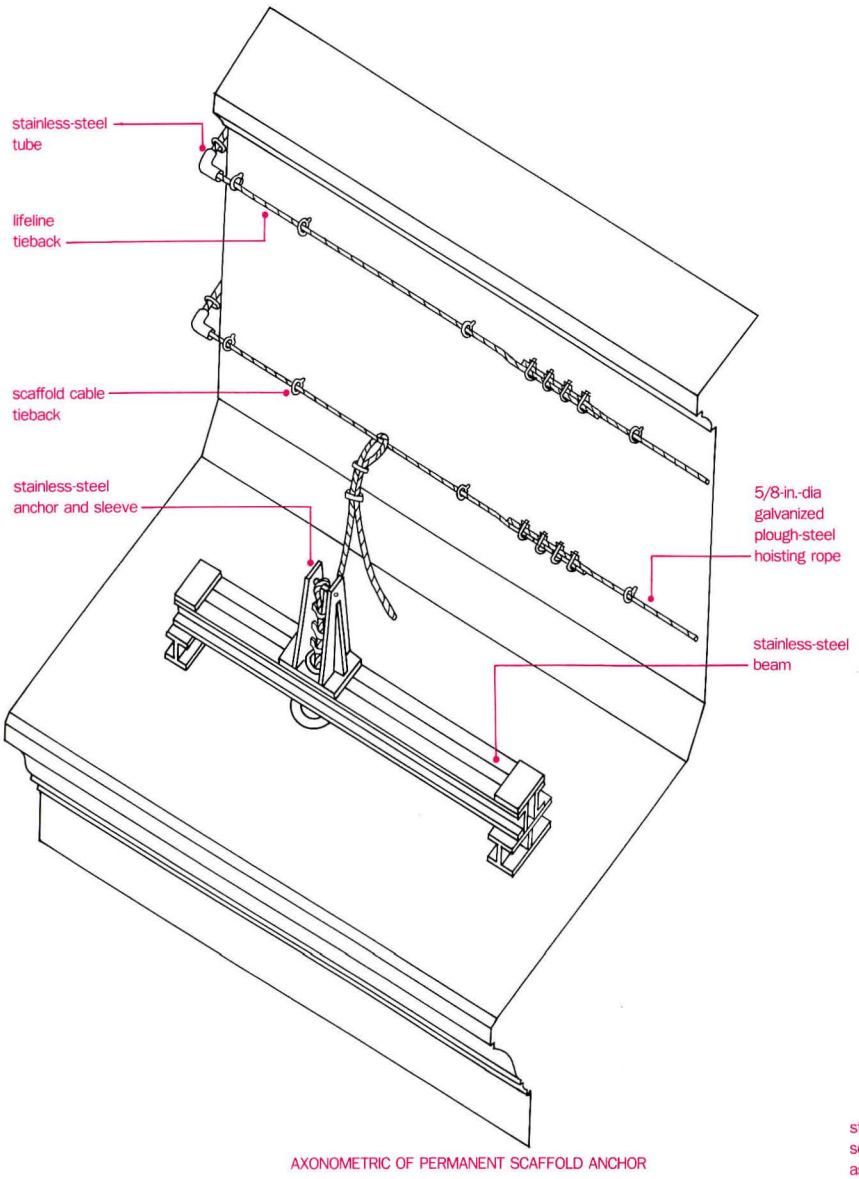
ELEVATION OF RESTORED BALCONY



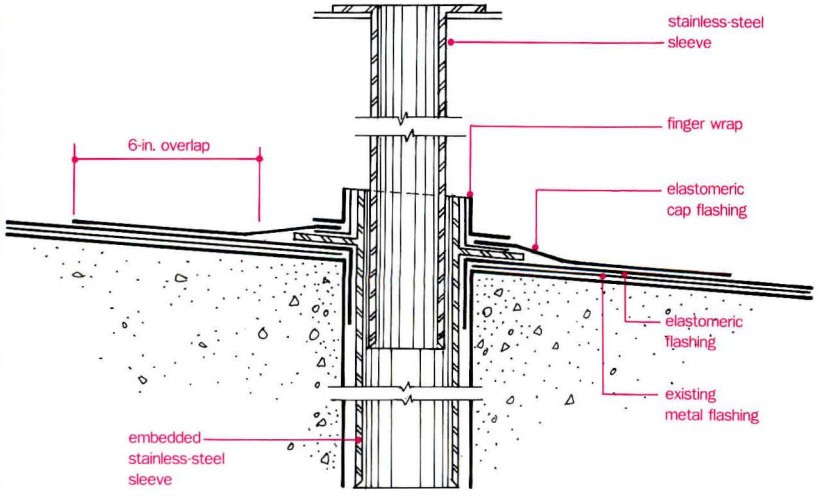
AXONOMETRIC OF BALUSTRADE FLASHING

Baltimore Gas & Electric
Ehrenkrantz, Eckstut & Whitelaw, Restoration Architect

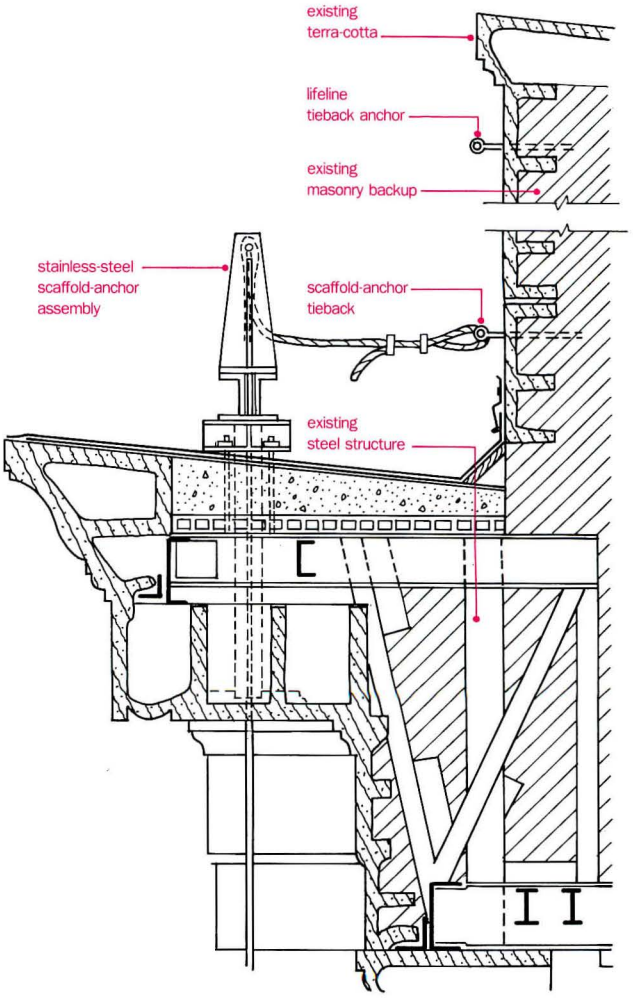
Though this commercial structure appears to be clad in stone, it is almost entirely laid up with terra-cotta. A friezelike band of projected balustrades punctuates the 19th floor, and was completely replaced. Flashings were fully described in plan and section (not shown) as well as axonometric and elevation (opposite). To replace the scaffold-anchor system, the architects developed a new way to attach the beam to the structure and carefully detailed the supporting penetrations (left).



AXONOMETRIC OF PERMANENT SCAFFOLD ANCHOR

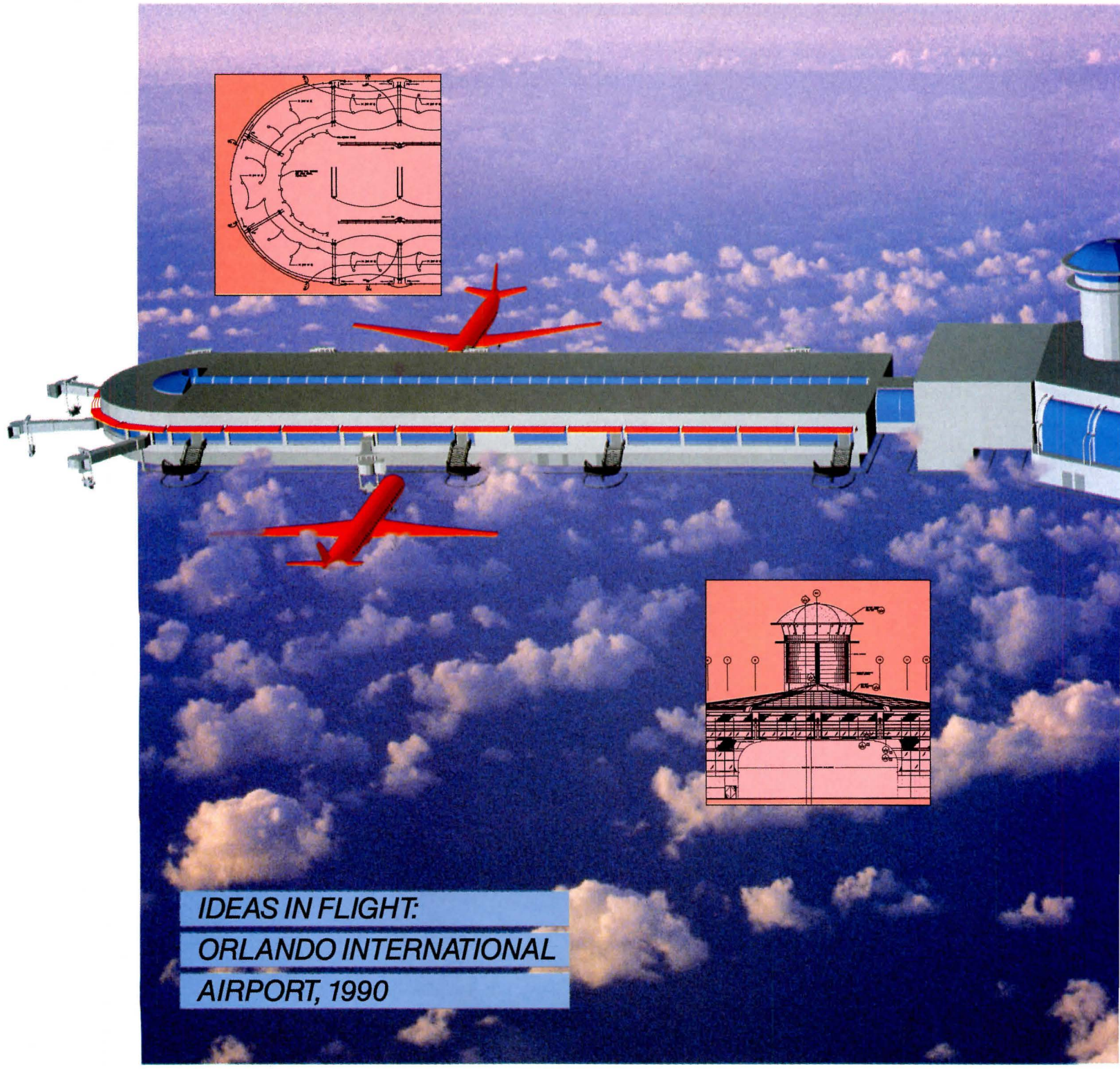


SLEEVE FLASHING DETAIL

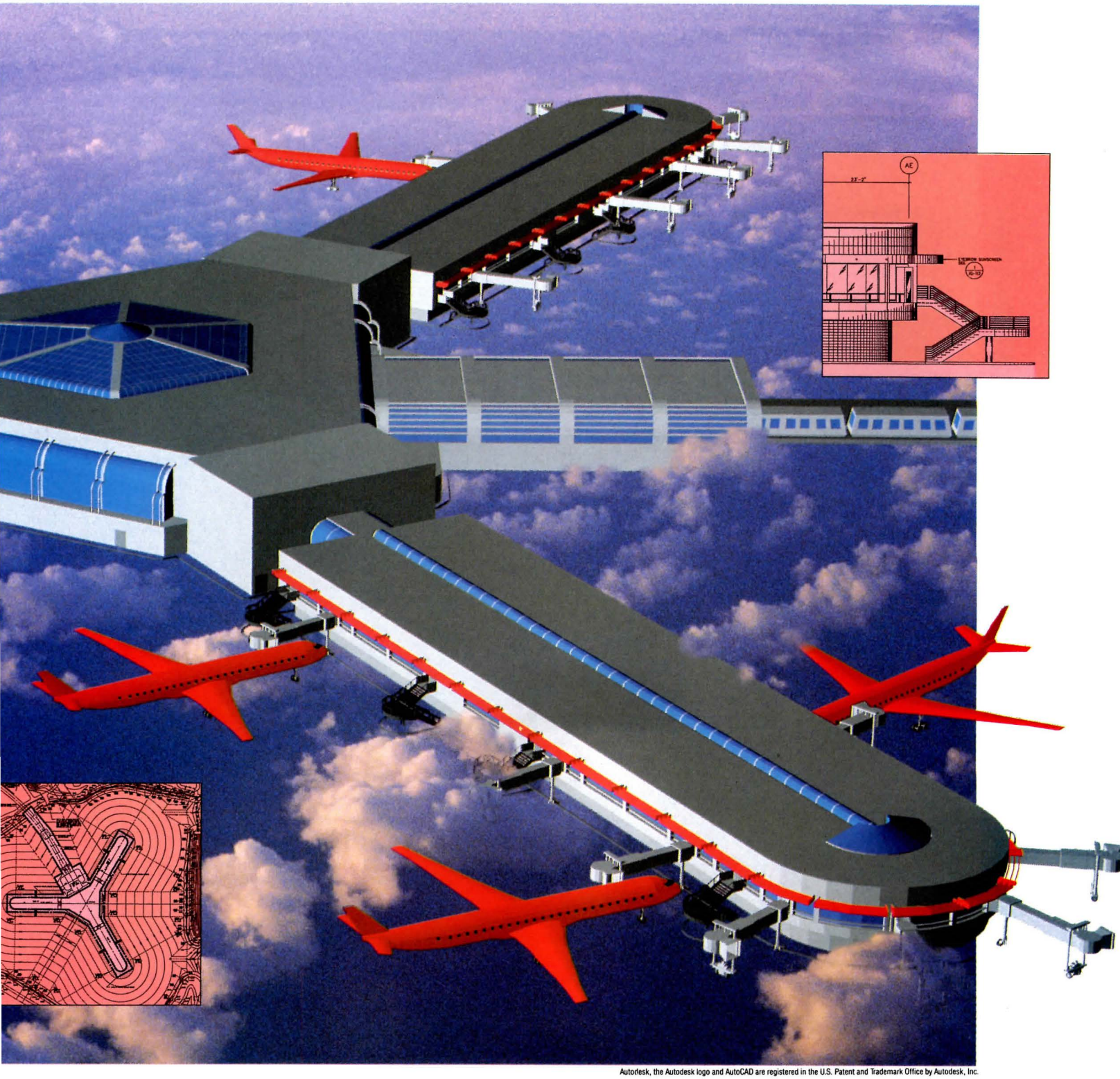


SECTION AT SCAFFOLD-ANCHOR

YOUR IDEAS. OUR SOFTWARE TECHNOLOGY.



This project was on a fast track. In late 1987, with air traffic exceeding all expectations, the Greater Orlando Aviation Authority decided to expand their airport. *Ten years* ahead of schedule. They called in KBJ Architects, of Jacksonville, Florida, who worked on the original project back in the 70s. ■ The expansion plan called for new passenger terminals, parking garages, a hotel complex and ground transportation systems, as well as new runways, taxiways and aprons. The schedule allowed only 30 months between the first drawings and the first passengers. ■ KBJ had three times the work due in one-third the time. They chose AutoCAD.® ■ There were



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civil engineers, mechanical engineers, structural engineers, aviation specialists and facilities consultants...they all used AutoCAD. So they all worked effectively together, sharing drawings, communicating accurately and eliminating duplicate efforts. ■ They all made the deadline. ■ AutoCAD will get your ideas flying, too. For more details on how fast track projects are handled, and for the name of your nearest Authorized AutoCAD Reseller, call Autodesk today at **800-445-5415, extension 80.**

Circle 36 on inquiry card

AUTODESK

A/E/C SYSTEMS PRODUCTS

New firepower in hardware, fewer one-supplier systems, and plummeting costs mean switching to CAD may be less risky. Even choosing the "wrong system" may not be fatal. By Steven S. Ross

1

Software vendors took more steps toward blurring the distinction between personal computers and technical workstations this year at the annual A/E/C Systems show in Atlanta. To help architects absorb the new hardware firepower introduced over the past two years, vendors offered new training services, easier networking, file conversion technology, and links between product catalogs and CAD software.

Everywhere, vendors were boasting of flexibility, too, rather than forcing customers into proprietary one-supplier systems. That, along with ever-decreasing prices for hardware, has continued to reduce the risk of implementing CAD for architects. That's because even choosing the "wrong" system for your practice is no longer a fatal mistake.

And mixing software and hardware could become the norm rather than the exception, too. One example: Put simple, fast 2-D CAD in the hands of drafters creating working drawings, let designers use 3-D packages for better visualization and for client presentations, and let others run a CAD program with database features for doing bills-of-materials or facilities management. And let all the software exchange drawing files freely.

To help clients *visualize* CAD-generated designs, more flexible presentation packages were demonstrated. The most interesting presentation packages, however, are promised only by the end of the year.

There were also many questions raised on the floor about the current dealer system being able to absorb the changes and explain them to design professionals. Hardware is becoming a low-priced, almost commodity item. Few new hardware products were released this year, and prices have eroded since last year. Software, on the other hand, is becoming ever more complex. Dealer margins are often not high enough for them to learn new packages well enough to demonstrate strengths and weaknesses to potential users.

And there were plenty of new packages:

AutoCAD ratified the long-awaited network trend with its demonstration of AutoCAD 11, due to be released this fall. "We're going after Intergraph, penetrating their market," said Autodesk's Scott Davison. To do that, AutoCAD will sport better integration with network software. Promised is seamless file locking across all platforms, so that DOS, Macintosh, and Unix versions, for instance, can share files on the same network. The company estimates that 20 to 25 percent of its customers are using networks now.

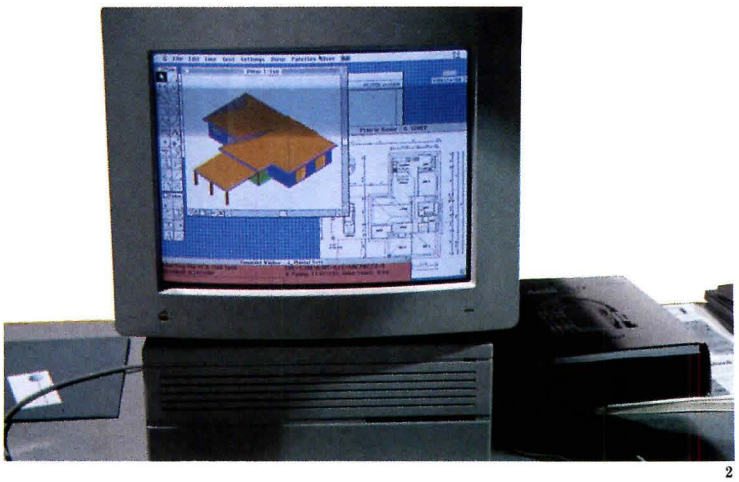
That's in line with a new survey from *Professional Services Management Journal.* Some 35 percent of the 442 responding engineering and architectural firms said they were using networked personal computers, up from 27 percent last year. Many firms in the survey reported using more than one system to meet client needs and produce projects in a cost-effective manner.

Release 11 will also sport better links to external reference files; they can be nested, too, like other block references. Help is finally being made context-sensitive, and multiple views can be combined on one master drawing ("paperspace," in Autodesk argot) for plotting all at once.

In Release 11, solids modeling will be an option. It will be shipped with all copies, but only an authorization code from Autodesk can turn it on. This Advanced Modeling Extension will not work on old "XT-class" computers that use the 8086 or 8088 microprocessor CPU.

Autodesk also announced that the Macintosh version of AutoCAD will run properly on the new, fast Mac IIfx.

Intergraph, of course, wasn't standing still. The firm demonstrated an upgraded interface for the DOS version of MicroStation; version 4.0 is due by



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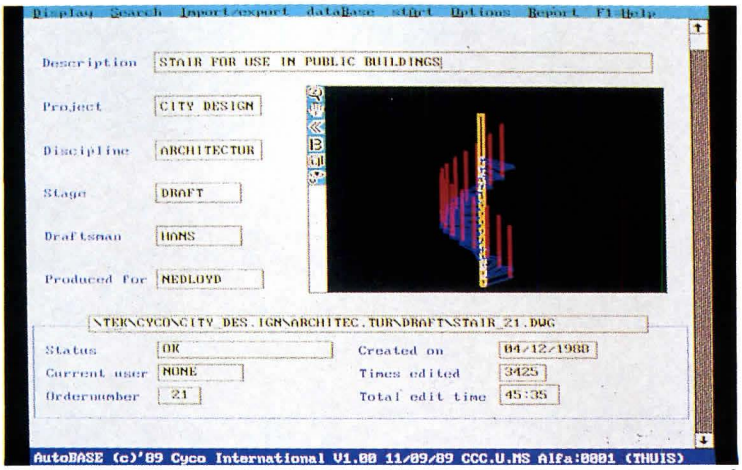

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1. Expert Graphics' RX Image paintbox using Rasterex board. 2. Intergraph's MicroStation Mac to ArchiCAD. 3. CYCO Autobase. 4. St. Louis Centre in Point Line CADD and RenderMan. 5. Dodge Dataline. 6. ISICAD CADvance.

year's end. The interface looks like the Open Software Foundation's Motif for Unix, in fact, with up to eight views on screen at the same time. There are also on-screen icons and better context-sensitive help, and extremely flexible associative dimensioning.

4

As with AutoCAD, there's a new link to the C programming language, for customizing and third-party add-ons. There are better built-in rendering routines, as well as support for RenderMan. Links to external Oracle databases are easier, too. The new version of MicroStation will run only on computers equipped with the 80386SX, 80386, or 80486 CPU chips.

Networks

Arris from Sigma Design is now available in DOS and Macintosh versions, using X-windows. The Arris package, long available in Xenix and Unix versions, is particularly adept at file sharing. *Circle 101*

ISICAD, Inc. introduced Cadvance 4.0 for Workgroups. It works with Novell NetWare and NetWare/386. The latter arrangement offers some unusual advantages. NetWare/386 allows the use of NLMs (NetWare Loadable Modules) to process data on the network server, rather than to move the data down the network and process it at the user's terminal. An NLM for hidden-line removal and one for querying project databases using English-like SQL (structured query language) are promised for September. The network version of Cadvance 4.0 is $3,495. The single-user version costs $3,295. *Circle 102*

Another way to do super-fast graphics calculations at the server is the Artistar from Artist Graphics. It works with Unix networks arranged in a star topology—that is, with all the terminals connected back directly to the server. Each server can control up to four terminals. The board will be compatible with AutoCAD's Unix version when shipments start in September. The price is $2,495 for the board and $1,995 for the network adaptor. *Circle 103*

Keeping track of all the drawing files on a network can be difficult. Cyco International introduced AutoBASE, which can access AutoCAD files outside AutoCAD itself. Users can attach more descriptive names and code numbers to files, beyond the normal 8-character DOS limit, too. The price is $695 for a single station and $1,995 for a six-station network license. (For single-computer users, Cyco's AutoManager has been upgraded so that it will work inside AutoCAD 10 as a convenient file-retrieval system, as well as a stand-alone to view and print files.) *Circle 104*

Another AutoCAD file management package, including file locking but not file viewing, was announced by Synergis Technologies; the price is $1,995 per server, independent of the number of terminals attached. *Circle 105*

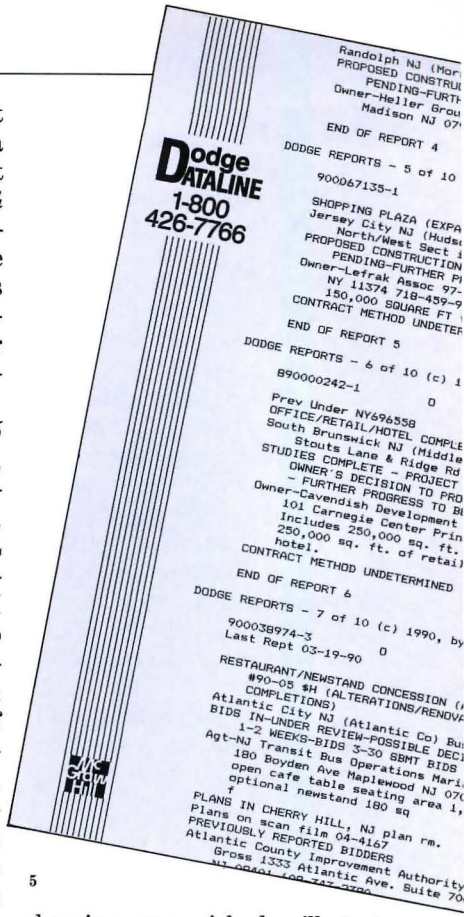
Sirlin VIEW/DWG 1.1, $295, views AutoCAD DWG files directly. SirlinVIEW/PLUS, $395, also allows viewing of HPGL and DXF files, and supports interfaces to dBase and ASCII text files. Both can be used to print or plot files without AutoCAD itself. The vendor is Sirlin Computer Corp. *Circle 106*

Still another package, AutoVue by Cimmetry Systems, Inc., released last year, allows viewing up to four viewports of an AutoCAD 3-D drawing at the same time. AutoVue can be run inside AutoCAD, or outside it, and can plot and modify drawings. *Circle 107*

Drawing Manager from Nahalem Bay Software can manage MicroStation and AutoCAD drawings on the same network using Novell NetWare, so that both CAD packages can share files. The price is $2,995 per Novell server, supporting any number of terminals. *Circle 108*

CADEXnet from Database Applications, Inc., manages all types of files on networks, including drawings, spreadsheets, and text. But users have to fill out a "file card" form for each one. The file card can contain the commands needed to launch an application. Thus, a VersaCAD drawing, once picked, will start VersaCAD automatically. It works with DOS and Unix networks, and costs $695 a seat (volume discounts and site licenses available). *Circle 109*

Worried about costs? SunRiver showed its CADLight network systems, announced in March, for the first time. The network uses super-fast 32-megabit-per-second fiber-optic cable to link relatively cheap workstation terminals (about $3,500 with accelerated graphics, $1,599 for bare-bones versions) to 30386- or 80486-equipped servers. At that speed, a 4 MB drawing file can be moved from server to terminal in one second. The demonstra-



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tion was with AutoCAD's SCO Xenix version. Light network adaptor cards are available to turn old personal computers into terminals, too. *Circle 110*

Other new CAD releases

Drawbase 107, with full extended memory support for 80386-equipped computers, was released at the show by Cadworks. *Circle 111*

Engineered Software announced a new site-licensing arrangement for its popular 2-D PowerDraw package for the Macintosh. Version 3.0, which costs $795 for a single-user license, can be purchased at discount prices that start at $2,782 for five users. *Circle 112*

Generic CADD is now available for the Macintosh, for $595. This 2-D design and drafting package offers more features than earlier versions that ran on IBM compatibles. *Circle 113*

Gimeor demonstrated Series 5/5 of its Architrion II package at the show, and promised July delivery. This architectural design and modeling software for the Macintosh features faster screen redraws, numerous new drawing and plotting tools, better links to an underlying database, and better control of libraries. Gimeor also released ArchiMovie, to create animated "films" of Architrion models, text screens, and other images for presentations. The price is $350 ($250 for Architrion users). *Circle 114*

Graphisoft announced a new demo package, complete with videotape, for its ArchiCAD drafting and 3-D modeling software for the Macintosh. The

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demo costs $48.50, refundable if you buy the full package. The firm also demonstrated a new translator, to move files back and forth between ArchiCAD and Intergraph's MicroStation. The translator will be bundled with ArchiCAD at no extra cost. *Circle 115*

CADKEY unveiled DataCAD 4.0, the first upgrade of this package since it was acquired by CADKEY in 1989. The maximum drawing size has been increased from 4 MB to 6 MB, and editing functions generally require fewer commands. The DC Modeler now is bundled at no extra charge, with the full package at $2,995. *Circle 116*

DCA Software, Inc., announced that it will bundle add-on software with Generic CADD. Each bundle will cost $1,000 or less when it is released, starting this fall with a home-builder and basic architecture package. Generic, now a subsidiary of AutoDesk, produces software that runs well on small, inexpensive computers. There's file compatibility with AutoCAD via DXF; more seamless file interchange is due soon. *Circle 117*

VersaCAD/Macintosh 3.0 was demonstrated for the first time. VersaCAD, long a division of Prime Computer, has now been folded into Computervision, another Prime division. This release allows nongraphic attributes such as part names and costs to be more easily attached to entities in drawings. A similar upgrade was also announced for VersaCAD/386, which runs on IBM compatibles equipped with the 80386, 80386SX, or 80486 CPU chip. *Circle 118*

VersaCAD/386 has always been bundled with CAD Overlay. A new feature—for $1,795—is Overlay ESP, which allows raster images (that is, images made up of dots instead of vectors) to be dot-edited, without redrawing. The big advantage will probably be for firms working with service bureaus that provide digitized overlay images; the images will be easier to clean up with Overlay ESP than with a vector-based CAD package itself. *Circle 119*

Presentation graphics

Professionals are using the new computing power of inexpensive workstations, Macintoshes, and computers equipped with the 80386 microprocessor to do increasingly sophisticated client presentations. For Macintosh systems, the growth has been dramatic. A survey by Macintosh Engineering & Scientific Report found that 22 percent of the Macintosh CAD software shipped (and 56 percent of the dollar value) in 1989 was capable of 3-D imagery. The survey excluded low-cost 2-D packages like MacDraft and MacDraw II.

ASG announced its presentation series, to present 3-D images its other AutoCAD add-ons produce. The big news is ASG Fly Through, due for release by fall. It can animate a walk-through, and even provide textured surfaces. *Circle 120*

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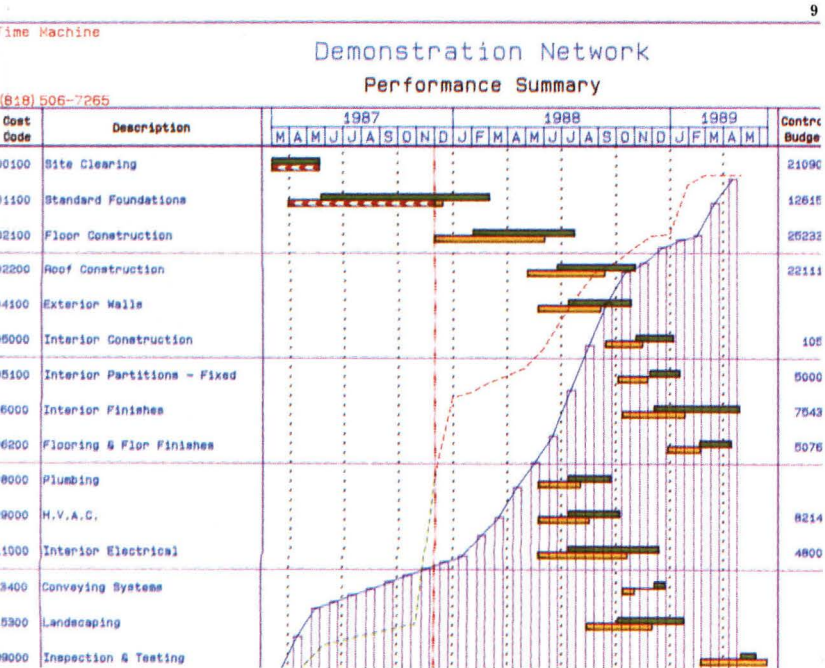
Autodessys, Inc. introduced a 3-D form synthesizer, form-Z for the Macintosh. It takes some getting used to, but the package allows merging of solid shapes, with masses added or subtracted from one another using logi-



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7. VersaCAD/Macintosh rendering. 8. CalComp 57000 series electrostatic plotters 9. DIS, Inc. Time Machine scheduling system 10. Intergraph's MicroStation for PC 4.0 11. ModelVision scanned image.

cal boolean operators. There are good file import and export routines, and a fair drafting module. The package is $199 until September 15, $999 afterward. *Circle 121*

Dynaware released DynaPerspective 2.0 at the show. This Macintosh package for presentations and animations includes full-color support, fast 30-frames-per-second animations of up to 8,970 frames, and file exchange with AutoCAD and other design packages via DXF. *Circle 122*

Landcadd showed VideoScapes, a $495 library of real-life images (cars, trees, and so forth) that works with VGA cards and Autodesk Animator to produce walk-throughs and other effects. The package, announced last fall, is also available in a version for TARGA cards and TIPS software. *Circle 123*

MegaCADD introduced MegaMODEL/386, a version of its 3-D modeling package that runs with a DOS extender to take advantage of the extra memory addressable by the 80386 microprocessor chip. The price is $995. *Circle 124*

RenderStar from Modern Medium, Inc., generates realistic images from AutoCAD 3-D files. The software, which costs $1,495, works with an impressive number of graphics boards, and can export files to Autodesk Animator. But printing of RenderStar files directly can be handled only by Epson-compatible dot-matrix and laser printers. *Circle 125*

Virtus caused quite a stir with its WalkThrough spatial design and visualization software for the Macintosh. The package, which is not due to ship until the end of the year, would allow designers to rough out a project, walk through it, change things, then export the Virtus file to a full-blown CAD program. That's the reverse of the way things are usually done today; a CAD package is used to create a detailed 2-D drawing, and the 2-D representation is modeled in 3-D. The price has not been decided upon, but will be less than $1,000, the firm says. *Circle 126*

More AutoCAD add-ons

Add annotations to AutoCAD drawings by voice with the Annotator Voice Notes System. This upgrade is included with the BUG voice command system from Command Corp., $1,395 for IBM compatibles and $495 for the Sun SPARCstation. *Circle 127*

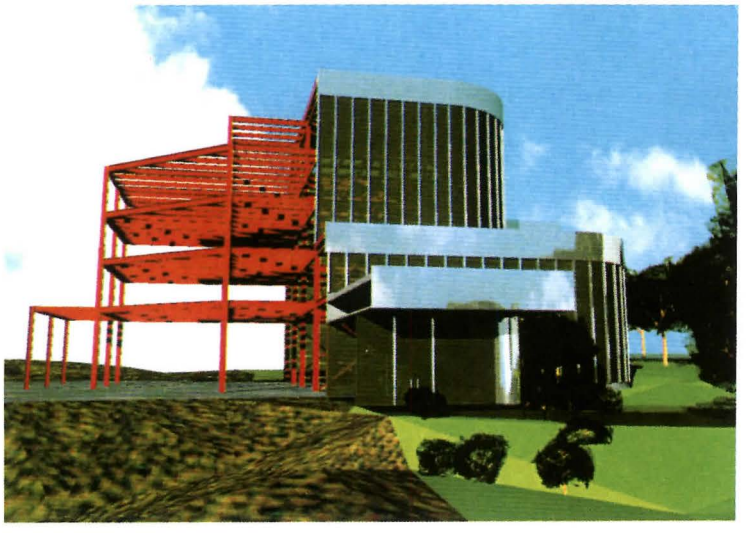
ASG announced that its entire series of AutoCAD add-ons would be Macintosh-compatible by fall. *Circle 128*

DCA introduced DCA FACILITIES, a full facility design and management program operating inside AutoCAD. It also announced DCA LANDSCAPE for landscape and irrigation designs. *Circle 129*

KETIV Technologies announced its ARCH-T2/3-D version 3.0, an upgrade of its package for AutoCAD. The new version adds full 3-D support for AutoCAD 10. The price is $795. *Circle 130*

Landcadd's new LANDCADD Light, at $695, blends the firm's most popular tools for site planning, landscape design; and irrigation design, complete with the ability to do takeoffs and schedules. It even calculates shadows cast by plants, in 3-D. The full version of all these tools would cost $3,495 as a package. The company pledges that this and its other products will not only work with AutoCAD, but will also work with all other AutoCAD add-ons. *Circle 131*

M. Slinn Engineering unveiled C-Line III Pro version 3.10, a linotype generator for AutoCAD. This $495 program can be trained to convert only specific types of objects to special-format lines. *Circle 132*



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Training

Many software packages demonstrated at this year's show included videotape orientation and training. One AutoCAD dealer, Technical Software, Inc., announced a 900 number national AutoCAD helpline. The cost is $3 per minute, which shows up on your phone bill. Technical Software has been offering the service on a smaller scale to its own customers. *Circle 133*

Colorado State University says it has more than 400 students enrolled in its AutoCAD correspondence course. A new course, supporting Cadkey, has just been introduced. *Circle 134*

Terry Wohlers's new videotraining series for AutoCAD, published by Glencoe/McGraw-Hill, began shipping in late May, just before the show. The price is $795 for seven videocassettes, two texts, and a workbook. *Circle 135*

Faster output

A wider range of electrostatic plotters was exhibited for the first time at A/E/C Systems.

Calcomp's new 57000 series of 400 dpi electrostatic plotters, for media 24, 36, or 44 inches wide, replaces the 5700 series. The new series includes many features that were optional on the older one, such as overlap plotting (the plotters start processing a new job while completing an old one). There's also a "Quikplot" mode, which plots at full resolution across the plotting head, but half resolution, selectively, along the direction of travel. The travel rate of the paper through the plotter is doubled to 0.8 to 1.4 inches per second (depending on the model), with little loss of image quality. Prices range from $25,995 for the 57424 (24-inch plotting width) to $64,995 for the 44-inch 57444. *Circle 136*

Calcomp also showed its Model 52236 DrawingMaster, a 36-inch-wide version of the 24-inch red/black thermosensitive paper plotter introduced last year. The price is $19,995. The standard resolution is 200 dpi, but 200 by 400 or 200 by 100 is possible. *Circle 137*

JDL introduced a new Macintosh interface for its color plotters. *Circle 138*

Roland announced pencil-plotting capabilities for its flatbed DPX series. *Circle 139*

Faster graphics

Production CAD systems are generally equipped with graphics accelerator cards. The cards handle most of the calculations needed for CAD software to re-

paint the screen during zooms, speeding things up by factors of 20 to 200. But the cards don't come cheap.

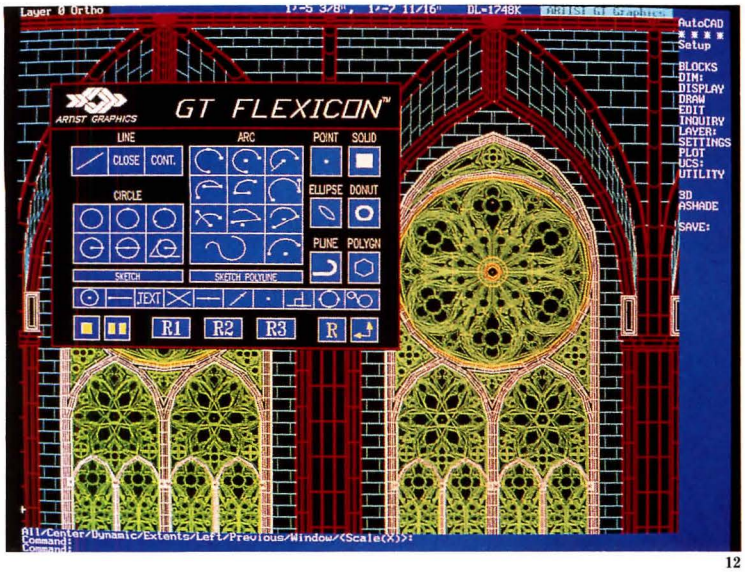
The wide use of computers equipped with 80386 CPU chips opened the door to another approach, however. Because the 80386 manages memory above the normal 640K DOS limit well, it is possible to do quite fast graphics in memory. The cost is typically $150 to $300 for the software, and $100 to $300 for the extra memory—1 to 2 MB. An accelerator card, in contrast, can cost $900 to $5,000.

Both the cards and the software work the same way. The technique is called "display list processing." Many people on the exhibit floor asked what that means, and how it works. An explanation: CAD programs keep track of the list of entities in your drawing, as if the entities were real objects. All CAD software converts the list of entities into pixels—that is, into dots on the screen—so that the image can be seen. Because conversions from entity to pixels (they're called "regens" or "regenerations") take time, many CAD packages keep a number of them in memory at once. That's why you can usually do some modest zooming in and out before a regen occurs. That's also why users with high-resolution screens see more regens. With more pixels to keep track of in a given image, there's room for fewer images. And, with more pixels, the regens are slower because images take more time to be calculated.

There are other ways to handle display list processing in software only. Next month we'll explain how it works and review all the software.

The Artist XJS series was announced at the show. It can be user-upgraded to support monitors with resolutions as high as 1600 by 1200 pixels and 16 colors for $4,295. The base-level board can handle 1,280 by 1,024; the price is $3,495. The AutoCAD driver, included, comes with an on-screen icon menu and bird's-eye view. There are also models for the Macintosh. Microchannel and EISA versions were promised for the fall. *Circle 140*

CalComp, which took over the DrawingCard line from Sanders Associates (both are Lockheed subsidiaries), introduced two microchannel (MCA) cards for IBM PS/2 and compatible computers. Model 3501, 16 displayable colors, is $1,995.



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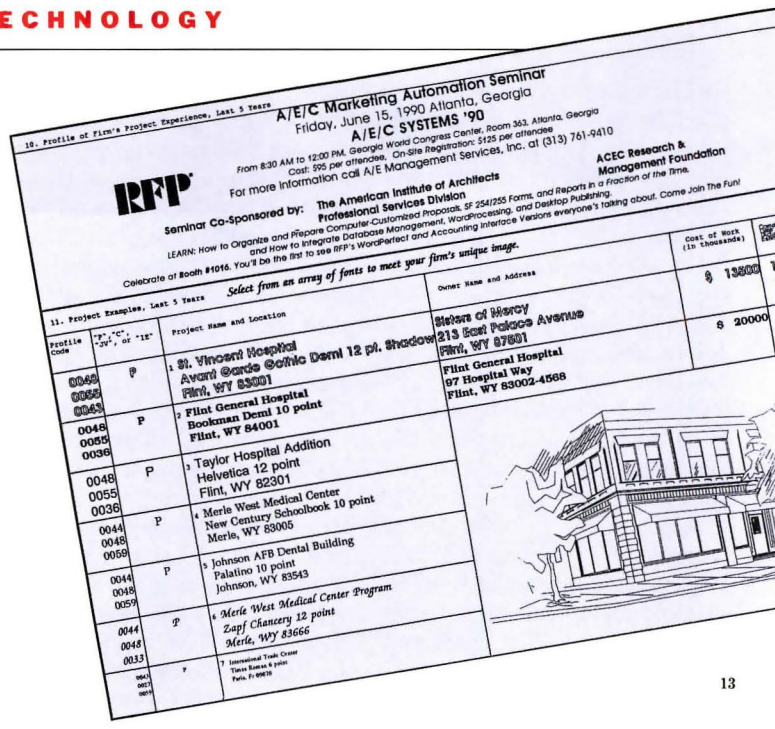
Model 3502, 256 colors, is $2,795. DrawingCard versions for standard AT-style computers were cut in price by $500 or more. The 1,024 by 768 pixel Model 3101, with 16 displayable colors, is now only $1,495; it had retailed for $1,995. *Circle 141*

The cards come with drivers for AutoCAD, VersaCAD, and others, and with a version of Cyco's AutoManager for displaying and tracking AutoCAD files. *Circle 142*

Rasterex's Liberty boards, marketed in the United States by Expert Graphics, offer resolutions as high as 1,280 by 1,024 pixels in 256 colors. In a sense, these are the first "open architecture" boards, in that they can be used with graphics software—even an on-screen command tablet that mimics the DCA Architect digitizer layout—written specifically for the card's Texas Instruments 34010 graphics processor chip. The card can even be reprogrammed for a variety of monitors, directly from your computer's keyboard. Versions for the standard AT-compatible bus were demonstrated at the show; microchannel versions were promised by summer's end. *Circle 143*



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Number Nine's Graphics Xccelerator card prices were cut drastically, especially at the low end. The Level 1 version, 1,024 by 768 with 16 colors, is only $895. *Circle 145*

Slower on specifications

Last year, vendors collaborated on an entire show-within-a-show on automated specifications. This year, most of the vendors were back. But some were much less optimistic about early acceptance of the technology and its costs by architects. And there was no special show.

It appears that automation of access to manufacturer-provided product catalogs is moving ahead rapidly, but that automation of specification-writing is not. Smaller firms do not want to pay even the low prices in effect for access to specs, and

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larger firms have their own spec-writing experts and specification libraries.

One indication: McGraw-Hill announced that Computer Aided Planning, purchased earlier in the year, would take over future planning and development of Electronic Sweet's. CAP is best known for planning contract furniture. Electronic Sweet's distributes CD-ROM databases along with its printed catalog files. One of the utilities on the CD-ROM disk, SweetSearch, allows easy searches of the print catalogs. It is free to owners of Sweet's Files. SweetSpec allows architects and engineers to connect into a remote database to build specifications from an enhanced version of the AIA's Masterspec. Prices are low: $5 for a preliminary spec, $19 for a short-form section for small-scale projects, and $24 for a full spec. Over 400 Masterspec sections are available. *Circle 146*

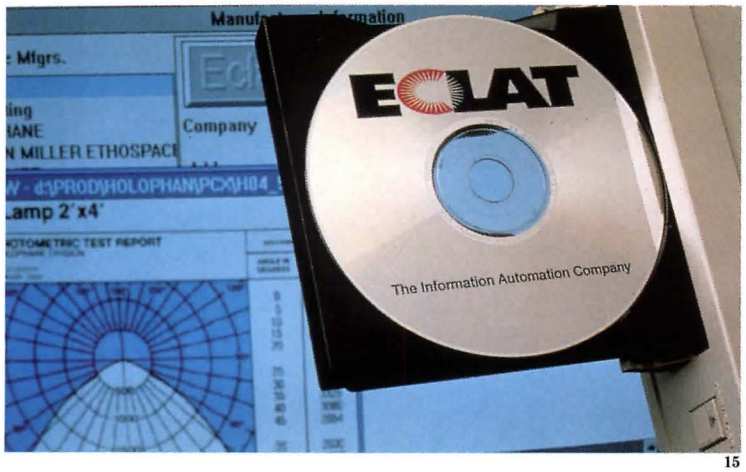
Eclat's QuickSpec is evolving into Product Researcher, a set of CD-ROM disks scheduled to be mailed free every three months to qualified design practices, starting early in 1991. The disks contain product catalogs, carefully indexed so users can search by function desired. The products' images appear on-screen along with specs. The search software's interface is through the new Microsoft Windows 3.0, with pull-down menus and on-screen help. It is intuitive enough to be used with little instruction, once the software is installed. *Circle 147*

SuperSpec offered an introductory $395 price to process your next set of specifications on-line. The price includes a 2,400 baud modem and data communications package. The service is still available through pencil-and-paper checklists, too. The regular on-line charge is $20 per section. Mailed checklists are $30 per section. *Circle 148*

Vertex Design Systems announced that it is now a value-added reseller of Communication Intelligence Corp's electronic pen for AutoCAD input. The CIC technology allows users to enter text by lettering on a digitizer template. The combination, dubbed The Vertex Pen, simplifies use of Vertex's Detailer ($1,995) and Dynamic Details ($595). New enhancements to the Dynamic Details package were released as well; it now covers 11 groups of construction details, and works in networks. *Circle 149*

The CIC Proficient AutoCAD Enhancer is available as a free-standing product, too. *Circle 150*

Macintosh CAD users can buy DocuKEY from Architectural Synthesis to insert spec section numbers in the CSI Masterformat system directly into drawings. The numbers reference the text of the specs so that the text does not cause clutter.



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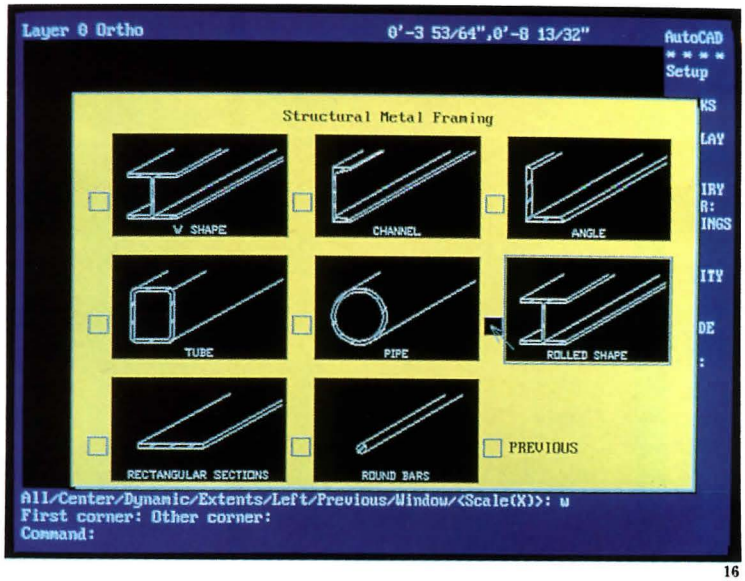
12. GT Flexicon by Artist Graphics 13. RFP font menu 14. Auto Shade rendering on JDL plotter 15. Eclat's Product Researcher on CD-ROM disk.
16. Vertex Detailer

A DOS version is promised.

PROPOSE, an AutoCAD add-on from Idea Graphics, allows designers to specify what type of wall they want, after laying out a building's footprint. The software builds the wall and issues specs. *Circle 151*



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Equipment

Summagraphics Corp. announced a new low-cost large-size digitizing tablet at the show. The 24- by 36-in. LCL, at $2,299, is aimed at the cost-estimating and facilities-management markets. *Circle 152*

Marketing and management

Aperture Technologies announced Visual Resource Manager for the Macintosh at the show. This facilities-management package includes a drawing module, database, and optional DXF translator for importing drawing files. *Circle 153*

CAFM Works, Inc., released version 4.0 of CAFM Space (formerly Space by Graphic Systems, Inc.). The new version of this software for linking a facility's graphic layout to a database of activities within it offers two-way transfer of files with CAD (via DXF), easier assignment of spaces, and a more powerful database function. *Circle 154*

The F. W. Dodge Division of McGraw-Hill is offering its Dodge DataLine on-line database of proposed construction projects at half-price to architects in the Northeast. This service is sold by monthly subscription rather than on a search-by-search or connect-time basis. Charges normally range from $224 to $12,000 a month, depending on the geographical area you wish to cover. *Circle 155*

Two new options were added to the RFP software proposal system from A/E Management Services, Inc. One is an interface with WordPerfect 5.1 that even allows graphics to be imported into SF 254 and 255 or nonstandard proposal formats. The other allows using the RFP package to receive data from most accounting, spreadsheet, and database packages directly. *Circle 156*

Statslog issued a new version of its popular software for contractor billing and other documents. The software is still compact enough to take into the field on a small laptop, and is now easier to use. *Circle 157*

Welcom issued Open Plan version 3.3, project management software for IBM compatibles. The new version supports FoxPro (a dBase II clone database program) and added some new reports to the built-in library of about 60. *Circle 158*

Wind-2 Software announced a substantial upgrade of its financial-management software, due August 1. There's now cost-plus-fixed-fee invoicing, multiple-cost rates (including overtime multipliers), and the ability to print reports only on specific sections of a project. The firm also announced Total Trak, accounting and project management for firms of eight or fewer employees, at a price of only $695, and says it will help distribute A/E Marketing Manager from Infomax. *Circle 159*

Allegro announced version 3.5 of its resource-management system; it now interfaces with Wind-2. It can gather everything about a client, a project, or an employee in one place. *Circle 160*

(For a news report on the A/E/C Systems show, see Practice News, page 17.) □

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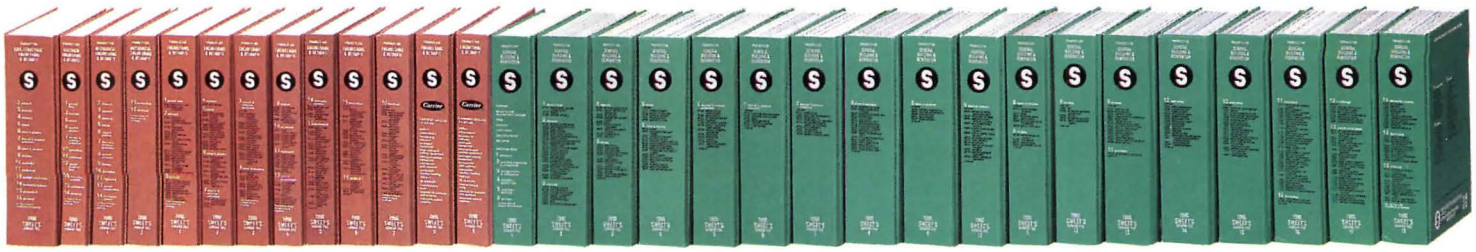

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Circle 37 on inquiry card

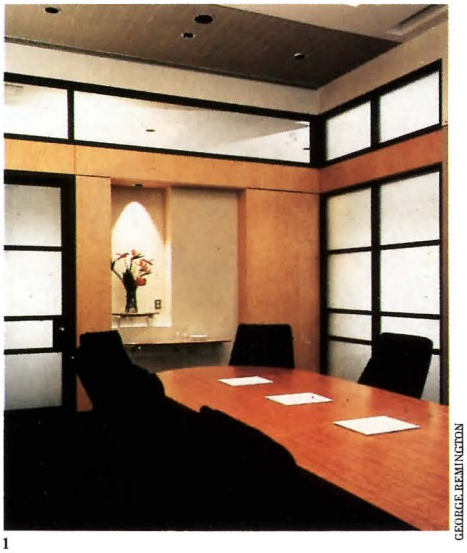
ARCHITECTURAL GLASS

New lamination and graphics techniques expand the custom-design potential of glass.

Two intriguing decorative treatments for laminated glass were displayed at the 34th annual convention of the Construction Specifications Institute, held last month in Chicago.

1. Custom-decoration interlayer

Deco Glass is a safety-glass configuration that encapsulates fabric, wire mesh, or other thin material within a laminating polyvinylbutyl interlayer. The conference room (right) designed by architect Ronald Reed of van Dijk, Johnson & Partners, Cleveland, has shoji-like panels of Deco Glass made with Unryu Ushi rice paper, chosen to allow natural light to flow through the conference and office spaces while keeping a sense of visual privacy. The opacity of the glass depends on the translucence of the decorative material selected. Another meeting-room installation cited by the manufacturer incorporates thin copper-wire mesh, which, in addition to being decorative, also serves to make the glass panels impervious to microwave and other snooping electromagnetic devices. Custom Deco Glass can be mass-produced in 1/4- to 1/2-in.-thick panels; special glass can be made up to 1 5/8-in. thick. The material has the UV-inhibiting and sound-control features of standard laminated glass, is guaranteed not to fog or delaminate, and can be curved or bent. Dlubak Corp., Freeport, Pa. *Circle 300*



GEORGE REMINGTON

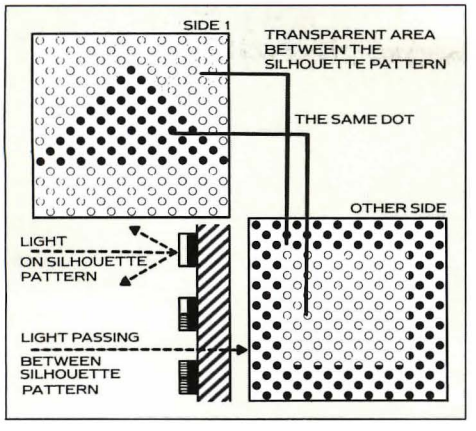
1

2. Now you see it . . .

Viracon, Inc., a major glass fabricator, introduced an Architectural Graphics Glass line that included ContraVision, a glass material with opaque color graphics when viewed on one side, but which appears transparent when seen from the opposite side. The process combines two new technologies: Chromafusion, a unique lamination method invented by artist Claudio Cesar that uses special pigments, dyes, and resins to reproduce graphics within two sheets of glass, and an extremely precise color-matrix printing technique developed in Great Britain.

The French doors shown here demonstrate the ContraVision effect. From the exterior of the house, daylight reflects from the white-dot field and red Greek key design, and the glass door panels read as a window blind. But from the inside looking out, only the black base dots face the viewer and the graphic "disappears," just as frit glass patterns are not readily apparent when viewed from a darker interior toward a brighter exterior. It is also possible to print two different images back-to-back while maintaining the essentially transparent properties. ContraVision films are used as two-way signage—a glass door reads "push" from one side, and "pull" from the other—and as a one-way security window, with graphics on the brighter side concealing an observer on the other side.

The drawing shows how the ContraVision graphic is reproduced from original art. The color design is printed dot by dot on the interlayer film, with each successive color-dot layer placed exactly over those beneath. Viracon, Inc., Owatonna, Minn. *Circle 301*



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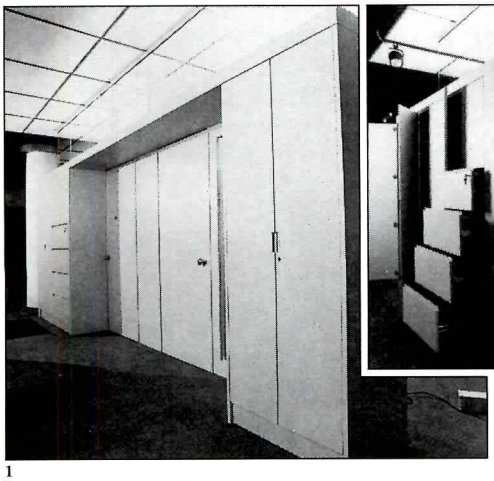
SUPER SAVERS

Energy-efficient glass, space-saving storage units, and a time-saving elevator: a trade-show sampler.



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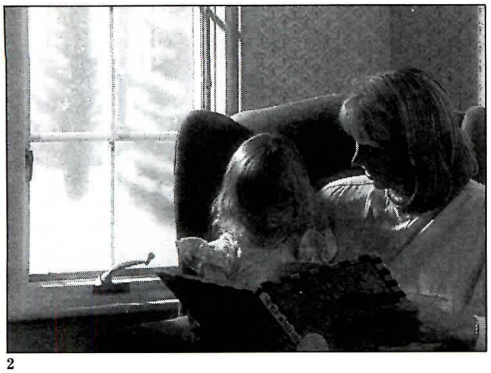

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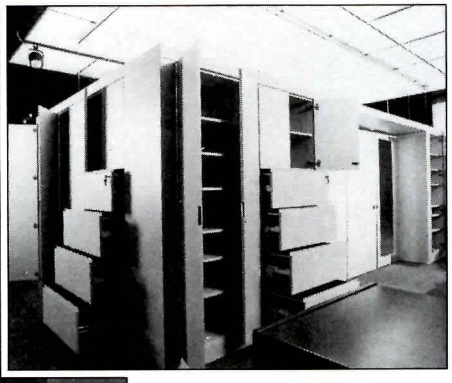

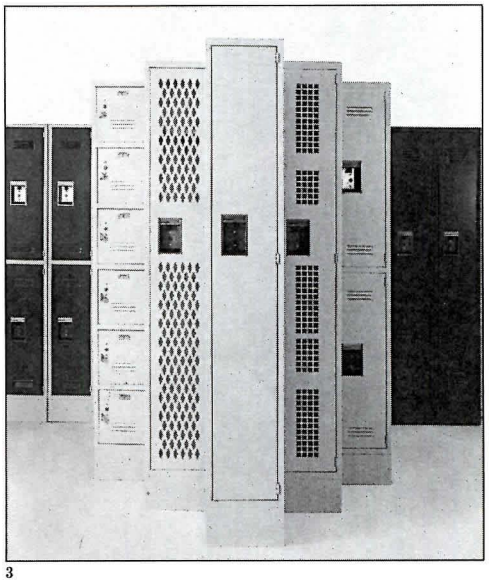

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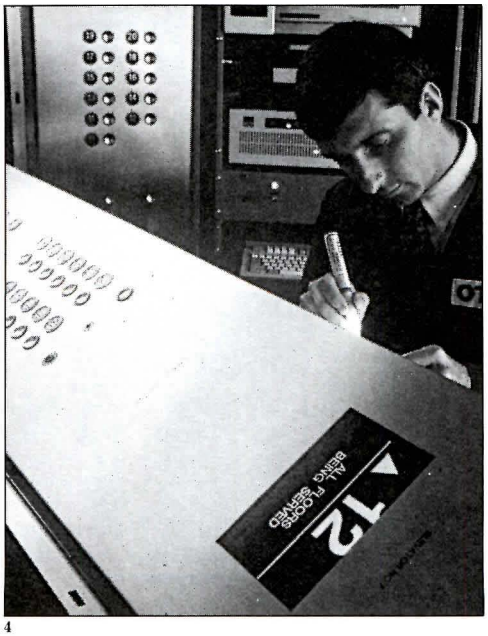

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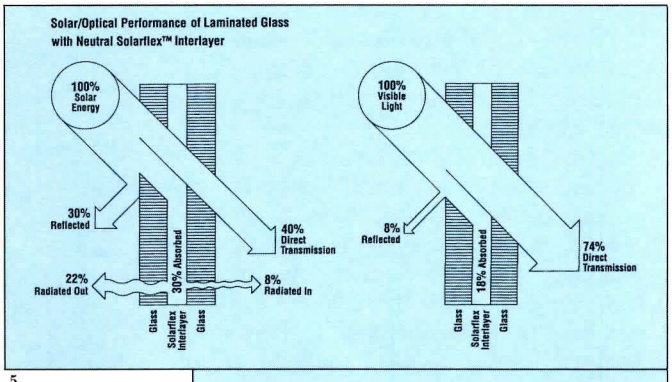

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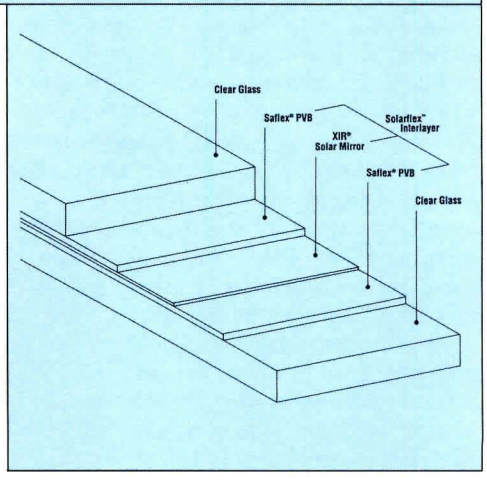


1. Custom-look storage walls
Introduced at NEOCON, Archetype free-standing storage and filing units form an office wall, with doors, clerestory glass, and connecting soffits. The factory-built system of interchangeable cabinets on cable-concealing bases is designed to look like custom architectural casework. JG Furniture Systems, Inc., Quakertown, Pa. *Circle 302*

2. Energy-saving glass
Introduced at the Pacific Coast Builder's Show, Libbey-Owens-Ford's new Energy Advantage Low-E Glass is designed to provide optimum solar-energy management in residential windows and decrease total energy consumption. The hard-coat pyrolytic coating, virtually color-free, is said to excel in heat gain while keeping heat loss to a minimum. It has a .87 shading coefficient and an overall U-value of .36. Libbey-Owens-Ford Co., Toledo, Ohio. *Circle 303*

3. Tough lockers
All-steel storage units come in space-saving single-, double, and triple-tier configurations and 18 new baked-enamel finishes—bold primary colors, pastels, and neutrals. A leather-like texture resists scratches. Medart, Inc., Greenwood, Miss. *Circle 304*

4. "Thinking" elevator
Shown at CSI, the new microcomputer-based Elevonic 411 controller uses artificial intelligence to "learn" elevator response times and traffic patterns based on fluctuating passenger flow. A channeling system assigns cars in a way that groups riders bound for the same floors during rush hours. Otis Elevator Co., Farmington, Conn. *Circle 305*

5. Solar-heat-reflecting interlayer
Solarflex laminated glass incorporates Heat Mirror film, and is designed to reflect more than 50 percent of heat-producing infrared radiation while admitting more than 70 percent of the cooler visible-light spectrum. Solarflex can be produced in any shape up to 72-in. wide, and can be curved. Monsanto Co., St. Louis. *Circle 306*

For your convenience in locating building materials and other products shown in this month's feature articles, RECORD *has asked the architects to identify the products specified*

Pages 54-61
San Diego Convention Center
Convention Center Architects
Aluminum-framed storefronts, windows, and entrances: Harmon Contract. Skylights: Metco. Metal roofing: Berridge Mfg. EDPM single-ply: Carlisle SynTec System. Tinted, ceramic frit, and laminated glass: PPG Industries (Solex). Rolling doors: Cookson. Paints: Dunn Edwards. Porcelain floor tile: Crossville Ceramics. Rubber flooring: Pirelli. Elevators: Montgomery Elevator.

Page 63
100 East Wisconsin Avenue
Clark Tribble Harris and Li Architects
Cordova limestone: Featherlite. Metal panels: Christian Pohl. Curtainwall: Hynardai Aluminum. Precast concrete: Kroeger Precast. Ceramic composite spandrels: Miles Hill. Copper roofing: F. J. A. Christianson. Tinted glass: St. Gobain, Euroglass Corp. (Pink Rosa). Entrances: Tubelite Div., Indal. Vaulted GFRG ceiling: FormGLAS. Paints: Devoe & Raynolds. Marble flooring: Breccia Perrice; Benota Rosa. Special lighting: Sterner; Omega. Elevators: Otis. Custom railing: Duwe Metal. Sconces: Winona Studio of Light.

Pages 64-65
Milwaukee Repertory Theater
Beckley/Myers Architects
Granite: Verdi. Curtainwall, aluminum-framed windows, and entrances: Kawneer. EIFS: Ispo USA. Steel-framed windows: Hope's Architectural Products. EPDM roofing: Carlisle SynTec System. Glazed bridges: Super Sky Products. Sound-proof doors: Richards-Wilcox. Carpeting: Harbinger. Stage flooring: Forbo Floor Coverings (Krommenie Linoleum). Fixed seating: Irwin Seating. Movable chairs: Krueger. Custom lobby fixtures: Visa Lighting. Theatrical lighting: Colortran. Stage lifts: Phlow Industries. Paint (auditorium): Zolotone. Custom railings: Construction Supply & Erection. Fountains: Haws Drinking Faucet. Luminaires: Munson (Milwaukee Harp Light).

Pages 66-67
5th Street Parking/Transit Facility
The Stageberg Partners, Architects
Facebrick and quarry tile: Endicott Clay Products. Single-ply roofing: Carlisle SynTec System. Windows and entrances: Kawneer. Exit devices: Von Duprin. Glazing: Viracon. Industrial doors: Raynor. Linear ceiling: Chicago Metallic Corp. Interior coatings: Thoro System Products. Laminate surfaces: Wilson Art. Lighting: Holophane; Columbia. Elevators: Montgomery Elevator.

Pages 68-69
Valspar Varnish Factory Renovation
Meyer, Scherer & Rockcastle, Architects
Windows and entrance: Kawneer. Paints: Valspar. Resilient flooring: Armstrong World Industries. Elevators: Lagerquist.

Pages 70-71
The Ceresota
Ellerbe Becket, Architects
Aluminum curtainwall and entrances: Kawneer. Tinted and reflective glazing: Viracon. Mirrors: Toledo Plate & Window Glass.

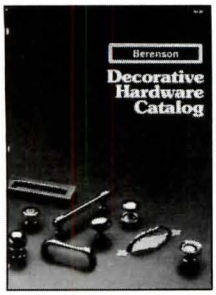
Pages 84-87
Salomon Center for Teaching
Goody, Clancy & Associates, Inc., Architects
Pages 84-85—Brick: Interstate Brick. (Mountain Red, Moroccan Brown, Canyon Rose.) Precast concrete: Durastone. Membrane roofing: Goodyear Roofing Systems (Versigard). Lead-coated copper batten-seam roofing: Appollo Roofing & Sheetmetal. Wood-framed windows, exterior doors, and architectural woodwork: Herrick & White, Ltd. Paints: Sherwin-Williams.
Pages 86-87—Slate flooring: Vermont Structural Slate. Carpeting: Lee's (Odyssey). Auditorium seating: Irwin Seating. Recessed downlighting: Kurt Versen. Custom pendants: Custom Metalcraft. Veneer plaster and drywall: USG Corp.

Pages 88-89
Psychology Building, Vanderbilt University
The Stubbins Associates, Architects
Brick and CMU: Wasco. Single-ply roofing: Carlisle SynTec Systems. Wood windows and doors: Eggers Industries; Maiman. Reflective glazing: Viracon. Ceiling grid: Ceildeck Corp.

Pages 90-91
Westminster School Performing Arts Center
Graham Gund Architects
Sand-cast brick: Belden Brick. Limestone trim: New England Cut Stone. Aluminum curtainwall: Kawneer. Double-hung windows: R & R Windows: Shingle roofing: GAF Building Materials Corp. (Timberline). Special fixtures at entrance: Wolfers Lighting. Exterior lights: Bega/FS. Fire-rated glass: Glassprotex. Ceiling tile: Armstrong World Industries. Grid: Donn Corp. GFRC paneling: FormGlas. Stage-floor finish: Minwax (Duraseal). Auditorium seating: J.G. Furniture Systems. Lobby floor tile: Buchtal Corp. (Porto Fino). Sconces and pendant: Visa Lighting. Paints and stains: Glidden.; TNEMEC.

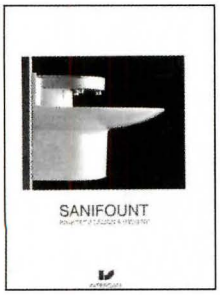
Pages 92-95
Price Center, University of California/San Diego
Kaplan/McLaughlin/Diaz Architects
Curtainwall and aluminum entrances: Vistawall Architectural Products. Glazing: PPG Industries. Metal roofing: W. G. Ehmcke. Windows: Windowmaster. Exterior lighting: Shaper Lighting; Devine Lighting. Cafe tables and chairs: Thonet.

For more information, circle item numbers on Reader Service Cards



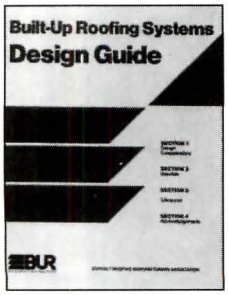
Cabinet hardware
Knobs and drawer pulls come in traditional, decorative, and contemporary styles. A broad range of materials includes solid brass, ceramics, steel, plastic, and wood; nylon pulls match major laminate colorations. 20 pages. Berenson Hardware, Buffalo. *Circle 400*

Sprinkler systems
Fire-supression products from the recently merged firms of Star and Grunau are introduced in a 20-page catalog. Decorative, standard, and institutional sprinkler heads, alarm devices, and valves are included. Star Sprinkler Corp., Milwaukee. *Circle 406*



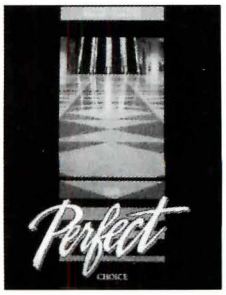
Handwashing fountain
The semicircular Sanifount is made of a granite-look composite said to provide a nonindustrial, "white collar" appearance to the three-faucet washbasin. A passive, no-touch sensor controls water flow. International Sanitary Ware Mfg. Co., Phoenix. *Circle 401*

Acrylic paint
The architectural advantages of premium acrylic latex systems are detailed in a booklet prepared by this maker's Paint Quality Institute. Correct preparation for masonry, concrete, wood, metal, and vinyl surfaces is discussed. Rohm and Haas Co., Philadelphia. *Circle 407*

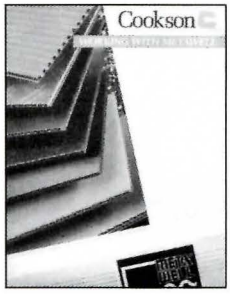


Built-up roofing guide
Provides performance criteria for all bituminous roofs and components, including UL, FM, and ASTM standards. A companion Specification Guide explains correct roof assembly, design, maintenance, and approved materials. $10 charge. ARMA, Rockville, Md. *Circle 402*

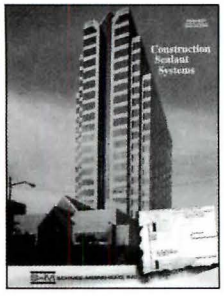
Tile and pavers
A full range of tile products, from impervious porcelain pavers and floor brick to custom hand-painted murals, is illustrated in a 40-page catalog. Setting and grouting products and installation tips are included. Summitville Tiles, Inc., Summitville, Ohio. *Circle 408*



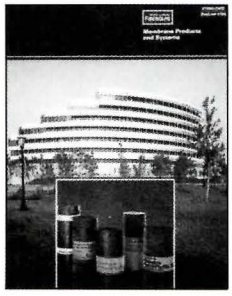
Thinset terrazzo flooring
Terrazzo floors made with epoxy, polyester, or polyacrylate materials are described as seamless and easy to maintain. Architectural and color data are given in an illustrated folder. General Polymers, Cincinnati. *Circle 403*



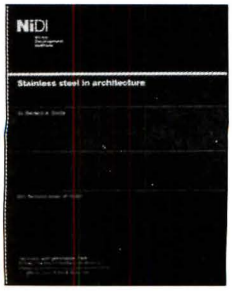
Corrugated-core metal panels
Data sheets explain the weight-saving and in-use performance benefits of German-made Metawell aluminum and galvanized steel panels. Joint and cap profiles and connecting systems are shown. Metawell, Warwick, R. I. *Circle 409*



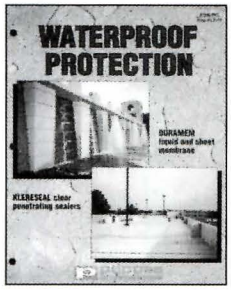
Construction sealants
Specification chart presents acrylic, urethane, and silicone products, using detail drawings to illustrate correct installation, and listing performance criteria and appropriate test standards. Extruded dry-gasket systems are included. Schnee-Morehead, Inc., Irving, Tex. *Circle 404*



Glass-fiber-reinforced roofing
Uses, features, benefits, and test data for all Derbigum and Perma Ply asphaltic roof systems are covered in a 28-page specification guide. Branch offices offering technical services are listed, with telephone numbers. Owens-Corning Fiberglas Corp., Toledo, Ohio. *Circle 410*



Architectural stainless steel
Prominent projects using stainless steel are illustrated in a 20-page design guide. The differences in steel grades, shapes, sizes, and finishes are explained; fabrication, forming, and joining techniques are also discussed. Nickel Development Institute, Toronto. *Circle 405*



Masonry weatherproofing
A technical catalog describes Klere-Seal penetrating sealers and water repellents, silane or acrylic formulations that protect concrete and other surfaces against the intrusion of liquid water and water-borne salts. Pecora Corp., Harleysville, Pa. *Circle 411*

Continued from page 79

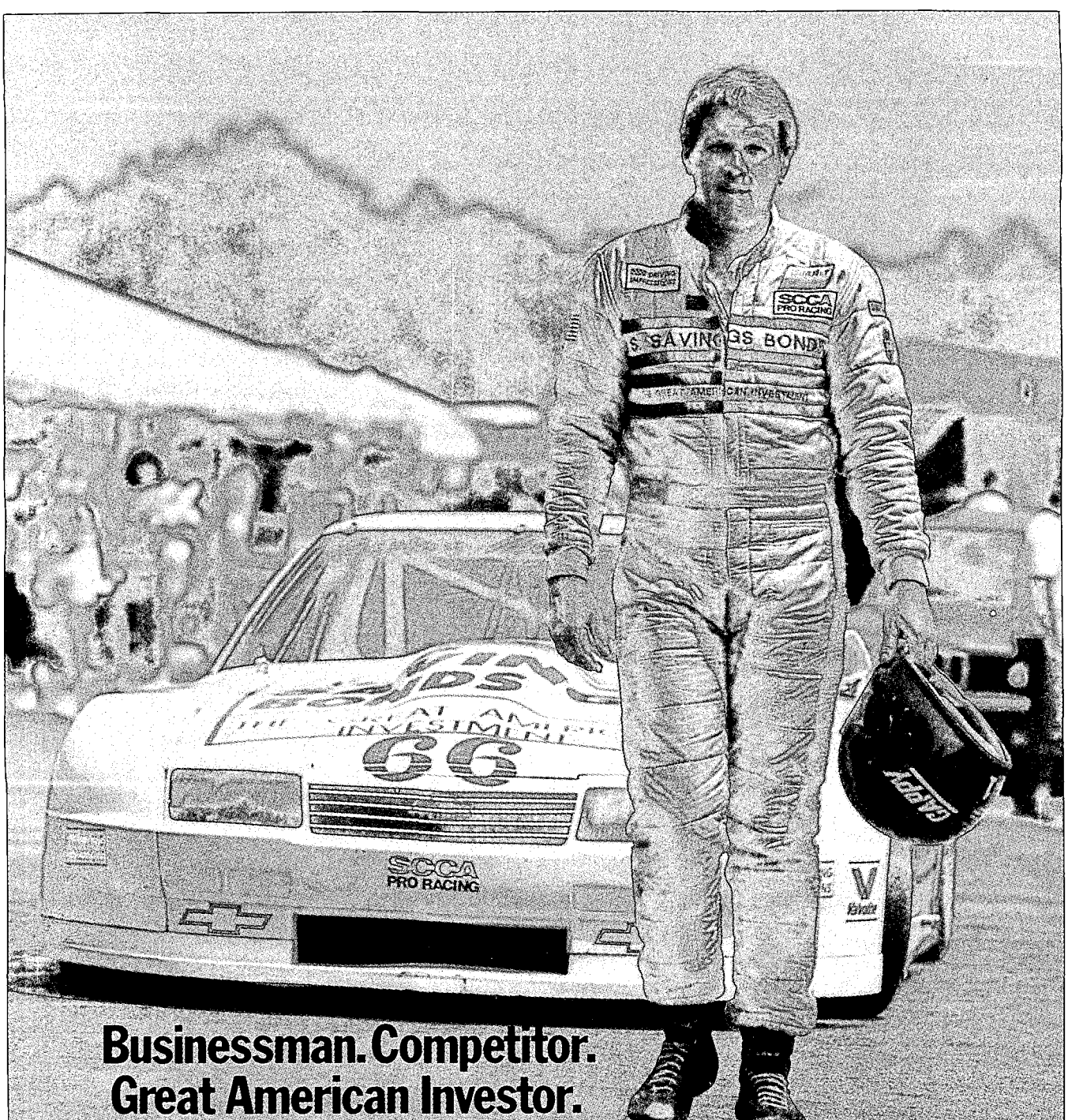
is typical in the U. S.—working on their design. Because of contractual arrangements, the name architects generally carry the design through schematics and 50 percent of design development. After that, local French architects complete the latter phase and execute working drawings, although the design architects are allowed to review the documents. Everyone expects some changes to be made in the field, and supposedly the design architects will be consulted. Evidently, Gehry's arrangement is different, for it permits him closer supervision throughout construction.

With the parceling out of responsibilities over design and construction, architecture and interiors, it is understandable that the original concepts could lose their integrity on the way to realization. In many ways the schemes are like screenplays, and, not surprisingly, a movie-making approach permeates much of Disney's undertakings. Some of the architects have observed they feel as if they are screenwriters whose "treatments" are meant to be tampered with by the directors, producers, and anybody else who comes into the picture. "It's as if Disney commissioned five different screenplays and mushed them together to satisfy market tastes," notes one. One wonders if this process will create architecture or simply three-dimensional filmic attractions.

Certainly many treacherous pitfalls await the idealistic architect who embarks on a project for Disney, the most obvious being the theming itself. To be sure, each of the architects has approached this aspect of their commission with a distinct method, including the use of iconography, irony, narrative, and dream sequences. But "high concept" isn't everything.

Designing high-use low-maintenance accommodations on relatively modest budgets (which the *Disnées* have admitted are much tighter than the Imagineer's big money-making theme-park attractions) could diminish the effect. The architects also don't have the benefit of Florida's or California's dazzling sunshine and warm weather to sidetrack visitors' attention from a low-rent look.

If carried too far, the chosen themes can end up as cute and cloying, and there is nothing worse than a hollow theme that doesn't stop reverberating. What will be created at Euro Disneyland is not just a three-dimensional cinematic attraction, but, supposedly, architecture. Or something that simulates it, however fleetingly, however entertainingly. □



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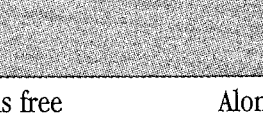

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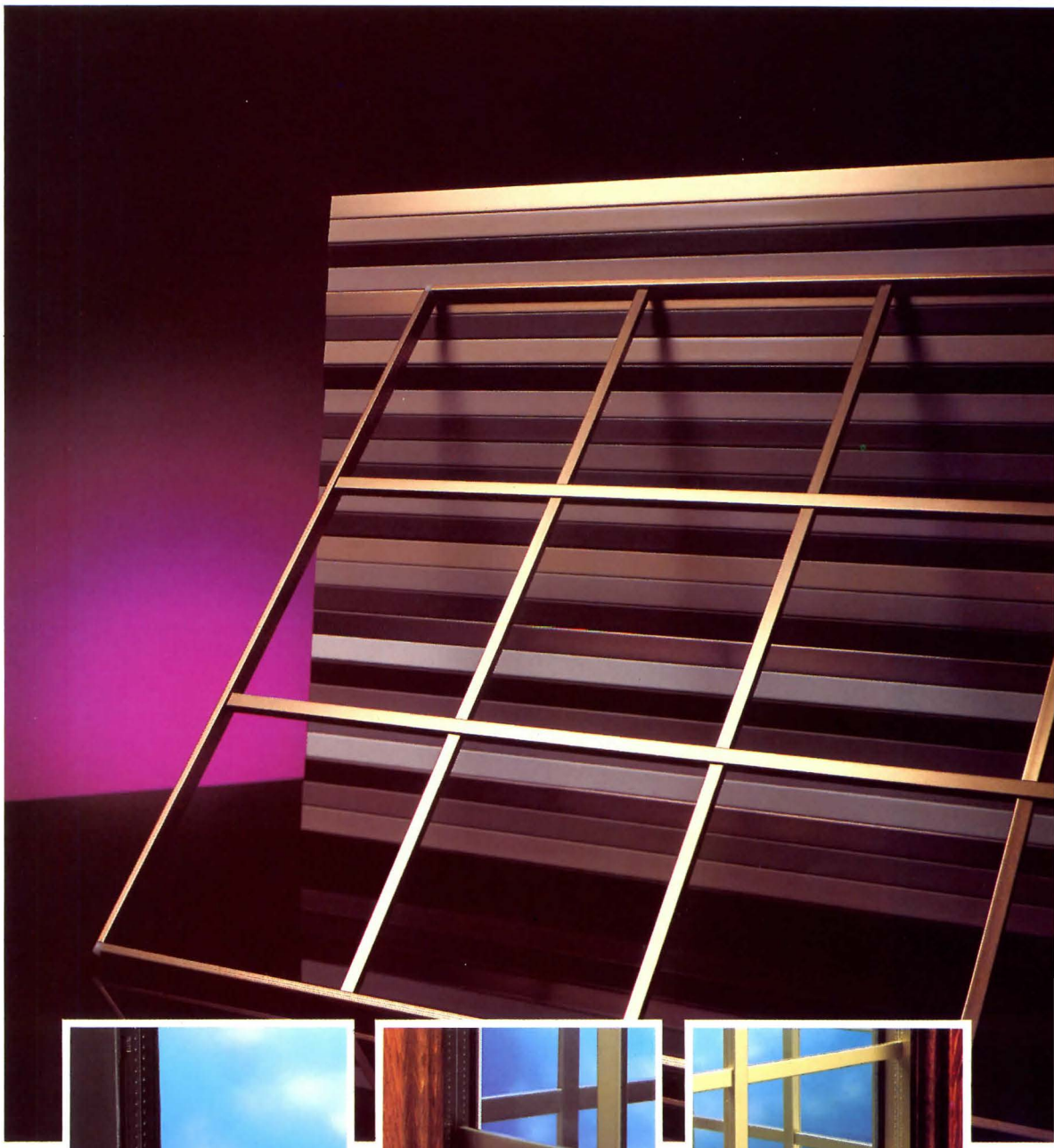

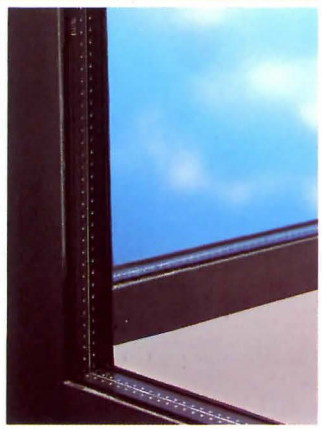

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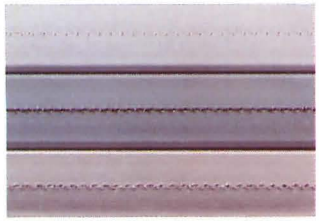

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RECORD LIGHTING

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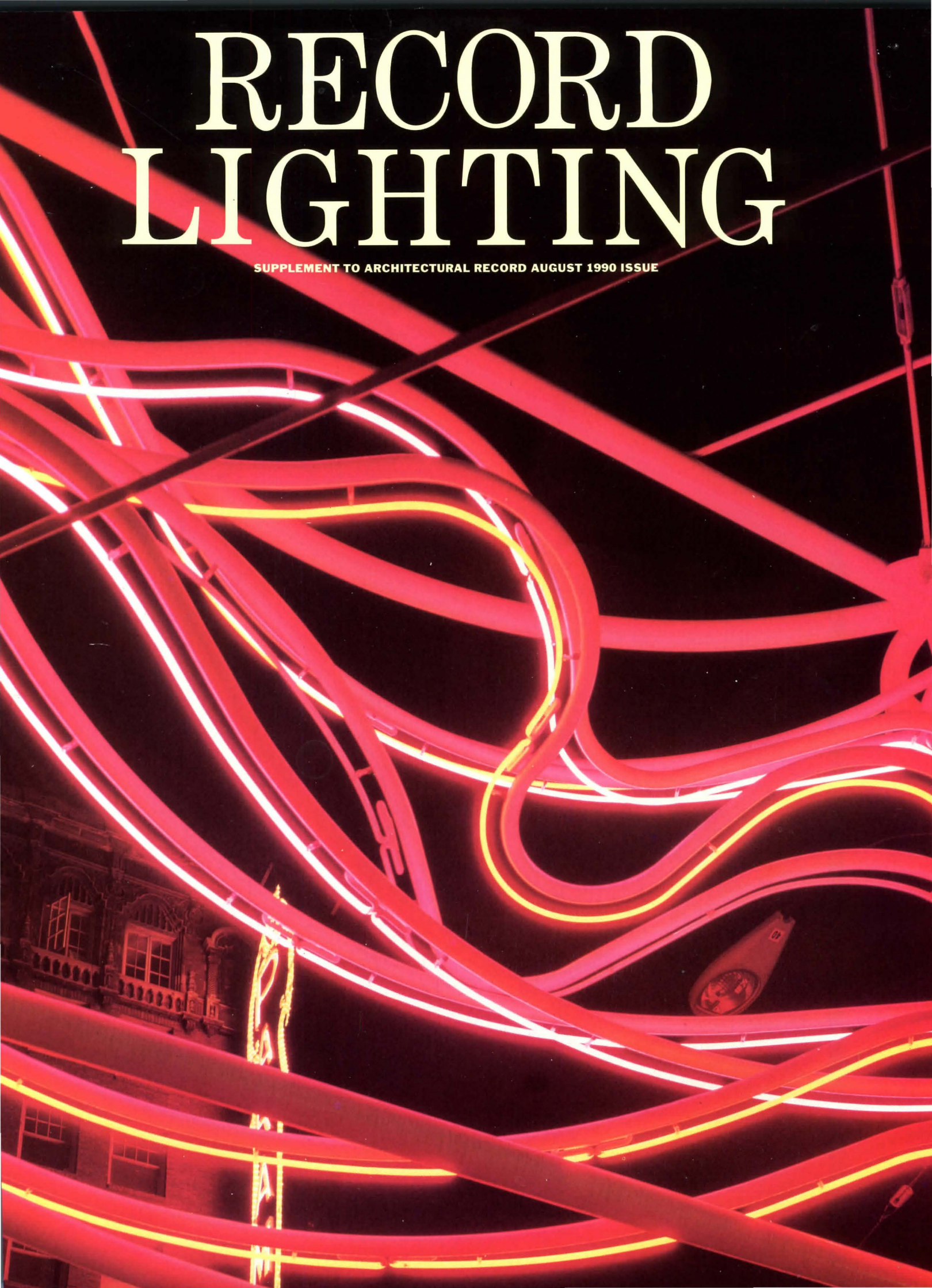

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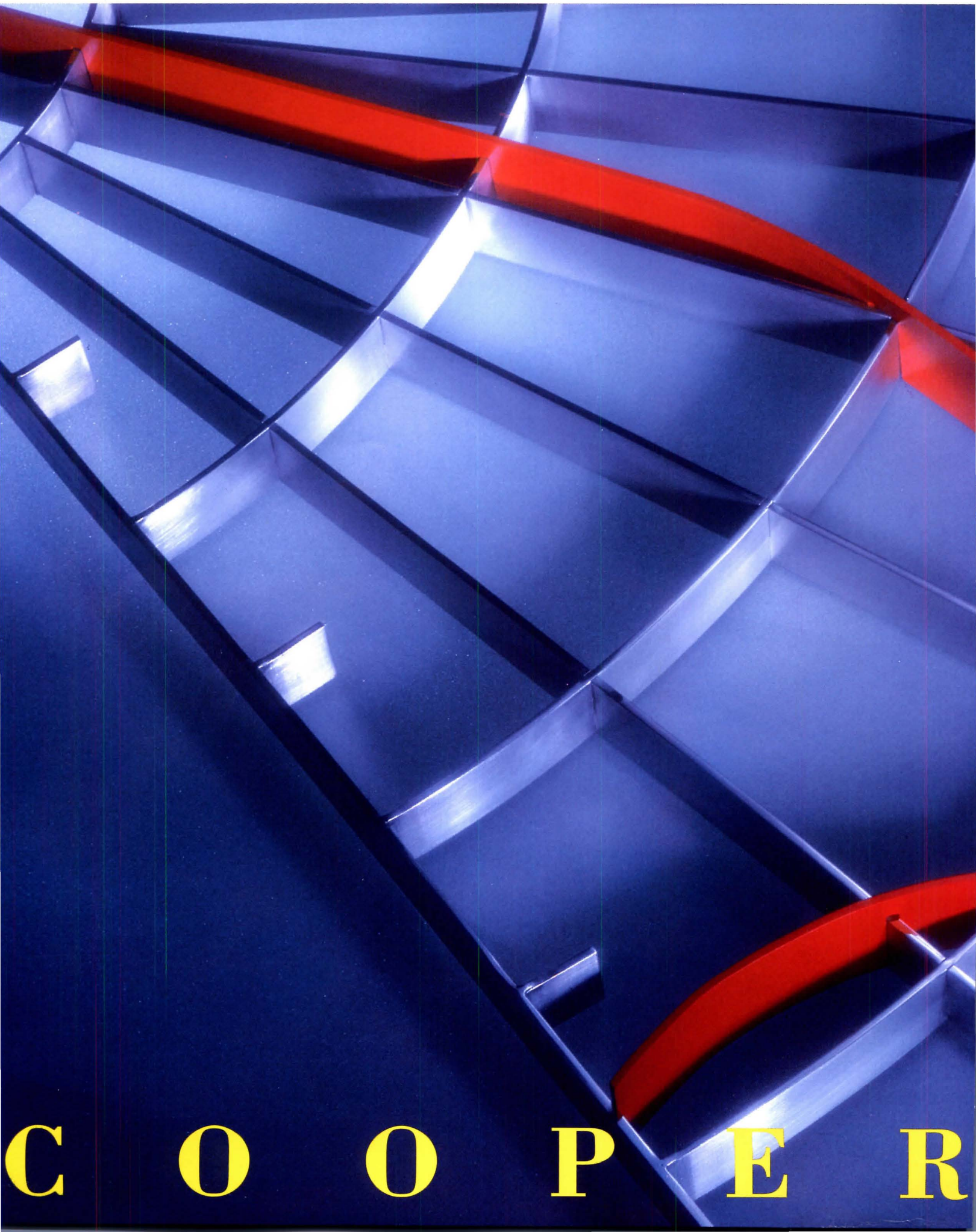


LIGHTING DESIGN

Japanese Electric Power Pavilion Celebrates Light

Tokyo-based lighting designer Motoko Ishii, focusing on the "emotional" and "human" side of lighting, creates spectacular interior and exterior scenes using a whole gamut of light sources, sometimes all together.

Ishii's recent lighting extravaganza is a "Fantasy of Light" pavilion in Osaka, Japan, sponsored by Japan's Federation of Electric Power Companies. Visitors are taken by special vehicles on a 12-and-a-half-minute trip through the exhibit, which features settings illustrating subjects such as the "birth of light" and the "creation of electricity." The tour culminates in the "wonder world of illumination" (right).

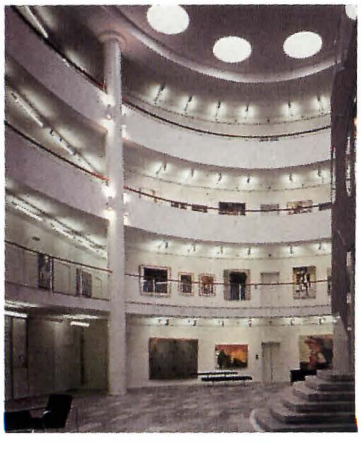
"No ugly light exists, all light sources are beautiful," says Ishii. But "if people just think of the technical side the lighting will be shabby." At the same time, she welcomes the use of new technology, such as solar power, lasers, and fiber optics. Through fiber optics, for example, she is using six HID lamps to produce 20,000 lights to create a "light sculpture" for the lobby of a Japanese construction company. In Yokohama's Minato Mirai 21 Grand Mall Park, Ishii created a sea of twinkling white lights sweeping up to a futuristic fair grounds. Over 1,000 pieces of "Yokohai Pave," a system that combines solar modules and LED, were used to design the dazzling display. Fixtures were concealed beneath the park, and indirect lighting used to uplight trees and illuminate walls, benches, and water. Ishii also designs chandeliers and neon sculptures that resemble intertwined rope glowing in a palette of hot colors. For U. S. work, she maintains an office in Los Angeles.

If Ishii's concepts seem soaring, she admits to having a high standard to aspire to: In the Japanese Shinto religion, the chief deity is the goddess of light, Amaterasu. CAROLYN KOENIG

Wall mirrors reflect the one-million light bulbs Motoko Ishii used in her "Wonder World of Illumination."

Ergonomic Lighting from Austria

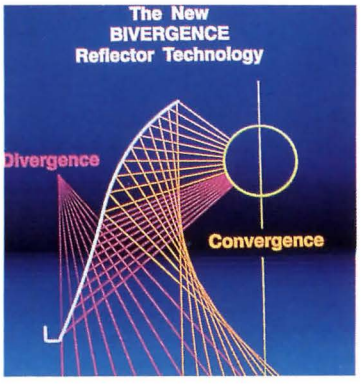
A Vienna lighting manufacturer, Zumtobel, thinks it has a better way, and the activity at its booth during the recent Lightfair in New York City seemed to bear this out.



Zumtobel devised glarefree lighting system for offices in Schoemer House, Austria.

Its new technology for glare control, for instance, has drawn favorable comments (see "Let There Be Light," page 21). One of its solutions to glarefree lighting was used in architect Heinz Tesar's Schoemer House in Klosterneuberg, Austria. Devising an indirect/direct lighting system for the building's offices, Zumtobel uses an indirect lighting component, which makes up about 70 percent of total light output, to direct light toward the ceiling from where it is reflected. Direct light is distributed through a louver onto the workplane, allowing accurate depth discrimination.

Luminaires with Bivergence reflectors developed by Zumtobel were the solution for computer-intensive offices in a Tacoma, Washington, office building designed by Wyatt Stapper. Unlike parabolic reflectors, the bell-shape reflector directs the maximum amount of light downward, virtually eliminating glare on computer screens (see diagram below). C. D. K.



Lightfair's Debut in New York City Draws 7,500 Attendees

Created to meet the needs of both the specifier and the exhibitor, last spring's Lightfair in New York City "met our expectations," according to Helen Diemer, president of the International Association of Lighting Designers, one of the fair's sponsors (it was also sponsored by the Illuminating Engineering Society of North America). Over 7,500 architects, designers, and lighting specialists attended.

The next Lightfair will be held March 5-7, 1991, at Expocenter, the Chicago Merchandise Mart. For more information, phone Lynne Weller at (404) 220-2115.

When and How to Hire a Lighting Designer

Budget allowing, it's probably a good idea. By Joseph Wilkinson

Headquarters offices of Capital Research Company, New York City; Robert A. M. Stern Architects; Cline-Bettridge-Bernstein Lighting Design Inc.

Architects who work with lighting consultants engage them for the same reason they hire accountants to prepare tax returns and go to physicians for appendectomies. They want professionals to do it.

A skilled lighting designer can enhance the utility, comfort, and grace of architectural space through the use of light and has a thorough knowledge of the lighting equipment market.

According to a distinguished lineup of lighting professionals consulted for this article, proficient lighting design must do many things. Among them:

- Help to define spaces and clarify their interrelationships.
- Reinforce the progression of spaces and allow people to move comfortably between spaces serving different functions.
- Heighten the visual qualities inherent in building materials.

"Lighting is a very subtle and complex matter, particularly with highly developed spaces, such as a museum," says Robert Gatje, of Richard Meier & Partners. "No electrical engineer can satisfy the complex needs of special space. And a lighting designer assures you of a truly independent judgment in the selection of manufacturers and the design of special lighting for the problem at hand."

The work of a lighting consultant depends mostly on the client's budget. When engaged to the ultimate, the lighting designer joins the design team at the concept phase, takes part in design development, sees the job through construction, and focuses the lights during final installation.

In general practice, lighting designers are more often called in at design development. But as David Martin, of Albert C. Martin & Associates, Los Angeles, says, "On certain jobs, such as museums, I want the lighting designer in on Day One."

Lighting designers sometimes have responsibility for all illumination in a building, but generally they work only on public areas, special areas, and offices. The electrical engineer usually takes care of service areas and general work spaces.

Some architects engage designers just for the concept phase. The minimum of an investigation is a visit to a designer's office to give a guided tour through lighting-equipment catalogs. The typical product of the lighting designer has two elements:

- Plans and specifications for lighting.
- Follow-through during installation of the lighting equipment.

Architects who have frequently engaged lighting consultants have some suggestions for you on ways to work with them:

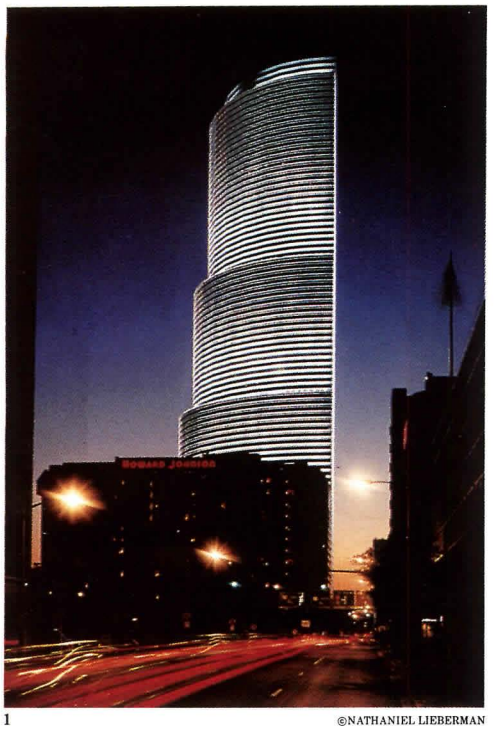
"It is important to establish up front the scope of the lighting consultant's service. Often they want to do much more than the budget can afford," says Lynn Molzan, Woollen, Molzan and Partners, Architects, Indianapolis.

"As with other consultants, it is important that the architect maintain design control. You can't delegate that. You have to have a strong idea of what you want," advises Alexander Lamis, Robert A. M. Stern Architects, New York City.

"You're using talent. I would always go for the best. At minimum, consult with them in their offices and see what equipment is available. Take your electrical engineer along. When he understands the features of the light fixtures, he is better equipped to design his end," says Tai Soo Kim, of Tai Soo Kim Associates, Hartford.

"I think you have to enter such a relationship knowing the direction you want to go. They are creative and inventive. You have to find a balance, give them their leeway while getting the effect you want for your design," says David Martin, of Albert C. Martin Associates.

The advice of lighting designer Francesca Bettridge, of Cline, Bettridge, Bernstein Lighting Design, Inc., is, "See that all the services you need are included in the contract. Determine how many site visits will be made. Be sure that the follow-through terms are detailed."



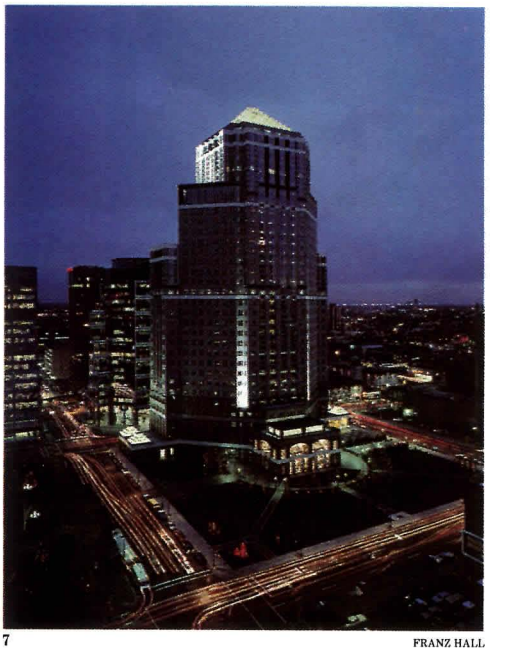
1 ©NATHANIEL LIEBERMAN

5 KELD HELMER PETERSEN

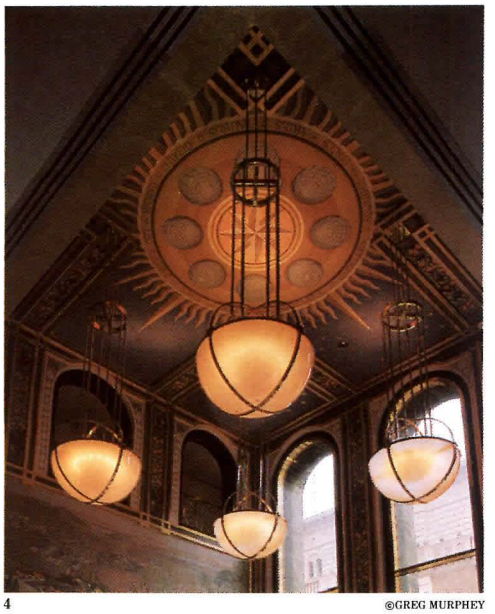
2 WAYNE FUGI

3 ©STEVE ROSENTHAL

1. Centrust, Miami; Pei Cobb Freed & Partners, Architects; Claude R. Engle, Lighting. 2. Puget Sound House, Seattle; Arthur Erickson Associates, Architects; Talis Inc., Christopher Thompson, Lighting. 3. MIT Graduate Library, Cambridge, Mass.; Mitchell/ Giurgola Architects; Paul Marantz, Lighting. 4. Home Savings of America Tower, Los Angeles; Albert C. Martin Associates, Architects; Francis Krahe, Lighting. 5. Volvo Headquarters, Gothenburg, Sweden; Mitchell/ Giurgola, Architects; Howard Brandston, Lighting. 6. National Gallery of Art, Washington, D. C.; Pei Cobb Freed & Partners, Architects; Claude R. Engle, Lighting. 7. Lincoln Centre, Minneapolis; Kohn Pedersen Fox, Architects; Cline-Bettridge-Bernstein, Lighting.



7 FRANZ HALL



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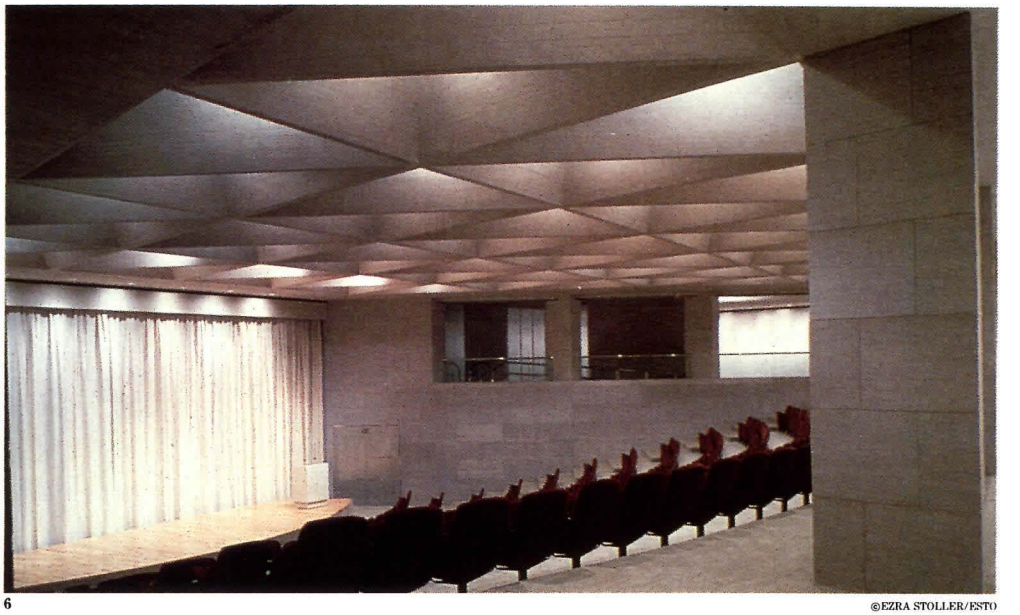

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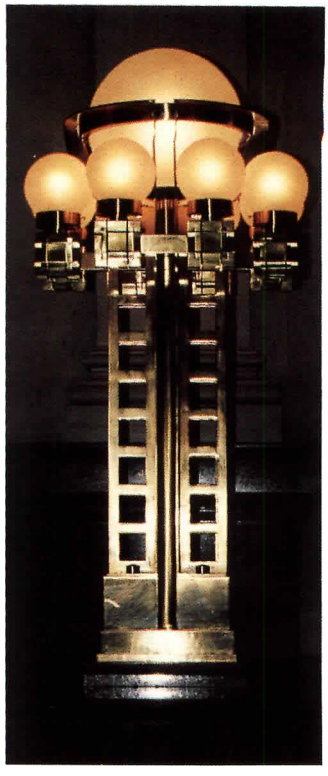

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8.,9. (Left and above) Carnegie Hall, New York City; James Stewart Polshek, Architects; Fisher-Marantz, Lighting Consultants. 12. (Opposite) St. Matthew's Episcopal Church, Pacific Palisades, California; Moore Ruble Yudell, Architects; Richard C. Peters, Lighting Consultant.

Until recent years, the ranks of lighting designers came from persons working in some aspects of design, architecture, engineering, interior design, theater, and retailing who had a deep interest in lighting and moved into the business, learning as they worked.

Now, lighting has become a discipline on its own. The Parsons School of Design and Pennsylvania State University offer masters degrees in lighting. Undergraduate majors are offered at Rensselaer Polytechnic Institute, Louisiana State, Pratt Institute, and the universities of Illinois, Colorado, and Kansas.

Joseph Wilkinson is the former managing editor of ENR *and a freelance writer based in New York City.*

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10

10. University of Hartford Gallery; Tai Soo Kim, Architects; William Lam Associates, Artificial Lighting Consultants; King-Lui Wu, Natural Light Consultant.

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11. Union Seminary, New York City; James Stewart Polshek; Cline-Bettridge-Bernstein.

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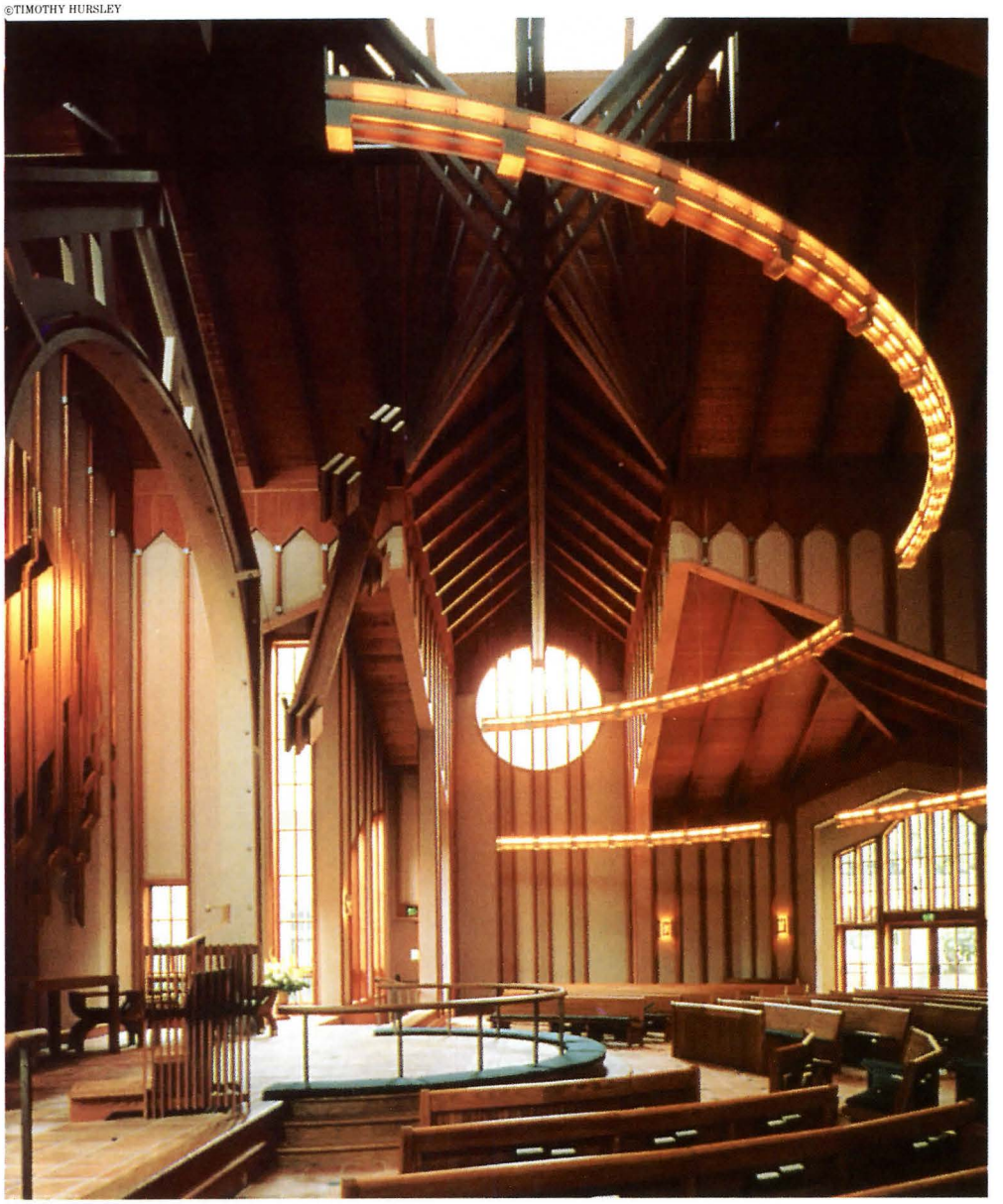

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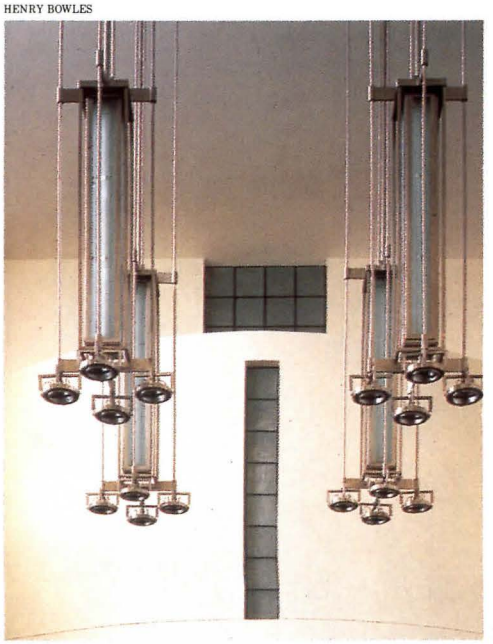
HENRY BOWLES



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13. St. Matthew's Church; Moore Ruble Yudell; Richard C. Peters.

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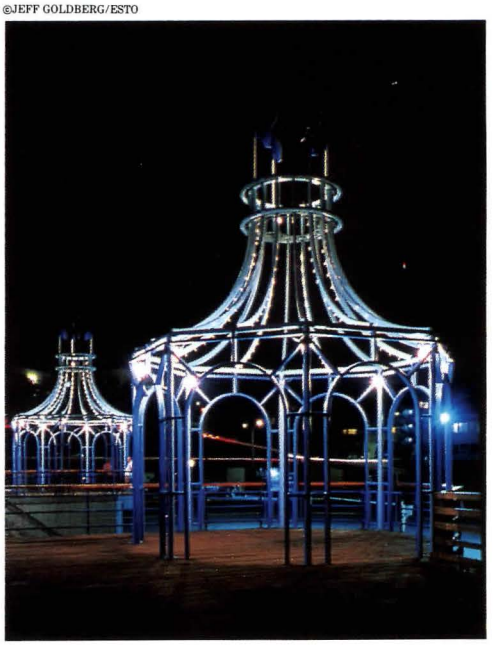

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14. Santa Monica Pier; Moore Ruble Yudell, Architects and Lighting.

BEFORE YOU ENGAGE A LIGHTING CONSULTANT

Here's a handy checklist for architects who have never embarked on a quest for the right lighting designer:

- Has the consultant experience related to your project?
- Ask for lists and photographs of previous work.
- See examples of specifications, drawings, and details.
- Speak with some of the consultant's prior clients.
- Does the consultant have a record of staying within budget?
- Does the consultant work on an hourly basis or on an upset fee?
- Is the consultant's design philosophy in harmony with yours?
- Will the consultant's personality fit in with the rest of your team?
- How does the lighting designer integrate services with those of the architect, electrical engineer, and interior designer?
- Is the consultant's staff large enough and experienced enough to handle your project?
- Does the consultant design custom fixtures?
- Is the consultant a member of IALD or IES? □

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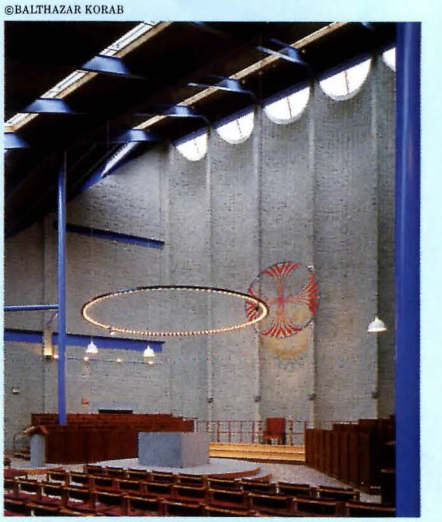
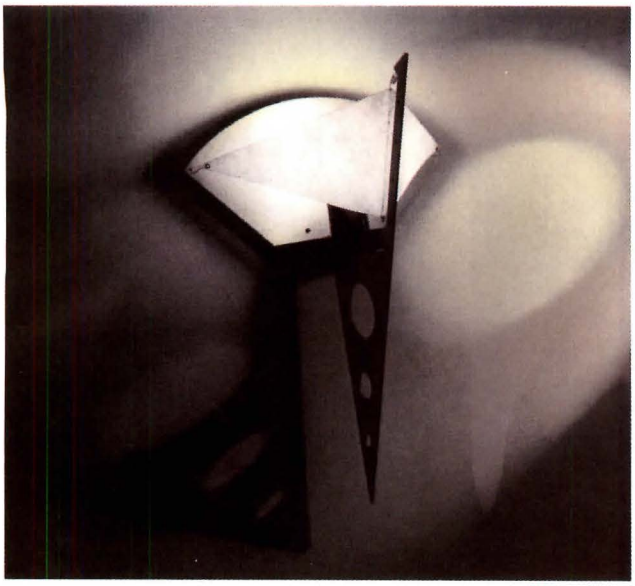


U. S. Embassy, Oman, James Stewart Polshek, Architect; Howard Brandston, Lighting.



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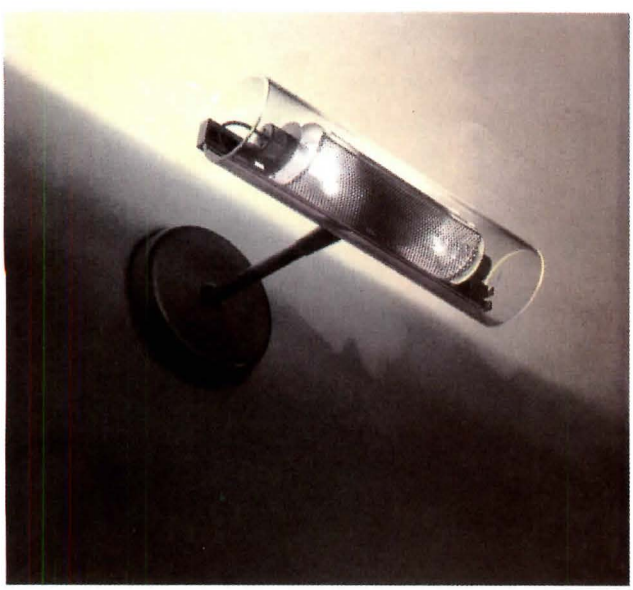

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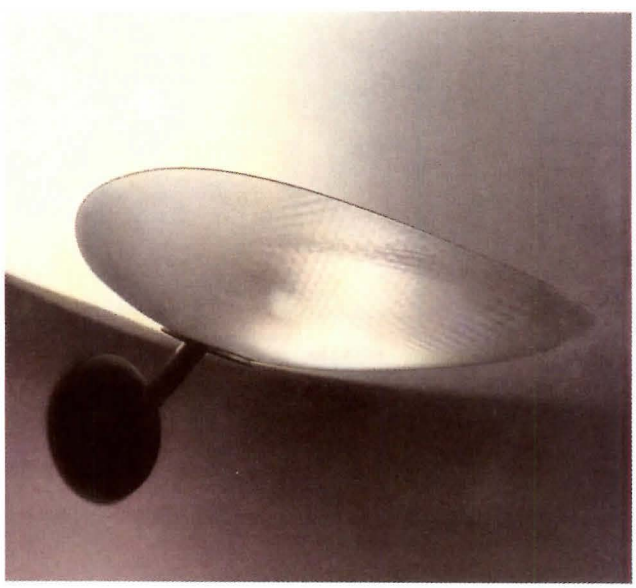

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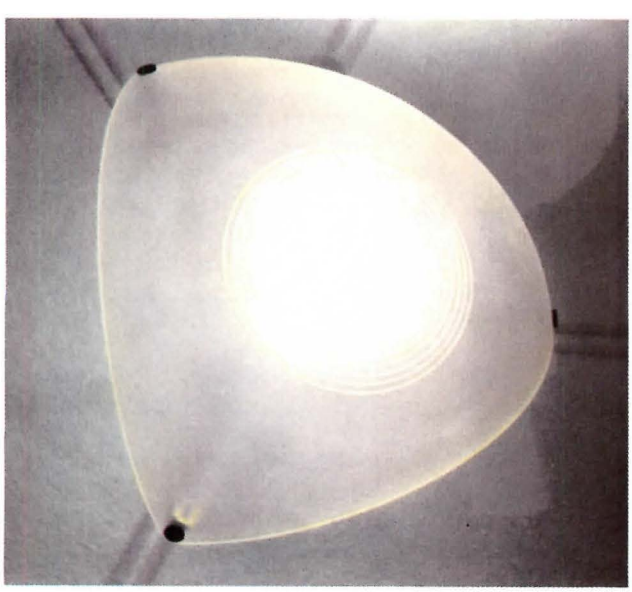

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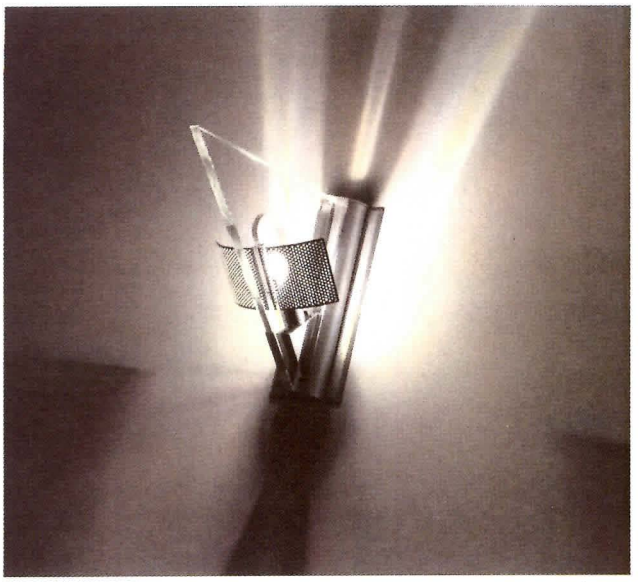

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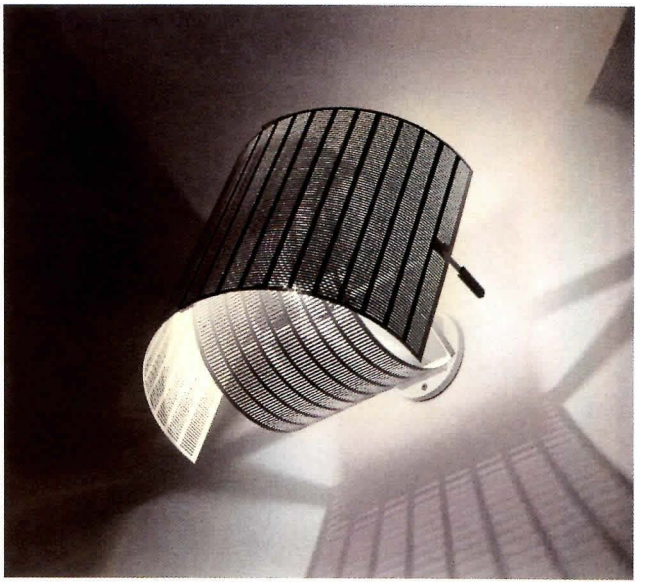

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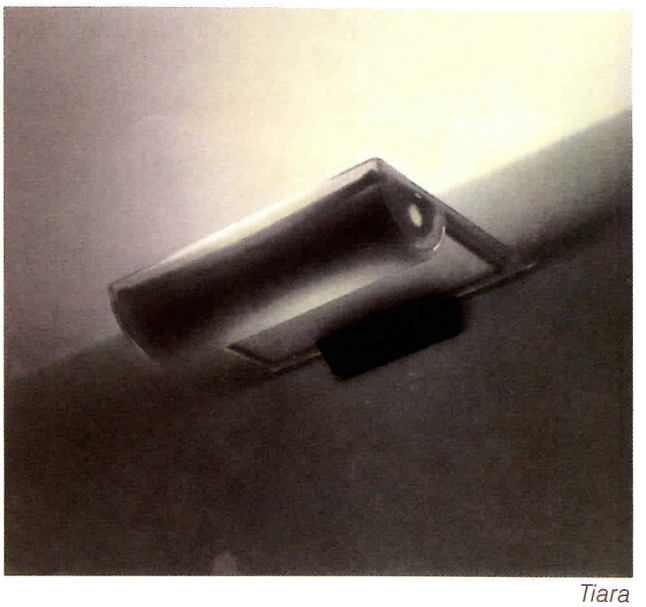

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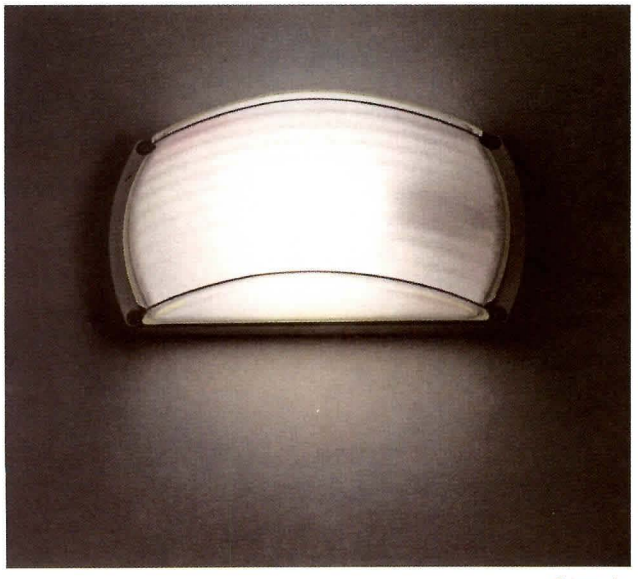

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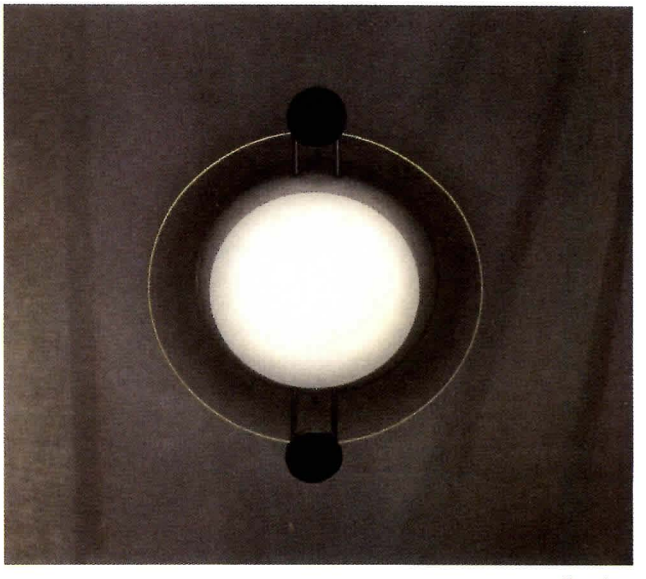
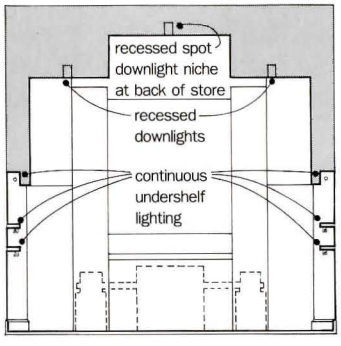


Cyclos

Jewel Box

A Seattle shop achieves museumlike richness and serenity through restrained use of materials and colors and dexterity in the use of light.



A rear spot emphasizes depth of space.

This tiny space, 620 square feet in all, was designed for a long-established Seattle jeweler moving into the city's retail core. It was important to establish qualities of continuity and solidity: the desired atmosphere was not unlike that of a museum—subdued, respectful both to visitors and to the objects displayed. Lighting played an important role in achieving this atmosphere.

The first lighting fixture encountered by visitors is an ornate glass and metal chandelier brought from the old store, itself highlighted by a recessed spot in the ceiling.

Chairs and some cabinetry, also brought from the previous store, complemented the distinctly modern interior since the new elements were kept simple. Plasterboard painted in quiet colors; sturdy, rectilinear precast concrete forms; and slab concrete floors with bronze screeds and marble inlay were some of the materials used.

Jewelry is presented in two rows of glass cabinets, and art objects are on shelves in coves in the walls. Each piece gets ample space; there is virtually no sense of clutter anywhere.

The cabinets are illuminated by recessed downlights in simple can fixtures with quartz bulbs. Quartz was used to bring out the true tones of the jewelry. Spots and floods alternate, and can be changed at will to bring out the best in what is being shown. The downlights shine diagonally rather than directly on the cabinets to avoid reflection. Though there was some concern that this might create shadows, the lights are mounted high enough so seated visitors do not cast shadows.

The original design for lighting the cove shelves included fixtures sending light down from above through the glass. Clear glass and white bulbs were first used, but the thickness of the glass produced a greenish cast that architects and client alike agreed was ghastly. Crystal was prohibitively expensive (total budget for the project was $120,000). Acrylic sheet was ruled out because the owner wanted no plastic in his shop.

The solution was installation of flexible light strips with tiny incandescent bulbs at each shelf so that light falls directly on the objects without passing through glass. The strips are held in bronze angles, and the bulb is amber, emanating light slightly yellow in tone. The result is a very pleasing warmth, but if the owner wants to highlight a particular object, a bulb can be replaced by a pure white halogen spot.

The architects describe their objective as "creating an environment that is both elegant and neutral so that it serves as an appropriate background for the display of jewels and fine-art treasures." One key was "restraint in the palate of materials and colors." Another key was scale. The shop is a tall, narrow volume, emphasized by the concrete entry portal, but it is kept from seeming constricting by the glowing coves in the walls and the wash of light on lower surfaces. **DONALD J. CANTY**

Monroe Jewelers
Seattle, Washington
OWNERS: *Philip and Lee Monroe*
ARCHITECT: *Olson/Sundberg—Jim Olson, principal, Tom Kundig, project architect*

Razzle-Dazzle On the Beach

High-tech highlights the abstract forms of a Malibu beach house. By Aaron Betsky

When David Steinitz was asked to light the monumental forms of a large house on the beach in Malibu, he turned first to subtlety, then to pizzazz. For the house itself, he used a combination of Power Line Carrier (PLC) technology, low voltage, and carefully hidden fixtures to highlight the house and the collection of modern art it contains. The garden area facing the sea, however, became a glamorous stage for remote-controlled lighting and multicolored fiber optics. The combination creates a rich spectrum of effects that rarely intrudes on either the minimalism of the design or the easy atmosphere of the house.

Steinitz can provide such a rich array of lighting effects because he is not only a consultant, but also a retailer and custom manufacturer of fixtures. The showroom of his F.I.R. LTD store in Los Angeles doubles as a research lab. There, the designer indulges in his obsession for new technology. He is already well-known for his use of low-voltage fixtures that can pinpoint objects or paintings with great precision, and now he is making extensive use of PLC. For several years, lighting manufacturers have been singing the praises of PLC technology, a component system that allows almost infinite flexibility in controlling and programming electrical equipment from a single transmitter. Most of the applications have been geared toward either urban paranoia (PLC allows you to program lighting and security systems from remote locations and in intricate patterns) or towards yuppie ostentation (turning on the hot tub from the carphone, redesigning the garden lighting from your living-room window).

That was not, however, the reason that Steinitz used PLC components in this case. "We wanted to make the whole system easy to use and unobtrusive. We were working with the architect, Warren Gray, to underline the forms, not interfere with them." The emphasis was thus not gadgetry, but on control and expandability. "You can't dial up the house from the car, but I have built in that capacity," explains lighting consultant Steinitz. "All you have to do to make that possible is plug in a $90 module." That capacity explains the potential of PLC technology: almost infinite flexibility controlled by software, rather than wiring. From one box hidden in a closet, the owner can manipulate lighting and equipment all over the property.

The secret is an electronic impulse that is sent out on the wires during the "zero crossing" of the 60 HZ power curve and addressed to up to 50 different "addresses." These destinations are modules that turn fixtures on or off. They can also dim and brighten them up to 200 times an hour. The user usually accesses the system through controllers that look like regular light switches, but are actually programmed to direct signals to specific fixtures. The impulse emanates from the hidden box, and can be controlled either there or through a plug-in module, allowing the owner to exchange lighting controls with great ease. In the case of the Malibu house, a series of what look like light switches are mounted at discreet locations throughout the house. These controls actually are programmed to send the signals to the centralized box, so that you can turn on a garden light from the kitchen, a light in the children's room from the master bedroom, or the master-bedroom lights from the bed. The fixtures can also be programmed to turn on and off in

As bright as a lighthouse, this beachfront house in white comes alive when washed with light by lighting designer David Steinitz. Controlled from a few switches inside, garden illumination sources remain hidden, but create a strong presence for the pavilions and varied levels stepping down to the adjacent beach.

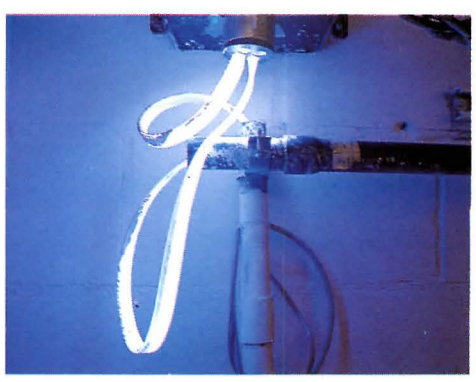
imitation of normal occupancy cycles during the owner's absence from this second home. Since the architecture of the house is made up of a series of stark, abstract volumes, the PLC technology serves not only for convenience, but also for controlling the intricate composition of light and dark so crucial to the esthetics of the house from a limited set of control points.

That "clean look" in fact governed the actual lighting controlled through this PLC technology. Most of that illumination is not only indirect and carefully focused, but almost invisible even in the vast expanses of white walls. The use of small fixtures, low-voltage systems, and design innovations allowed for this disappearance of the usual clutter of fixtures. One of Steinitz's favorite tricks is concealed behind what looks like an exhaust—a clean rectangular hole in the wall—that in reality contains a light pointing down to wash the floor area. In the garden, downlights are worked into the wood slats that shade the picnic areas, hidden underwater lights bathe the hot tub and pool, and purposefully rusted cylinders glow unobtrusively with washers that have been mounted so that they point up to a disk that then reflects light down and out. The fixtures were designed and fabricated by Steinitz.

The real fireworks, however, are reserved for the lower reaches of the garden. Steinitz started his career as a stage designer. He has since progressed to the design of lighting systems for the stars of Tinseltown, and he has a keen sense for the dramatic. The client in this case had owned a special-events laser company, and was not adverse to some industrial light and magic. The architect, finally, was keen on preserving the spartan appearance of the house. These concerns coalesced in the lighting for the steps of the garden. Steinitz had the concrete for these long trays poured to include a narrow trough, and then embedded fiber-optic rods in those cavities. The rods loop from step to step and are controlled from two small cubical pool storage units on either side. At night, these thin braids give out an eerie, even glow. In their neutral setting, they act as highly refined step lighting, similar to, but more even, softer, and considerably cheaper than, fluorescent tubes. The touch of a "color wheel" in the storage space, however, turns them from white to green to violet to red, transforming the garden into a light show of horizontal stripes etched below the stark white forms of the house. The effect is a spectacular bravura trick that only serves to emphasize the subtlety and clarity of thinking of the overall lighting scheme.

In the end, this bravura display highlights the three achievements of a well though-out lighting design. First, it can enhance architectural design, disappearing into the forms set by the architect. Second, it is part of the technological revolution that is turning houses into infinitely flexible machines for living. Finally, lighting design can stake out its own realm between architecture and convenience, a place where the sheer delight in light carries over from the realm of pure prisms seen in light to the new day of artificial light for modern habitation.

Irmus House
Malibu, California
ARCHITECT: *Warren Gray*
LIGHTING DESIGNER: *David Steinitz*
LIGHTING AND CONTROLS MANUFACTURER: *Leviton Manufacturing Company, Inc.*



Fiber-optic controls are found in a garden shed, while the PLC for the whole compound—including hidden lights for the waterfall-filled jacuzzi (top)—works from a few control panels in the house.

With a turn of the color wheel, fiber optics, which are embedded in the steps that cascade down to the water can turn the concrete slabs into planes floating on mysterious blue light.

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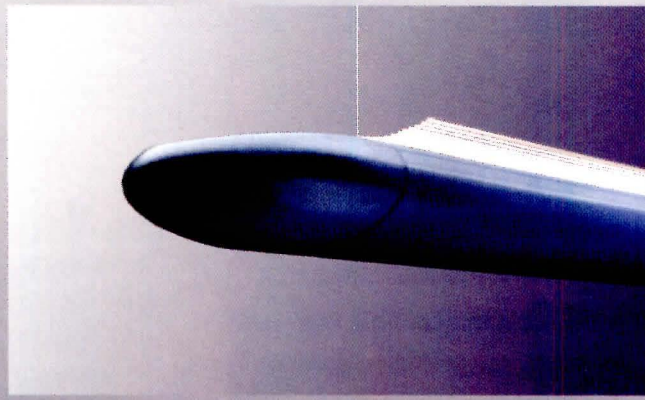

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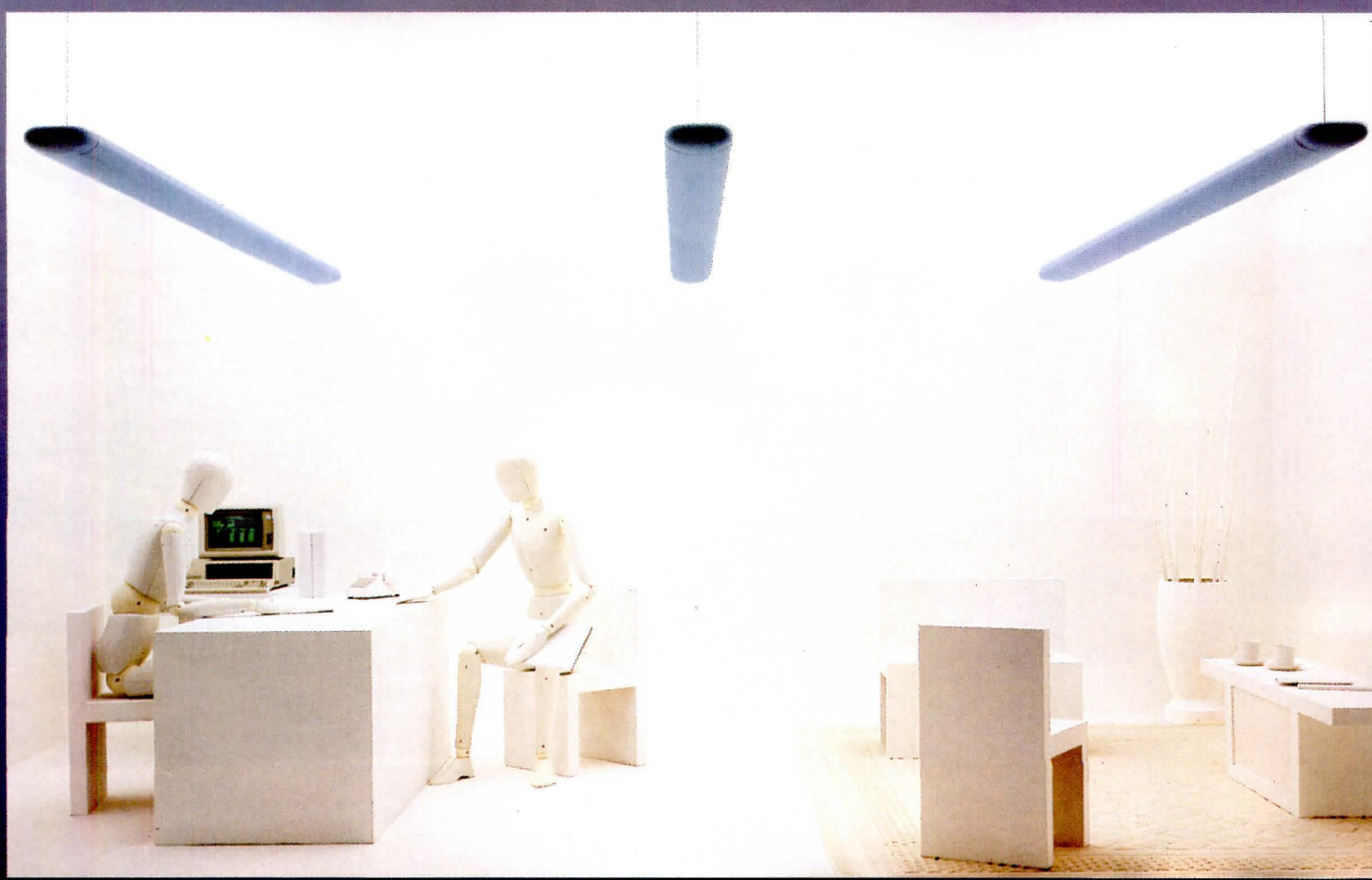


Let There Be Light

Lighting manufacturers are marrying innovative design and energy efficiency to their latest lines. By Joseph Spiers

The commercial lighting business in recent years has been ablaze with innovation, resulting in new lamps and new fixtures and designs to take advantage of those lamps.

Among products and concepts foremost on the minds of manufacturers and designers: compact fluorescents, MR-16s, direct/indirect lighting systems, deep-cell parabolic louvers, electronic ballasts, computerized controls. But two themes—energy conservation and glare control—link many of the changes.

Energy conservation has, of course, been a major concern in the U. S. for 15 years. Yet the focus on lighting as a major energy-saving area has been heating up again, and promises to heat up even further. New energy codes have put lighting "on the front burner," says Guy Esberg, marketing director of Peerless Lighting, a fixture manufacturer. Joel Siegel, vice president-marketing and sales at Edison Price, another fixture maker, foresees state governments in the 1990s imposing "extremely severe" energy restrictions that will greatly restrict incandescent lighting.

Helen Diemer, associate in the lighting consulting firm of David A. Mintz Inc. and president of the International Association of Lighting Designers, cites "a spate of legislation on energy" that will help set the pace for further technological improvements. Examples: further shrinkage in the size of compact light sources and fixtures, more reliable electronic ballasts (and greater acceptance of these ballasts), and increased use of occupancy and daylight sensors due to declining cost.

ELLIOTT KAUFMAN

Krueger Associates used 1-in. cold cathode tubes, handpacked with shards of phosphored glass, at Club Zanzibar, Newark, New Jersey, to create stunning light patterns.

Compact fluorescents

Energy-efficient compact fluorescents already on the market have won praise. Peerless's Esberg calls the compact fluorescents "manna from heaven," allowing the manufacture of "smaller, sleeker, more powerful fixtures." For example, Peerless, which specializes in indirect lighting, has put four compact lamps in a square pattern in standard round fixtures 12 feet apart in an office to distribute light symmetrically, meet lighting standards, and stop glare, Esberg says. The compacts also enable Peerless to design sconces and wall washes that are compatible with the ceiling fixtures and that produce consistent color.

Compact fluorescents have also been a big bonus for Hambrecht Terrell International's director of lighting design David Apfel, who has developed lighting systems for many major department stores. "There has been explosive growth in efficiency, life, and ballast control along with a whole lot better color rendering than could have been dreamed of" five years ago, says Apfel. Though the initial cost of a compact fluorescent is about twice that of a comparable incandescent, lower energy usage and longer life of fluorescents have led to most big stores choosing fluorescents for general lighting. What's more, Apfel predicts that in the coming decade government energy codes will make it impossible to use incandescent for general lighting.

From a design standpoint, accelerated miniaturization of fluorescents coincided with the rapid growth of specialty clothing stores and with the trend to more intimate areas within big stores, creating the need for small lights that produced a comfortable atmosphere. The newer compacts were able to fill the bill, thanks in part to triphosphor technology that enabled the compact fluorescent to produce inviting light similar to incandescents.

Lightolier vice president of point-source marketing, Daniel Blitzer, believes the industry will learn how to produce better color matching between compact fluorescents and incandescents. "The challenge of the 1990s is how to control triphosphor fluorescent technology for higher color quality."

Besides using compact fluorescents for general lighting, Apfel also uses them where subtlety is required—e.g., fine designer shops and cosmetic departments, which used to be the exclusive preserve of incandescents. For jewelry and crystal displays, he still employs incandescents—tungsten halogen—because "it's the only way to get that sparkle."

Incandescent lighting

Incandescent lighting in commercial settings is still popular, however. A halogen lamp, the MR-16, is widely considered one

of the "hot" products now in the marketplace. The MR-16 has "completely changed display lighting," says AT&T senior electrical engineer Owen Kelly, who does design work for AT&T facilities such as display centers. The MR-16 has a low wattage—again the energy theme—but provides what Kelly calls a "nice punch." It's also small, allowing use of modest-size fixtures so "light comes out of nowhere to highlight the products." Another plus, says Nat Drucker, applications engineering manager at Staff Lighting, a fixture maker, is "precise control of the light beam that can be further enhanced with lenses."

Designer Mark Kruger of Kruger Associates cites the MR-16's variety of beam spreads as well as its small size as keys to his award-winning design for the lighting of the Aureole restaurant in New York. Kruger used recessed MR-16s from only a foot away to wash a 22-foot-high wall covered in bas-relief sculptures. An alternating pattern of wide flood and narrow spot sources is used to create two overlapping sheets of light. The design was possible solely because of small light sources in compact fixtures. "Miniaturization has spurred manufacturers to explore an entirely new vocabulary of product design for track-based, recessed, and surface-mounted luminaires," says Kruger. "This trend will surely continue, supported by a consumer marketplace which prefers, in many circumstances, to 'see' the light without 'seeing' the lights."

Besides its low wattage, the MR-16 conserves energy by providing good lighting in areas where people work or where merchandise is displayed, thereby allowing ambient light levels to be reduced. Says Siegel of Edison Price, "We are using smaller and more concentrated light sources with low wattage. The idea is to have a small amount of energy focused on a certain area."

Designers are also thinking about saving energy outdoors. For example, William Lam Associates put a ring of poles around a parking lot instead of filling the lot with poles, cutting down on the number of lamps. To provide enough illumination, light from 1000W metal-halide lamps was shot into reflectors that transferred the light into 24 images, says Lam's Paul Zaferiou. "The whole idea was to cut down on energy use, not to mention easier maintenance and wirings and the reduced number of poles." While satisfied with the results, Zaferiou would like to see a metal halide lamp with better beam control, and he anticipates such a development.

Electronic ballasts

In addition to more efficient lamps, lighting-industry professionals give credit for energy savings to electronic ballasts, which they expect to become much more popular in coming years. Frederick Pritikin, product manager-lighting electronics at Advance Transformer, says a high-frequency electronic ballast allows a fluorescent lamp to produce more light at the same power level than a low-frequency electromagnetic ballast. As a result, fewer lamps and fixtures can be used in new construction, or less power can be used in a retrofit.

Lamp manufacturers are also zeroing in on ballasts. GTE/Sylvania is considering bringing out a compact fluorescent system in which the lamp, when its life is over, can be unplugged from an electronic ballast and a new lamp can be plugged in. Typically, the ballast and lamp are integrated so that when the lamp dies the whole unit has to be thrown out, which Sylvania feels is wasteful and costly.

Meanwhile, Osram earlier this year introduced in the U. S. an electronic ballast for HID lamps. Osram, a lamp manufacturing unit of Siemens, says the new ballast stabilizes lamp color, increases lamp life, and improves lumen maintenance.

"Miniaturization has spurred exploration of an entirely new vocabulary of product design for track-based, recessed, and surface-mounted luminaires."

Advance Transformer's Pritikin says, "What's new and great" is ballasts that can easily dim fluorescent lights, allowing for further energy savings. A development he anticipates is a hookup of ballasts to overall building controls so that office lights could be dimmed when occupants leave an area, saving energy while providing enough light for safety.

A different wrinkle in lighting controls is a Lightolier system that can be programmed to create different lighting environments in a given space. For example, at the touch of a button a conference room can be lit to facilitate face-to-face discussions; then with another touch the lighting can be changed for an audio-visual presentation or a speech, or for cleanup.

Continuing glare

Along with energy conservation, the other key lighting theme of the 1990s will be glare control. Edison Price has over 20 new products under development linked by the theme of high efficiency and the best control of glare for the light source, says vice president Siegel. Architectural lighting consultant Mitchell Kohn says, "Clients are becoming more and more aware of the impact of glare on productivity." And Laura Godfrey, marketing communications director of the Lithonia Fluorescent unit of Lithonia Lighting, cites computer-industry data showing the number of VDTs has grown to 28 million from 15 million five years ago. "Controlling VDT glare is the most important technological work going on in office lighting design," asserts Godfrey.

Lithonia, one of the U. S.'s largest fixture manufacturers, is developing a deep-cell parabolic glare-control system, with special shielding, that Godfrey calls "our biggest product development in more than 20 years." Lithonia touts research showing its product prevents glare no matter what angle VDTs are viewed from, while being far more energy efficient than small-celled louvered systems that eliminate glare.

AT&T's Kelly agrees that "metal parabolic louvers in the past three years have been much improved and are the key development in reducing computer glare."

Another approach to glare control that has been gaining adherents is indirect lighting, which, as noted, got a big boost from compact fluorescent lamps. As a measure of how much indirect lighting has gained as an answer to glare, Esberg of Peerless Lighting says in the past seven years his firm's indirect business has jumped to 80 percent of total business from 20 percent, while overall business has increased sharply. And Peerless now counts 54 competitors versus only two.

Esberg believes another "burgeoning area" in glare control will be computer simulations that show where glare occurs in a setting and how much light there is for any given design. A number of companies already offer such simulations as alternatives to mockups. But in two or three years, predicts Esberg, such computer systems "will be like hand-held calculators."

Glare can also be treated with a combination of direct and indirect lighting. Consultant Kohn says direct lighting alone gives a dark feeling because the ceiling is dark and "that is much of what we see." If the ceiling is at least 9 ft 6 in. high, uniform ceiling brightness can be produced with indirect lighting, but Kohn characterizes such lighting alone as "bland." So he recommends a combination, preferably from a single fixture, with direct light for intensity and indirect light for brightness and to soften shadows.

The fixtures Kohn has in mind are made by Zumtobel, a company viewed as one to watch because of its innovations and elegant designs. Zumtobel marketing manager Wolfgang Egger recommends that offices and trading floors be lighted with direct/indirect systems, ceiling height per-

mitting, to provide appropriate light for both paper and computer tasks.

Zumtobel's direct/indirect systems feature perforated metal that gives fixtures a certain brightness from the indirect source so they do not appear dark against a bright ceiling. The fixtures, designed for the T-8 but also available for compact fluorescents, can be hooked together to form different configurations. An aerodynamic-looking version, introduced in 1989, has an electronic ballast and its height can be easily adjusted, Egger says. He adds that this model has proved popular with designers because of its shape, an important element in indirect lighting systems because the fixtures become part of the architecture. When ceilings aren't high enough for a regular indirect lighting system, Zumtobel sells a freestanding indirect fixture that redirects part of the light to the working surface.

Another Zumtobel variation on the direct/indirect theme is a 2 by 2 semirecessed mounted luminaire that uses a semicircular tube of perforated metal to control the glare of a single 36W compact fluorescent lamp, while letting some light through. General brightness is created as light reflects off the fixture's white matte background. Among Zumtobel's newer direct/indirect products is one that exposes the louvers, "the idea being to have the optical system visible for design purposes," says Egger.

A future for HID

Most of the lamps referred to so far have been fluorescent or incandescent. The third major family of lamps, high-intensity discharge (HID), was at one time expected to make big waves. But color inconsistency from lamp to lamp dampened the enthusiasm for HID. So, says designer Apfel, while HID is acceptable for use in discount stores or supermarkets, it's less ideal for department stores "because fashion merchandise has to do with color and texture and HID is too chancy."

Still, HID lamps have gotten better, and more improvements are expected. IALD president Diemer, for example, anticipates lower-wattage, smaller metal halide lamps with much better color and beam control. And Edison Price's Siegel thinks HID will "probably be a source for the future." Lamp manufacturers have already made advances, Siegel says, but the variety of wattages in the improved products is still limited.

Manufacturers are sensitive to the criticisms and are working to meet them—witness Osram's new electronic ballast for HID lamps. Another recent development: General Electric in April announced a new high-pressure sodium lamp that GE says delivers a white light, virtually eliminating the yellow quality of light from this source. The new product, designed for use in retail applications, has an electronic ballast and shows very little color shift throughout its life, GE says.

Robert Horner, manager of commercial lighting at Osram, says his company's metal halide lamps are "getting closer to what people feel comfortable with in terms of incandescent light," while using one-fourth the power of incandescents. Besides color, Osram will also be focusing on making metal halide lamps smaller.

Robert Davis, GTE/Sylvania's manager of lighting applications and research in the U. S., says Sylvania has also put emphasis on controlling color stability in metal halide lamps. Better color rendering will also be a key theme in new fluorescent lamps, Davis says.

Energy efficiency and compactness

Two other new-product themes Davis sees in the 1990s are energy efficiency—e.g., more efficient reflectors in PAR lamps and more efficient mixtures of gases in fluorescents—and more compactness, including smaller metal halide lamps.

"There are no bad products out there for the most part, only badly used products."

Davis characterizes the coming changes as "minor gains," and he doesn't foresee any "sudden and dramatic" development for perhaps 10 years. Osram's Horner agrees: "Most of the changes will be evolutionary and applications-oriented." As an example of a new application, he cites use of HID indoors.

Among the trends Horner sees are increased use of electronic ballasts and a greater variety of wattages in high-pressure sodium lamps and compact fluorescents. The coming advances are not unlike the kind of advances of the 1980s, when evolutionary changes were enough to bring a plethora of new and much improved products to a market spurred on by energy regulations, concern over VDT glare, and tougher competition among lamp makers jousting on a global stage.

Yet amid all this activity, the cliché "the more things change the more they stay the same" still has some bearing. For example, Paul von Paumgartten, manager of lighting at Johnson Controls, says that though the 2 ft by 2 ft fixture with compact fluorescent lamps provides more uniform light than the 2 by 4, looks better, and is recommended by designers, building owners are resisting it because of cost. The same goes for new lamps. "The lamp industry is doing a great job with better color rendering, greater efficiency, improved lifetimes, and reduced size, but cost is a sticking point," Paumgartten says.

Beside concern with cost, another thing that doesn't change is need for professional judgment in designing a lighting system. "There are no bad products out there for the most part, only badly used products," asserts lighting designer Howard Brandston, of H. M. Brandston & Partners. Brandston, who has helped set energy standards, believes regulators and engineers have made energy conservation too much of a fad, contributing to "visual blur and clutter" in lighting systems. Instead, the focus should be the person occupying the space who represents the major cost. If the space is well designed and pleasing, "the person will work better and that's how to save energy."

In a related vein, Luminae Souter senior principal James Benya points out that energy efficiency is only one element of lighting-system design and that there is no simple energy-saving answer to every situation. "There are still way too many design, esthetic, budget, and technology issues to consider," says Benya. "The important thing is that [because of new products] we can start out with energy-efficient sources."

To put it another way, lighting design will continue to be more than a response to technical problems. "We try to make lighting an art form," says John Sarkioglu, president of Lighting Design Collaborative. For example, Sarkioglu has designed airport-terminal fixtures, suspended on aircraft cable, that "float in space" and use perforated metal through which planes can be seen taking off.

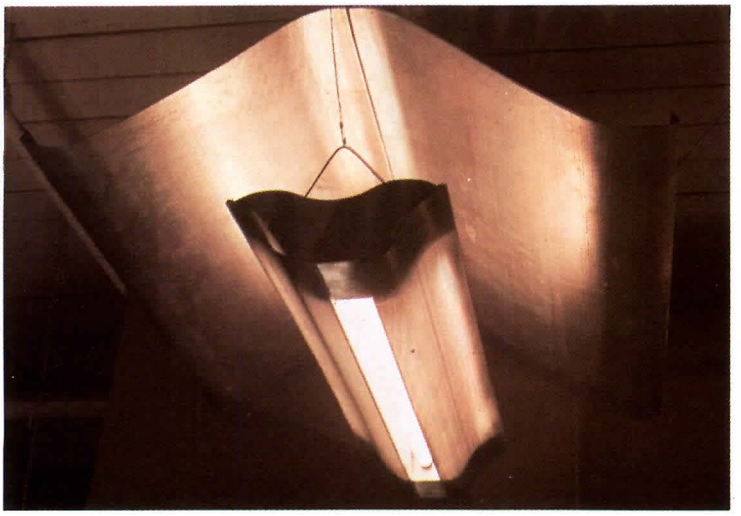
Style is in everywhere

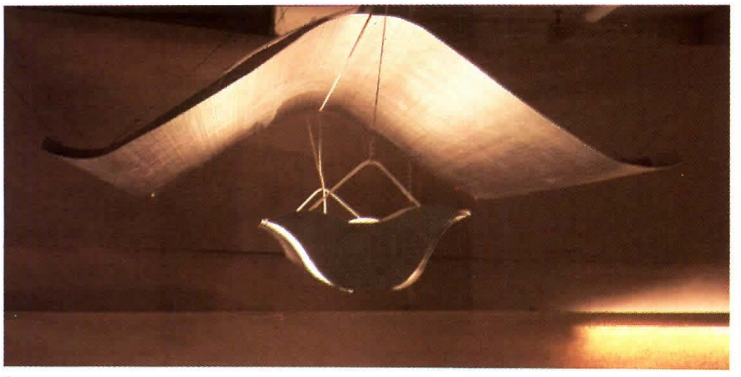
Fixture makers, too, are focusing on style. In fact, Lightolier's Blitzer says there is a shift to more "expressive" lighting, with architects increasingly specifying decorative fixtures such as chandeliers and wall sconces for settings such as small lobbies, restaurants, and conference rooms. In response, Lightolier has produced an array of decorative fixtures to install where older Lightolier fixtures are in place. The company has also carried its "visual interest" theme to track lighting.

So despite what may have seemed like a sea change in lighting in the 1980s, certain fixed points—concern with costs and with esthetics—remain. And no matter how many innovations hit the market in the 1990s, the rule is still that lighting professionals will be seeking to create attractive and comfortable environments in an economical way.

Joseph Spiers is a New York City-based free-lance writer.

DICK DUNLAP PHOTO FOR EWING COLE CHERRY PARSKY





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SCOTT FRANCIS PHOTOGRAPHY

1. Aerodynamic profile of cloud pendant reinforces notion of flight at Northeast Corridor airport. Ewing Cole Cherry Parsky, Architects; Lighting Design Collaborative, Lighting Consultants. 2. Indirect fixture (left) by Peerless Lighting does not create glare, while parabolic downlight (right) does. 3. Fiber-optic bundle emits light over its full length, and can be draped, woven, or nested into ornamental forms; at Aureole Restaurant, New York City, by Krueger Associates.

4. Combining direct and indirect illumination gave birth to a "saw-tooth" ceiling shape over A. Webster Dougherty trading floor, Philadelphia. Lighting consultant Mitchell B. Kohn used Zumtobel lamps and lighting fixtures. 5. At the Houston Design Center, selective exterior floodlighting provides dramatic color rendering using incandescent sources. Howard M. Brandston & Partners, New York City, created the scheme.

©TOM CRANE

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RICHARD PAYNE

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PHOTOS COURTESY OF PEERLESS LIGHTING

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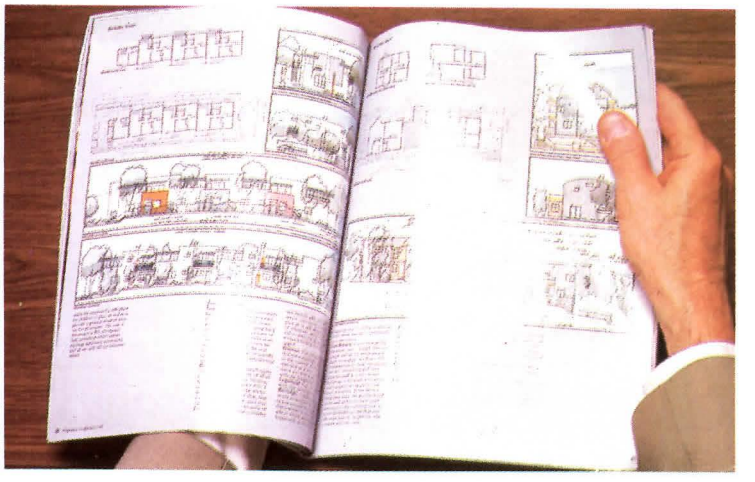

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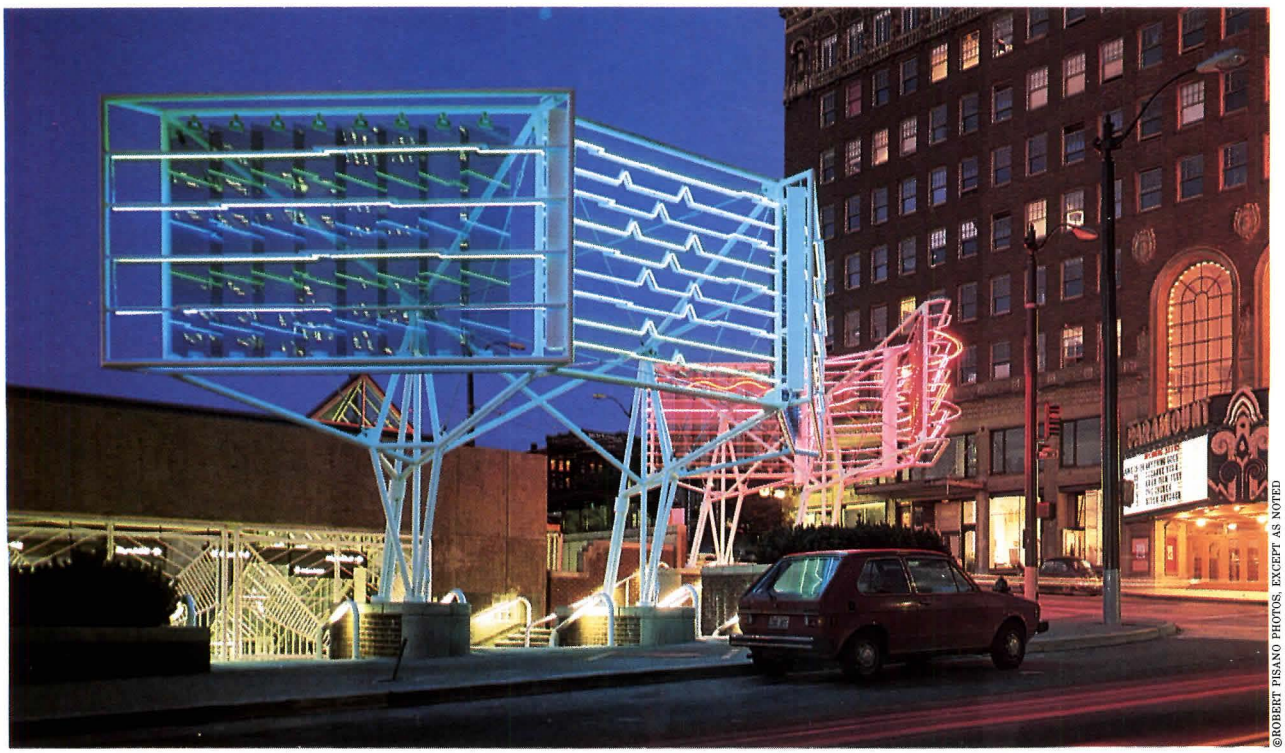
Sparkling Station

Brightly colored neon and glass "marquees" and a varied and artful approach to lighting help make this a bright stop in Seattle's new downtown transit system.



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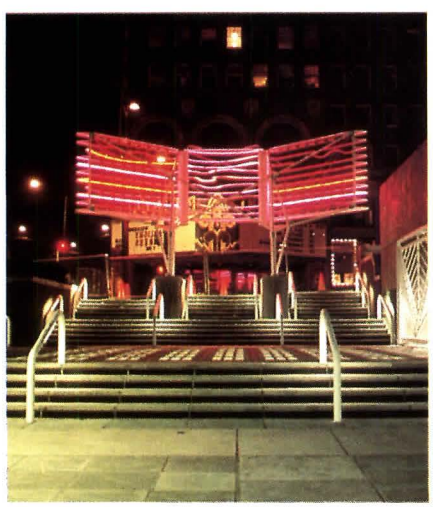
At the beginning of September Seattle will open an unusual new downtown transit system. Buses will come from the suburbs under diesel power, then go underground and operate electrically. The idea is to keep them off the city's increasingly congested downtown streets. The project involved extensive tunneling and construction of five stations. Principal architecture and engineering consultant for the project was Parsons Brinckerhoff Quade and Douglas with TRA, a large local architectural firm, as consultant for station- and street-improvement design.

TRA took the unusual design approach of trying to make each of the stations reflect the sector of downtown in which it was built. To induce diversity it divided the task among five separate teams, with Mark Spitzer as overall design coordinator.

The Convention Place station, so named because it is a block from the city's massive midtown convention center, is one of two "portals" through which buses will enter the system and make the transition in mode of power. It is sunk below grade but is the only station in the system to be entirely open to the sky. It makes the most of the fact by night when it presents a pleasing, and sometimes dazzling, variety of lighting effects.

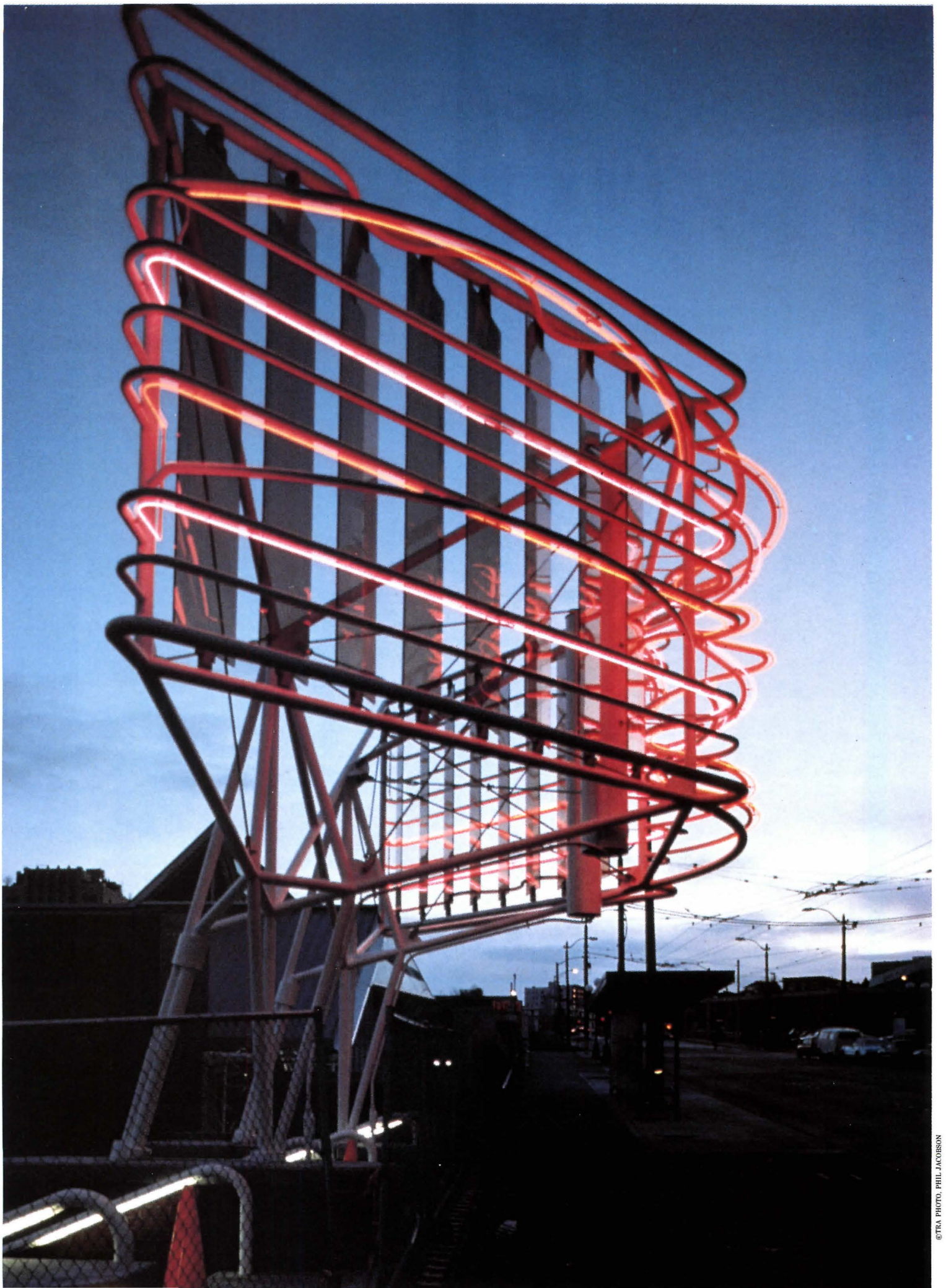


The roofless station has a series of canopies above the bus platforms and escalators to shelter passengers. They are white tubular metal with roofs that are glass to the south and metal to the north.

The first design concept was to have the canopies extend upward to the corner of the site facing the downtown core. The project had an extensive art component—each design team had an artist as a member—and under this concept there would have been decorative glass and special lighting as the canopies approached the corner facing the downtown core. This scheme was abandoned in favor of one that brought the canopies, and the passengers, into an extensive new public space. This added a signficant public amenity but left the corner looking somewhat bare.

Part of the design approach to the project was to inventory the highlights and assets of the neighborhood around each station and somehow reflect or incorporate them into the design. The neighborhood around the Convention Place station is a miscellaneous, even nondescript, downtown fringe area.

But it had one major asset that proved key to enlivening the corner and a generator of other aspects of the station's lighting design. That was the Paramount Theater, a much-beloved local landmark in the grand tradition of early movie palaces.



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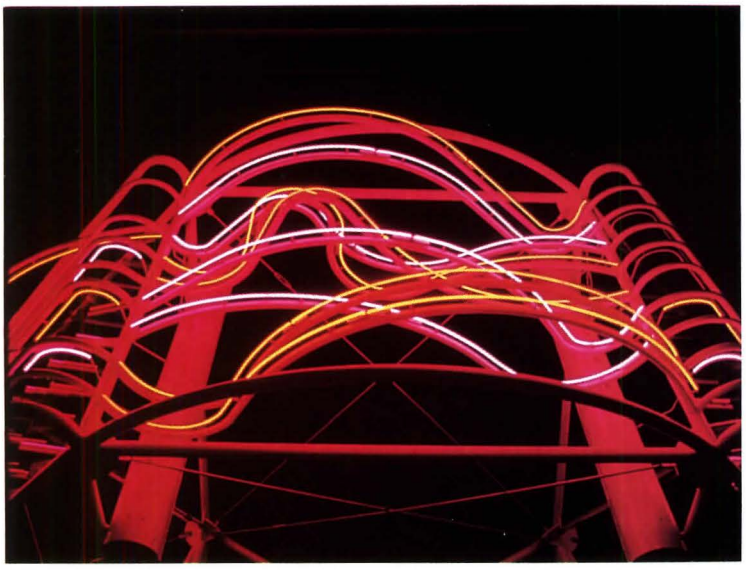
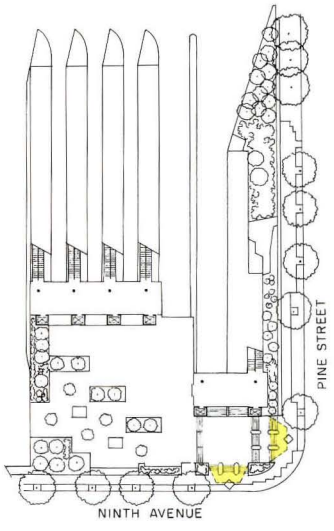




When the red and blue neon marquees are lighted, stainless-steel secondary bracing virtually disappears (bottom left). Between these structures and the station gates is a glass-block plaza, dramatically lit from below by intense fluorescent tubes (top left). Upper portion of site plan is a large public open space. Below it are canopies sheltering bus platforms and vertical passenger transportation. Their sequences of short fluorescent fixtures sparkle at night (above).

Just across the street from the corner in question was the Paramount's exuberant, neon-etched marquee. So Spitzer and the design team for the Convention Place station—Alice Adams was principal artist and Robert Jones station design architect—decided to raise marquees of their own.

Lighting the marquees

There are two on the corner, both with white welded tubular steel frames holding colored glass panels lit by "slashes" of neon. Adams made them quite different in character. The one facing the Paramount is extravagant and curvilinear, glowing with neon reds and oranges. The second marquee, abutting the somewhat formal new plaza, is rectilinear and its colors are cool blues and greens.

In their overall approach to lighting the station, the designers avoided bathing the entire site in bright light from tall towers, pursuing a more varied and subtle approach. "We tried to concentrate the lighting where it is needed, not blast away everywhere," says Spitzer.

Most lighting is tubular, picking up the theme established by the pipe structures. Originally the canopies were to be lighted by continuous fluorescent fixtures at the edges of the roofs, but they tended to collide with the elaborate structure. Now the canopies are lit by four-foot tubular fluorescent fixtures in pairs, generally with one facing up and one down, adding to the station's sense of movement.

There is lighting under the rails of the stairs and escalators. In the open spaces there are free-standing vertical tubular fixtures bent in their upper halves.

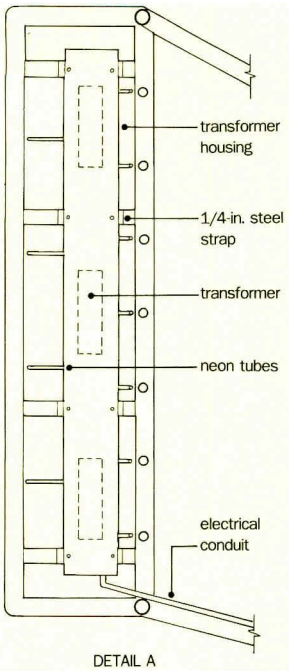
The brick and concrete plaza on the station's upper level is organized into four "sitting rooms" arranged around large urns whose plantings themselves were approached as works of art. There are lights in each urn, and the plaza floor is bathed in light from fixtures under benches.

A high retaining wall on one side of the station will be softened with a waterfall, pools, and landscaping. All eventually will be illuminated by incandescent fixtures in the water and plantings.

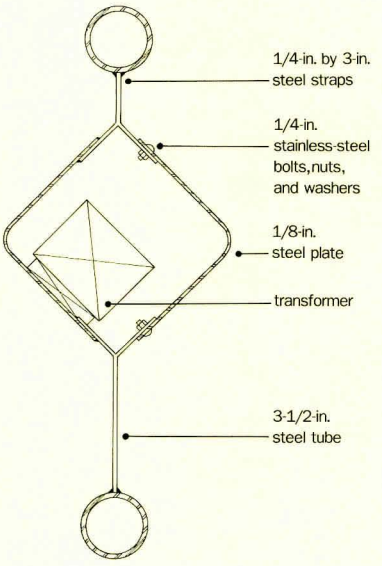
Adams was inspired to another theatrical gesture by the adjacency of the Paramount Theater. Between the station gates and marquees she made a small plaza of glass block, lit from below by powerful fluorescents. Glass block is also used on the edges of the outdoor "sitting rooms," giving them additional definition.

The designers see the glass plaza as a kind of stage. No specific activities are planned for it, but they point out that it would be a fine place for dancing. **D. J. C.**

Convention Place Station
Downtown Seattle Transit Project
Seattle, Washington
OWNER: *The Municipality of Metropolitan Seattle (METRO)*
ENGINEERING AND ARCHITECTURE: *Parsons Brinckerhoff Quade & Douglas Inc.; station architecture and surface improvement, TRA*
LIGHTING CONSULTANT: *Lightsource Inc.*



DETAIL A



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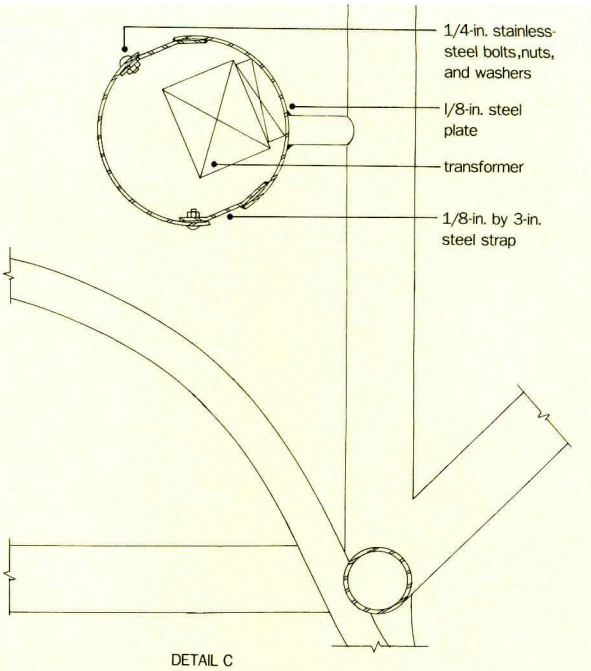

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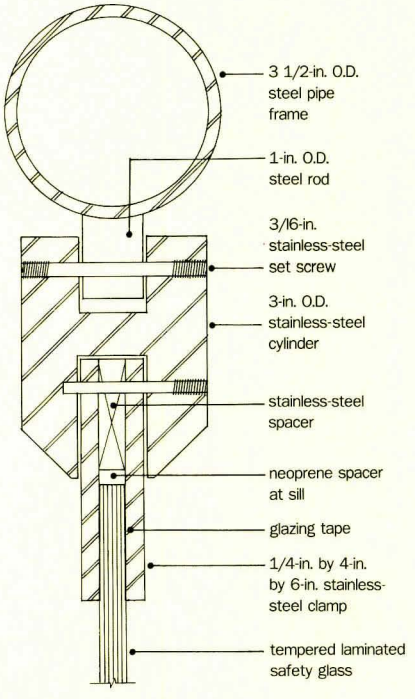

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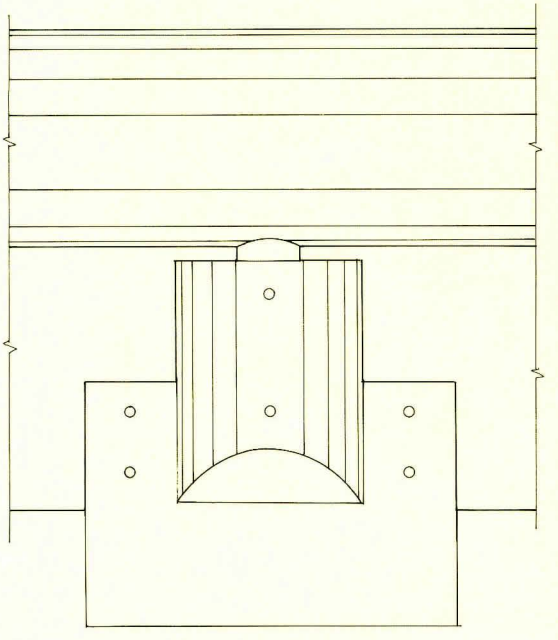
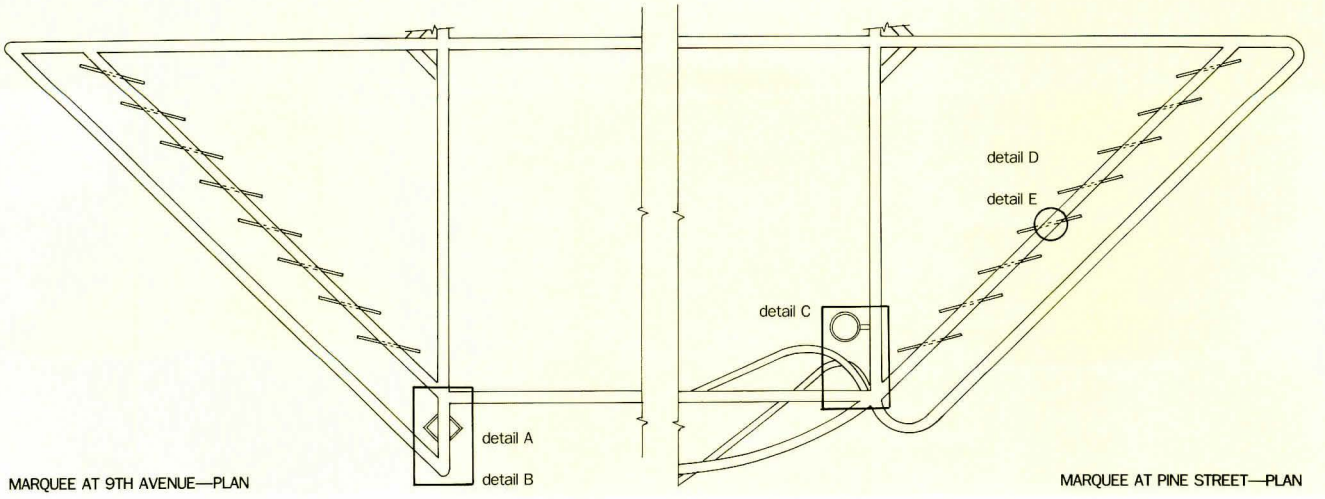


DETAIL E

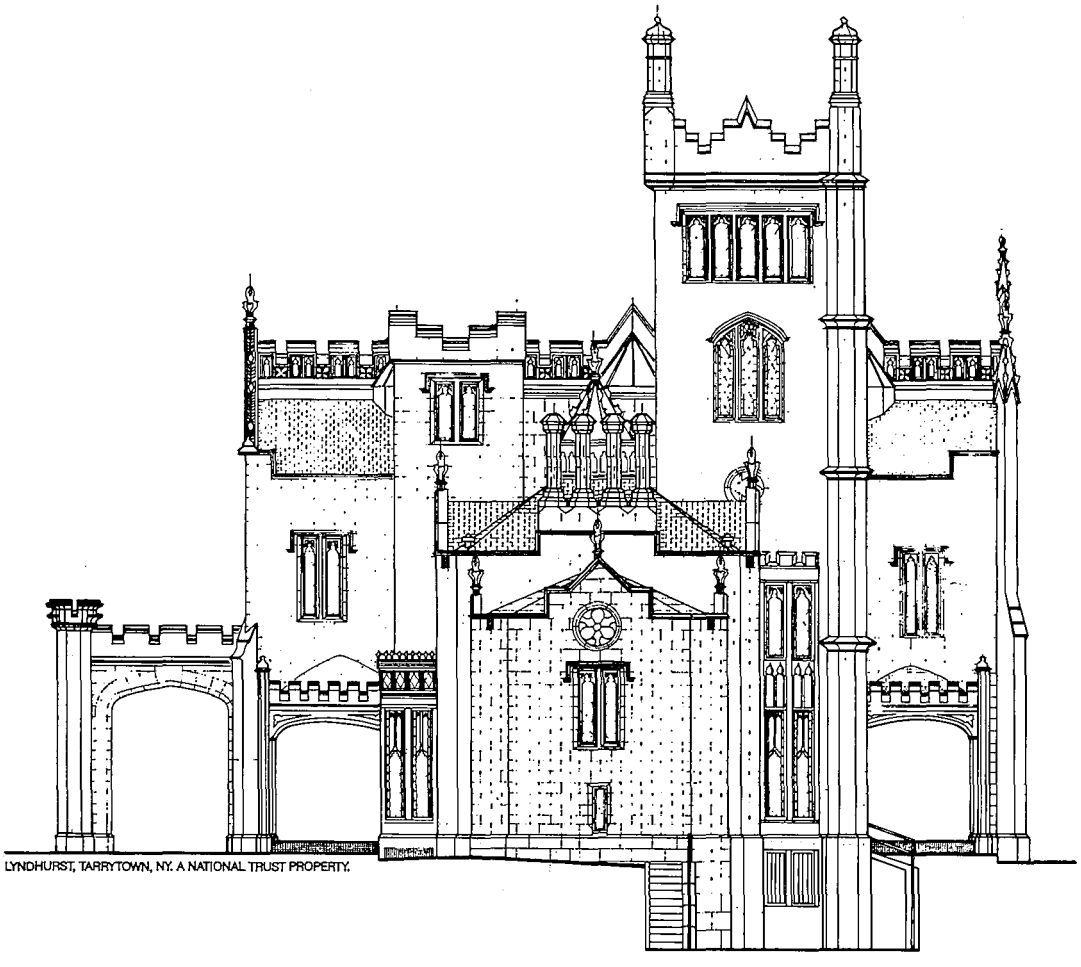
The two corner marquees (plan below) differ markedly in design as well as color. In both marquees, 15-millimeter tubes are mounted behind the pipe structure on the sides, and in front of it in the center panel (detail left). Each marquee has four transformers, typically held in the corners of the structure (details above). Detail at far left shows how the neon glass is attached to the structure. Jeffrey Miller of Lightsource, Inc., lighting designer for the station, credits artist Alice Adams with "taking standard marquee technology, the kind used for years, and making sculptures of it."



MARQUEE AT 9TH AVENUE—PLAN

MARQUEE AT PINE STREET—PLAN

PRESERVATION PLAN ON IT



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A Well-Lighted Space

David Mintz's solution for the state-of-the-art control room at Electronic Data System's headquarters plays light against dark, and uses existing technology in a novel way. By David Masello

As lighting designers we are the interpolaters between the architect's vision and the engineer's wiring," says David A. Mintz, president of David A. Mintz, Inc. Lighting Consultants, a 25-year-old Manhattan-based firm that has shed light—literally—on everything from subway stations and theaters to world's fair pavilions and state-of-the-art control rooms.

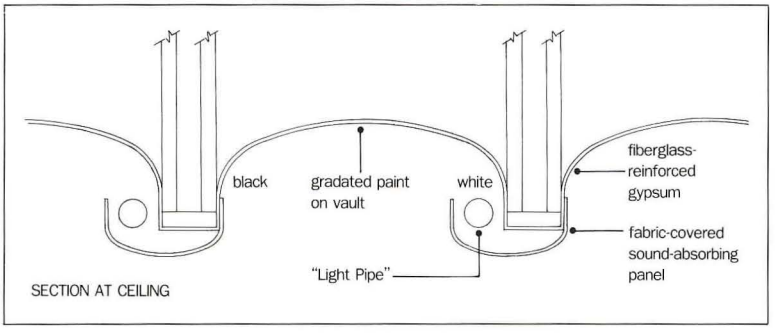
"Lighting design is both an art and a science and we fill that crucial gap between the architect and engineer. In fact, you might call us lighting architects in that we conceive in cooperation with the architect or interior designer what the lighting system will do or should do for a building or space, in terms of both function and esthetics."

Adhering to the design adage that form follows function proved to be an especially challenging mission for the lighting scheme for the control room of the Information Management Center (IMC) of the Electronic Data Systems Corp. (EDS). David Mintz says that the solution for the center in Plano, Tex., was "amazingly complex on one level and yet devilishly simple when you really get to it. And at the heart of the solution was a lighting oxymoron, in that we created a highly directional diffuse lighting scheme, which are contradictory notions."

Space-age lighting

EDS manages the world's largest private digital network, called EDS * NET. The network is set up to perform data processing and telecommunications management functions, some 730 million each month, or nearly 17,000 transactions per minute 24 hours a day, 365 days per year. David Mintz's task was to design appropriate lighting for the NASA-like IMC control room, perhaps the most labor-intensive electronic-oriented room on earth.

The arc-shaped space, capable of accommodating 550 employees, is defined by rows of consoles (CRTs) at which workers sit. From their computer workstations, employees rely also on data and images that are projected on very large (9- by 12-foot) screens with high resolution. Some, seated back as far as 90 feet, must be able to distinguish letters and symbols. Because the screens are front projection, they have a luminance of only about eight footlamberts (a measurement of the amount of light reflecting from a surface). It was imperative, therefore, that ambient light be kept off the screens because the images would be washed out. At the same time, with workers in front of consoles, Mintz had to find a way not to have highly directional point sources that would reflect on the CRT screens. A further problem was the shape of the room. If the lighting system was not properly executed, someone sitting in a front corner of the large room might see distracting light emanating from the ceiling in the opposite back corner.



Innovative ceiling coffers, coves, and light pipes make for a highly functional, well-lighted work space at EDS headquarters.

"What we designed, ultimately, was a ceiling system that is integral to the lighting system," Mintz explains. He designed a series of coffers from which varying lengths of coves shed light. In fact, to test out the novel idea, Mintz had built a full-size coffer. Within, the coves are painted half black and half white so that all of the light bouncing off the white would bounce in one general direction even though it was diffuse, yet no light from the opposite side of the cove would bounce backward toward the CRT screens.

Mintz also calculated the cut-off points so that people seated in opposite corners and sides of the room would not see light emanating from other coves. Consequently, the console workers are bathed in about five or six footcandles (a measurement of the amount of light illuminating a surface) of ambient lighting, an ideal amount given the high contrast on the large projection screens in an otherwise dark room.

It was the lighting source itself, however, that exemplified Mintz's statement that "we often find complex solutions for everyday projects. For many projects we have used existing products in a new and interesting way." Since the IMC never shuts down, Mintz was prohibited from building a series of scaffolds to relamp the space from below; the scaffold would block the projector and thus literally prevent the center from operating.

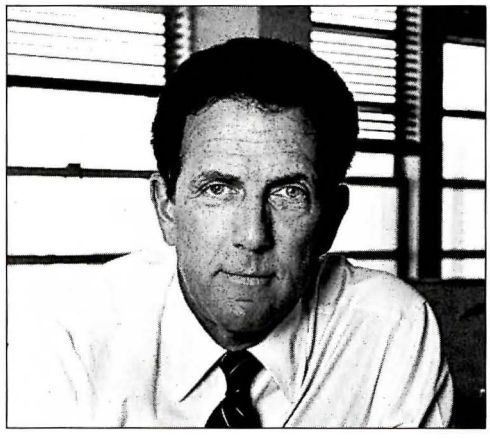
Realizing that he had to relamp from above, Mintz decided to use a device known as a light pipe. Consisting of a plastic tube with a special refracting material, the six-inch-diameter pipes are able to contain a light source in one end that illuminates the entire surface evenly. Up until their application in the IMC's control room, light pipes had been used solely as decorative mediums, notably for the ornamental roof-lighting on Helmut Jahn's One Liberty Place in Philadelphia. They have also been used to illuminate fountains.

A series of limited-access catwalks (configured front to back only) that were designed by the architect enable all light pipes to be reached easily. With a pull on a handle, the whole lighting element emerges for easy relamping. To compensate for the varying lengths of the coves given the shape of the room (the ones in the front of the room being the longest), the light pipe's source consists of a series of different wattages, ranging from about 90 up to 250. The lighting scheme has given the room the high-tech colorful glow of a Star Trek-like spacecraft, yet it remains, despite its vastness, elegant, subdued, and intimate.

Bridging two disciplines

As a lighting designer for more than three decades, Mintz has a seasoned perspective on his craft. He explains that up until the 1960s, it was either the architect or the electrical engineer who would devise a project's lighting scheme. Typically, the architect would have a vision of the lighting effect he wanted and would specify fixtures for the job, relying on intuitive knowledge and/or help from a lighting-company representative; the electrical engineer would then wire it. "The other way was to leave it up to the electrical engineer who, after a discussion with the architect, would calculate watts per square foot and candle power. The problem with that system is that, *historically*, architects in architecture school maybe get only a week or so of lighting instruction as part of a larger course. And electrical engineers may be well-trained in how to wire and calculate power distribution, but they get no exposure to esthetics. As lighting-designer specialists, we have the intuitive sense of esthetics that enables us to work with the architect, as well as the technical background to make sure that what is achieved works, can be maintained, meets energy codes, and delivers the right number of footcandles."

Armed with a Bachelor of Arts degree in Drama from the then-called Carnegie Institute of Technology (Carnegie-Mellon University), Mintz opened his own consulting firm in 1965. "Back then, there were probably less than a dozen freestanding, unaffiliated—that is, not connected with a manufacturer—lighting designers," Mintz says from his wholly naturally lighted corner office in Raymond Hood's former McGraw-Hill Building. Today there are some 450 members of the IALD (International Association of Lighting Designers). "I helped found IALD because another lighting designer and I realized that we needed to get group health insurance, we didn't have licensing requirements, and we couldn't get errors and omissions insurance. In fact, we still can't get the insurance because the one underwriter who works for architects and engineers will only write it for licensed professionals. We should have licensing for lighting consultants because there is no formal training, no test you can take that says you are now qualified." While IALD has, ironically, not achieved its original goals, the organization is especially active in legislating for energy codes that are both practical and esthetically pleasing, as well as fostering a strong sense of community and identity among lighting consultants.



David Mintz

The first thing Mintz did when he received the commission in 1974 to design all of the lighting fixtures and write the design guidelines and criteria for stations of the Metropolitan Atlanta Rapid Transit System was to take a tour of the major transit systems in North America—from Mexico City to Montreal. Mintz discovered on his continental subway trip that there were two approaches to designing mass-transit lighting systems. Either all stations were identical in terms of design, graphics, and lighting, such as with Washington, D. C.'s Metro, or every station was different, as was the case with San Francisco's BART. From a maintenance standpoint, the former situation has a clear advantage but, from an esthetic one, it can mean a boring ride.

"So we came up with the idea of combining the best of those two," Mintz recalls. "We designed what came to be known as a luminaire palette. It's a selection of luminaires that we designed and which encompass all types of lighting appropriate for transit systems. Then we produced, in effect, a mini catalog from which all fixtures can be chosen."

Combining sound and lighting

Another of Mintz's more novel commissions was for Washington, D. C.'s Ford's Theater, site of Abraham Lincoln's assassination. Mintz was commissioned by the National Park Service to create a sound and light show that would reenact, without actors, that infamous event of April 14, 1865. "Because the program was to be run by a very minimal National Park Service staff, we had to automate the show as much as possible," Mintz remarks. "Creating lighting effects with a programmable dimmer board had been done for years, and creating certain sound effects by recording them on tape had been done, to an extent, for years. But no one had combined both sound cues and lighting cues on the same tape."

Mintz devised a system that used 8-track 35 millimeter magnetic tape in which several tracks cued the lighting, the sound, and even the air conditioner (which had to be shut off during the performance because its breeze made the on-stage scrims flap). One button set the entire program in effect. So lifelike was the program that visitors to that harrowing and chilling sound and light show often recall having seen actors on stage even though none appeared.

One of David Mintz's biggest on-going projects is the interior and exterior lighting of Cesar Pelli's Society Tower in Cleveland. In addition to his work on the elevator cabs, lobby, and building exterior, Mintz has had to design lighting for an 86-foot-long painting in the lobby, *F-111* by James Rosenquist.

While the lighting that defines a particular space is often as crucial to its function and mood as its very design, few are able to regard light as an almost tangible entity. "My emotional inclination is to do creative things, but my skills tend toward things that are mechanical and electrical, so I can be creative with a medium that takes equipment. I love the fact that I can go back to buildings that I lighted 20 years ago and see that they are still standing, still look good, and know that they will be there for many more years. There will be something left I did that is meaningful."

David Masello is a free-lance writer from New York City. □

A GUIDE TO LAMPS AND CONTROLS

Here's a detailed breakdown of lighting equipment to help you spec the right fixtures. By Joseph Knisely

Choosing a lamp type is usually the first step in the design of any lighting system. But the selection of a light source is becoming increasingly difficult because of the great variety of products available.

Understandably, many of the new sources boast of higher efficacy, greater compactness, and better color rendering capabilities. Thus a knowledge of various lamps and controls available today is important for the architect.

A number of technical terms is used to accurately describe lamps and their characteristics. Some of the important terms are:

•Luminous efficiency—A lamp's luminous efficiency (more precisely called efficacy) is rated according to its average initial lumens. Dividing that value by its wattage consumption determines its efficacy in lumens per watt (LPW) of power consumed.

•Lumen maintenance—As a lamp is used over time, its efficacy is reduced, with the amount and rate of reduction depending on the lamp type and wattage. Therefore lamp catalogs offer a listing of both the inital lumens and the mean lumens, the lumen ouput at some percentage of a lamp's rated life. Because illumination levels are normally calculated with reference to "maintained footcandles" (the fc level after lamps have been operating for a specific time), the lumen-maintenance characteristic is important.

•Rated lamp life—All lamps are given a rated life expressed in the number of hours at which it is expected that 50 percent of a group of them is likely to fail. Thus rated lamp life (called average rated life in lamp catalogs) directly relates to lighting-maintenance costs.

Light sources and color

Color has become a major concern in lamp selection today. But color is one of the most difficult light-source characteristics to evaluate, because the colored appearance that a light source gives an object, or a space, is subjective. In addition, most of the widely used lamps are thought of as producing "white" light because they have all, or a large number, of the wavelengths of radiation in the visible spectrum. But each lamp type has these wavelengths in varying wavelengths of radiation in the visible spectrum; that is, each lamp type has a particular spectral distribution and therefore affects colors in a specific way.

Thus, the choice of lamp type will often involve accepting compromise on some features in order to optimize others, such as efficiency, cost, and color rendition.

The lighting industry uses four methods, none of which is completely satisfactory, to describe, or specify, lamp color. The two most widely used are: chromaticity (color temperature) measured in kelvins (K), and the color-rendering index (CRI).

•Chromaticity is the measure of a light source's warmth or coolness expressed in the degrees Kelvin (K). K Degrees Kelvin = degrees Celsius plus 273. The scale runs from 2000 to 7000K, and it is a convenient way of judging or comparing lamp types. Chromaticity values of 4000K and higher are considered "cool," those around 3500K or 3600K are called "balanced," or "neutral," and those of 3000K or less are described as "warm."

A color-temperature designation is truly accurate only for an incandescent lamp because it produces a continuous spectrum. Fluorescent or HID electric-discharge lamps, producing a somewhat discontinuous spectrum, are said to have a "correlated" or "apparent" color temperature, and thus are always described using the term correlated color temperature (CCT).

•Color rendering index (CRI) describes how well or poorly the colors of objects will appear "familiar" or "natural" under the light source being selected. Since the maximum index rating is 100, a light source with an index of 85 or 90 is very good.

With these factors and terms out of the way, let's study the three major lamp types—incandescent, fluorescent, and high-intensity-discharge (HID). Important characteristics are explained below and in the accompanying tables.

Incandescent lamps

The incandescent lamp, which produces light by passing an electric current through a tungsten filament heated to incandescence, represents the oldest family of light sources, and is available in a variety of bulb sizes, shapes, and wattages.

The most popular incandescent lamps use a screw-type base, and among the most widely used of this group are the general lighting-service lamps, described on page 42. For applications where a concentration of light has to be specifically directed, reflectorized incandescent lamps, in which the filament is mounted in front of a sealed-in reflector, are available in two basic types. The PAR (parabolic aluminized reflector) lamp has a molded reflector to which a separate lens is then attached. The R (reflector) lamp uses a less-expensive, one-piece blown-glass bulb, which produces a less-accurate beam pattern than the PAR lamp.

Most of the widely used A and reflectorized incandescent lamps are available in an energy-saving version to provide about a 10 to 20 percent reduction in wattage, while generally keeping the same performance characteristics of the standard lamp.

Higher-wattage projector lamps, in ratings from 250 to 500W, can provide relatively high-intensity spot and floodlighting where accurate beam control is required in high-ceilinged spaces.

Tungsten-halogen lamp: A line of incandescent lamps, called the tungsten halogen (TH) group, has a halogen gas (usually iodine or bromine) added to the fill gas within a relatively compact quartz glass bulb to reduce the deterioration of the lamp filament and the darkening of the bulb. The halogen gas provides a repetitive cleaning cycle that redeposits tungsten particles back onto the filament. Thus, the life of certain types of TH lamps is extended to over 3,000 hr and, for some versions, to 4,000 hr, significantly greater than conventional incandescent lamps, which have a life range of 750 to 2,500 hr.

The TH lamps are available in five different constructions: (1) tubular double-ended, (2) tubular single-ended, (3) a PAR bulb enclosing the quartz bulb, or capsule, to gain improved optical control and increased life, (4) a general-lighting-service A bulb enclosing the quartz capsule, and (5) a rim-mounted miniature reflector lamp. Since they operate at high temperatures, these lamps must be mounted in a well-constructed fixture, having suitable temperature-rated sockets.

•Rim-mounted miniature reflector (MR) lamp—This family consists of the 2-in. dia reflector, MR-16 lamps in 20-, 42-, 50-, and 65W ratings and the MR-11 1 3/8-in.-dia-re-

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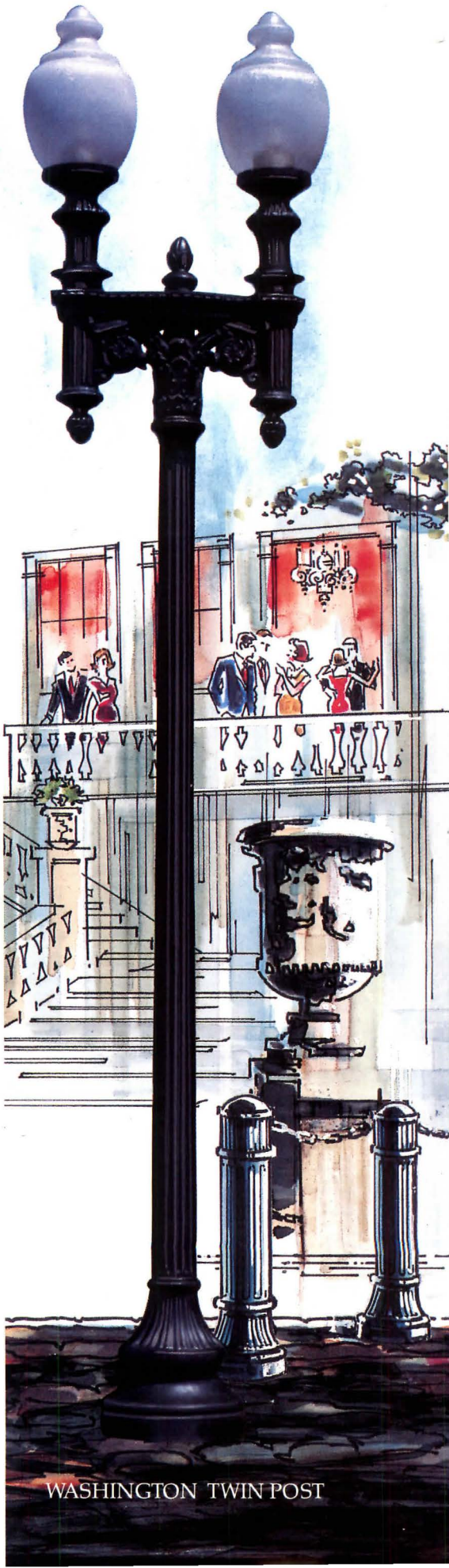

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flector in 20- and 30W ratings. Dichromic film coatings are used on the reflector of an MR lamps. The coatings, consisting of layers of thin, almost invisible films, pass some wavelengths and reflect other wavelengths of energy, thereby directing much of the infrared heat energy out the back or the lamp. Thus, the degrading effects of infrared light on objects displayed in the light beam is greatly reduced.

Also available in a variety of wattage sizes and beam patterns, lensed MR-16 lamps provide improved beam control while also providing a physical barrier for the tungsten-halogen capsule and the dichromic reflector.

Although first made for low-voltage (12V) operation, the MR-16 is now available in a line of 120V lamps, eliminating the need for a step-down transformer as part of the fixture/socket construction.

With their extensive array of styles, wattages, and beam patterns, MR lamps are widely used in recessed ceiling fixtures and track-mounted heads to serve a variety of display lighting applications.

• Infrared halogen (IR) PAR lamps combine both the infrared heat-reflection technology and the regenerative halogen cleaning-cycle technology to provide a dramatic increase in incandescent lamp efficacy. Available in 30-, 60-, and 100W ratings, the IH lamp has a compact filament enclosed within a small spherical-shaped quartz glass bulb, which in turn is enclosed in a PAR envelope. A thin-film coating, applied to the outside of the sphere, reflects infrared heat energy back to the filament, which further increases the filament temperature and boosts the light output. Thus, the increased filament heating lowers the filament wattage consumption, so that a 100W IH lamp has the same lumen output of a standard 150W incandescent lamp.

The lamp is ideal for a variety of display lighting applications wherever a 40 percent reduction in energy consumption is desirable.

Low-voltage lamps: Low-voltage lamps provide precise concentrated beams of light for a variety of accent-lighting applications, and one of the most popular types is the PAR 36 bulb. The PAR 36 lamp is available in a range of beam spreads and intensities from very narrow to very wide. A hemispherical shield covers the filament, and the lamp is ideal for pinpointing small targets at long distances. Other low-voltage lamps are the R 14, R 16 and S8 bulbs, all of which use bayonet-base connections.

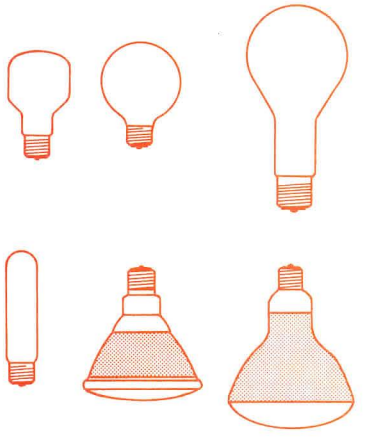
In general, low-voltage lamps can be fitted to smaller fixtures, which are less obtrusive.

Fluorescent lamps

Fluorescent lamps, which produce light by the passage of electric current through a low-pressure vapor, or gas, contained within a glass tube, have benefited from recent improvements in efficacy, in color-rendering characteristics, and in depreciation characteristics.

Ranging from 5/8 to 2 1/2 in. dia, fluorescent lamps are designated by the letter T indicating the tubular shape of the bulb, followed by a number that indicates the diameter of the glass tube in eighths of an inch, the same as incandescent lamps. The ultraviolet radiation given off by the mercury vapor arc stream created along the length of the tube is absorbed by the phosphor material coating on the inside surface of the bulb, and this energy is reradiated at wavelengths that are seen as visible light. The material composition of the phosphors determines the spectral power distribution, or color, that is produced by the lamps.

Fluorescent lamps with a color rendering index up to 90 and (apparent) color temperatures, or chromaticities, from 2700



to 6300K, are available, depending on the phosphor materials and their proportions.

The 4-ft long, rapid-start T12 F40 lamp, operating at 430mA and using a medium bi-pin base, has been the most popular lamp for general use over the years. This lamp is the reference commonly used for comparisons regarding all of the recent fluorescent lamp developments, such as higher efficacy and better color properties. Rapid-start refers to a ballast type (and the lamp-starting method).

Efficacy (lumens per watt) of the rapid-start fluorescent lamp (and some other fluorescent types) has been increased two ways. The first way is the development of the energy-saving lamp, which uses a different fill gas than the standard lamp. Depending on the lamp type, wattage is reduced 13 to 20 percent with minimal loss in light output. Energy-saving lamps are generally more expensive than the standard lamps, but their use can be justified on the basis of providing reduced energy consumption and therefore operating costs.

The second way is the development of the energy-saving lamp with a cutout switch on the cathode heating filament at both ends of the lamp, which provides an additional 2JW reduction in power consumption of an energy-saving lamp, once the lamp has been started.

Color selection: The two most popular, and most economical, fluorescent lamp colors have been the cool-white and warm-white lamps because of their high efficacy and acceptable color. The cool-white lamp has a chromaticity of 4000K and a CRI of 62, The warm-white lamp has a chromacity of 3000K and a CRI of 58. Both lamps use phosphor coatings called halophosphors.

To address the need for fluorescent lamps which offer both high efficacies and good color characteristics, new phosphors have been developed. Introduced over the past few years, the new phosphors use what are called triphosphors, or rare-earth phosphors, that essentially create the appearance of balanced white light, while actually producing a spectrum composed of three isolated light bands, or peaks. These three bands occur close to the primary colors: red-orange, green, and blue.

In making the lamp, a thin layer of the triphosphor coating is deposited over a thicker layer of the standard, less expensive (halo)phosphor coating. A family of deluxe triphosphor lamps, having a thicker triphosphor coating, and thus a higher CRI, is also available.

Both the standard and the energy-saving T-12 lamp lines are available with the triphosphor coating, at a cost of about 50 percent more than the standard cool-white or warm-white lamps. The triphosphor lamps can be selected with a chromaticity of 3000, 3500, or 4100 K.

Smaller-diameter fluorescent lamps: The industry is seeing an emerging trend toward the use of recently developed lower-wattage, smaller-diameter, (T-5, T-8 and T-10) rapid-start lamps in a variety of lengths, which are replacing the F40 T12 lamps in many applications. These recently developed fluorescent lamps use the triphospor coatings exclusively, and both the T-5 and T-8 line of lamps operate on special ballasts. Because of their smaller tube diameters, both the T-5 and T-8 lamps have wide application in recessed fixtures, in shallow-depth suspended fixtures, and in architectural cove-lighting applications.

A complete family of T-8 lamps is available in four straight tube lengths and in three bent-tube lengths to serve a variety of applications. The 4-ft, 32W T-8 lamp, which is rated at 265 mA and which provides a high lumen output from two-, three-, and even four-lamp ballasts, is an excellent direct substitute for the 40W T12 lamp. In a bent-tube version, the 4-ft T-8 lamp has a 1-5/8-in. leg spacing, thereby permitting two or three of these 2-ft lamps to be used in a square fixture, within a 2- by 2-ft grid ceiling. Thus, the straight lamp could be used in continuous rows of 4-ft long fixtures within an office area, and the bent-tube version could be used in 2-ft square fixtures above circulation areas, or

corridors, where lower light levels are required. Other straight-lamp versions of the T-8 lamp in 2-, 3-, and 5-ft lengths have wattage ratings of 17, 25, and 40W, respectively. The 2- and 3-ft lamps are also available as bent-tube types.

A family of T5 high-output, twin-tube (HO-TT) fluorescent lamps also provides lumen output comparable to the 48-in standard T12 lamp. For example, the 16.5-in., 36W T5 lamp provides 3,000 lumens (163 lumens/cu in. of volume) as compared to the 48-in., 40W T12 fluorescent lamp, which provides 3,150 lumens (35 lumens/cu in. of volume). This drastic reduction in size and volume of the T5 lamp results in a much higher lamp brightness that must be properly shielded from view.

Compact fluorescent lamp: The compact fluorescent (CF) was developed as an economical substitute for lower-wattage incandescent lamps in applications requiring long burning hours, such as corridors, stairwells, lobbies, and reception areas. The economies are twofold: the CF has a rated life of about 10,000 hr and, even when ballast losses are included, the CF lamp offers four times the efficacy of an incandescent lamp. In addition, being the first lamp type to use the triphosphor coating, the CF lamp has a CRI of 80 or better and a 2790K color temperature, making it compatible in appearance with the chromaticity of an incandescent lamp.

CF lamps have either a T4 (10mm) or a T5 (15mm) glass envelope that is bent in a U shape and mounted on a special base. The T4 is usually a twin-tube construction and the T5 a quad-tube construction. Ratings are 5, 7, 9, 13, 18 and 26W.

High-intensity-discharge-lamps

The family of high-intensity-discharge (HID) sources consists of the mercury-vapor (MV), the metal-halide (MH), and high-pressure-sodium (HPS) types.

Mercury-vapor lamp: The mercury-vapor (MV) lamp has ratings from 50 to 1000W and is available with a clear outer bulb or a phosphor-coated bulb that increases the lamp's color-rendering properties. Phosphor-coated MV lamps have application in interior spaces where extended operating life is required and good color rendering is not a critical factor, such as corridors and circulation areas. The phosphor-coated version offers a correlated color temperature of 4000K and a CRI of 52.

Currently, the MV lamp has only limited application, mainly because of the developments in both metal-halide and high-pressure-sodium lamps, as well as improvements in fluorescent technology.

Metal-halide lamp: The metal-halide (MH) lamp has ratings from 32 to 1500W and is available in three different outer-bulb finishes: clear, phosphor-coated, and diffuse. Clear lamps are recommended where good optical control from a fixture is important. Phosphor-coated lamps are recommended for even better color rendition with a slightly warmer appearance, or for a more uniform lamp brightness and a resulting softening of shadows and highlights. The phosphor-coated MH lamp has an efficacy 6 to 8 percent below that of a comparable clear lamp. Serving only to reduce lamp brightness, a diffuse coating (nonphosphor) MH lamp is recommended for use in recessed downlight fixtures installed at low mounting heights.

A MH lamp offers the best combination of performance features of the HID sources because it has good color-rendering characteristics (between 60 and 90 CRI), high efficacy (up to 100 LPW initial output), and long life (5,000 to 15,000 hr average rated life). Although similar to the MV lamp in construction, the MH lamp also has small amounts of metallic salts in specific combinations within its compact arc tube. The precise amounts of the various metals in the arc tube determine the lamp's efficacy and color.

The shortcomings of the MH lamp should

Lamp description	Watts	Initial lumens	(k) Color/ temp	CRI	Approx. hrs. life	Notes
INCANDESCENT						
50 W R 20	50	440	2500	100	2000	Efficient in recessed downlights, accent & display
100 WA	100	1750	2500	100	750	General service lamp. Used in fixtures with optical control. Extended life available.
150 PAR (SP,FL)	150	1740	2500	100	2000	General flood, spot, accent and display lighting. Heat-rejecting versions reduce radiant heat in beam.
300 PAR 56 (NSP,MFL,WFL)	300	3840	2500	100	2000	Huge lumen output for interior and exterior display and spotlighting. Heat-rejecting versions reduce radiant heat in beam.
TUNGSTEN-HALOGEN INCANDESCENT						
T-H 75 PAR (NSP,NFL,FL)	75	7500CP	3000	100	2000	General flood, spot, accent and display lighting. CP for narrow spot given. Also available in PAR 16 bulb.
T-H 90 PAR (NSP,SP,FL,WFL)	90	22,500CP	3000	100	2000	General flood, spot, accent and display lighting. CP for narrow spot given. Heat-rejecting versions reduce radiant heat in beam.
T-H 90A	90	1750	3000	100	2000	General service lamp with extended life, good lumen maintenance.
T-H 150 PAR (NSP,SP,FL)	150	37,500CP	3000	100	3000	General flood, spot, accent and display lighting. CP for narrow spot given.
T-H 250 SINGLE-ENDED	250	5000	3000	100	2000	For fixtures with reflectors, spot, flood, accent and display. Mini-can base or bayonet base, clear or frosted.
T-H 500 T3	500	10,950	3000	100	2000	For fixtures with reflectors. Outdoor floodlighting and wall washing. Double-ended lamp, in clear or frosted glass.

Note: NSP=narrow spot, NFL=narrow flood, FL=flood, CP=candlepower

Lamp description	Watts	Length	Phosphor description	(k) Color/ temp	CRI	Notes
FLUORESCENT LAMPS						
T-8 straight tube	32	48 in.	triphosphor	3100	75	
				3500	75	Lamp has matched ballast.
				4100	75	
T-8 bent tube	31	22 in.	triphosphor	3100	75	
				3500	75	Lamp has matched ballast.
				4100	75	
T-5 twin tube	40	16.5 in.	triphosphor	3100	75	
				3500	75	Lamp has matched ballast.
				4100	75	

also be considered. The lamp usually experiences as much as a 1,000K shift in apparent color temperature over its life, generally toward a cooler chromaticity. Operating conditions (such as the lamp's burning position) and normal variations in supply voltage or ballast characteristics can also affect lamp color—and light output as well.

Available in either a single-ended or a double-ended bulb shape, MH lamps are constructed for specific applications or mounting conditions, and these can be understood best by grouping them according to families of lamps with common characteristics, starting with the single-ended type:

- Universal burning lamps, the most widely used type, can be operated in any burning position from base-up to base-down, and they are available in 175 to 1500W ratings.
- Warm-color lamps have an apparent color temperature of 3200K, a CRI of 65, and are available in 32, 50, 70, 100, 175, 250, and 400W ratings. Generally these lamps are of position-restricted design, meaning that they are specified for base-up, base-down or horizontal-burning position.
- Low-wattage MH lamps are for applications where fewer lumens from a smaller lamps are desired to fit more compact fixtures. With a medium screw base, the lamp is available in 32, 50, 70, 100, 150, and 175W ratings. Typical applications are for architectural and landscape lighting using small floodlights, bollards, and wall-packs.
- Reflector lamps provide optical control within the lamp, thereby eliminating the need for a reflector in the fixture. Available in 70, 100, 175, 250, and 400W ratings in both spot and flood designs, the lamp has a hard glass outer bulb, making it suitable for outdoor as well as indoor applications.

The double-ended, M-H lamp, which is available in 70, 100 and 150W ratings, has a tubular outer jacket only slightly larger than the arc tube, and therefore the lamp can be mounted close to a reflector for greater light control. Additionally, the lamp can fit into compact fixtures having minimal ceiling apertures, and also fit into track-mounted fixtures used for display and accent lighting and for wall-washing applications.

Since the outer jacket is able to transmit ultraviolet energy, all double-ended lamps must be enclosed within a fixture having a borosilicate tempered-glass lens, and the fixture must have a safety interlock to prevent lamp operation when the lens door is open.

Either single- or double-ended MH lamps in ratings up to 175W can serve areas with ceiling heights of 8, 10, and 12 ft, where color rendition is important. Thus, low ceilings no longer pose an obstacle to the use of the MH source. Areas such as lobbies, shopping malls, airports, and reception areas can also benefit from the reduced-maintenance requirements of the MH source.

Lamp description	Watts	Initial lumens	(k) Color/ temp	CRI	Approx. hrs. life	Notes
MERCURY-VAPOR (HID)						
100 M-V	100	4400	5500	40	24,000	General lighting for long-burning hours. Phosphor coating improves color rendition. Reflector bulb available.
400 M-V	400	20,000	5500	55	24,000	General lighting for long-burning hours. Phosphor coating improves color rendition.
METAL-HALIDE (HID)						
70 M-H	70	4900	3000	75	6,000	For concentrated accent and display lighting. D-E lamp must operate horizontally.
100 M-H	100	8500	3200	65	10,000	For general accent lighting.
150 M-H	150	12,000	4300	85	6,000	For concentrated accent lighting. Rated life of D-E lamp conservatively rated before possible color shift.
250 M-H	250	23,000	4200	65	24,000	Horizontal operation using a bent arc tube extends lamp life. Phosphor-coated type increases CRI to 70 at 3700K.
400 M-H	400	38,000	3400	65	20,000	High output design. Lamp must burn vertically in an open fixture only.
HIGH-PRESSURE-SODIUM (HID)						
HPS 70 COATED	70	6300	2100	34	15,000	Coating diffuses lamp brightness. For use in open-bottomed fixtures or where glare is a problem.
HPS 100 WHITE	100	5200	2800	70+	10,000	Can be combined with incandescent sources. The lamp, which is matched to an electric ballast, does not experience a color shift.
HPS 250 DELUXE	250	26,000	2200	65	15,000	For commercial and industrial indoor area lighting where color rendition is important.
HPS 400	400	47,500	2100	20	24,000+	For general lighting applications where color-rendering property of the lamp is not important.

Lamp description	Watts	Length	Phosphor description	(k) Color/ temp	CRI	Notes
FLUORESCENT LAMPS (continued)						
T-12 straight tube	40	48 in.	cool-white	4200	62	Lamp uses standard ballasts.
T-12 straight tube	40	48 in.	warm-white	3000	52	Lamp uses standard ballasts.
T-12 straight tube	40	48 in.	triphosphor	3000	69	
			thin coat over	3500	69	Lamp uses standard ballasts.
			halophosphor	4100	69	
T-12 straight tube	40	48 in.	triphosphor	3000	80	
			thin coat over	3500	80	Lamp uses standard ballasts.
			halophosphor	4100	80	

High-pressure-sodium lamp

The high-pressure sodium (HPS) lamp, with ratings from 35 to 1000W, produces energy across the entire visible spectrum but predominantly in the yellow, orange, and red region. The low CRI of the lamp limits its use, but it serves well in applications where its spectral power distribution is desired, such as for floodlightings on sand- or yellow-colored stucco or red brick walls. Occasionally, the spectral power distribution of both the MH and the HPS lamp are combined for indirect-lighting applications, or for downlighting in high-ceilinged lobbies.

With few exceptions, the HPS lamp is suitable for operation in any burning position, and it has an average rated life of 24,000 hr, plus excellent lumen maintenance (90 percent mean lumens over the lamp life) in many of its wattage ratings.

A deluxe, or improved-color HPS lamp, available in 70 to 400W ratings, produces a more balanced color spectrum that contains more red and blue color than the standard HPS lamp, but the rated life is

reduced to about 10,000 hr.

More recently introduced is a "white" HPS lamp, which is available in 35-, 50- and 100W ratings and which can be specified almost anywhere incandescent or tungsten-halogen lamps would be used. Designed primarily for indoor and outdoor accent and display applications, the new lamp has a 2800K color temperature and a greater than 70 CRI, with no color shift over its 10,000 hpr life.

In the 70- to 400-W sizes, the HPS lamp is available with an aluminum-oxide coating on the outer bulb to diffuse light-source brightness, but lamp efficacy is reduced about 5 to 7 percent.

Lighting controls

Lighting controls give an operator, or user, the means to adjust the lighting to suit the activity to be performed and also to de-energize the lighting system when it is not needed.

A variety of automated-control systems is available, and frequently they depend on a practical combination of manual and automated features. For example, the lighting system can be activated manually by a wall switch and deactivated automatically after a given time interval, unless manual intervention occurs first.

Some automated-control systems use a network of dedicated circuits within the building to connect to the central computer or control station, and other systems use both a dedicated wiring system and dial-up telephone lines to communicate to the central operator console. The most versatile automated-control systems also include simple personalizing and customizing features.

Some of the control devices are:

•Time-clock controls—Mechanical motor-operated clocks do an adequate job of switching lights automatically, but even small facilities often need several clocks to properly control lighting systems. For that reason, electronic time clocks are available that can control many individual areas simultaneously. With its astronomic operation capability, the microprocessor-based clock can recall different schedules for different days of the week, calculate sunrise and sunset times, daylight-savings-time changes, and include leap year and holiday changes.

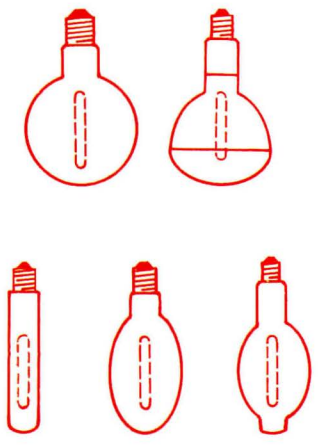
Some electronic clocks are able to accommodate local manual override requests, such as for late-working occupants. Additionally, in the event of a power outage, electronic time clocks can stagger turn-on of electrical loads, thereby preventing a possibly damaging surge in the electrical power system.

•*Photosensor* switching—Photocells are now available as two-component systems in which the externally mounted sensor element is connected to a remotely mounted electronic module via low-voltage wiring, thus making it convenient to adjust operational set points. The photocell systems also have time-delay circuitry to prevent rapid On-Off cycling of the lighting circuits on cloudy days, an important feature especially with HID sources.

Photosensors can also be used to control curtains and blinds, and thus the amount of lighting entering a space through windows or skylights.

•Occupancy sensors—These devices switch the lighting on only when someone is in the space and then deactivate the lighting after a given time interval, when people are no longer detected in a space. The controls operate on the principles of motion detection (ultrasonics), body heat and motion (passive infrared), noise in the human-activity range (acoustic), or the interruption of beams given off and returned by a detector (active infrared).

The best applications for ultrasonic sensors are: enclosed offices, larger conference



rooms, classrooms, etc.; areas up to 2,000 sq ft that can be considered enclosed, storage areas with cabinets and shelving; completely enclosed hallways; and open office space and areas that require 360 deg coverage.

Some models incorporate self-varying sensitivity, so that once a person is detected in a space, the device remains highly sensitive and the lights remain on even if the occupant barely moves. If no motion occurs for an extended period of time, the lights are switched off and the sensor shifts to a less sensitive mode, ignoring small amounts of motion until a significant movement, such as someone walking into the room, occurs.

The best application for infrared sensors are: enclosed offices where sensors have a clear view of the entire area; as a wall switch replacement; in areas with high air flow (computer rooms, laboratories, etc.); warehouses and high-ceiling-mount applications; and hallways or aisles in storage areas. As with ultrasonic detectors, the sensor placement is important in order to gain proper coverage of the space, so occasionally two or more detectors may be needed to gain the required coverage.

•Low-voltage switching—Typical On-Off switching is done with low-voltage (24V) relays controlling the power circuit feeding a group of fixtures. Split-wiring allows several lighting levels within a switched zone, and the use of multiple-level control is particularly important in areas having light levels above 50fc, since 1/3 or 1/2 lighting is still adequate for cleaning and other non-critical tasks.

The most advanced lighting-automation systems for low-voltage, and other types of switching use a technique called distributed intelligence, in which a number of control/operation panels are located throughout a building. Each panel has its own controller, which can operate independently but also communicate to other units of the network. System reliability is enhanced since the failure of a single controller affects only a limited area.

As a rule of thumb, any facility with a building-automation-system should also include a lighting-automation system, either on a stand-alone basis or as part of the building automation system.

Dimming light control: While switching allows lights to be turned On or Off, dimming equipment, which can respond to many inputs, allows the illumination to be set at any desired level and also to save energy. For example, a dimming systems can be run from photosensors to automatically lower lighting in daylighted areas or to drop the illumination levels in locations where new lamps and clean fixtures would provide more light than needed.

Dimming can vary the lighting to create visual dynamics in a space such as a building lobby, and in addition, localized dimming can be a valuable control feature in a VDT office space where the occupant is able to set the exact light level for comfort and thus enhance productivity.

Some of the dimming devices are:

•Wallbox-type dimmers allow up to 2000W of lighting to be controlled from a single electrical device box. Some models allow dimming from two or more locations. Wallbox dimmers are available with integral electronic switching to allow remote On-/Off control from multiple locations, using controls that match the dimmers.

•Microprocessor-based wallbox dimmers combine dimming control, preset memory, and time-clock operation.

•Preset dimming control, previously possible only with expensive remotely controlled dimmer panels, can now be fitted in a standard, multigang electrical box. A typical preset control has four dimmers, each with four scenes of possible settings.

•Console-sized, microprocessor-based systems can provide memory for hundreds of scenes and lighting zones, and the automatically produced dimmer settings can change at very slow fade times.

Joseph Knisely is a senior editor of Electrical Construction & Maintenance. □

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