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OBJECT PROPERTIES TOOLBAR — quick access to object properties like layers and linetypes lets you change settings right from the toolbar.

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NOTE: Additional electrical outlets *will need to be installed* to accommodate emergency patient overflow.

FASTER FULL-SHADED RENDERING — makes it easy to create and present design previews. AutoVision 2 works with AutoCAD Release 13 to create photorealistic renderings such as this one.

OLE — allows you to embed data from other Windows applications—in this case, a finish schedule from Excel.

EDULE	Color
gshell	sand sto
ni-gloss	mission white
-01	plaid
15cm	
velvet	

demo. **To order your free demo disk or to request the name of the Authorized Autodesk Dealer nearest you, call 1-800-964-6432 and ask for DemoPak R728.** Outside the U.S. and Canada, please fax your request to 1-415-507-6142.

M**P**A ABC

On The Carpet

I have been reasonably impressed with RECORD editorials in recent issues, but, in March 1995 [RECORD—Architectural Carpetbaggers?, page 9] all I can say is:

"Why?, The point is....."
"Why not?, What is the point?"
Irving Katz, PE
Manhasset, NY

I appreciate your editorial in the March issue. ["Architectural Carpetbaggers?"] It touches a nerve and addresses it in a more or less even-handed way.

There is, however, one aspect you overlooked: the role publications such as RECORD play in creating the reputations of the "signature" designers. It seems that the more outrageous the creations some of these designers produce, the more we see of them in the architectural, and more frequently of late, the general press. Once these stars have been "discovered," almost any excrescence they can produce is bound to be the darling of the month in the press.

Even the designers of published work which has clear architectural merit garner perhaps unwarranted weight to their reputations by the sheer frequency of their names appearing in the media. Anything they do seems to get published. While it may be good, that doesn't mean it is any better than or even as good as local architects could do, but in this age, those with the best public relations and reputations get the attention and the plums.

The architectural press has a major role in building those reputations. They are sometimes not deserved, and sometimes by default overshadow the merit of

less well-known locals.
To compound all this, the bureaucratic mindset prevails in the private as well as public sectors. This means that there is a great pressure to make the "safe" choice when selecting an architect. Selections can always be defended on the grounds of "national" reputation and few will deign to disagree.

Even more irksome, though, is the propensity of the press to latch onto the weird and wacky and make heroes out of their creators. We have come to expect you and your brothers to promote this kind of kinkiness whenever given the opportunity. An example from the March issue—when I first saw the bottom photo on page 17 I could have sworn I was looking at the latest Frank Gehry creation, not damage from the Kobe earthquake. Your promotion of the perception by the public that this kind of thing is the "best" architecture is damaging to the profession and to the value the public deserves from the fruit of our labors.
Frank Orr
Orr/Houk & Associates Inc.
Nashville, Tenn.

First Source

I noticed that your article entitled "Focus On: Turning Ordinary into Extraordinary" [February 1995]—describing the architectural style of Moore Street Market in Brooklyn— mentioned the designer of the project but not its initiator.

The New York City Economic Development Corporation (EDC)—the Giuliani administration's primary vehicle for economic development services— is the organization that promulgated and spurred on the *Continued on page 75*

May 23-25
Lightfair International, Navy Pier, Chicago. Call 404/220-2217 for conference information.

June 5-8
A/E/C Systems will hold its 1995 conference and exhibit at the Georgia World Conference Center, Atlanta. Call Sharon Price at 800/451-1196; 203/665-0153, or fax her at 203/666-4782.

June 23-25
Construction Specifications Institute (CSI) annual convention and trade show, Minneapolis. Call 800/689-2900 for information.

Through June 24
"Temple of Liberty: Building the Capitol for a New Nation" exhibition in the Madison Gallery of the Library of Congress, James Madison Building, traces the effort to create a building reflecting the new nation's ideals. Bicentennial event features newly commissioned models of the Capitol and nearly 200 original documents. Call 202/707-2905 for more information.

July 1-14
• "The Art of Architecture: Works by Laureates of the Pritzker Architecture Prize," Columbus Gallery, Indianapolis Museum of Art. Call 317/923-1331 for details.

Competitions
• Design for Transportation Awards Program entries due May 15 in the following categories: architecture (passenger and freight terminals, stations, ports, other structures); historic preservation; urban design and planning; special interest (ADA provisions; mixed-use development). Call Thomas Grooms at 202/682-5437 for entry forms and further information.
• Extension and Replanning of the Prado National Museum (Madrid). Registration due June 12 for a $215 fee. Call 34-1/435-77-23 or fax 34-1/575-38-39 for more details.

Oklahoma Outrage

The horrifying phrase "hundreds of rescue workers are searching through the rubble for survivors..." has outgrown the broadcaster's cliché to become a metaphor of our times. At this writing one day after the car explosion at the Murrah Federal Office Building in Oklahoma City—with dozens dead and scores missing and injured, including children in a second-story daycare center, and with some bystanders blocks away having their eardrums shattered by the blast and others temporarily blinded by the impact on the optic nerve—one needs to come to grips with this latest in a series of events that is threatening to undermine the fabric of civilized modern life.

For if this sort of disaster can happen in Oklahoma City, a neighborly community of 454,000 people in the nation's heartland, no town of any size is safe from the skewed initiatives of a few. The tragedy must force a rethinking of future roles by every professional and business person in the country, from politicians and crime prevention officials to explosives manufacturers, doctors, men and women of the cloth and, not least, the community of design and construction professionals.

That's because the venues of these criminal acts are buildings. The office building in Oklahoma City is only the latest in a long line of building explosions that includes New York's World Trade Center, the Marine Barracks in Beirut, and countless structures in Bosnia, Ireland, Egypt, Algeria, Israel, Lebanon and elsewhere. It is proof, if proof were needed, that society, including now so-called developed Western society, faces a choice among two options: one option is to make into a fortress every building where enough people congregate to attract the terrorist, using berms or bollards to keep bomb-laden cars at a distance, concrete windowless walls, battalions of guards, a mega-network of electronic surveillance systems, and building codes that will protect occupants against the seismic-like aftereffects of attacks by explosive shock-waves. The impact of this on architecture is not hard to imagine. You need only look at the design of foreign embassies in bomb-prone nations such as several in the Middle East and South America to foresee architecture and urban design in countries which to date have always felt free of bomb attacks. Yet already in the U.S., the level of crimes committed within courts of justice is rising at a rate that may make this building type the bellwether of a new style—terrorism as a determinant of architectural form (see the feature on courthouses on pages 104-111).

The other scenario is fatalistic. It takes the view that to avoid being killed or hurt by a parked carbomb is virtually impossible. Life goes on; there are risks in crossing the road, taking a shower, or playing basketball. This scenario urges calm, and faith that the authorities will capture the criminals; eliminate the root causes of the attacks which are not by cranks but by idealists with a cause but with peculiar morals; develop a reasonable policy of protecting vulnerable (e.g. densely occupied or symbolic buildings); and enforce code-driven construction and safety standards that will minimize casualties.

These two options should trigger an important debate among architects, where their special viewpoint as artists, technologists, and champions of urban values carry special weight. *Stephen A. Kliment*

Readers: you can now reach ARCHITECTURAL RECORD *online, with letters, questions, and comments. Address is: JSRRecord@aol.com.*

Florida

Machado and Silvetti Add Caribbean Accent To Nostalgic Voice of Seaside
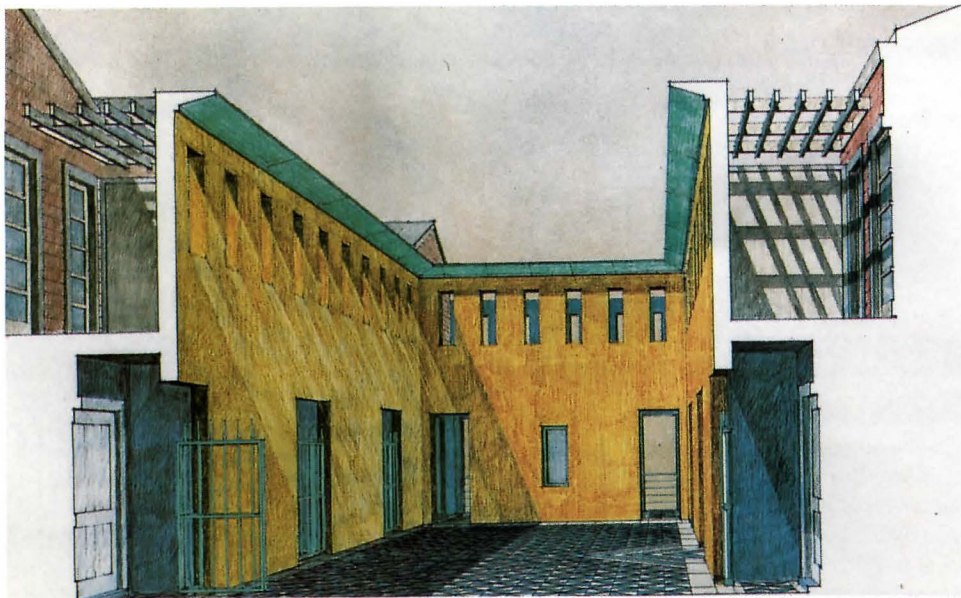
Rodolfo Machado and Jorge Silvetti's new building for Seaside—Florida's utopian community begun during the '80s—is a Caribbean-inspired work set in a nostalgic village. Seven apartments will sit above commercial and office spaces in the four-story building. Machado and Silvetti have inserted a colonnade facing the street—required by town regulations—continuing the existing colonnade that wraps around the town green. On the top floor, screen-like shutters will enclose the apartments' balconies below subtle roof overhangs. But the key moment is the appearance of an internal public courtyard when visitors reach the third floor (left). It gives poetic focus to the residences above: from here one can either enter the apartments or stroll around a quiet garden that overlooks the ocean. ∎
Nicolai Ouroussof

Singapore

Gwathmey Siegel Swings East—and Wins
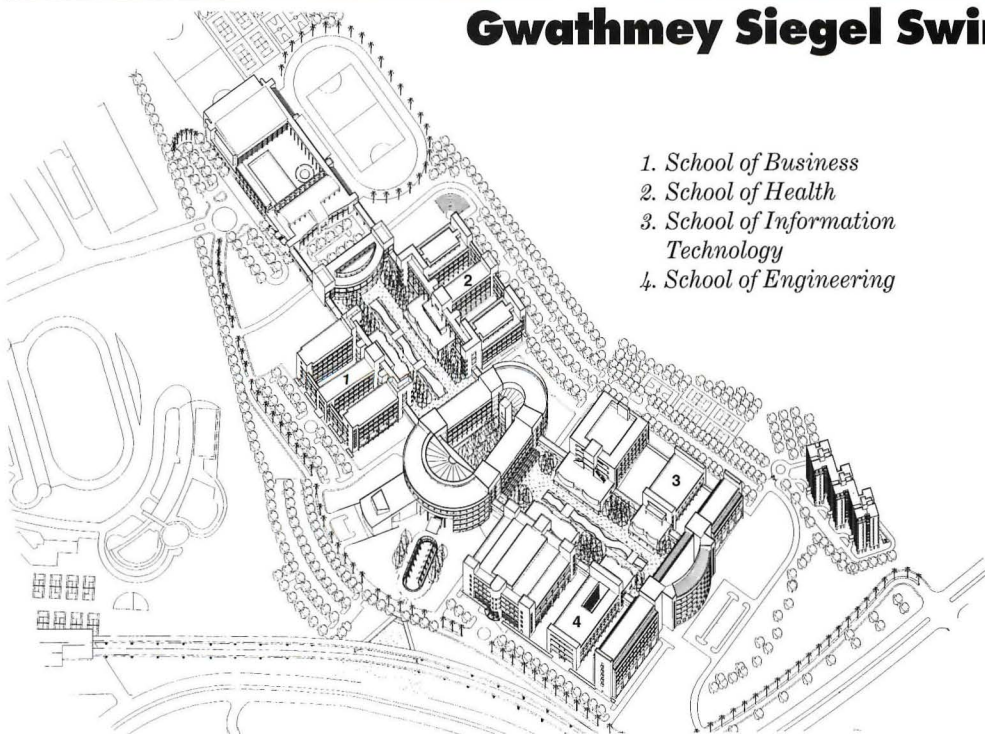
1. *School of Business*
2. *School of Health*
3. *School of Information Technology*
4. *School of Engineering*

Charles Gwathmey and Robert Siegel's winning design for the Nanyang Polytechnique is a 2.3-million-sq-ft linear city that can keep on growing. Located in north-central Singapore, the university's campus is organized as two wings of a 500,000-sq-ft, egg-shaped, multi-purpose building that is the complex's main entrance. The central building—with its enclosed, terraced garden—houses the library, administrative offices, and a theater. On each flank, sleek, vaulted buildings house four distinct schools (engineering, business, health and information technology), all arranged along a strip of courtyards and gardens. Pedestrian circulation and cars are carefully segregated, and future plans allow for the school to grow by another 25 percent towards the pedestrian walks and car parks that encircle it. Completion is scheduled for September 1998. ∎

Landmark or Eyesore?

Courtesy of Historic American Building Survey

If the expansive interpretation of preservation promulgated at "Preserving the Recent Past," a conference held March 30 to April 1 in Chicago, takes hold, the relationship between architects and preservationists could take on quite a different cast. The meeting, sponsored primarily by the National Park Service, generated a palpable excitement—a sense that the artifacts of the 20th century (including "historic" technologies like asphalt shingles) had at last emerged into the light of recognition. Amazingly, most presentations lacked any critical view about what should be preserved. Already listed as national landmarks are: Dealey Plaza (where John F. Kennedy was shot), Graceland, and the crumbling Philadelphia studio where *American Bandstand* was first teletaped.

Fast-food restaurants and roadside ephemera, such as the Columbia, S. C., Greyhound terminal (above), were considered of similar merit to the conventional "great monuments" and the contributions of minorities, women, and poorer communities that have only recently received academic attention. It all seems naive in the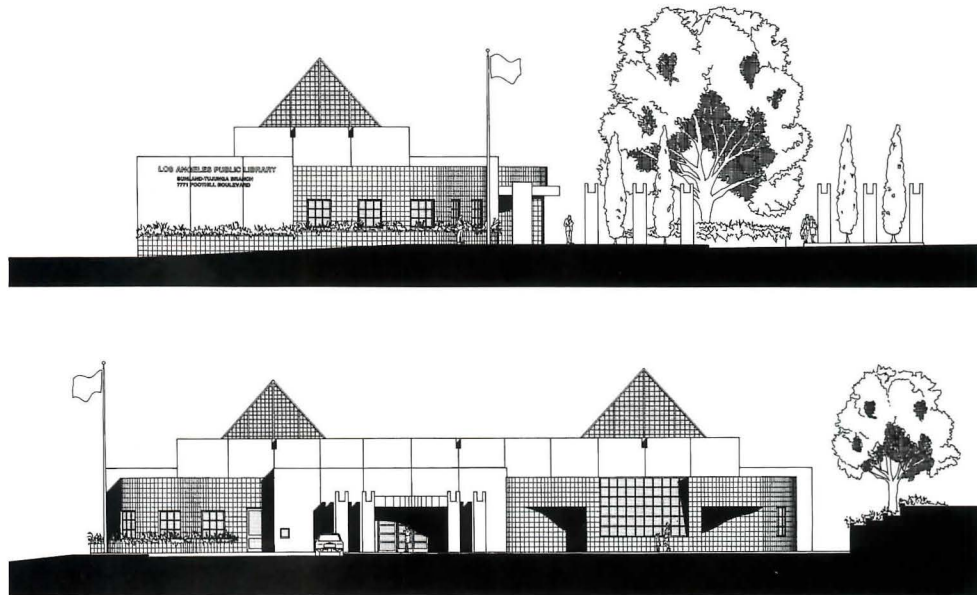 face of attacks in Congress and elsewhere on landmark and other zoning regulations seen as trampling on property rights. The proceedings (which include a great deal of useful technical information) have been published ($49): Historic Preservation Education Foundation, P. O. Box 77160, Washington, DC 20013-7160. *J.S.R*

Outside New Library, a Tree of Knowledge Grows

An old oak tree marks the entrance of Widom Wein Cohen's Sunland/Tujunga branch library on the outskirts of Los Angeles. The original 1950s library was torn down because it was inefficient and encroached on the historical tree. In the new design, the tree is the center of an outdoor public "gathering place" that is now the focus of the site. A path of free-flowing, natural-stone paving encircles the old oak and leads into the main building lobby. The building's facade is a natural curve that faces the garden to highlight the bucolic setting. Inside, the building becomes more rigid: two large pyramid-shaped skylights rise above the adult and children's reading rooms, and administrative offices are pushed to the back. A bookstore, multi-purpose room, and bathrooms are located around the lobby, and function independently after hours as part of the garden space. The 10,500 sq-ft building was designed as a melding of man-made and natural worlds. It is part of a larger civic center that includes a fire station and town-council headquarters. and borders a recreation park. The $1.8-million project will be completed in 1996. ■

Discovering the Gold in Glass Brings Award to Frederick M. Winkler
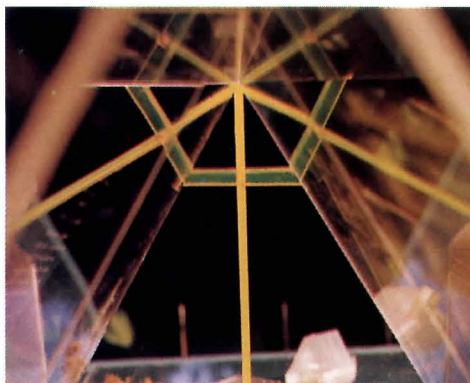
Frederick M. Winkler Architect has designed a floating chapel that extends Pittsburgh's downtown grid to the water's edge on the site of a former steel mill. In the design, a "Golden Cathedral" rests nearby on the shore. Both structures are designed as a collage of triangular glass forms—their golden hue is meant to reflect the light bouncing off the river. The image is a reference to Pittsburgh's legacy: the city was once nicknamed "The Golden Triangle." The Cathedral and Chapel won the Libbey Owens Ford Glass international design competition. ■

Briefs

1995 Pritzker Prize laureate Tadao Ando.

Awards

• Tadao Ando has been named the 18th recipient of the Pritzker Architecture Prize, joining fellow Japanese architects Kenzo Tange (1987) and Fumihiko Maki (1993) as a laureate. Ando will receive a $100,000 grant at ceremonies this month at Versailles.

• William Turnbull Associates' house at Teviot Springs (below) won the American Wood Council Award. The tiny, 640-sq-ft house is meant as a minimal shelter from the great outdoors. The real living space is a 2,500-sq-ft carpet of grass.

TAC closes doors

The Architects Collaborative, Cambridge, Mass., is going out of business and may file for Chapter 11, say knowledgeable sources.

Restorations

• Villa Viscaya has begun a major endowment drive to preserve the museum. Miami's diminutive version of San Simeon is a renaissance splendor overlooking Biscayne Bay.

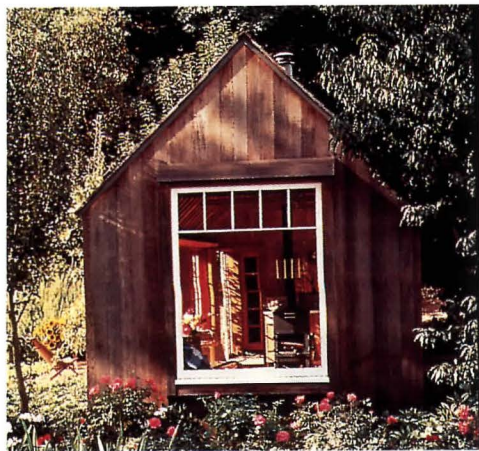• A summer seminar at the Pratt Institute School of Architecture (July 10-August 18) will study the reconstruction of Civil War warehouses in Red Hook, Brooklyn. Students will try to find new uses for the site. ∎

Cesar Pelli Wins Dade PAC Project Over Arquitectonica and Rem Koolhaas

Cesar Pelli has won Miami's most important architectural competition in a decade. His $139-million design for the Dade Performing Arts Center curls around a vibrantly urban plaza—the plaza will be bisected by Biscayne Boulevard. The symphony hall and the opera house will sit on each side, the former facing north towards the boulevard, the later south towards the bay. (An octagonal 1929 Sears tower will be preserved).

In a nod to "Latin American" architecture, the plaza is lined with a classical colonnade, and the buildings are stucco. Pelli argues that the boulevard will enliven the public space.

Architectonica's losing scheme proposed two separate buildings with glass facades that opened the theaters to the public in order to "dispel the notion that this facility is only for the elite." Rem Koolhaas' scheme compressed both theaters on one side of the boulevard, turning their lobbies into social "mixing chambers" and using the rest of the site as a public park. The PAC project is scheduled for completion in 1999. ∎

Perrault Creates 'Minimalist Village' to Win Salzburg Sparkasse Competition
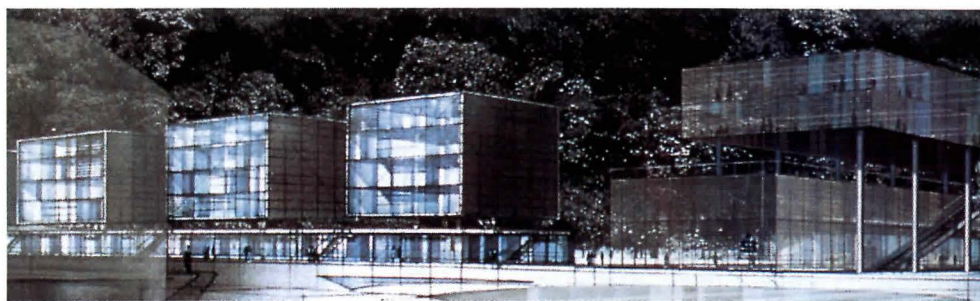
In his controversial winning design for the Salzburg Sparkasse competition, Dominique Perrault inserts a minimalist village into the green Austrian landscape. The project includes 211,250 sq ft of housing, shops, a bank, and an underground parking lot. These elements are arranged as market, square, street, and promenade to give an in-town scale to a perimeter site. Perrault's response to the mountainous environment is, in part, to maximize the open space while turning the visible roof "facade" into a pedestrian walkway. From the street, the project is largely transparent, with housing pavilions raised on pilotis, and glass facades lined with pivoting interior wood shutters. The construction start is on hold while public debate continues. *Claire Downey*

A NOTE FROM THE EDITOR

Terry Beaubois
Terry Beaubois & Associates
Palo Alto, California
Beaubois@aol.com

Last year the exciting new computer elements were hardware:
- the powerful color PowerBooks
- the PowerMacintosh desktop computer with the power of a workstation, and
- the digital camera.

These things are probably still new to many architects, so I want to mention them again, as tools to seriously consider incorporating into your practice. Each of these tools has been improved by Apple since last year. In 1995 and 1996 we'll see PowerPC versions of the PowerBook; even faster and more powerful Power Macintoshes (as well as the beginning of Macintosh clones from companies such as Radius, DayStar, and Power Computing); and an update of the digital camera.

This year some of the most exciting developments, from my perspective, have been in software.
1. Online services
2. QuickTime VR
3. Information Management Systems

Online

The development of online systems is so significant that if you have a computer and are not online, yet — seriously consider getting online. The connection with the online world is one that every architect can benefit from in many ways.

With online email you can communicate immediately and effortlessly with others who are on e-mail. I have exchanged e-mail with

> *"Quick Time VR is the killer application that architects have been waiting for."*

architects from England to Egypt and I even found one of the architects to interview for this article by entering the keywords "architect" and "Newton" in America Online's Member Search feature.

Our local newspaper has a wonderful online service called NewsHound. With NewsHound I can set up certain keywords that are topics in which I have an interest and each day the NewsHound will bring to my computer any article that appears on the news wires with those keywords in it. It is a focused, efficient way of receiving news. I can still read the paper when

I feel like it, but for keeping up to the minute with the specific areas that are most important to me — it cannot be beat.

QuickTime VR

In my opinion, QuickTime VR technology from Apple Computer is the "killer application" that architects and other building industry professionals have been waiting for. For years we have been trying to look around a design or an existing building on our desktop computers — and with QuickTime VR we will be able to do so, much more easily than before. Look for QuickTime VR to develop as a major design and communication tool on the computer. As QuickTime VR becomes used in software programs and products, you will be truly amazed how it will assist us in more effectively communicating information about the 3-dimensional spaces that comprise our work.

Information Management Systems

This year I had the opportunity to observe how technical professionals in fields other than the building industry, are involving desktop computers in their work. I have always been surprised to be reminded that architecture, as a profession, has not been a leader in the application of computers. Perhaps an individual, a firm, or a University class, but as a profession, not so. I was amazed to see how much further along other professions were.

One such example of this is in the world of chemistry where they have LIMS — Laboratory Information Management Systems — computer software systems where the entire lab from each "bench top" to the project managers to the president are working on networked desktop computers. They are performing calculations, generating charts and graphics, preparing proposals and reports, having to satisfy federal and state codes and regulations, running their business, and performing tasks just as complex and sophisticated and any in architecture, design, and construction, but with the benefit of software and networks that ease the access to information, allow for 3-D viewing and design, and speed communication and reporting.

An important component of Computer Aided Practice in the building industry will be the development of information management systems that are tailored to the building industry. A new computer development from Apple Computer named OpenDoc will assist software developers and users tailor computer functions to their own purposes. With devel-

opments like OpenDoc and the increase in speed and power of the desktop computer, I think we can look forward to seeing software that is much more able to assist us with our specific tasks, as well as be more easily combined with other data and other types of data, and then be printed out or transmitted easily.

It was clear by observing other technical professions that we are in a period where the management of information is the major activity of business and the successful management of information requires an efficient, well organized and well managed, networked computer system, where each individual has access to the information, both within and outside of their organization, necessary to perform their job well.

As publishers, product manufacturers, and other members of the building industry develop their use of their computer systems and capabilities, our desktop computer is where information in the form of text, graphics, and sound will converge for each of us. This multimedia business capability will allow us to successfully and more efficiently perform our services — as we leave the era of specialized computers and software and evolve into the age of the Computer Aided Practice.

Terry Beaubois *has been using computers in the practice of architecture since 1978. A graduate of the University of Michigan College of Art and Architecture, he earned a Masters of Architecture program in 1972. He has practiced architecture in Michigan, Massachusetts, and California. His design experience includes hospital, high-technology, public, hotel-resort, and residential design.*

Beaubois has lectured at Stanford University on the advanced use of computers in architecture and to the AIA PIA on computer-aided practice. He is also president of RDC Interactive Media, a firm specializing in the production of digital media for the building industry.

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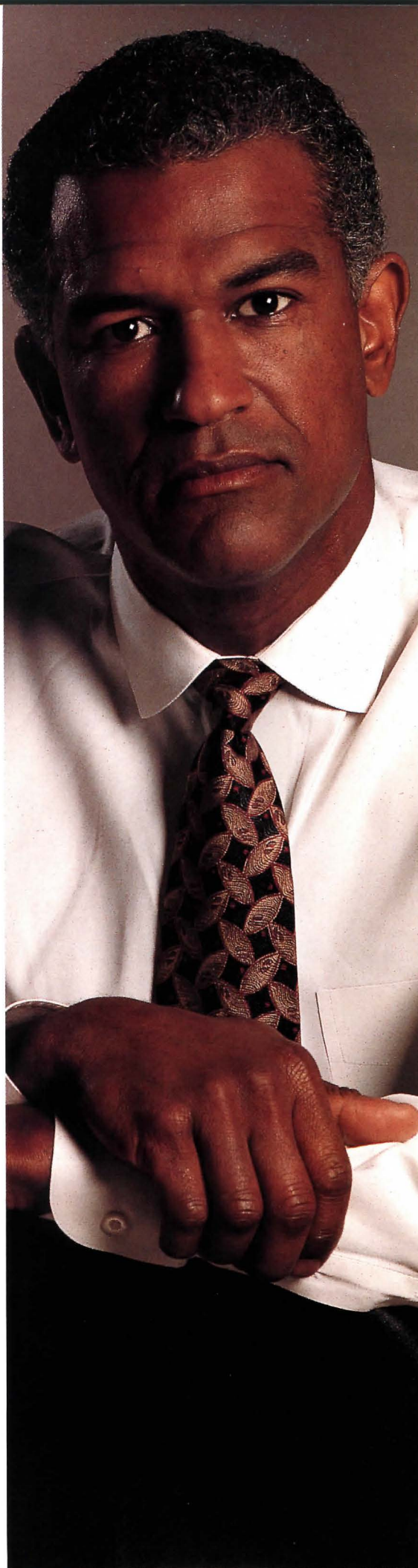
With Power Macintosh and the Mac OS, you can use multiple monitors at once. So, for example, you can work with two levels of a design, each on its own monitor. Or track automated analyses on one screen. While you express your ideas on another.

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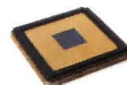
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Apple

ALDO ROSSI, STUDIO DI ARCHITETTURA

New York, New York
Morris Adjmi, AIA

## La Bella Macchina Architettonica

Aldo Rossi, one of the most important theorists and practitioners of contemporary architecture, employs 50 architects worldwide. Morris Adjmi, Rossi's U.S.-based partner, is carrying on the Rossi tradition through projects like the award-winning Il Palazzo Hotel in Japan, the Proyecto Alameda in Mexico, and Disney Development Company's Orlando-based headquarters.

Adjmi's office has been using Macintosh computers since it opened its doors eight years ago. Initially these computers were used only for letter writing and accounting, but slowly, Macintosh systems made their way onto the desks of every architect.

"We recently switched our design system from AutoCAD on IBM-compatible PCs to MiniCAD on the Macintosh," says Adjmi. "We find that the Macintosh platform is much easier to use, and the interface and final drawings are graphically superior. In keeping with

> *"The Macintosh enables us to quickly explore design alternatives ."*

Rossi's style, we try to put a hand-quality finish on all of our drawings. We typically manipulate a CAD drawing to get the ideal perspective view, then add color, texture, and shadows by hand on a computer printout."

PROYECTO ALAMEDA

ALDO ROSSI
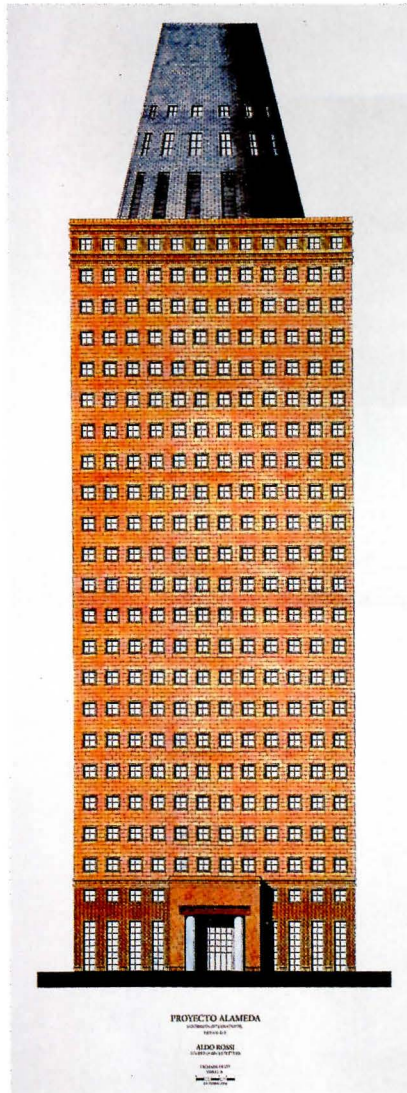
When asked how the use of computers has changed the nature of his practice, Adjmi replied: "My 12-person staff can now do a lot more work in less time. The Macintosh enables us to quickly explore design alternatives."

One of the difficulties of managing international projects is keeping in touch with the home office and clients across multiple time zones. Adjmi has found that his Newton MessagePad eases this burden. He uses this hand-held computer to store names and phone numbers, to take notes, and to communicate via fax and e-mail while he's on the road. The firm also uses America Online's electronic mail facility to transfer files between associate architectural firms.

The studio's enthusiasm for Macintosh technology has led to other exciting projects. The Milan office is taking the lead on the development of a CD-ROM—based collection of Aldo Rossi's sketches and architectural designs. And using the Macintosh and Quark Xpress, Adjmi edited *Aldo Rossi: Architecture 1981-1991 and Aldo Rossi: Drawings and Paintings* for Princeton Architectual Press, both of which received AIA honor awards.

Architects in Rossi's firm hand painted a computer-generated elevation of Proyecto Alameda in Mexico to create this stunning presentation piece.

Hardware: Power Macintosh computers, Macintosh IIci, Quadras, PowerBook, HP DesignJet 650C printer, color scanner
**Software:** MiniCAD, Quark, Illustrator, Photoshop

Macintosh and Architecture:
Computer Aided Practice

In choosing a computer system for your architectural practice, you can usethe same checklist that you'd use to hire a new architect. An importantquality you'd look for is versatility. After all, in given day a typicalarchitect or building industry professional might have to write a letter,give a presentation, update a project timeline, publish a proposal, putfinishing touches on working drawings, and of course, design. You'd also lookat a candidate's track record-is there a history of innovation? Is thecandidate visually oriented and friendly? Evaluating today's computer systemsby these standards, the computer that best meets and exceeds theseexpectations is the Macintosh from Apple Computer, Inc.

In this article we offer you ideas on how you can use the Macintosh andcompatible products to enhance all facets of your architectural practice-notjust computer-aided design tasks — but Computer Aided Practice. Whetheryou're new to computers or a veteran Macintosh or IBM-compatible computer user, you'll find advice, tips, and information on new technologies that you can put to work in your own firm. You'll also see how ten diverse architectshave been using Apple computers, 3-D software, online services, digitalcameras, and a host of other technologies to improve the way that they *run their computer-aided practices.*
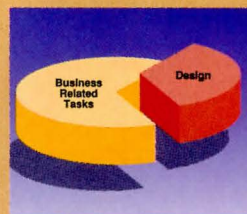
Studies show that architectural firms spend about two-thirds of their time on business-related tasks and only one third of their time performing design and building anaylsis related tasks. Incorporating Macintosh computers into your practice can help you get all of these tasks done with greater efficiency and quality.

JAMBHEKAR STRAUSS PC

New York, New York
Mark E. Strauss, AIA, APA

An Efficient All-Macintosh Office

"**B**y nature, architectural planning and urban design requires a great deal of written and graphic information," says Mark Strauss of Jambhekar Strauss. "Using the Macintosh we can quickly and easily combine diagrams, photographs, environmental reports, bids, and company information in attractive spiral-bound booklets."

Strauss has been working with Macintosh computers for more than half of his 18 years as an architect and urban planner. Projects he's worked on at his two-year old firm

and his previous position as Director of Planning at Kohn Pederson Fox (KPF) include the master plans for West Point, the Homeport Navy Base on Staten Island, the Philadelphia Station Railyards, and Boston Properties' Cambridge Center. The firm is now involved with projects ranging from community master plans to rail station designs.

Jambhekar Strauss uses Macintosh computers for virtually all aspects of its practice. Architects in the firm typically create 2-D plans in PowerDraw, move them over to

SITE OPTION B

PARCEL D

MASTER PLAN STUDY
SKI RESORT CONDOMINIUMS · PARCEL 'D'   JACKSON, WY

> *"By totally embracing the Macintosh technology, our six-person office is able to more effectively compete against larger groups."*

DesignWorkshop to create 3-D cityscapes, then use Photoshop to superimpose building images over site photos. Strauss likes to use DesignWorkshop for quick studies, because it's fast and easy to manipulate. His partner, Sudhir Jambhekar, who previously had no computer experience, is now fully adept with his own Macintosh PowerBook.

For creating customer proposals and final reports, they use Quark to integrate all the components of a project into a professional-looking deliverable. Camera-ready art is

delivered in electronic form directly to a printer. And for special projects, images can be enlarged to 3-by-12 feet by sending it to a service bureau's Versatec 8900 color plotter.

Strauss has also found America Online, an online service with more than 4 million subscribers, to be useful in looking for new business. His firm religiously scans the Commerce Business Daily bulletin board for upcoming government architectural projects. They've also used America Online's architectural forum to place a classified ad for a new employee.

"We're small, efficient, and economical. By totally embracing the Macintosh technology, our six-person office is able to more effectively compete against larger groups. These computers help us respond quickly to client concerns and create higher quality designs."

Strauss uses Macintosh computers for everything from studies for this Staten Island redevelopment project, to online business prospecting.

Hardware: 3-Macintosh Quadra 650s, PowerBook, scanner, QMS 11x17 printer
Software: PowerDraw, DesignWorkshop, Adobe Illustrator, ModelShop, Photoshop, Quark XPress, Microsoft Write, QuickDex, America Online, Microsoft Excel

Macintosh—The Computer for the Practice of all aspects of Architecure

The essence of what makes the Macintosh the best tool for architecture is that it works the way you work—visually. And a computer that works like you is going to be fundamentally easier to use. The Macintosh was designed from the ground up with a visual interface. Other platforms have "curtain wall" inter-faces that may look like the Macintosh, but that merely dresses up a computer structure that requires you to think more like a computer programmer than a visual artist. What's more, Apple Computer, Inc. has communicated this intuitive, visual way of doing things to its developers through interface guidelines. These "building codes" help software developers create Macintosh software applications that also work the way you do. So

basic tasks that you want to perform—saving files, pasting images into documents, and so on—all work more or less the same way, no matter what type of application you're using. And this means you can spend more time doing the task at hand, rather than reading software manuals.

When shopping for a computer system, 'ease-of-use' isn't as easy to measure as RAM, ROM, or processor speed. But it's an essential feature in a profession like architecture, where you may have to switch between a half dozen different types of software applications in a single day. And every hour not spent figuring out how to use your computer is another hour that you can be working on a task that you can bill to a client. All-in-all, the Macintosh computer's visual nature and superior ease-of-use, along with the following advantages listed, add up to the best long-term computer value for your architectural practice.

ALAN BROWN ARCHITECTURE/CONSULTING

Atlanta, Georgia
Alan Brown, Architect

Bridging with Clients Through 3-D

"Architecture is the study of three-dimensional forms in space, and the Macintosh is an excellent advanced tool for exploring the relationship between form and light," says Alan Brown, principal of an architectural consulting firm.

Brown's expertise in Macintosh modeling, rendering, and animation has earned him a host of impressive architectural projects. The artists working with the 1996 Olympic committee hired him to create a "fly-through" animation of the Atlanta Natatorium for studying event graphics and camera angles. He's working with Heery International to model a multistory office tower for the study of its form and design details like brick patterns, glass color, and lighting. And another client, Nix Mann Viehman Architects, recently hired him to create a walk-through rendering of a new laboratory, so he can help evaluate everything from natural light to new faucets.

"Most clients can't read blueprints, so creating 3-D renderings and animations

makes it easier to communicate and present architectural designs," says Brown.

One of his projects that illustrates the power of this approach is a pedestrian bridge that connects two adjacent Atlanta hospitals. Collaborating with Jimmy Smith at Nix

"The Macintosh frees me to give in to my creative whims."

Mann and Associates, Brown modeled the hospital buildings and new bridge in form•Z, a Macintosh-based solids modeler. He then rendered these structures, adding surface textures and lighting, using ElectricImage Animation System. With a video camera he captured a digital image of the building site, then placed PhotoCD images behind the struc-

"With just a set of blueprints, it would've been hard to win the approval of the two different teams of hospital administrators. The 3-D rendering helped our clients better understand how the new bridge would benefit their patients and staff. Using the Macintosh, we could sell the project on a conceptual level before spending a lot of resources on engineering analysis and detailed design."

Brown considers the Macintosh to be the best computer for architects and artists because of its intuitive interface and emphasis on high-quality color and graphics. "The Macintosh frees me to give in to my creative whims.

Because applications are so easy to learn and use, there are no barriers to experimenting with new applications and technologies."

Alan Brown uses 3-D tools like form • Z and Electric-Image to more effectively communicate and sell his designs.

Hardware: Power Macintosh 8100AV, Quadra 800 with Radius VideoVision, Quadra 650, PowerBook, Macintosh IIcx with Rocket, Macintosh Classic, Newton, Sony Hi8 V-Deck
Software: form • Z, ElectricImage Animation System, Premiere

LENNON ASSOCIATES

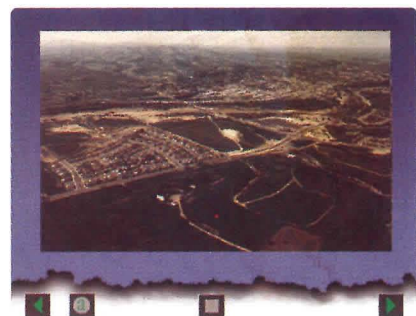Del Mar, California
Jim Lennon, AIA

Mastering the Science of Architecture

You won't find any drafting boards at Lennon Associates, a firm that specializes in health care architecture. They use computers for everything from design to on-site construction reports. Their extensive use of Macintosh computers and Newton MessagePads is more typical of a physics lab than an architect's studio. Their analytical approach to solving customer problems through computer simulations provides a glimpse into the future of computer-aided practice.

"Right now architecture is a prototype business. Architects get one try at a building and the client has to live with the outcome," says Jim Lennon. "Computer simulations, on the other hand, let us test a design before it's built. They help us learn from our mistakes."

Optimizing the flow of staff and patients is a top priority in health care architecture. Each hospital staff member or room that can be eliminated through efficient building layout saves a health care provider millions of dollars over the life of a building. Using Macintosh simulation software, Lennon has raised this art form to a science.

Lennon's staff spends the first month of a new hospital project using their MessagePads to collect data on the flow of patients and staff around a client's existing

Lennon Associates utilized a multimedia presentation to zoom in on a proposed site for a hospital.

facility. Using this data and Extend, a general purpose simulation language, they develop a computer simulation of hospital activities. Then as they work on the new hospital floor plan, the simulation helps them make design decisions. It might influence them to move the x-ray room closer to the emergency room or place patient queue monitors in key areas.

"After we present our simulation to hospital administrators, we brainstorm on ways to make a hospital more efficient. In one case this resulted in the development of a Macintosh-based patient tracking system."

design. Final designs are often translated into AutoCAD, and construction progress is monitored using Newton MessagePads.

Lennon comments on why he chose to standardize on Macintosh computers: "We just couldn't do this type of work on any other computer platform. The visual nature of the Macintosh enables us to show movements through a building and convey vast amounts of information very easily."

"Computer simulations let

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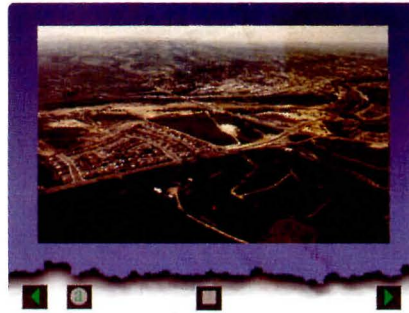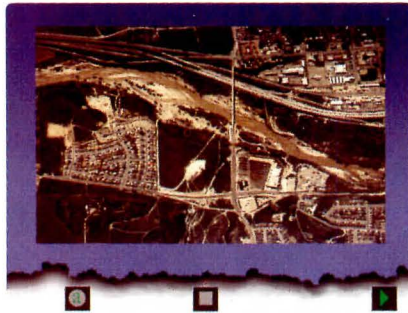
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"After we present our simulation to hospital administrators, we brainstorm on ways to make a hospital more efficient. In one case this resulted in the development of a Macintosh-based patient tracking system," says Lennon.

Final design options are modeled in form•Z and rendered and animated in Studio-Pro, enabling the client to take a virtual tour through the building before choosing a final

design. Final designs are often translated into AutoCAD, and construction progress is monitored using Newton MessagePads.

Lennon comments on why he chose to standardize on Macintosh computers: "We just couldn't do this type of work on any other computer platform. The visual nature of the Macintosh enables us to show movements through a building and convey vast amounts of information very easily."

Hardware: 3-Power Macintoshes, Quadra 840AV, 3-Quadra 605s, Macintosh LCII, 4-Macintosh Classics, 2-HP 550C printers, Fargo dye sublimation printer, HP plotter, Newton MessagePads
Software: Extend, StudioPro, form•Z, PowerDraw, Photoshop, Painter, Design Workshop, Filemaker Pro, Excel, MacWrite Pro, Pagemaker

Lennon Associates utilized a multimedia presentation to zoom in on a proposed site for a hospital.

Today it's difficult to find a graphic design firm that doesn't do at least part of its work on computers. But looking back at graphic design ten years ago, designers were skeptical of computers. Designers were afraid that high-quality fonts and clip art would put them out of business. And many designers clung to the old way of doing things, because they couldn't see beyond the expense and the training needed to incorporate computers into their business. Then three rapid changes upset the status quo and gave early adopters a competitive advantage, forcing many non-adopters out of business.
These changes were:
• Computers and software went dramatically down in price and up in efficiency.
• Computer-related service bureaus formed, helping firms reduce staffing requirements and overhead.

• Computers empowered designers with new capabilities, such as in-house typesetting, instant color comps (previews), and digital photo manipulation.

We predict you'll see the same forces at work in the building industry and in particular in architecture. Software developers are already at work developing more intuitive, less expensive 3-D design applications. Service bureaus are beginning to offer computer-related services that help your business run more efficiently. For example, some surveyors will deliver 3-D topographical maps in computer formats, and you can now hire specialists to create 3-D walkthroughs. And firms that offer new computer-aided services, such as 3-D virtual tours through buildings, are gaining a competive advantage over traditional firms.

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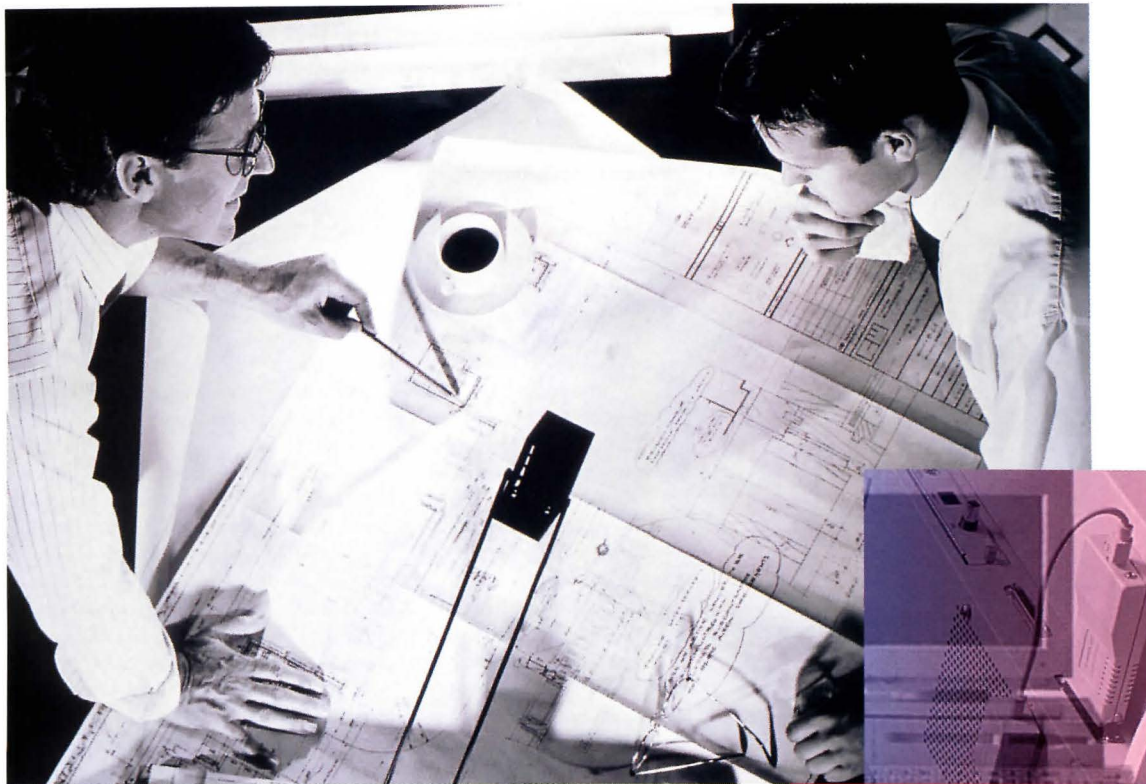
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THOMAS HARLEY • ARCHITECTS

Indiana, Pennsylvania
Thomas Harley, Architect

Keeping an Eye
on the Bottom Line

Thomas Harley runs a ten-person architectural practice in a quaint little place that's best know as the hometown of the movie actor Jimmy Stewart. Over the years, Harley has built up a loyal following of clients, who keep him busy with soup-to-nuts design projects such as the local pharmacy, ice skating rinks, a train station restoration, and even the new Jimmy Stewart Airport Terminal. In managing this mix of small and large projects—sometimes 150 at a time—the firm has found the

> *"The Macintosh helps*
> *our most skilled and*
> *highly paid people work*
> *more efficiently."*

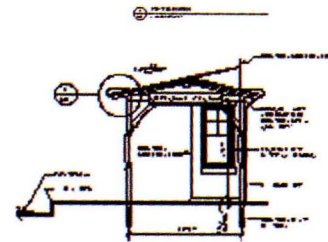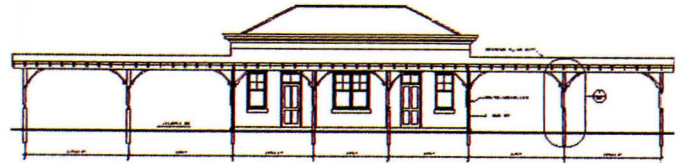Macintosh to be essential in keeping the balance sheet healthy and clients happy.

"When I joined the group, I was handed a mountain of paper and an invoicing process that took ten to fourteen days a month to complete," says Sherry Brezinski the firm's office manager. "Then we got MacArchitect software up and running on our Macintosh computers, and now I can finish the invoicing, with much greater accuracy, in a day."

The firm soon discovered other advantages to using MacArchitect to manage their business. When Federal Aviation Administration (FAA) auditors requested a detailed accounting of all charges on the Jimmy Stewart Airport, they were able to send it off in minutes. Project leaders could quickly check labor hours of ongoing projects. And the software provided them with a convenient way to track and bill clients for blueprints, photocopies, postage, and extended services.

Brezinski talks about how this system improved client satisfaction: "Now clients know what our fees cover, and if anyone calls to question an invoice, we can resolve issues immediately over the phone."

Harley's firm also uses Macintosh computers for other aspects of their practice. Proposals are written in Microsoft Word, and integrated with Microsoft Project timelines and Excel spreadsheets. TouchBase Pro helps them track important information about clients and
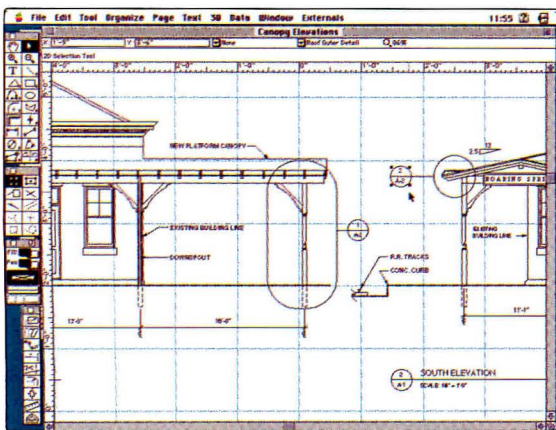
contractors. They use MiniCAD for architectural drawings and Virtus Walkthrough for 3-D renderings. And their head designer, Tim Morris, says they can get computer-savvy employees up and running with CAD in less than a week.

Karen Welsh, one of the firm's architects, also talked about how they use their Apple QuickTake 100 camera. "A client on a tight budget asked for a new front porch design. So I ran over to the site with our three-day old QuickTake camera, took a photo, dropped it into MiniCAD, and created dimensioned drawings, all in under two hours."

Summing up why his firm uses Macintosh computers, Harley says, "The Macintosh helps our most skilled and highly paid people work more efficiently."

Harley's firm is using MiniCAD to develop the plans for Indiana's Roaring Springs Railroad Station restoration project.

Hardware: 2-Power Macintoshes, PowerBook, 2-Macintosh IIcis, Macintosh SE, QuickTake 100, Apple LaserWriter, Apple Personal LaserWriter, HP color plotter, Bernoulli back-up
Software: MacArchitect, TouchBase Pro, MiniCAD, Virtus Walkthrough, Microsoft Word, Microsoft Project, Microsoft Excel

Apple put the Power into Power Macintosh

Most graphic designers work in two-dimensions and much of the information in architecture, graphically relating to the building, is three-dimensional. Until a little over a year ago, there weren't inexpensive computers with the power to handle 3-D work effectively. The availability of super-fast RISC microprocessors (Reduced Instruction Set Computing— like the PowerPC chip) in desktop computers, and more specifically the Power Macintosh, has changed all that. With the Power Macintosh, architects can now afford to buy enough desktop computing horsepower to manage all aspects of their work, not just office productivity. This opportunity allows architects to advance to the stage of computer use in their practices, where graphic designers were a number of years ago.
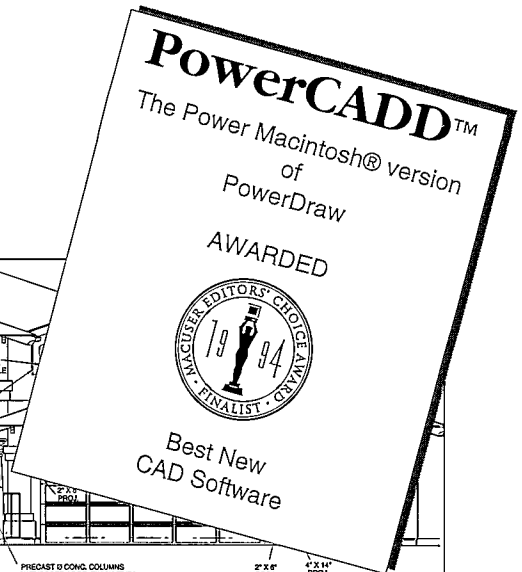
A Track Record for Innovation

There is another very important thing we can learn from graphic designers — what type of computer to buy. Most graphic design professional use Macintosh computers in their practice. Even in larger corporations that are "standardized" on the IBM-compatible computer, when you visit their graphics department - there they are - $250,000 worth of Quadras or Power Macs and a department head that will protect their Apples with a passion — because their life would be miserable if they couldn't use Apple computers to do their work. This is because the Macintosh offers visual artists, without a doubt, the best set of hardware and software tools for design.

archiTREK

Santa Barbara, California
Mindy Rosenblatt

Rendering Her Clients Speechless

Mindy Rosenblatt's computer-animated "fly-throughs" of structures have an undeniable dramatic flair. Sometimes structures grow up from lines on a blueprint lying on a table. An

> *"3-D animations help architects come up with the best possible client designs before construction."*

old building may sink into the ground to make way for a new one. And in a virtual tour through a residential estate, visitors are greeted by a red '57 Chevy zooming down the driveway, roaring fireplaces, and a twinkling Christmas tree.

Beyond the glitz, Rosenblatt discusses the practical side of the services she provides: "3-D animations help architects come up with the best possible client designs before construction," says Rosenblatt. "Most clients really don't get a good sense of scale from blueprints and models. By putting a design on what is essentially a televi-

sion, you're communicating to clients through a medium that they've learned to understand at an early age."

Many architectural firms hire outside contractors for animation and simulation services because of the equipment and skills required. These visualization aids are often well worth the effort for projects in which environmental impact and public acceptance is an issue.

Such was the case with the administrators of the Samarkand Retirement Community, who wanted to get city approval on three new structures in an established part of Santa Barbara. Neighbors were concerned about structure heights, and Rosenblatt's fly-by animations showed residents how the new buildings would look with landscaping in place. She also included animated design variations

that minimized the visual impact of the buildings. After benefiting from several of Rosenblatt's animations, the Santa Barbara Planning Department is now requiring animations on many other large projects.

To create realistic renderings, Rosenblatt first scans topographical maps into form•Z to create a 3-D terrain model. She builds structures in ArchiCAD them moves all these objects into ElectricImage, where she adds textures, color, and landscaping. Finally, she uses Photoshop to place models against a backdrop of aerial site photos and the Santa Barbara skyline.

Rosenblatt, a self-proclaimed computer nerd, has a Macintosh system that would be the envy of most software developers. Because "animation consumes memory like kids eat chocolate", she has loaded her three Quadra computers with almost 400MB of RAM.

Rosenblatt has a computer science degree and the skills to master any computer system. She uses a Macintosh because she feels, "The intuitive approach of the Macintosh liberates the right hemisphere of my brain."

This Victorian farmhouse, designed by Alex Pujo Architects, was animated to enable the clients to take a virtual walk through their future home. Rosenblatt used AMAP and TreePro applications to add mature landscaping to the site.

> **Hardware:** 2-Quadra 950s, each with 160MB RAM, Quadra 700 with 64MB RAM, Tektronix PhaserIISCX printer, Sony LVR3000 laser disk recorder, NuVista+board, Exabyte 8mm tape drive, 7GB Fujitsu hard drives, LaCie Silverscanner II
> **Software:** Photoshop, ArchiCAD, form•Z, Electric Image, AMAP, TreePro

Apple and Innovations

Over the years, Apple has been first to market with an amazing number of innovations that directly benefit visual artists. The Macintosh was the first computer to offer WYSIWIG (what-you-see-is-what-you-get) operating system interface, providing designers with the assurance that anything printed would look the same as the image on the computer screen. Apple was the first to ship their computers with affordable laser printers and high quality fonts. And today the Mac OS is the only operating system that offers users a built-in high-quality graphics engine (QuickDraw), color matching (ColorSync), a video movie-player (QuickTime), and the capacity to handle any language system, including Chinese, Japanese, and Arabic (WorldScript). (The Macintosh computer's ability to switch between multiple language systems is essential if you're involved in international work.)

Two other innovations that are becoming increasingly important to architects is digital photography (using a QuickTake

camera) and photographic quality 3-D, 360-degree walka-rounds (using QuickTime VR). With a QuickTake camera, you can quickly take pictures of sites or structures, plug the camera into a Macintosh, then drop digital images into proposals or presentations. You can even use a photo editing application like Photoshop to combine photos with your own computer-rendered designs. (See the Alan Brown and Lennon Associates interviews for examples of this capability.)

QuickTime VR— Another Apple Innovation The Perfect Tool for Architecture

QuickTime VR (virtual reality) is a software tool that lets you quickly build, either from photographs or computer generated images, 360-degree "virtual" spaces that can be navigated through on the computer screen. You can even "connect" rooms, allowing you to "move" from space to space and look around those spaces. QuickTime VR is different than a "fly-through" in that it is not "linear" (in a fly-through you

size pages per minute, making it the fastest printer in its price range. And with the optional fax card, anyone on the network—yes, anyone—can send a fax from his or her desk. It's as easy as selecting the Fax option in the Print dialog box. You can also receive pristine plain-paper faxes at the printer. All of this cross-platform business goes on unseen by network users, thanks to built-in LocalTalk® and Ethernet support (including EtherTalk® TCP/IP and Novell IPX support) and automatic emulation switching. Which means the only time the Macintosh, DOS, Windows and UNIX software users at your office might meet each other is at the printer.

Apple

Can you tell
which document came
from a Macintosh and
which came from a PC?

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HARTMAN-COX ARCHITECTS

Washington DC
Mary Kay Lanzillotta, AIA

Integrating the Old with the New

Hartman-Cox Architects is a firm known for contextual design work. They've become masters at blending old architectural styles with new building methods. And as you might expect, this philosophy has carried over to their practice, where they've struck a happy medium between the use of old and new computer-based architectural tools.

"We initially brought computers into our practice to help write specifications, not to produce drawings or graphics," says Mary

> *"With Macintosh computers, we never have to send anyone to training classes."*

Kay Lanzillotta, a Hartman-Cox architect. "But over time, we incrementally experimented with computers on a project by project basis-after all, none of us relished the thought of drawing 500 Gothic Revival windows by hand. Now that more clients require Auto-CAD drawings, we've made computers an integral part of our practice."
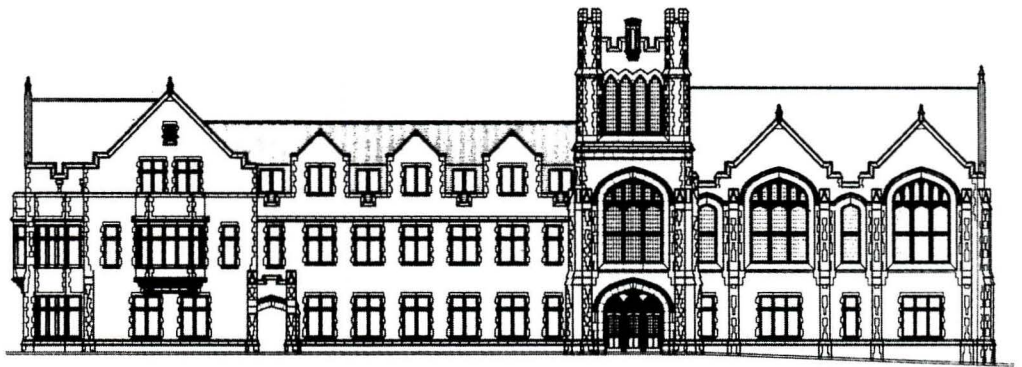
Lanzillotta, who specializes in historic preservation, is currently the project architect for the preservation of the Lincoln and the Jefferson Memorials. During the next three to four years, she will overseeing this process.

Another good example of how computers are used in their practice is the Washington University Law School and Library project, which is currently under construction in St. Louis. Hartman-Cox architects Warren Cox and Lee Becker spent the first six months of the project analyzing the needs of the law school staff. They worked on optimizing space requirements and locations of faculty offices, library facilities, mock courtrooms, and mailrooms. Preliminary schematics were prepared by hand, so teams of people could quickly rearrange rooms with traditional cut-and-paste techniques. The final design and development of the building was completed using AutoCAD on Macintosh computers.

Hartman-Cox often combines computer-aided design and hand-rendering in their presentation drawings. Sometimes they hand-render over computer-generated wireframe drawings. And one architect has developed a random hatching pattern that he "pours" into their computer-based renderings to simulate hand-textured granite.

There's one other thing that Lanzillotta likes about Macintosh computers: "With Macintosh computers, we never have to send anyone to training classes."

Hardware: 3-Quadras, Macintosh IIci, Macintosh IIcx, HP 600 Plotter
Software: Microsoft Word, Microsoft Excel, Quicken, Claris CAD, AutoCAD

---

program the paths and then "play back" the trip, like a video) With QuickTime VR the computer user can choose, when viewing the image, whether they want to look to the left or right, up, down, stop, or move ahead. It is a "navigable" image.
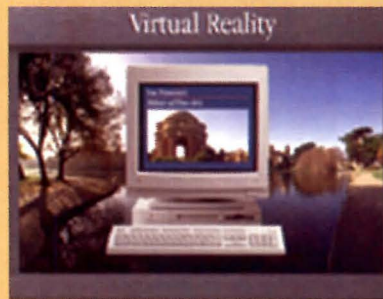
In my opinion, this one software application has the ability to transform the practice of architecture and is the single most important advance in computer software for use in the building industry. Look for examples and applications of this exciting new technology to be coming out of the lab and into general usage very soon.

Virtual Reality

PALACE OF FINE ARTS QuickTime VR software will allow you to view real and virtual spaces as well as computer generated or photographed objects.

A QUICKTAKE CAMERA You can use the QuickTake 150 to take a digital photograph of a site, then quickly integrate the image into proposals or renderings.

Choosing the Best Tool for the Job

Designers who use Macintosh computers spend less on training and support, and research firms publish data that substantiate

this claim. The Macintosh computer's resume includes studies such as these:
• Easiest to learn and use. The Mac OS is *nearly twice as* efficient to learn and use as the Windows operating system. (Arthur D. Little, Inc., 1994)
• Less expensive to own. The five year cost of owning a Macintosh with System 7 is nearly $6,500 less than a comparable Windows-based computer. (Gartner Group of Stamford, Connecticut, May 1993)
• Highest customer satisfaction. The PowerBook computer ranked highest in customer satisfaction among notebook computer business users. (J.D. Powers, 1994 Notebook Computer End-User Satisfaction Study)
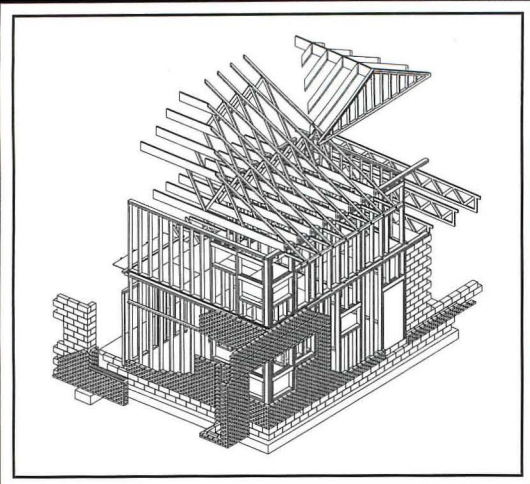
All models created with **form•Z**. *Below:* Le Corbusier's Ronchamp by Mark Niemi, auto•des•sys, Inc., rendered with **form•Z**. *Above, clockwise from top left:* Model by Sean Thompson, Heather Cross, and Charlene Tu, University of Cincinnati; Building by Sullivan Gray Bruck Architects, model by Marty Clayton, Electric Pictures, Columbus, OH, rendered with InfiniD; Conference Room by Hae Young Yoon, MR Y Associates, New York, NY, rendered with ElectricImage; Oral-B Corporate Headquarters by John Marx, DES Architects/Engineers, Redwood City, CA, rendered with Raydream Designer; Hyatt Hong Kong, model by Teresa Williams, See[3], Culver City, CA, rendered with ElectricImage.

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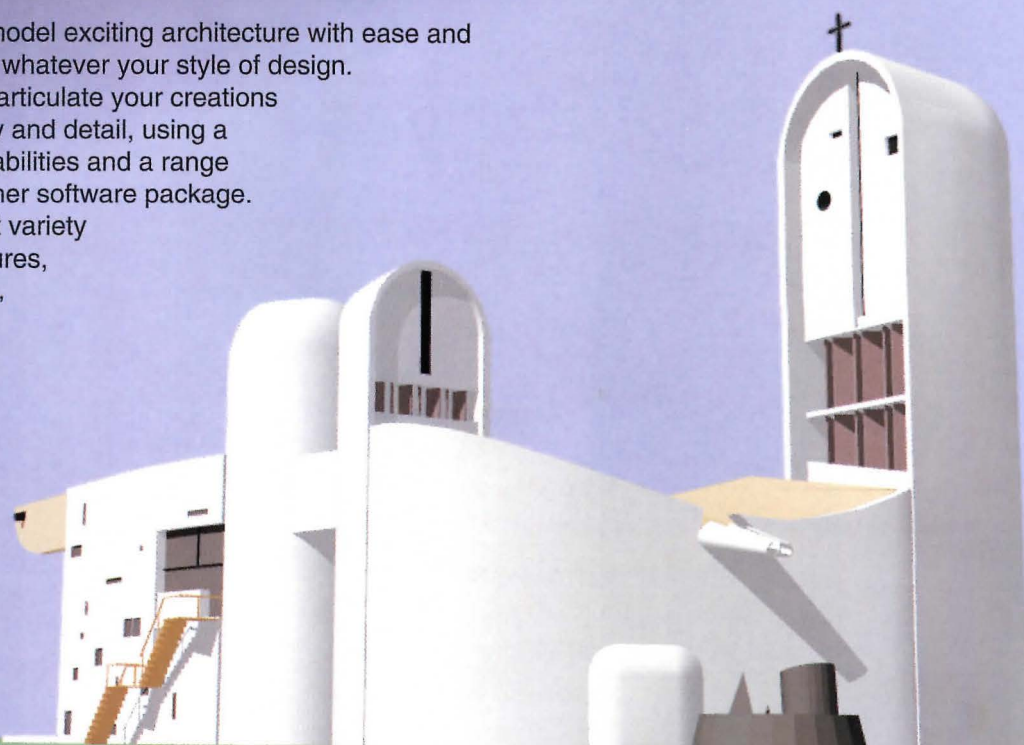All integrated in a single package.

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EASTLAKE STUDIO

Chicago, Illinois
David Johnson

Broadening Their Practice Through Computers

When David Johnson and his partners decided to start their own architectural firm in 1987, they realized that breaking away from an established firm presented them with an opportunity to use computers in an innovative way. So they began drafting a plan for a different kind of architectural practice.

"We use Macintosh computers for everything, and many office visitors notice that we have very little paper lying around compared to traditional architectural offices," says Johnson. "Drawings, rolodexes, in-out boards, time sheets, correspondence, and financial reports are all maintained on our computers. And this information is networked so that employees can access just about anything from their desktop computers."

Johnson feels that their emphasis on information accessibility has had other beneficial side-affects: "Besides making our architects more productive, this sharing of information flattens hierarchies. Every architect is granted free reign to borrow design details, budget spreadsheets, or schedules from other projects. There's no waiting around for another architect to return from a site visit or for a busy partner to search through file cabinets."

Moreover, Johnson thinks that comput-
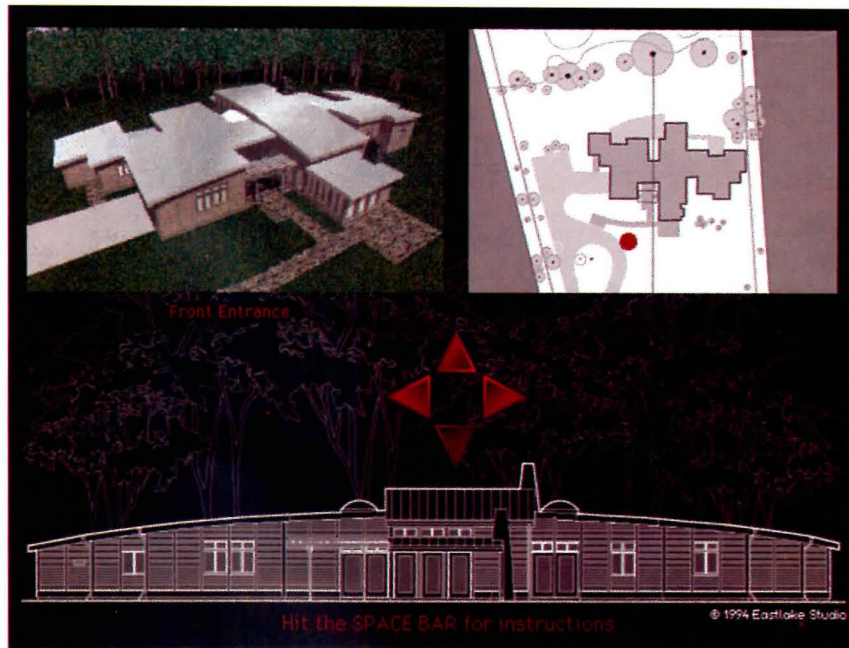
EastLake Studios created this 3-D walk-through for an art gallery's "New Chicago Villa" multimedia kiosk.

> *"Among clients, our innovative use of computers helps position us as forward thinkers."*

er technology provides architects with an opportunity to broaden their practice. For example, as a service to their corporate customers, his firm develops custom facilities management programs in FileMaker Pro. And last year a local art gallery hired him to create a multimedia kiosk presentation at a "New Chicago Villa" exhibit. It featured one of their custom home designs and provided the firm with great publicity.

Eastlake Studios also uses online services to help them win new business. They search Internet databases to learn more about prospective clients. And very soon, they'll be posting an electronic version of their portfolio to a custom Web page (the Internet's version of a retail store front).

"All of these computer-aided opportunities provide us with additional revenue streams and a competitive advantage, says Johnson. "Among clients, our innovative use of computers helps position us as forward thinkers. And because corporate clients have seen how well computers work for us, some have hired us to make recommendations on computer use in their own companies."

Hardware: 2-Power Macintoshes, 3-Quadras, 2-Macintosh fxs, 2-Macintosh IIcis, PowerBook
Software: PowerDraw, MacDraft, form • Z, ModelShop, Claris FileMaker Pro, Microsoft Excel, Adobe Pagemaker, Macromedia Director

POWERBOOK 540C
If you have to spend a lot of time at job sites or traveling, a PowerBook computer can be your office away from home.

Compatibility For Fitting Into Any Environment

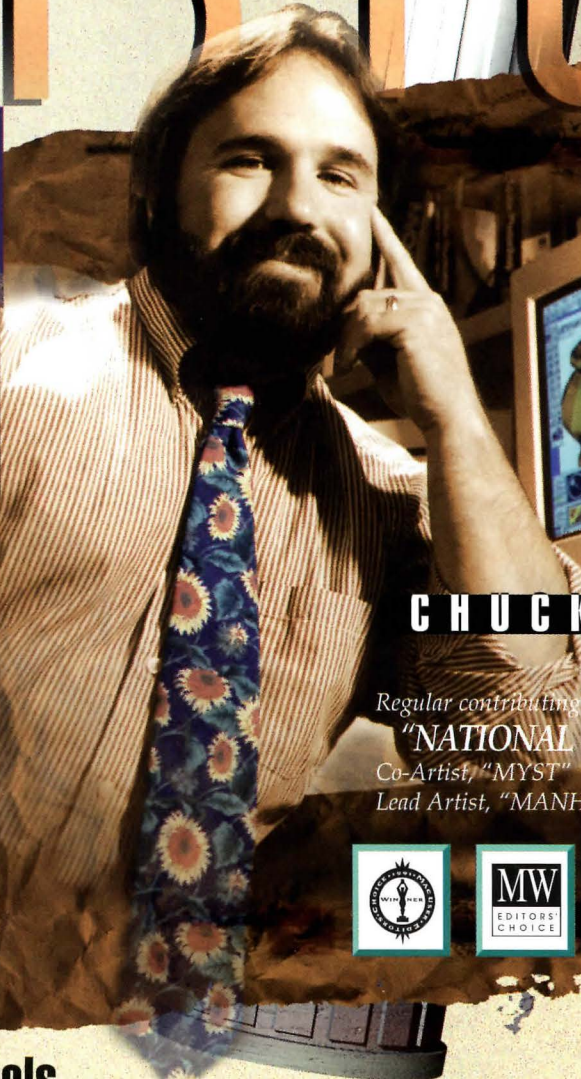One factor that's helping the Macintosh's increasing acceptance in the architecture community is the widespread availability of compatibility aids —which make it easier for mixed-system offices to exist in harmony. (In fact, none of the architects whom we interviewed for this article has major problems converting Macintosh files to DOS/Windows formats.) Here are the levels of compatibility that users can expect with Macintosh computers today.

• Many Power Macintosh configurations are DOS/Windows-compatible, enabling users to run the hundreds of off-the-shelf MS-DOS and Windows programs at 486performance levels.
• With a Macintosh you can share data easily with all your colleagues and clients, whether they're using systems running Macintosh, MS-DOS, Windows, VMS, or UNIXr operating systems
• All Apple floppy drives can format, read from, and write to 3.5-inch MS-DOS, OS/2, and Windows floppy disks.
• Most Macintosh software includes conversion utilities that let you use popular computer-aided design and text files

UNIVERSITY OF MINNESOTA SCHOOL OF ARCHITECTURE

Minneapolis, Minnesota
Lee Anderson, Professor

A Glimpse Into the Future

The University of Minnesota has built the ultimate playground for its architecture students—it's called the Microcomputer Lab. With 34 Macintosh computers, cutting-edge design software, video production equipment, and a large-screen video projector, future architects at this school experiment with computer tools and techniques that will someday benefit their employers and the architecture professional as a whole.
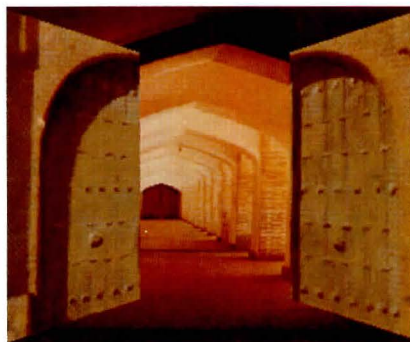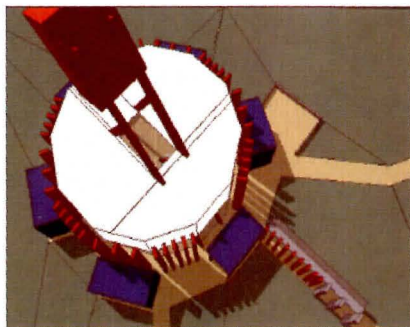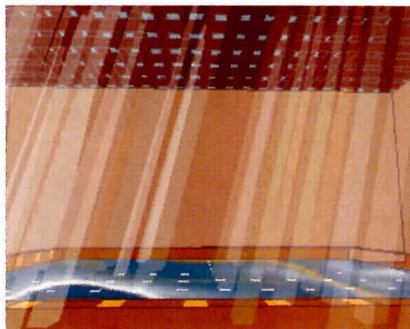
Lee Anderson, Architecture Professor and Director of the University's Computer Aided Design Center, is the driving force behind

"The Macintosh provides us with good value and a technology that won't be obsolete in a few years."

this school's emphasis on computers. He says, "Architecture is still rooted in the aesthetics and methods of a previous time—static drawings and presentations," says Anderson. "Our classes enable students to experiment with computer tools that have been used artistically for years in cinema and video."

Here are just a few technologies that students in Anderson's classes get to "play" with.
• At the University's Artificial Reality Lab, students wear "virtual reality" goggles to view and manipulate designs created in upFRONT's Swivel 3D software.
• Using Working Model by Knowledge Rev-

olution, students can design structures and study the effects of different materials and gravity over time.
• Students have access to the latest anima-

tion and design software—for example, Premiere, Photoshop, Canvas, and Alias Sketch!—so they can learn new skills and techniques in architectural design.

Anderson thinks a lot about how computer technology will ultimately change the practice of architecture. He believes the impact of computers in architecture goes beyond just creating "pretty pictures". In his own words, "Computers will help architects more effectively manage the large amounts of information that are needed to design structures. They will help architects better analyze materials and the energy efficiency of buildings. And new communication technologies will increase the frequency of "just in time" architectural teams—in other words, ad hoc design teams that include architect-specialists brought in for special projects."

When asked why their school chose to standardize on Macintosh computers, Anderson replied, "The Macintosh provides us with good value and a technology that won't be obsolete in a few years. These computers are also the easiest to set up, network, share file and teach with."

A pool, tower, & dungeon created by students at the University of Minnesota.

Hardware: 34 Macintosh computers, plotters laser printers, scanners, HP PaintWriter, and network connections to a Cray Supercomputer and the Campus library search system and electronic mail
Software: Premiere, upFRONT, Photoshop, Canvas, Swivel 3D, Alias Sketch!, Adobe Premiere, Working Model

With the Macintosh, you just plug in the power cord, and your multimedia system is ready to run—all Macintoshes are multimedia ready right out of the box! Unlike many other systems, you don't have to purchase extra memory, sound cards, networking software, or speakers. And if you want to connect a video camera or VCR to your computer, you can purchase an "AV" version of Power Macintosh. These computers come with additional multimedia features such as video in/out, telephone integration, and speech recognition.

You can even integrate Macintosh computers into complex networked environments that use Token-Ring, Ethernet, NFS, and TCP/IP protocols. This level of connectivity and compatibility makes it possible for you to access drawings and data stored on a mainframe, make revisions to these files, then store them on

servers, without leaving your desk. And all of this "plug and play" networking makes it easier for team members to collaborate, increasing the productivity and efficiency of your firm.

NEWTON
Many architects have begun using Newton MessagePads to manage client information, save sketches, and send faxes while they're away from the office.
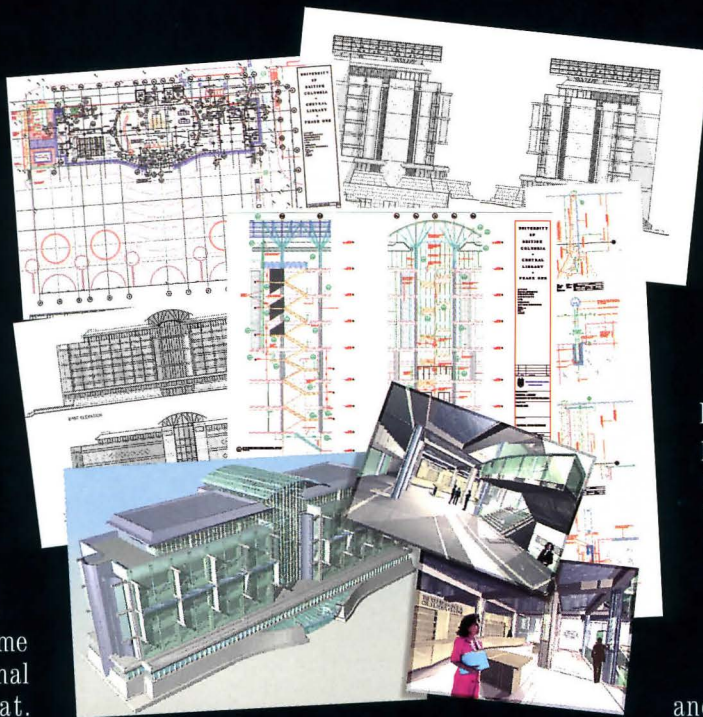
TULLOCH CONSTRUCTION

Oakland, California
Edward Ong, PE, ASCE, ACI

Building a Structural Analysis Toolbox

"One of the reasons I like using Macintosh computers in our design and build construction firm is that they eliminate repetitive tasks and help us get things done faster. After we began using Macintosh computers, our overall design time was cut in half," says Edward Ong, the chief structural engineer at Tulloch Construction.

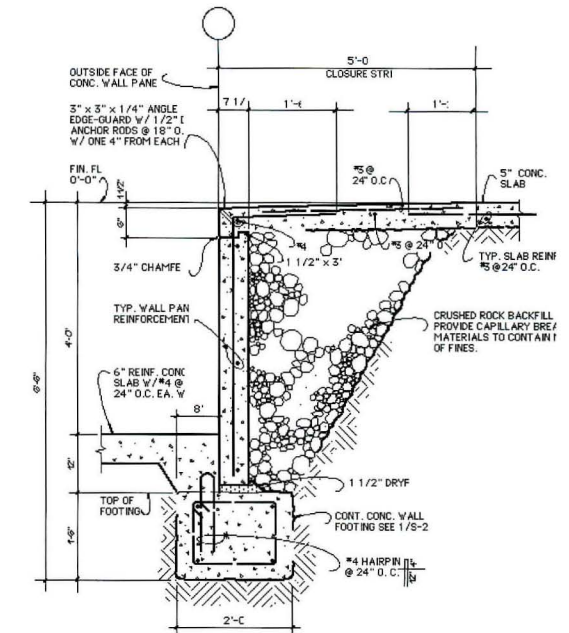This dramatic time savings is largely a result of the extensive collection of computer-based design details that the firm has developed. In many of the warehouses and office buildings that Tulloch Construction develops, building elements such as roof, foundation, and wall connection details, as well as handicapped-access standards, can be reused in future designs. During the firm's slow times, designers work on modularizing these details so they can be dropped into ClarisCAD-based drawings when the need arises.

Ong saves time on structural analysis by creatively working with a variety of programs. Over the years, he's created a virtual "toolbox" of Excel-based structural calculation templates that help him analyze components like tilt-up walls, floor beams, and retaining walls. In addition, he uses FRAMEMac for analyzing two-dimensional structural elements and Multiframe3D for performing three-dimensional loading calculations.

One of Ong's favorite features of FRAMEMac is the Rectangular Mesh Generator, a tool for creating multi-story and multi-bay structures. Using this tool, a high-rise model with regular story heights and bay widths can be created graphically with the mouse in minutes, without having to type in nodal points.

"Both of these programs allow us to visually see the loads being imposed on beams, trusses, structures and nodes," says Ong. "We input values graphically on the screen, not as a list of numbers. Not only does this save us a tedious typing job, but just by looking at load diagrams, we can instantly see if we've made any obvious errors."

Recently, Ong's toolbox of Macintosh structural and design tools was put to the test. With a building department deadline looming and the drafting staff working to capacity, Ong had to step in and create working drawings for a project. He surprised himself with the outcome: Using ClarisCAD and his Macintosh, he completed five pages of construction drawings, complete with structural analysis, in just a weekend.

> *"After we began using Macintosh computers, our overall design time was cut in half."*

Ong uses Excel-based calculation templates to analyze structural elements like this retaining wall and truck dock door sill.
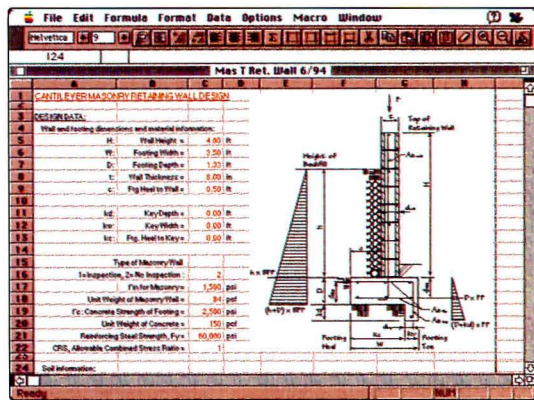
Hardware: 3-Macintosh LCIIs, Macintosh IIci, Macintosh fx, 2-Apple LaserWriters, HP DraftPro plotter
Software: ClarisCAD, Excel, FRAMEMac, Multiframe3D

created on other computers. In addition, translator programs like DataViz's MacLink Plus/PC offer over 700 different translation options. Specialized graphics translators such as Forthought's SNAP! Translator, Engineered Software's PowerDraw Translator, and Kandu Software's CADMover easily convert industry standards like CALS, IGES, and AutoCAD's DXF to Macintosh-readable formats.

• For users with existing investments in UNIX RISC-based hardware, Macintosh Application Environment (MAE) enables Macintosh applications to run on top of Sun, HP, and other popular workstations.

• An upcoming software development framework, OpenDoc, will, over time, enable Macintosh users to mix and match their favorite applications. For example, in the future, you'll be able to drop a spreadsheet or a rendering directly into a CAD drawing, and edit either of these in place.

So even with many of your clients demanding final output in non-Macintosh formats, all these compatibility aids let you choose the easiest to use, most powerful computer for the job you need to get done—architecture.

Painless Networking and Communication

One of the hidden benefits of a Macintosh is its painless networking and communication facilities. The "plug and play" AppleTalk networking capabilities built into every Apple computer enable you to network your Macintosh simply by plugging it into a printer or another Macintosh with an inexpensive cable. No additional software or hardware is needed. And with AppleTalk you can start small, then easily expand your network as your organization grows. Another hidden benefit is the bundle of built-in extras that comes with each system.

Breaking the Siege: Architects in Sarajevo

In the Bosnian capital, architects Lebbeus Woods and Thom Mayne found architecture more of an issue than in many places not at war.

Editor's note: Last year, architects Lebbeus Woods and Thom Mayne spent a week in Sarajevo holding workshops with architects and architecture students. At a time when many American architects bemoan their loss of influence on society at large, Woods and Mayne used architecture as a way of addressing basic needs of a war-torn city. Once famous for its multi-ethnic culture and its diverse architectural heritage, Sarajevo today represents the nightmare of a pluralistic society ripped apart. Lessons from Bosnia might well apply to other places where multi-culturalism is under siege from repressive governments, ethnic hatreds, or rampant crime. C.A.P.

By Lebbeus Woods

"How can anyone go to Sarajevo now and talk about architecture? There's still a war going on there! What those people need is food and blankets and medical care, not architecture." That's what many people say after hearing I have gone to Sarajevo to discuss architecture. In fact, the mere mention of the idea elicits the same kind of comment.

What "those people" need is certainly food and blankets and medical care. But that is not all. They also need art, theater, music, architecture, and all the other activities that sustain humanity in any community anywhere. After more than three years of a siege aimed as much at the dehumanization of Sarajevans as at the military conquest of the city, architecture is more of an issue than it is in places not at war.

In Sarajevo, architecture is not only about buildings basic to daily survival, but also about concepts of civilized life that have been under merciless attack. In Sarajevo, architecture is about the idea of construction as an antidote to barbarism and destruction, about planning for the rebuilding of a shattered city as a form of resistance to despair.

Foreign architects, artists, and cultural figures are needed in Sarajevo, and are welcome. Their willingness to come and to

Lebbeus Woods is a New York City architect whose monograph entitled War and Architecture *will be published this coming fall by A+U Publishing.*
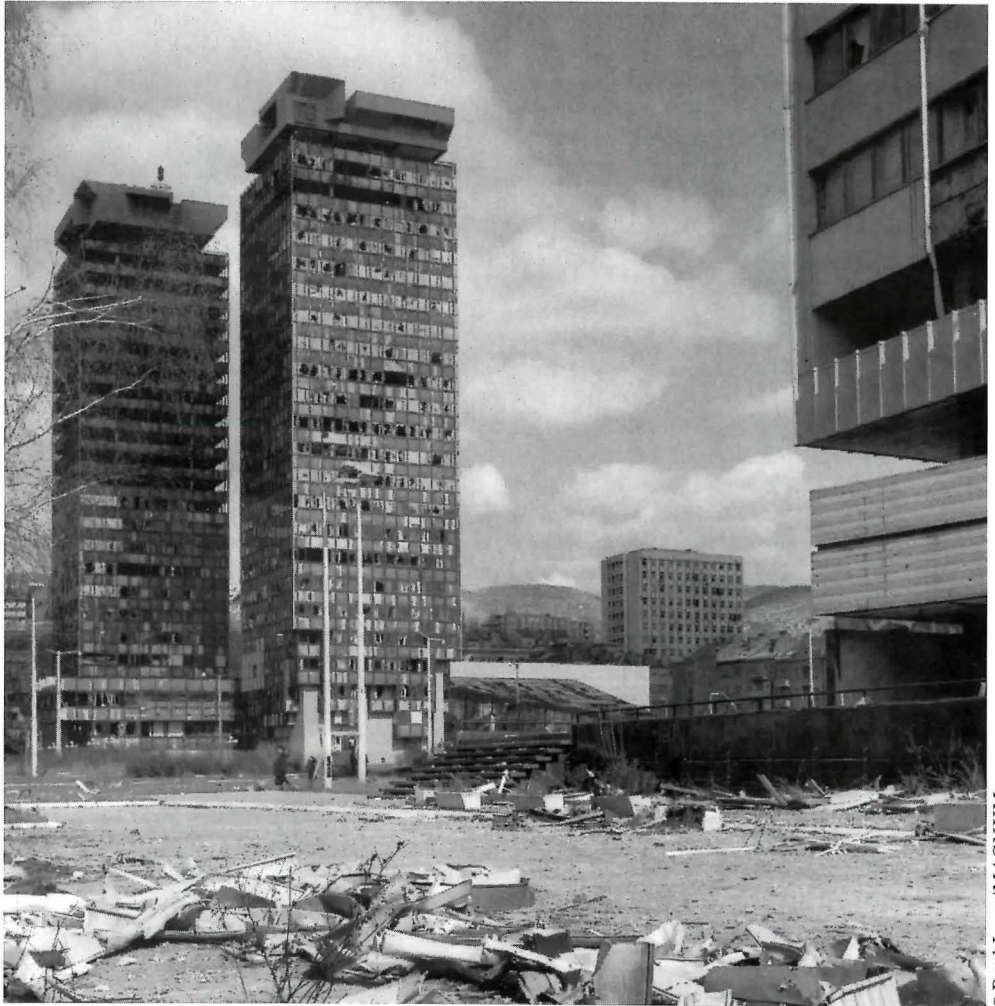
©Paul Lowe/MAGNUM
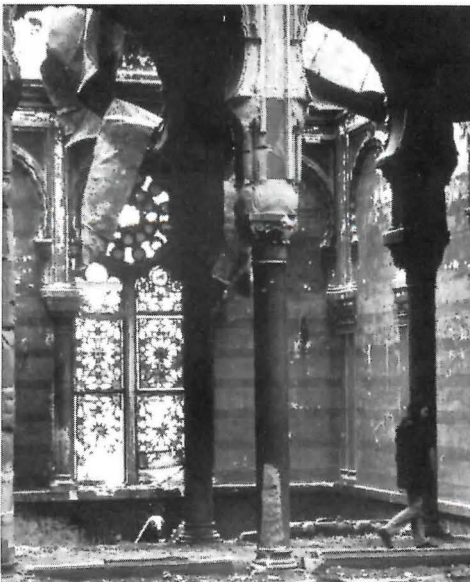
©Ekkehard Rehfeld

©Ekkehard Rehfeld

The ruined UNIS towers, once symbols of modern Sarajevo, today stand as icons of a different kind (top). Buildings with historical value, such as the National Library (left) have also been targeted by Serbian gunners. Architects and students present their work in workshops run by Woods and Mayne in a building battered by the siege (above).

Observations

work is, first of all, an act of solidarity. But they also bring fresh energy and ideas to a people worn out by the most difficult living conditions. This is a reality not always well understood by Americans, largely because the news media create the impression that Sarajevans have no life other than that of shivering, starving, and dodging shells or sniper's bullets.

Going to Sarajevo

At the request of Sarajevo architects Ivan Straus, Hasan Cemalovic, Tanja and Stjepan Ros, as well as theater director Haris Pasovic, Thom Mayne and I traveled to Sarajevo in March of last year. While I had already made several trips to the city since the Serbian invasion of Bosnia and Herzegovina, this would be Thom's first venture into the besieged capital. Funding was offered by the Soros Humanitarian Foundation, under sponsorship of the Research Institute for Experimental Architecture. The purpose of our trip was to conduct workshops with Sarajevo architects and students that would critically examine the condition of the city and its people, and possibly indicate some directions for reconstruction.
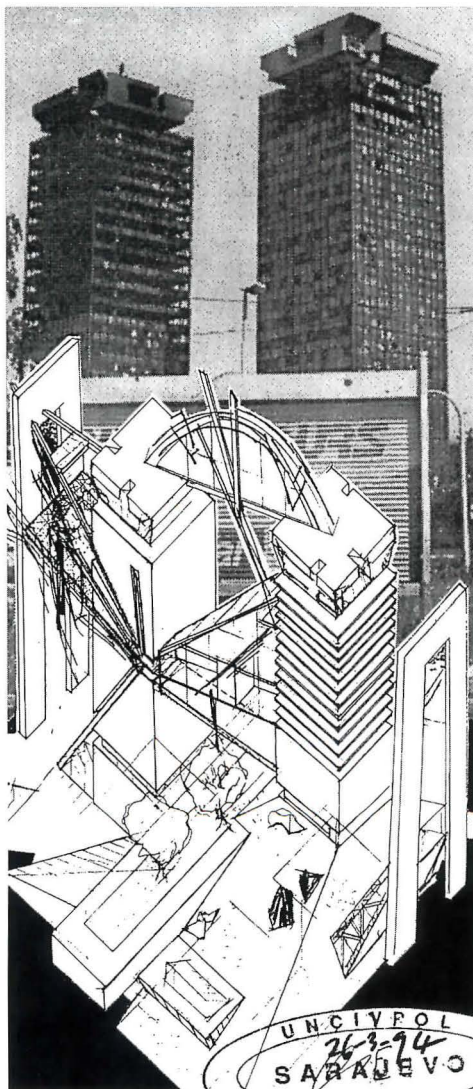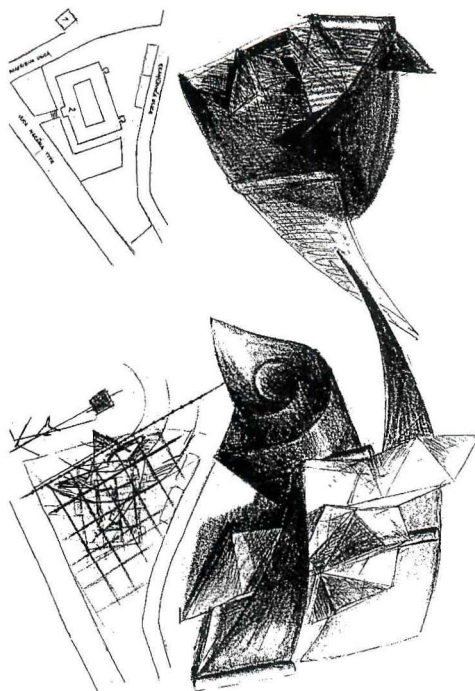
Thom and I were joined by Ekkehard Rehfeld, an architect from Vienna who had traveled with me to Sarajevo previously to make preparations. The three of us conducted workshops involving more than 50 architects and students.

Mayne's group looked at the city as a whole by dividing it into a grid of some 26 squares, each to be dealt with by a single participant. Rehfeld's group examined one of Sarajevo's major parks, which has been stripped of its trees for firewood during three bitter winters largely spent without electricity or oil, and is now being used in part as a cemetery. My group focused on how war-damaged sites and buildings might be rebuilt. In all cases, the emphasis was not on generating architectural designs per se, but on getting participants to think about specific parts of the city and actual conditions in new ways. Only then would it be possible to build affirmatively on the devastating experiences of the war.

Some of the designs that emerged from the workshops tried to confront those experi-

ences with symbols or memorials of one kind or another. These were the weakest ideas, as they merely invoked memories of destruction, without any transformation. The stronger work attempted to identify new relationships in the city's fabric revealed by the siege—usually juxtapositions of familiar elements jarred from their original relationships or thrown into dramatic shifts in scale.

For example, one group of participants used the traditional Bosnian house, which is arranged around a series of intimate courtyards, as the basis for reconstructing an entire block in the city center. Another envisioned the pieces of a blasted wall as an echo of the fragmentation created by Modernist town planning. And a third imagined a new type of greening in a barren park—where artificial trees are metaphors for nature and the design offers a setting for both recreation and reflection.

Fresh ideas on urban patterns

In these and other, similar ideas, the reconstructed city was imagined neither as a nostalgic echo of the old, nor as an abstract imposition. Rather, the questioning of existing purposes and assumptions forced on Sarajevo by the siege inspired fresh interpretations of the relationships among new and old urban elements and patterns.

The workshops ended with a presentation of the participants' projects in the Gallery of Bosnia and Herzegovina in the city center, attended by all participants, as well as many architects and other Sarajevo citizens. Feelings were mixed. The city was in ruins and still under siege. Electricity and water were sporadic. Food was scarce and expensive. Every day more people were being killed by snipers shooting into the city from the mountain ridges. Battle lines were still held against the Serbs by a lightly armed, but determined, army of Bosnian defenders. The people of Sarajevo, including those who gathered in the gallery, were still prisoners in their city, virtually cut off from the outside world.

It would be some time before any of this would change, and even longer before reconstruction could begin. It was not the moment to be self-congratulatory or even to say what

Lost in a nightmare

use the workshops would be to the architects and people of Sarajevo in the difficult task they faced. But the fact that the workshops happened clearly marked the beginning of an effort to confront this task critically.

The war in Bosnia-Herzegovina and the siege of Sarajevo have stripped away the superfluous and redundant elements that accumulate in peaceful times, exposing both the best and the worst in human nature. The worst is seen in the violence and cruelty committed by people who in other times would be condemned as criminals, but who rise to the surface when civil order is disrupted. The best is seen in the resistance of people to the brutalization of their cultures, families, and persons, and in the noble instincts for cooperation that must continually overcome fear and despair.

These are qualities found not only in Sarajevo, but also in London, Berlin, New York, Los Angeles, and Mexico City, wherever the forces of change are steadily and in some cases violently overturning an entrenched order. In Sarajevo, however, the best and the worst—creativity and murder—exist in such stark contrast that they are impossible to ignore. There, the struggle to launch new ideas is not an option, but a necessity. As a colleague of mine has said, "Violence has transformed the architecture, now architecture must learn to transform the violence." This challenge rings true far beyond the city limits of Sarajevo. ■

A project by Sasa Radjenovic and Dragan Martinovic uses old and new elements.
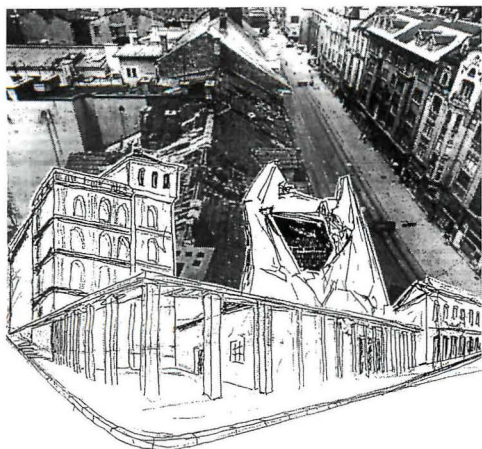
By Thom Mayne
The British transport plane's payload consisted of four pallets of flour, a Canadian nun, a British journalist, and myself—a Los Angeles architect who, I'll confess now, was full of questions as to what he was doing there. I had been pondering my role since I had accepted Lebbeus Woods' invitation to participate in some architectural workshops in war-ravaged Sarajevo. Clearly we architects were not equipped to help in any tangible way. Equally clear, we were too early to aid in any rebuilding that might happen later.

I had decided to travel to Sarajevo simply to lend my support to those who have lived in a city that for the last three years has been systematically cannibalized. I was drawn by the knowledge that Sarajevo had once been a model of cosmopolitan pluralism and was now

ture with meaning in an increasingly pluralistic world. Like many of my peers, I embrace the complexity that a heterogeneous population brings with it. Yet in Bosnia and Serbia, a multi-ethnic society has collapsed. People are killing others because they are different and are destroying any architecture which represents these differences.

It was in Sarajevo that I saw and appreciated the full power of architecture. Buildings that have deep meaning for people—a mosque, a library, a school—can be blown away by a lone gunner on a nearby hill. To live amidst the ferocity of this destructive force, even for just a few days, reminded me of how little time and energy it takes to erase the products of enormous effort. I think this was what made the most significant impression on me: that there are powerful forces attacking the many layers of intelligence, energy, and

> *"It was in Sarajevo that I saw and appreciated the full power of architecture. Buildings that have deep meaning for people... can be blown away by a lone gunner on a hill."*

under siege. What I found was a people who are innocently lost in a nightmare, as unable as I am to understand why.

It was this disengagement from good sense that struck me. On the one hand, the poetic-to-prosaic transformation of a city to military camp was evident. On the other hand, I found myself constantly confronted with the power of the human spirit to aspire to normalcy at all costs: three women walking hand-in-hand, a sidewalk café and the smell of espresso, children playing in a vestpocket park, women who had lost 20 percent of their body weight but still found it important enough to wait in long lines for overpriced tubes of mascara.

As a resident of Los Angeles, I have been involved in the struggle to create an architec-

Thom Mayne is a principal in the Santa Monica, California-based architecture firm Morphosis.

emotion invested in the city as architecture. This investment is the ultimate value of our work and provides a glimpse of how people live together in cities.

For four days I was immersed in a world marked by the sheer randomness of life. One person on a streetcar is killed by a sniper, while the other passengers remain unharmed. Relief convoys are allowed to enter the city one day, but not the next.

So it comes as no surprise that the collective tissue of ideas culled from the work of the 26 students in the design studio I ran for three days in Sarajevo was dominated by notions of chance, entropy, and randomness. But the students' work also showed interest in more mundane projects—restaurants and shops, for example—that express their longing for business as usual. The resilience of these students is a tribute to the diverse and cosmopolitan life of pre-war Sarajevo. ■

GRAB THE BRASS RING

The First Quad Concrete Floor Box

Here's another Raceway first … a concrete floor box in double duplex power configuration. Raceway's award winning Flush Top Design* adds aesthetics to function by maintaining the continuity of flush design throughout the building. The sliding service covers offer convenience and protection with "no-trip" safety.

To the delight of Architects and Interior Designers, the unit is available with a stunning carpet flange in pure drop forged brass (also available in all Raceway Flush Poke-Thru and Flush Raised Floor Fittings).

The Raceway Slide-Cover Concrete Floor Box is also available in single service power and a comm/data version

which accommodates four RJ-45's (Cat. 5). The small 3¼" height permits installation in cellular as well as non-cellular and slab type floors, another unique feature.

Grab the "Brass Ring"… Raceway's Flush Quad Concrete Floor Box is a winner. For further information, call or write:

Raceway Components, Inc. P.O. Box 1640, Paterson, NJ 07544 Telephone: (201) 279-1116. FAX: (201) 279-2410

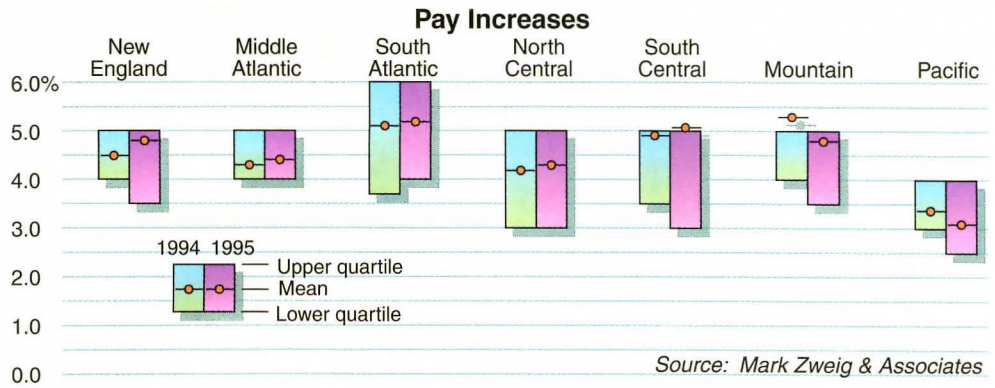*Roscoe "Product of the Year" Award.

rci RACEWAY COMPONENTS, INC.

Circle 24 on inquiry card

Indicators

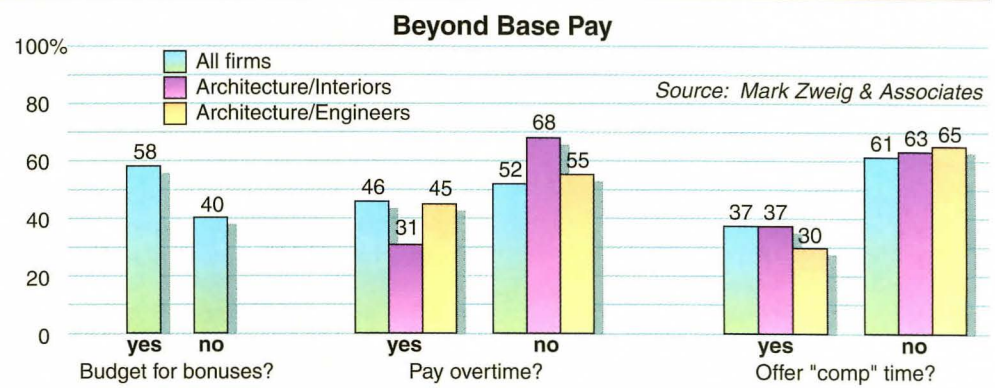### Budgeting for pay raises ticks upward

Firms in Mark Zweig & Associates' *Policies & Procedures Survey* are budgeting slightly higher median amounts for raises in 1995. Some firms, though, said they were budgeting for no raises, and one budgeted 20 percent. Only 70 percent of architecture firms actually budget for raises, says the survey (80 percent of A/Es do). Raises were lowest in the Pacific Northwest, which is typically the lowest-paying region. The survey costs $195 and can be obtained from Box 8325, Natick, MA 01760, 508/651-1559. ■

Pay Increases

New England · Middle Atlantic · South Atlantic · North Central · South Central · Mountain · Pacific

6.0% 5.0 4.0 3.0 2.0 1.0 0.0

1994 1995
— Upper quartile
— Mean
— Lower quartile

Source: Mark Zweig & Associates
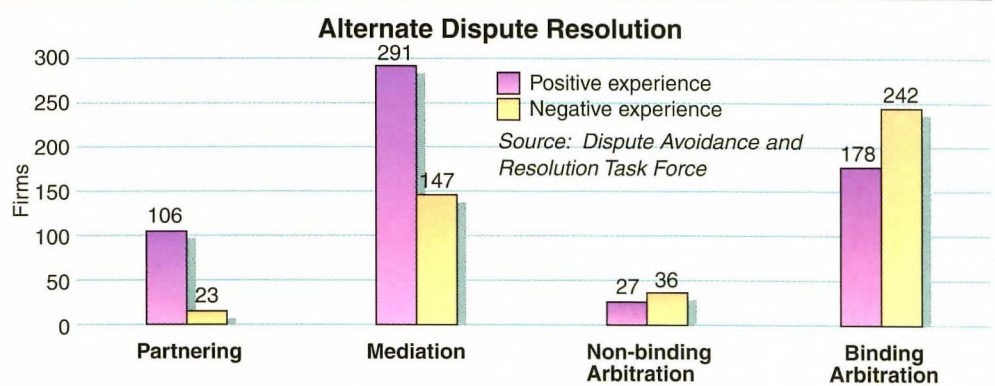
How do firms deal with overtime?

The Zweig survey described above also asked about means of compensating salaried (officially "exempt") employees in a profession where overtime work is a given. Though 58 percent of firms budget for bonuses, this does not mean the same percentage of firms pay them. The survey also shows that architects tend to offer overtime pay less often than do other design professionals and compensatory time off at about the same rate. Firms that pay exempt employees "hourly" have run afoul of labor laws. ■

Beyond Base Pay

100% 80 60 40 20 0

☐ All firms
☐ Architecture/Interiors
☐ Architecture/Engineers

Source: Mark Zweig & Associates

	Budget for bonuses?		Pay overtime?		Offer "comp" time?	
	yes	no	yes	no	yes	no
	58	40	46 / 31 / 45	52 / 68 / 55	37 / 37 / 30	61 / 63 / 65

Thumbs up to partnering, mediation

Respondents to a survey of attorneys, design professionals, and contractors endorsed partnering and mediation as alternate dispute resolution (ADR) methods. By comparison, those surveyed had had more negative than positive experiences with arbitration. Insurers, like DPIC Companies, one of the sponsors, have been promoting ADR to reduce costs associated with litigation. While relatively few of those surveyed had actually "partnered," they overwhelmingly predicted increased use of the technique. ■

Alternate Dispute Resolution

300 250 200 150 100 50 0

Firms

☐ Positive experience
☐ Negative experience

Source: Dispute Avoidance and Resolution Task Force

	Partnering	Mediation	Non-binding Arbitration	Binding Arbitration
Positive	106	291	27	178
Negative	23	147	36	242

Charts prepared by Leanor Glynn

Short Takes

• **Housing slides:** The residential market continued to show weakness, according to February numbers released by F. W. Dodge. Commercial work (except for office buildings) and institutional work (except for health care) held its own.

• **Where's that recovery?** New construction as a percent of gross domestic product has climbed from its 7.0-percent trough of 1991, according to the Commerce Department. It's now close to 7.5 percent—a far cry from its 1986 peak of more than 9.5 percent or the 9.3 percent of 10 years ago.

• **Construction costs under control:** *Engineering News Record*'s construction economics department records sliding lumber and gypsum prices in 1995's first quarter, while steel, copper, and aluminum are climbing rapidly. Labor raises remain in the 3- to 4-percent ranges. The metals prices are expected to ease later this year; gypsum and lumber reflect a declining housing market. ■

Where Print and Electronic Worlds Collide

By Elena Marcheso Moreno

From isolated rooms to monumental edifices, libraries have for centuries been the traditional repository of history and culture. Now the electronic revolution is thrusting the very concept of this institution into turmoil. The rapid expansion of information technology has overburdened the resources and physical space of libraries everywhere, as they struggle to stay current with new forms of communication—the Internet and other on-line services, CD-ROMs, and so on.

Redefining the library

With on-line access available for everything from legal citations and research studies to cooking and self-help, the need to consult printed materials and book-stack space is going down, right? Wrong. Electronic technologies actually ease the publishing of more printed materials. At the same time, librarians are increasingly called upon to decide the form in which information should be catalogued and disseminated. They must decide how to stay ahead of constantly changing technology.

Architects must not only understand how people will use a library at completion, they

Elena Marcheso Moreno, of McLean, Va., writes on architecture and its technology.

must anticipate the very different way patrons are likely to use it in a few years, says Geoffrey Freeman, principal, Shepley Bulfinch Richardson and Abbott, a Boston firm long prominent in the design of academic libraries. The vast collections of hard-copy texts that may never be converted to computer formats will always attract users to specialized research libraries, but these institutions are increasingly offering an array of computer-search devices to make material more available. Large public libraries, too, are turning to electronic means for accessing collections, but also offer training (as do some research institutions), so that patrons learn how to use sophisticated electronic-information tools.

Where libraries go wrong

The physical consequences of these changes are only now being addressed. Standards prescribed by states and organizations like the American Library Association have failed to keep up with the changing ways collections are used. Andrea Michaels, president of Michaels Associates Design Consultants, an Alexandria, Va.-based firm specializing in library planning, found that programmers too often assume a constant 5-percent increase in the size of book collections for a 20-year usable building life. But they fail to recognize the space or support needs of proliferating

electronic devices such as terminals, printers, fax machines, disk storage, manuals, and copiers. Other program issues often overlooked include space for both research and administrative-support activities; the physical area required for circulation security devices, coin changers, and storage of meeting room furnishings, out-of-service technical and media equipment, and supplies. Planning often lags code changes, with the result that some facilities didn't plan for—or understand the consequences of—requirements for sprinklers in stack spaces.

Michaels found recent libraries to be much larger than standards would have predicted. "We assumed that either the architects had designed inefficient buildings, with too much area consumed by atriums and dramatic lobbies, or that the engineering disciplines had increasing appetites for space." But the firm found that new libraries added technology faster than anticipated by even the most ambitious projections, and that virtually every staff and user workstation needed more surface area for better efficiency and ergonomics. Too many institutions couldn't easily respond to changing needs.

Even in relatively new facilities, Michaels Associates found lighting that was too dim in stacks, too bright in study areas (where

adjustable light fixture
pop-up power and data outlets
leather writing surface
wire chase
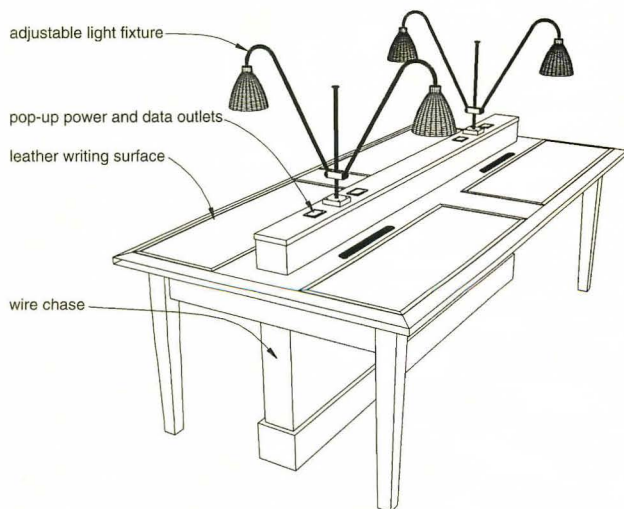
The long-predicted end of printed books is still not upon us. Libraries, however, have become the testing ground for the architectural accommodation of numerous electronic technologies.

direct lighting causes computer-screen glare), or completely lacking at seating near windows (making the seats useless at night). In addition, hvac systems often lacked adequate filtration capability where large quantities of dusty print materials were handled, and weren't flexible enough to handle erratic use patterns. (In universities, high use is between classes; in public libraries, it's at lunchtime, after work, and on Saturdays.) While laptop computers and more-efficient lighting permit some downsizing of mechanical rooms and duct space, more space is often needed for communication devices and electrical closets. The Americans with Disabilities Act requires wider stack corridors and careful exit design, including places of refuge near stairs and elevators.

Fire- and life-safety systems have also become more complex, with space and cost implications. All libraries now use sprinklers for fire protection, says Mario Boiardi, a partner with Hartman Cox, in Washington, D.C., because wet books are better than burned books. (They can be salvaged at facilities such as the General Electric Space Division at Valley Forge, Pa., which freeze-dries soaked books, often returning them to their former condition.) Halon extinguishing systems, once used in some rare book areas, have been phased out. Current practice, says

Boiardi, is to use pre-action air-filled sprinklers so that water is not accidentally released during maintenance or if pipes leak.

"Building programmers and library directors can expect space needs to be 300 percent of what they were two decades ago," says Michaels. "Doubling current areas won't provide for growth or change in service deliveries. In addition to more space for electronics and associated equipment, dead-end aisles will need to be 5-ft-wide so wheelchairs can be turned around; all others, between 3-1/2- to 4-ft-wide. Then, too, it is no longer possible to put files or storage close to exits. All of this means less efficient use of square footage in libraries from a programming point of view."

Shelving more in less space

As more information becomes available on-line, some books and periodicals are used less frequently, but not so infrequently that they belong in an archive. Compact storage is helping to shelve these printed materials in condensed space that is still accessible to the library patron. Compact shelving consists of four or more vertical shelving units on a track. Normally nested together, the units can move on the track to make an aisle when a user needs access to a given shelf. The system radically shrinks the floor space

needed for occasionally used stacks. While compact storage has typically been used in library-staff areas, it's seeing increased use in public spaces. Despite higher cost, it's finding a market within libraries where physical expansion is difficult.

Compact storage is not a panacea. Boiardi says he finds himself relying more and more on compact storage for university and specialized libraries, but points to some easily overlooked pitfalls. "Because of more concentrated loads, floors must be stronger," he says, and ceiling heights must permit sprinklers to cover every "aisle." He estimates that the combination of these elements means that compact storage requires two feet more floor-to-floor than conventional shelving. If other programmatic needs mean that ceiling heights in stack areas must extend to other spaces, the cost premium for the compact system is even higher, Boiardi explains. Another way to cope with space limitations is to move off site materials that have been superseded by electronic access. Such material can be kept in less-expensive, off-campus, industrial-type buildings, says Boiardi.

A library experiment

Opening its doors for the first time last September, the Leavey Library at the University of Southern California was designed by

Courtesy Meyer Scherer & Rockcastle

Clearing the Senate's info cobwebs:

The uneasy fit of electronic technologies within research facilities is all too evident in the U. S. Senate Library, where staff works under conditions shown, documented by architects Meyer, Scherer & Rockcastle. Staff will get new and better space. And users will find tables equipped with adjustable task lighting, power outlets for laptops, phone lines for modems, and jacks for data (drawing opposite). Leather inserts offer an optimum surface for increasingly quaint handwriting.

Some say expanded space for books and periodicals will soon be superfluous. Others contend that computers will actually make printed resources more useful if they are too expensive to digitize.

Shepley Bulfinch Richardson and Abbott as an experimental facility that recognizes how technology is changing the research library.

Housing more than 125,000 volumes and 1,200 seats, paper-based and electronic information coexist at Leavey. At grade, a conventional reserve area offers a quiet environment for students to use paper-based materials on their own. Students using the three conventional stack levels can also plug laptop computers into study-carrel outlets, offering the best of the electronic and hard-copy worlds. The Information Commons, one level below grade (this page and opposite), is a much noisier place, as students work individually or in groups of up to 10, using desktop computers not only to locate printed information, but to do electronic research using on-line resources like the Internet. To help students learn to use electronic tools, training areas and an auditorium equipped with audio-visual equipment are nearby.

The planning and construction of the $28-million library took place under the direction of Peter Lyman, now head librarian at the University of California, Berkeley. "We discovered that students tend to work in clusters, so we switched our focus to groups to how the computer could be introduced to help them learn better," explains Lyman.

A new look at old libraries

Renovating older libraries presents unique challenges, but the architect can respect traditional library spaces while easing users onto the information superhighway. Jeffrey Scherer, of the Minneapolis firm Meyer, Scherer & Rockcastle, is in the midst of moving most of the U.S. Senate Library from a historic location within the Capitol to the Dirksen office building. Computerized technology is critical in this library, where staff members keep one eye on C-Span and the other on documents of major historical significance. "American culture is seduced by new technologies and tends to throw out the old," says Scherer. Preferring peaceful coexistence, Scherer sees no conflict in placing a facsimile machine or computer workstation on a traditional-style table equipped with integrated wire chases. Esthetic diversity has often been a hallmark of historic libraries, he explains.
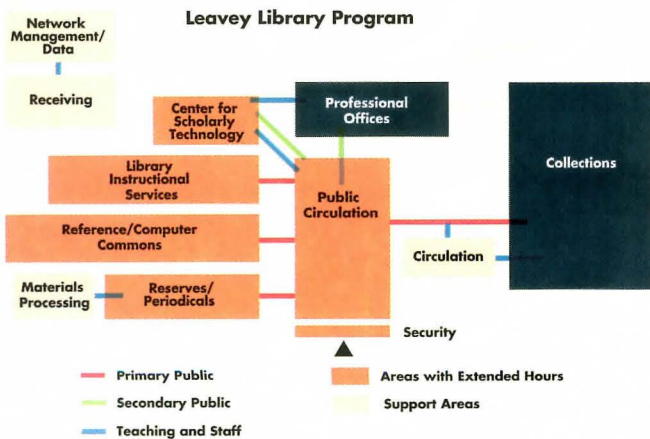
A new focus on lighting

In planning renovations for existing buildings, lighting should be carefully considered, says Scherer. Appropriate task lighting at carrels, tables, and computer stations can deliver higher quality lighting at lower operating cost. (Roughly 50 percent of the energy consumed in libraries is for lighting.) Reducing the heat gain from lighting can offset the

load added by computers and monitors. Scherer suggests using motion-detectorload switches to reduce energy use in study and conference rooms. Automatic dimming systems can step down lighting where there's enough daylight. Lighting quality can be enhanced with higher (but not too high) wall reflectance, fixture locations that reduce glare, combinations of both direct and indirect lighting, and avoiding large brightness ratios.

Lighting also needs to be flexible to account for changing uses of space. At the Brookdale-Hennepin Library in Brooklyn Park, Minn., Meyer, Scherer & Rockcastle used ceiling lighting fixtures that slide on tracks to new locations without needing rewiring or complicated re-installation.

With students demanding electrical and data outlets at virtually every table and carrel, adding electrical capacity and handling wiring is becoming more of a headache, especially for older buildings. Power redundancy or uninterruptible power systems may be required to protect a library's high-value electronic data. As cabling systems change, administrators find it costly to remove older wiring, but it's usually best to do so. As cable trenches and chases fill, it becomes very expensive to track what's in use and what's

Chart drawn by Michael J. Thibodeau

Leavey Library Program

- Network Management/ Data
- Receiving
- Center for Scholarly Technology
- Professional Offices
- Library Instructional Services
- Public Circulation
- Collections
- Reference/Computer Commons
- Circulation
- Materials Processing
- Reserves/ Periodicals
- Security

— Primary Public   ■ Areas with Extended Hours
— Secondary Public   ■ Support Areas
— Teaching and Staff

© B. Goyette

Changing the way libraries are used: *The programming diagram (above left) for the Leavey library, at the University of Southern California in Los Angeles shows how space needs* *and usage are changing in response to electronic technologies. Though conventional stack space is still the largest program element, the building must accommodate* *considerable space for an Information Commons (above) to support on-line research. Print reference material is also found at the commons. It's staffed with professionals who can field* *reference queries and computer-search queries. "We tried to distinguish the reference area and the computing area and staff them independently," says Shepley Bulfinch's Geoffrey*

abandoned (though, software, of course, can come to the rescue). It costs even more to add the space to accommodate more wires.

A future for print?

Some say expanded space for printed resources will soon be superfluous. They contend that as more and more information is converted to electronic storage, the "virtual" library—accessed on-line from wherever researchers and students are—will take the place of the library as a discrete physical building. Some research areas are already highly oriented to electronic information, such as New York City's Columbia Law School. Lawyer and reference librarian Francine Alfandary says that a great deal of the current information students need is available electronically, but she predicts a long future for her library's vast print resources, because the law, in particular, demands serendipitous idea generation. Thumbing through volumes of citations often proves more "efficient" that the highly focused searches that computers do best.

Yet Berkeley librarian Lyman sees a virtual library as already a possibility in some sciences. On-line subscriptions to science journals—which are proliferating as research delves into ever-more specific subjects—could prove cost-effective, lowering skyrocketing costs for subscriptions, shelf-space, and cataloging.

The rapid change in electronic technologies introduces new costs and management headaches. Both Michaels and Boiardi point out that there's little data available on the usable life of electronic storage methods. Disks and tapes degrade; information must continually be indexed and backed up. Someone will need to maintain old software and "ancient" equipment to access data too expensive to transfer to newer technologies.

Industry experts estimate that less than five percent of all information is available in electronic formats. Contrasted to the typical dimly lit computer-study area, the work of reading books is eased by the ability of a well-designed library to provide natural light and a pleasant view. Further, Charles Henry, director of Vassar College Libraries, notes that "Colleges and universities boast of the size of their collections when seeking to attract the best students and faculty to the institutions." Electronic sources may ultimately push out much that is now printed. According to census figures, though, the number of books printed doubled in the last nine years, and the U.S. Department of Commerce reports that 1.2 billion more books were sold in 1993 than the previous year.

Ironically, just as pundits confidently predict a future for the library as a placeless information supermarket, the library as a physical fact is becoming more important. Gate tallies show increased usage at all libraries, says Lyman. In fact, it's rare to go into a public or university library and not find it crowded.

But the image of the library as silent cathedral to solitary contemplation is giving way to a more community-oriented vision. In newer suburbs, libraries increasingly provide the social focus that Main Street or the village green once did. Recognizing this, Freeman, of Shepley Bulfinch, designed the library at George Mason University, in Fairfax, Va., around an espresso and cappuccino bar. It has become another place where social networks are established and intellectual exchange happens.

Since libraries must accommodate more print resources *and* more electronic data, institutions are already facing a severe budget crunch. Worse, public-funding cuts for libraries are in the offing at virtually every level. But as demand for library services increases, library administrators hope users will recognize the need to fund them appropriately. "People's thirst for high fidelity, immediate, and accurate information—in any form—is unquenchable," observes Scherer. ∎

1. Information Commons
2. Group Work
3. Training
4. Auditorium

GROUND LEVEL

50 FT.
15 M.
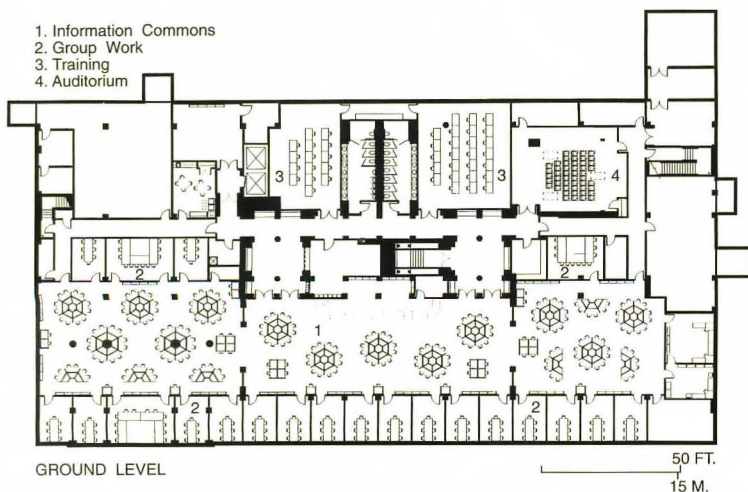
Freeman, "but we found that users asked library questions at the computing area and computing questions at the reference area."

© Jeff Goldberg/Esto

Out of the computer closet: Screen glare doesn't occur at the bottom of a deep, daylit atrium, making it comfortable to use the computerized card catalog at the Joseph S. Stauffer Library at *Queens University in Kingston, Ontario. The library's architects, Kuwabara Payne McKenna Blumberg, concealed wiring for the terminals within the table.*

A Guide to Architectural Art Glass

by Stephen Knapp

From hand-formed stained glass to today's curtain walls, glass has always been a part of the built environment. In the United States, the heyday of decorative glass came in the second half of the 19th century, as glass became a more-affordable commodity, and both commercial and residential commissions became popular. In the face of Modernism, though, etched (sandblasted) glass survived tenuously, stained glass increasingly was relegated to religious commissions, and the use of art and decorative glass nearly disappeared entirely.

The resurgence in contemporary crafts in the late '60s and early '70s was perfectly in sync with a return to historic materials by the Postmodernists, encouraging a new generation of artists and craftspeople working in glass. New energy requirements and an increased understanding of the physics and

Some new glasses for the built environment have been found by architects and designers searching for new materials—glass artists exploring possibilities have provided others.

physiology of light placed new demands on glass itself. For example, how could glass provide a higher level of privacy while still transmitting light? Can stained glass meet impact requirements? In healthcare environments, was there a way to infuse the room with light, and still have a soothing setting?

What follows is a brief overview of some of the glass treatments available to architects today, many of which have been created to respond to these appearance, maintenance, energy-efficiency, and safety issues.

Etched glass
Etched glass, usually sandblasted glass, is the most common of the architectural art

Using kiln-formed and cast glass, ceramics, steel, stone, etched and painted metals, Stephen Knapp's work includes architectural art glass, sculpture, murals, and lighting.

glasses. It is less costly than other forms of art glass and is readily available. Artists, draftspeople, or monument carvers routinely execute work for architects. By first masking and then sandblasting surfaces, all sorts of patterns, designs, and lettering can be frosted on glass, making it ideal for dividers, walls, and signage.

Etched glass does have maintenance and strength disadvantages. Fingerprints are difficult to remove from sandblasted surfaces, so an overcoat—often clear with a touch of white—is usually applied to the glass. Most sandblasting, done to a piece of tempered glass, only frosts the surface, and cannot achieve deep carved effects. Sandblasting also weakens the glass.

Stained glass
Stained glass, the most traditional of decorative glasses, returned to public, private, and commercial buildings with a vengeance in the '70s and '80s. One of the most telling changes has been the larger scale of installations, especially in secular settings. Whole facades of buildings have been covered with stained glass, and large atriums have been a major focus for its colorful plays of light. In this type of architectural use, stained glass performs the same function as the standard glass it displaces, and creative designers can build on a project's existing glass budget to reduce the cost of stained glass.

With new adhesives and laminating techniques available, faceted glass and prisms have been combined with stained glass for a new look. As art glass has boomed, new manufacturing companies have started up, offering a rich palette of glass products for the artist. Although stained glass is usually not suitable for tempering, due to the imperfections in the manufacture of hand-made

glass, it can often be laminated. This creates more opportunities for the architect and designer, not just for the glass artist, because larger lights can be used. Sheets of stained glass are not available in commercial sizes, but design that accommodates smaller pieces can be quite effective.

Kiln-formed glass
Kiln-formed glass is flat glass that has been heated just enough to cause it to slump or sag over molds, giving it a sculptural, bas-relief effect quite unlike any other form of glass. The glass surface retains a smooth finish, while the underside picks up the texture of the mold material. Unlike cast glass, it can be worked in architectural sizes, with 3- to 4-ft widths by 6- to 8-ft heights possible.

Glass this size is usually worked in 1/4- to 1/2-in. thicknesses for architectural art glass, and can be fully tempered. Because there is no removal of material as in sandblasting, it retains its strength, and can be easily cleaned and maintained. With its ability to diffuse light and give privacy, kiln-formed glass has become an important architectural material in doors, walls, and windows. A major advantage of kiln-formed glass is that it can be tempered, drilled, notched, and fitted into metal rail systems—making a significant design statement while keeping the strength and functionality of commercial glass.

Cast glass
Unlike kiln forming, which uses existing sheets, cast glass starts with glass in a liquid state which is poured into a sand mold or form. Its main advantages are the thickness of glass which can be achieved and the variety of colors available. A major disadvantage is the limitation on the sizes that can be worked. Although there have been huge pieces of glass cast—giant telescope lenses and the like—the annealing time required makes these impractical for ordinary use. Artist John Lewis may be unique in working with large-scale pieces of cast glass.

There are a few manufacturers currently casting glass for wall and floor tiles, with a variety of colors and designs, and they offer plenty of opportunity for customizing by the architect. Artists, for example, have created walls of cast-glass blocks.

Glass artist Stephen Knapp describes new-wave versions of an ancient architectural medium.

Dichroic glass

One of the newer players in the glass field, dichroic glass became available in the '80s. Essentially a metallic coating on glass, its primary use has been in scientific instruments, enlargers, and landing lights. Artists and architects have discovered it, and used it in large art installations, as a coating on conventional glass, and on slumped glass and commercially available glass block. Though used for its ability to refract color into a space, it is dramatically different from stained glass. The light that passes through the glass is so strong that it "paints" a line across all it touches, while the opposite color reflects off the glass surface. It constantly changes color throughout the day, depending on the angle of light passing through it.

Commercial glass

Besides the art glass discussed above, there are other exciting glasses available which are greatly underutilized. Vitrolite, also known as Carrara glass, is a thick, homogenous opaque structural glass once used for storefronts. This material and some other older glasses are still available in limited quantities for those patient enough to find them.

There are a number of machine-rolled glasses on the market, produced both here and abroad, and quantities of older textured and patterned glass can still be found hidden away. Less expensive than custom glass, they have a vitality often lacking in today's plate glass. The texture is rolled onto the glass, giving them a uniformity that stained glass does not have, and the sizes available are more appropriate for commercial work. New laminating techniques permit whole new forms of glass: combinations of machine-rolled glasses "glued" into a single light. For a unique piece of glass, without the cost of a custom art glass, machine-embossed glass can be the answer.

From Italy comes handmade Venetian-glass tiles and panels made to be used in buildings. Japan produces innovative products such as crystallized glass, and Germany makes opal glasses that transmit a wonderful diffused light and can be used for ceilings.

Also interesting are laminated glasses made with tinted or screen-printed interlayers.

Rice paper or other thin materials can be sandwiched between glass layers. Multiple colors can be added to the PVB interlayer itself, and any type of design can be silk-screened on, including even the halftone dot patterns of photographs. This process has been used to simulate etched glass, creating a low-maintenance frosted effect. Fritted glass, with a ceramic paint baked onto the surface, provides additional decorative and glare-control opportunities.

Glass block

Glass block has also seen a resurgence, with a wide variety of shapes and designs available. Although considered a masonry product, and installed that way, there are companies offering metal framing systems that are changing the way glass block is used. Combining these installations with fiber-optic and other lighting techniques makes block even more attractive.

Commercial glass installers

Don't overlook innovative plate-glass installations. Glazers such Trainor Glass in Chicago are sought out for their ability to do unique installations. They offer triple-laminated translucent or reflective glass in ceilings, and have done pie-shaped glass staircases. They can also create an unusual look by simply sandwiching a layer of wire mesh between two layers of plate glass.

New directions

Many of the trends in glass for the built environment have been driven by artists, often with a nudge from architects and designers. In the future, new technology, craftsmanship, and collaboration will be the guiding forces behind an even newer wave of glass. ∎

1. Stephen Knapp: 9- by 28-ft kiln-formed-glass wall for the Brunswick Corp.
2. Stephen Knapp: illuminated formed-glass structure; United Air Lines, Dulles Airport.
3. Ed Carpenter: Etched- and painted-glass wall, 19- by 19 1/2-ft; University of Wisconsin, Madison.
4. Ed Carpenter: 60- by 50- by 40-ft sculpture of dichroic glass and glass prisms; Human Resources Building, Salem, Ore.

A bibliography of architectural-glass sources appears on page 121.

1

2

3
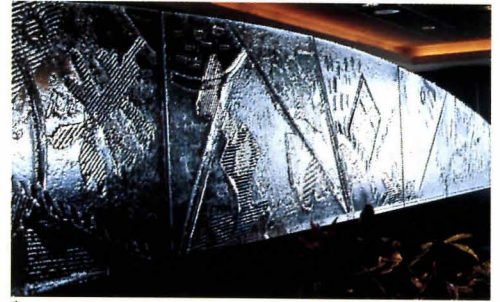
© Greg Anderson photo.

4

© Grants/Johnston photo

Electronic Persuasion

First Prize:
The Middle Passage Project

Delineators: Gregory Anderson and Lawrence Sass

The winners, students at MIT's school of architecture, created an animation of a yet-to-be-built monument designed by the Boston architectural firm Stull and Lee. (The winners were offered a choice of BAGH Technologies' Architrion II, release 5.8, or Graphisoft's ArchiCAD 4.55; both are powerful integrated software packages, available on several operating systems.) The Middle Passage was the route slave ships used to transport Africans to the Americas. The computer animation describes the visitor experience to potential donors or patrons.

Beginning with arrival by boat (top left image), the "tour" moves the visitor around and eventually into the memorial (top right and opposite top images), where the interior of a broken cube describes the lives and cruel experiences of the millions of Africans who passed this way (and the many who didn't survive). "It's not trying to do anything beyond clearly presenting the project to the public," juror Manuel Fernandez-Casteleiro commented. (Because the entrants were students at juror William Mitchell's school, he did not discuss or vote on the project.) "It's presented very convincingly," said juror Chee Pearlman. "It understands the symbolic nature of the project. There are no gimmicks."

Computer: DEC 5000 Workstation; SGI Indigo 2 Workstation
Software: Autodesk AutoCAD 12; Radiance 2.3
Output: VHS tape
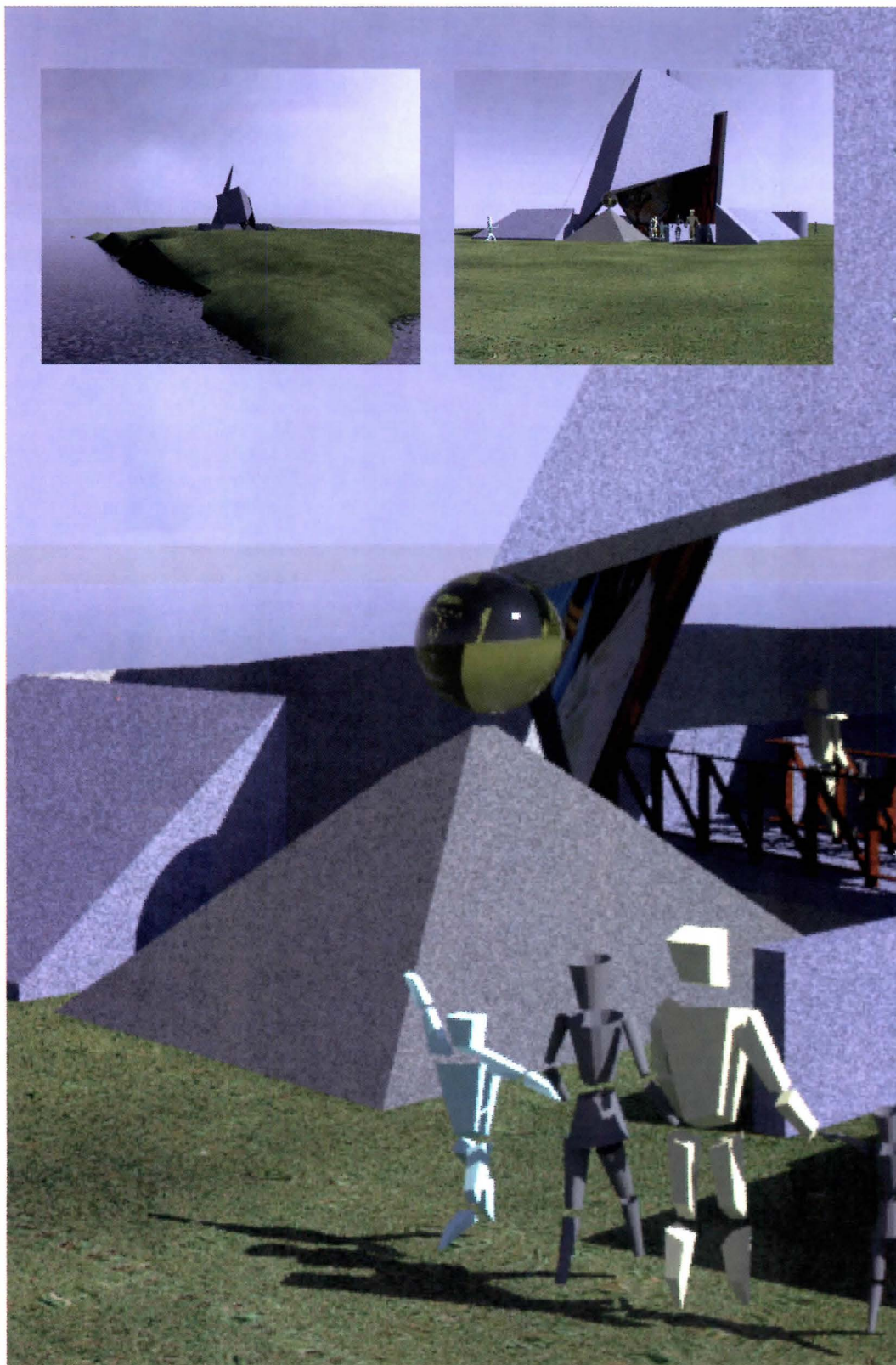
For the second year, RECORD recognizes the computer as not just a production tool, but as a means of exploring design options and creating presentations for clients and colleagues.

This year jurors found many presentations to be so accomplished as to look almost canned. Discussion of this year's entries will be found after the pages showing the winners.
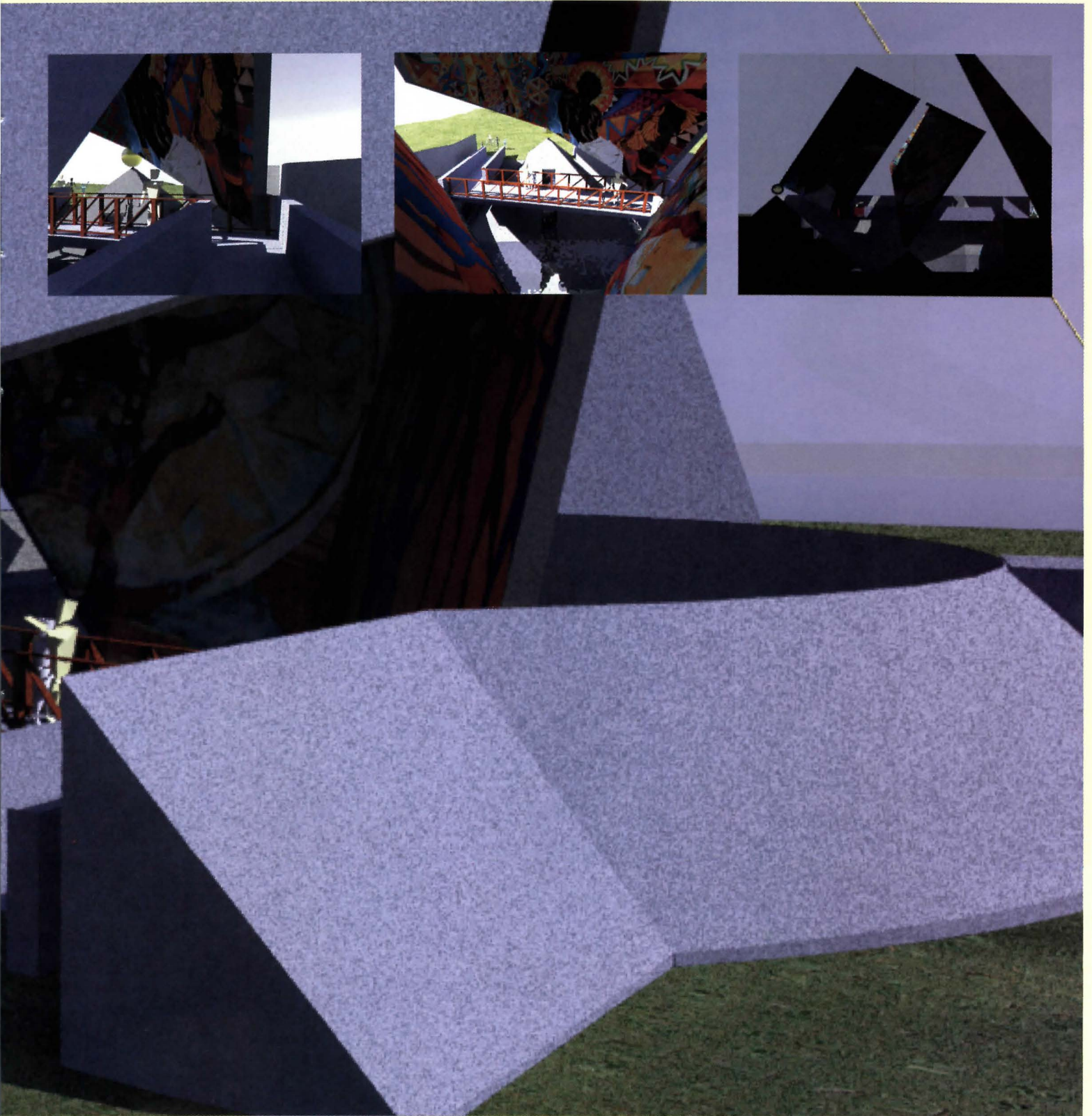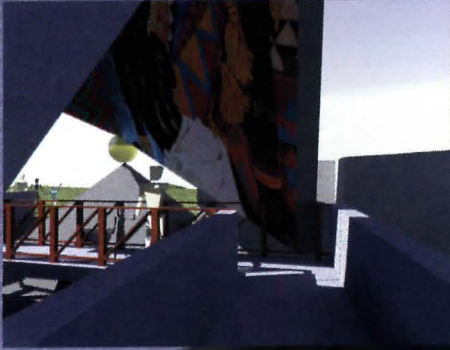
A selection of printed images demonstrates a restrained use of lighting and rendering effects.

Second Prize: Projects of Richard Meier & Partners, Architects

Delineators: Greg Reaves and Timothy Collins Douglas

Among hard-copy entries, the jury quickly focused on several images submitted by the office of Richard Meier. The ones chosen to receive the second prize are the city hall and central library of The Hague, in Holland (1, right), an office tower in Houston (2), both delineated by Reaves, and the Euregio office and retail building in Basel, Switzerland (3), delineated by Douglas. The firm submitted three other images that the jury admired, among them a perspective section of the Museum of Ethnology, in Frankfurt am Main, Germany, also delineated by Reaves (4).

The entrants exploited the strengths inherent in the software, noted the jury, using easily rendered, flat, saturated colors to good effect in the Houston project, for example. The winners "shift gears when appropriate," Pearlman said, using lighting, reflectance, and luminosity effects with restraint in the Hague project. "This is what the computer can do for you," enthused Fernandez-Casteleiro. The winners received a $2,000 cash prize offered by RECORD.
Computer: IBM RS6000 Model *320H*
Software: IBM Architecture and Engineering System Version 1 Modeling and Rendering programs
Output: Iris 3047 large-format ink-jet printer

1
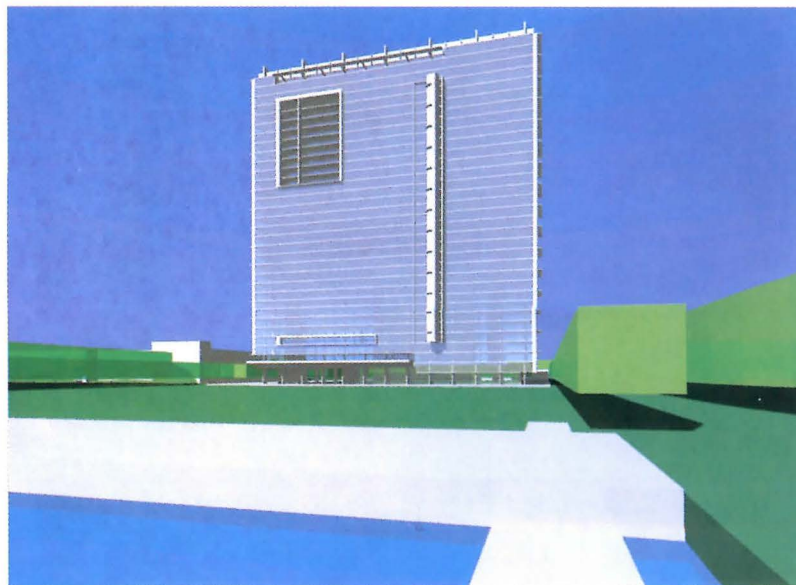
2

3
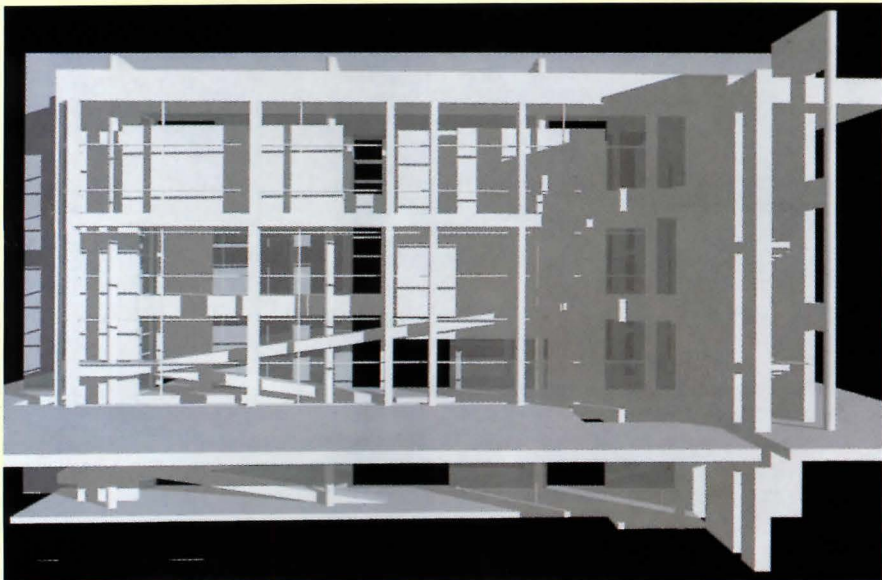
4

Beneath this entry's apparent whimsy, the jury found a serious exploration of the way both a "virtual" and an actual library might be designed in the near future.

Third Prize: Architecture as Information

Delineator: Drew Miller

The entrant, a student at the Savannah (Ga.) College of Art and Design, submitted an animation proposing that virtual reality makes possible a three-dimensional "architecture" of information (1, right) through which the user can move.

Using a whimsical soundtrack and some tongue-in-cheek imagery, the animation takes the viewer from a barely conventional concept of a library (2) to a free-flowing spatial one, where a design project's physical site is not only shown on maps of various scales but evoked through historical association (3). The site rises out of the maps (4). Program elements are expressed as volumes in space (5), which re-form themselves at ground (6).

Miller designed and studied his proposal in computer-model form (figure 5 shows a shaded mode; 6 adds a wire frame). Additional images were scanned or import-

ed from Excel and manipulated in Photoshop. The maps, for example, were defined as materials and applied to surfaces.

"Here is someone who has totally fallen in love with computer animation," commented juror William Mitchell. "There's sheer joy in it." Juror Fernandez-Casteleiro wasn't sure what the architectural message was, but saw it as a different exercise: "What's to be lauded is not just that he went from the page to the model. He's asking, how can I tell a story?" Pearlman called it "a real leap, where the technology comes into its own." Miller won a $1,000 prize offered by RECORD. He worked with instructors Jim Goodlett and Fernando Munilla.
Computer: PC-type Pentium 90mhz notebook; PC-type 486-66mhz imaging station
Software: Datacad 6.0; Stereo-CAD Realtime (virtual-reality interactive application); Autodesk 3D Studio; Adobe Photoshop; Microsoft Word and Excel
Output: YEM CVS-980 Scan Rate Converter; Sony EVO-9650 Hi-8mm video deck; Xerox Color Fiery 5775 (prints)

1

2

3

Drew Miller's entry considers a "design" for finding information in cyberspace (right), then transports the viewer to a physical site and proposes an architectural massing (opposite).
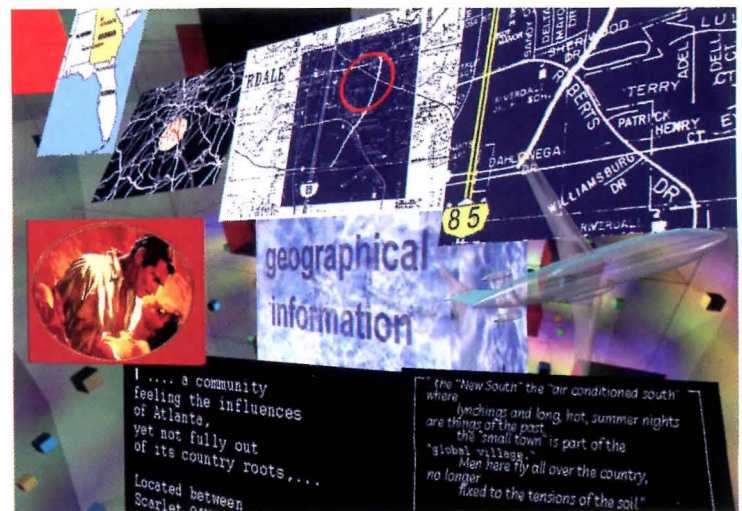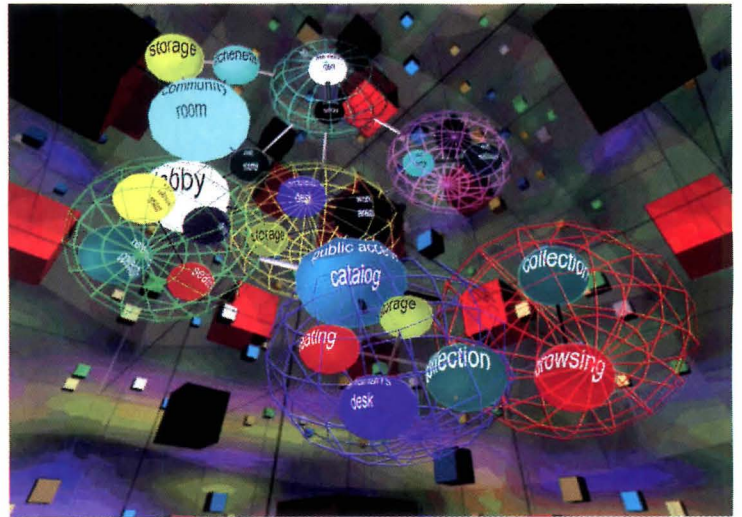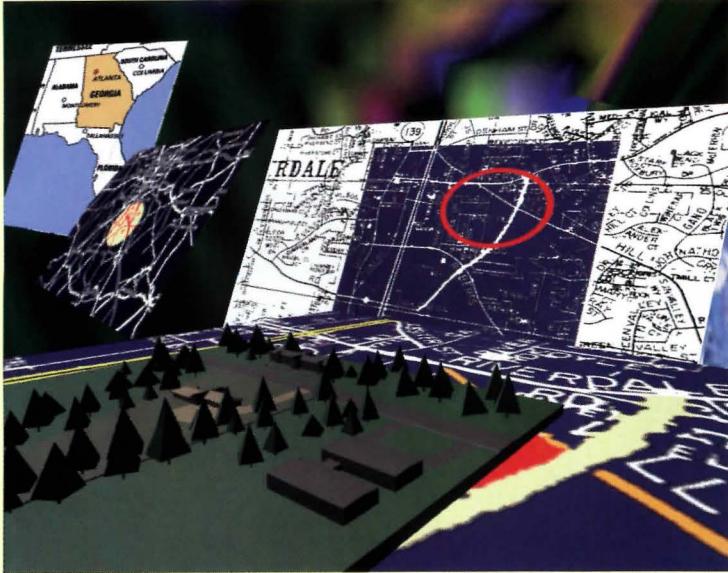
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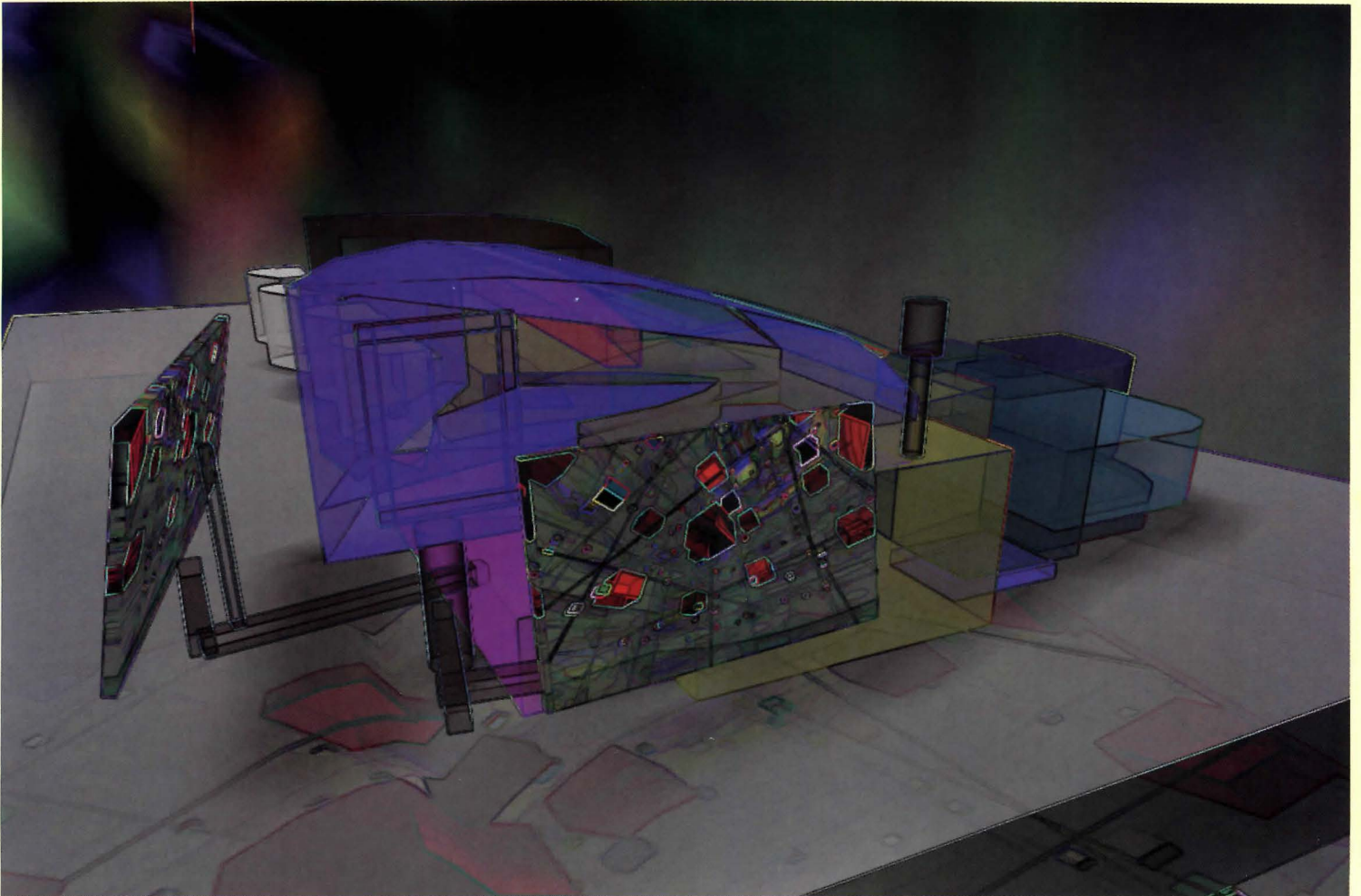
6

Two images below were permiated for clarity and technical finesse (1 and 2). Others represented a unique perspective on a project (3 and 4).

1

2
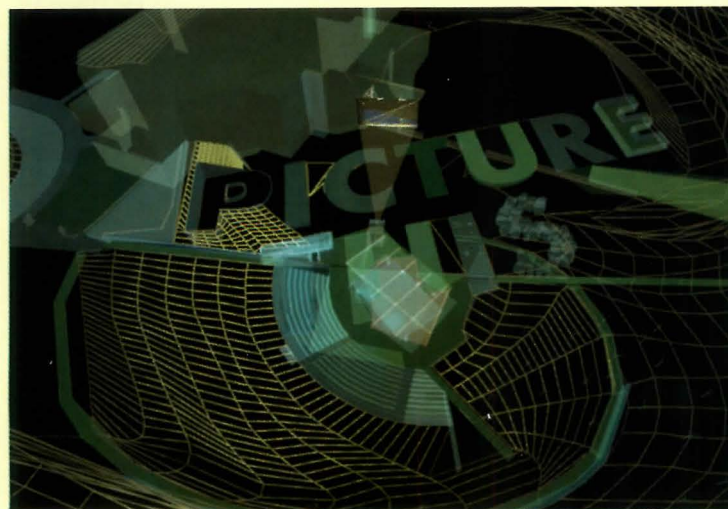
3
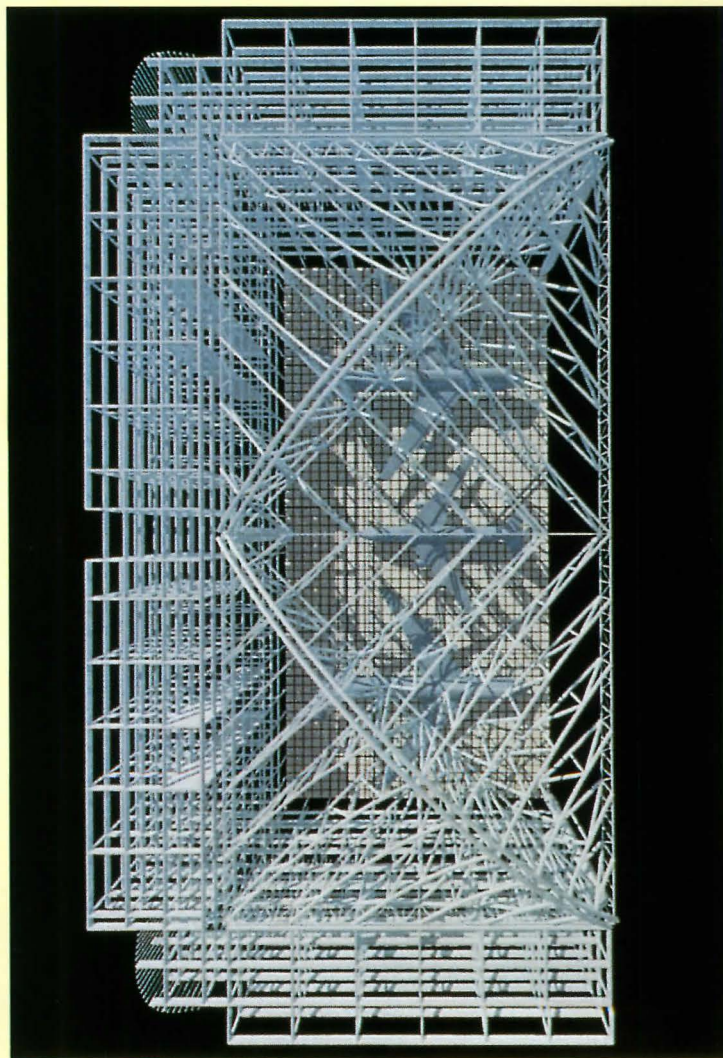
4

Cinematic Architects

Honorable Mentions

Along with the main prize winners, the jury commended the images opposite.

1. 66th Street Subway Station Rehabilitation,
New York City
Entrant: Pete S. Bochek, PSB Imaging, for Lee Harris Pomeroy Associates, architect
Computer: IBM RS6000 Model 530
Software: IBM Architecture and Engineering Series modeling and rendering program
Output: Iris plotter

2. MGM/Bally's Monorail Station
Entrant: Eric Hanson of Gensler Associates, Santa Monica, Calif.
Computer: Silicon Graphics Indy 4400
Software: Alias Power Animator
Output: Fujix photography

3. "Picture This," an animated tour of the proposed North Carolina State Museum of Art
Entrants: Henry Smith-Miller and Laurie Hawkinson of Smith-Miller + Hawkinson, Architects. Collaborators: Barbara Kruger, Nicholas Quennel, Guy Nordenson, Jim Venturi, Noah Carter, Selim Kober
Computer: PC-type
Software: Autodesk AutoCAD 12; Autodesk 3D Studio
Output: Video tape by Beta St Video; National Cave Art

4. Korean Airlines Operations Center, Seoul
Entrant: Scott Sarver of Skidmore Owings & Merrill, Chicago
Computer: IBM RS6000
Software: IBM Architecture and Engineering Series modeling and rendering program
Output: TGA file to slide ■

As one of this year's Computer Delineation Awards jurors noted, current imaging programs certainly can create presentations that evoke a client "Wow!" But does the state of the hardware and software art obscure or illuminate the design? The jury came back to this question again and again in considering the 80 entries received. (A testimony to the information-dissemination power of the Internet, entrants submitted contenders from as far away as Iran and China.)

Given the rapidly changing technology, and architects' swiftness in adopting it, the lines between design technique and presentation mode are shifting. Thus the editors left to the jury the choice of judging criteria. And jurors set priorities that differed from those used last year. Serving were Manuel Fernandez-Casteleiro, principal in the New York City architecture firm of Parsons + Fernandez-Casteleiro; William Mitchell, dean of MIT's school of architecture and co-author of *Digital Design Media*, and Chee Pearlman, editor-in-chief of *I. D.* magazine, which has recently focused much of its coverage on the wired universe.

Jurors last year gave more weight to those entries that used the computer to develop and explore the design. This year, jurors looked more critically at whether each entry was successful as a *presentation* of the design. In considering each image, Chee Pearlman asked, "Is this more persuasive than conventional modes of imagery?"

Camera work criticized
The discussion of animated presentations was especially lively. The first prize was awarded in large part for the straightforwardness and lucidity of the animated presentation. Jurors felt the presentation describes the visitor experience in a way that overcomes the typical inability of an interested non-architect audience to understand plans or scale models. A surprising number of animations did not successfully illustrate the design, jurors felt, even when the delineator was clearly technically accomplished. "Architects are not cinematographers," commented William Mitchell, "but perhaps they need to become cinematographers." Some fly-through animations induced vertigo rather than

understanding. Others had the viewer "virtually" banging into walls. The jury liked simple camera movements and animations that included pauses so that the room or building shown could be examined in an unhurried way.

Are some techniques "dangerous"?
Juror Manuel Fernandez-Casteleiro, principal of a design firm that uses computers for production but rarely for design, felt that many entries were "elegant, but cold." One presentation, prepared to promote a waterfront housing development, he found "dangerous." With its focus on yachts, sea planes, and sunsets rather than the architecture of the complex, he felt the delineators meant to dazzle rather than describe. Another presentation, which used many 3D library elements available on disk, caused him to comment: "The danger of the kit of parts is that it can limit the design. You better make your trees honey locusts because that's what's available."

Compared to last year's jury, this year's members were more sympathetic to projects that used computer tools to emulate traditional techniques. The monorail project (2, opposite), though admired, was thought almost *too* realistic.

With more schools offering computer imaging courses and tools, the awards attract many sophisticated student entries. This year, work of and for practicing architects won more often. Though the first prize was awarded to a pair of students, the project delineated was an actual proposal created by architects Stull & Lee. The second prize and all the honorable mentions came from architects' offices. Only the third-prize winner was a wholly speculative project created by a student, one who—unknown to the jury—was awarded a second prize last year.

The winners and additional entries will be exhibited at A/E/C Systems '95, the largest computer exhibition oriented to the design and construction industry. The show runs June 5-8 in Atlanta. Comments on the contest are welcomed by letter mail or e-mail (JSR Record@aol.com). *James S. Russell*

Bentley Adds Steam to the Drafting Engine; AutoDesk Poised to Follow

By Stephen S. Ross

MicroStation PowerDraft debuted at the end of March, along with a new marketing strategy. This software, 2D with some 3D functionality and optimized for production drafting, is reviewed in this issue. The strategy is important, both for short- and long-term.

Basically, Bentley is trying to assure that all the third-party vendors who provide add-ons for MicroStation allow entities created by the add-ons to retain their full image and intelligence in the final drawing and drawing database, even if the third-party product is not installed in the particular system being used to view the drawing.

To put it another way, the "smarts" move with the drawing, rather than being mainly in the CAD software. This is close to SOM, the so-called single-object model, being developed by software vendors in other disciplines. With SOM, when you link, say, a spreadsheet file to a word-processing document, and then reformat the spreadsheet file from inside the document, the file handles the reformatting without the spreadsheet software present.

Currently, with OLE (Microsoft's Object Linking and Embedding), if you try to reformat an Excel spreadsheet file inside Word, the spreadsheet fragment starts Excel running in the background. Excel is needed to do the reformatting.

All this functionality has a price. File sizes created with third-party add-ons will be much larger. The price is also much higher than Autodesk's low-end drafting package, LT ($1,950 versus $500), but half the price of AutoCAD 13 or MicroStation 5.0. Thus, Bentley explores the thinly populated "midrange" CAD area.

At presstime AutoDesk had not publicly disclosed its demands on third-party vendors. It had stated only that vendors could do as they wished. But on April 18 Autodesk said it's cooperating with 11 vendors to standardize data across the construction industry's full spectrum, from site planning to facilities management. Speculation is strong that AutoDesk will go further and unveil a plan similar to Bentley's at the A/E/C Systems show in June.

Another sign of the times: with this issue, we supply Internet and World Wide Web addresses for vendors, where available. ■

MicroStation Power Draft 5.5

Vendor: Bentley Systems, Inc., 690 Pennsylvania Dr., Exton, Pa 19341-1136, 610-458-5000, fax 610/458-1060, 800/778-4274, family@bentley.com, http://www.bentley.com.

Price: $1,950.

Equipment required: IBM PC or compatible with 80386 CPU chip or higher (fast Pentium recommended), 8MB of random-access memory (16MB recommended), DOS 5.0, Windows NT 3.5 (32MB recommended for NT), Windows 3.1 or Windows for Workgroups 3.11. Use a mouse for the pointing device; digitizers are not directly supported.

Wow! In PowerDraft, Bentley Systems has packaged just about all the 2D functionality, and some 3D, of its flagship MicroStation 5.0

MicroStation PowerDraft 5.5's AccuDraw feature uses a window (near right) that can be used to access or edit short-cut command keys, reset coordinates, and so forth. Windows can be moved around the screen at will.

Essentially, you can open as many dialog boxes as you want (far right), changing drawing points or working on the drawing, then coming back to the box you started with. Windows usually doesn't let you do this.

product with a super-fast, super production-oriented drafting engine and a spiffy, more Windows-standard interface (you can keep the old "Motif-style" interface if you wish). The DOS version looks like Windows, too. You get it all for half the price of 5.0.

About the only thing more complicated about this version of MicroStation is its positioning in the Bentley product line. It's the first release, but is being called 5.5 because it is more advanced in some ways than MicroStation 5.0—and the full-featured top-of-the-line MicroStation will be getting a "5.5" facelift later this year. Remember, too, that Intergraph owns half of Bentley. While Intergraph is the largest third-party vendor of Bentley software, Bentley now has prime marketing responsibility. And Intergraph sells Autodesk products as well.

Although in general you cannot edit complex 3D objects inside PowerDraft, add-ons using MDL (the MicroStation Development Language) can. And you do get the 3D basics—simple solid objects and primitives. Thus, an office can easily mix PowerDraft and MicroStation.

The interface features an AccuDraw window that uses single-keystroke commands and the ability to set drawing points easily with the mouse, going back and forth between dialog box and drawing (usually, in Windows, you can't get at the drawing when a dialog box is open). You can have as many as eight drawing views open at once; they all update as you draw in one.

Bentley claims that it requires significantly fewer keystrokes to draw a typical object or detail in PowerDraft than in AutoCAD 12—
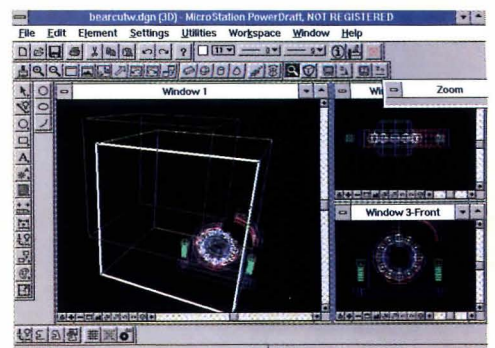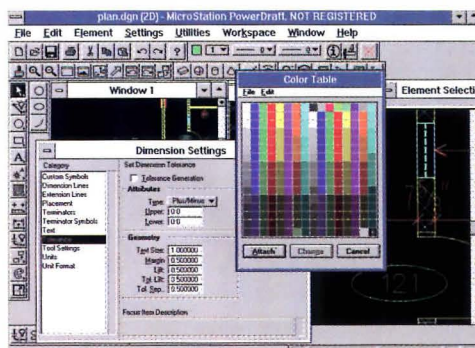
With MicroStation Power Draft 5.5, the "smarts" move with the drawing rather than through CAD software. Thus, designs using add-on software will remain in place, even on another computer.

Update: Visual CADD 1.2

We looked at Numera's Visual CADD 1.0 last fall and found it an inexpensive and sensible Windows upgrade path for Generic CADD users—it reads and writes GenCADD files as well as AutoCAD DWG and DXF, can be configured with GenCADD commands, and sells for under $500. Version 1.2 is much faster and offers more custom programming hooks (Visual BASIC and Visual C++). The GenCADD parentage is not incidental—Numera was founded by GenCADD developers.

Contact Numera at 1501 Fourth Ave., Suite 2880, Seattle, WA 98101, 206/622-2233, fax 206/622-5382, CompuServe 74222,3031.
301 *on Reader Service Card*

often only half as many. That's clearly so when one compares unadorned versions of both products. But AutoCAD 13 closes the gap somewhat. Adding typical third-party products to AutoCAD (we tried some comparisons versus Eagle Point Advanced Architecture on AutoCAD 12 and Softdesk AutoArchitect on AutoCAD 12 and 13; it is not yet optimized specifically for 13) also closes the gap somewhat.

Nevertheless, PowerDraft, all by itself, offers so many productivity features at a lower price that there's really no contest.

You get 3D rendering (everything in MicroStation 5.0 except Phong shading), reference files, library, database links, great dimensioning, lots of built-in printer drivers, AutoCAD DWG and DXF (we did not have time to fully test DWG compatibility), Windows clipboard functionality, custom linetypes, and more.

Manuals: Three paperbacks—a thick reference with tab guides, separate setup guide, and small tutorial.
Ease of use: There is a steep learning curve, but the trip is worth it. For instance, using the AccuDraw box well requires that you memorize single-keystroke commands. You can step through a process once (say, to draw a detail), while defining it as a macro.
Error-trapping: Excellent, with an undo, too.
300 *on Reader Service Card*

SureTrak Project Manager For Windows

Vendor: Primavera Systems SureTrak Division, 1574 West 1700 South, Salt Lake City, Utah 84104, 801/973-1300, fax 801/973-9725.

Price: $695, including six-day a week free support (we have noted a street price of under $300). Upgrade $199.

Equipment required: IBM PC or compatible running Windows 3.1 or 3.11, 80386 CPU or higher (80486 or higher recommended), 4MB of RAM (8MB strongly recommended).

These days, good project-management software has to offer a range of reports for output, a clean on-screen interface that makes it easy to enter new data or adapt old project ideas, and reasonable speed.

If you're building a gigantic project, or need better networking capability, Primavera offers Project Planner. But if your project is merely huge (up to 10,000 activities), and you don't need multiuser access, SureTrak is a great option. The two packages also can exchange files (SureTrak doesn't support some Project Planner features such as Resource Limit shifts, however). SureTrak also reads and writes Microsoft Project Planner files.

This package works well for setting up a plan, tracking progress, some billing, and doing what-if scenarios.

All but the largest offices should find it sized right for their needs.

Manual: One 663-page paperback reference and tutorial. Particularly good help file.
Ease-of-use: The best mid-range Windows project-management package we've seen.
Error-trapping: Good. It is hard to destroy data. There's also a flexible automatic save. If you copy activities from another project and the activity numbers match something in the target project, you will be prompted to modify the numbers.
302 *on Reader Service Card*
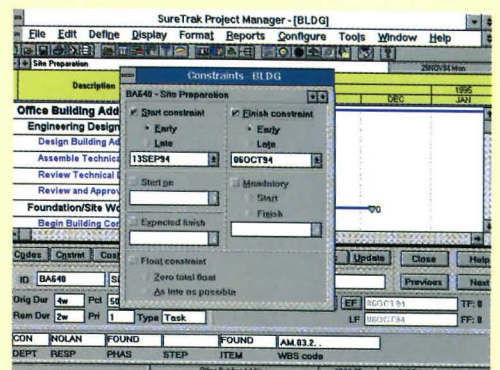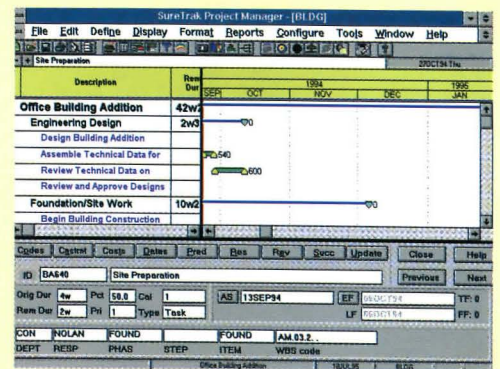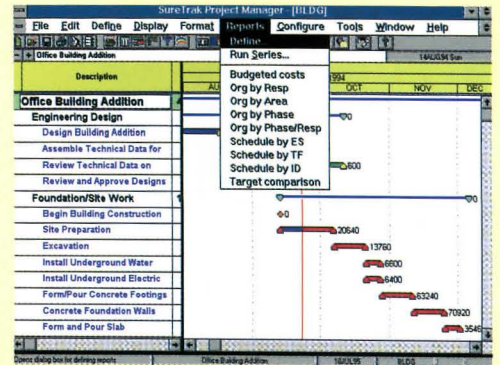
Top: Primavera's sleeker project-management model, SureTrak, works well setting up a work plan. Gantt chart with activities also on screen. Note report pull-down menu; there are many custom reports built in.

Center: Clicking on any activity opens the data section covering the lower half of this screen.

Bottom: You can update constraints at will.

Teamwork Kit-of-Parts

303. On a roll

Haworth will show a unique group of officing components at NEOCON next month. Consisting of mobile work surfaces, rolling files, and technology-support units collectively called Crossings, there is no hierarchy to the line—no bigger desk for managerial types. These pieces are for team players who interact frequently with their co-workers: advertising agencies, product-engineering or software groups, designers, or graphics professionals whose work styles call for conferences or computer-based show-and-tells as well as task-focused desk work: who "balance individual effort with collaboration."

An individual Crossings work center might be semi-enclosed by a "fence" of three sliding glazed panels (1), dividing a stained medium-density fiberboard "work plane" from an open-plan common conferencing space. These doors can fold in to totally surround the work area for security when not in use. Metal organizer shelves or file bins hang on the rungs bracing the desk (2). For computer-intensive functions, there is a fully adjustable keyboard tray with bilateral mousing tablets (3). Materials include hammered-metal finishes and ladder-like structures reminiscent of Frank Lloyd Wright's desk for the Johnson Wax building. The plan sketches computer carrels clustered for an ad hoc conference, with the kidney-shaped work surfaces shielded by the glazed panels; photo (4) gives an idea of the range of storage, filing, and computer-support options offered—all mobile. Haworth, Inc., Holland, Mich. ∎

1

2

3

4
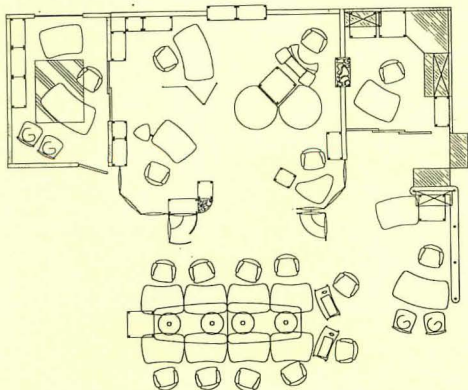
Comfy

304. Expressive

Massimo Iosa Ghini's first designs for
Cassina are his Leggero (Light) sofa (pic-
tured), with a tubular-steel frame clearly
displayed, and the Formale model, which has
fabric skirts concealing the structure. The
seat "platform," built like a tent with
Cordura nylon stretched tight by stainless-
steel turnbuckles, holds fabric-covered
expanded-polyurethane-foam cushions.
Cassina USA, Inc., Huntington Station, N.Y.

305. Legacy

Designed by Charles Pfister towards the end
of the '80s, but never manufactured before
his death in 1990, his Profile lounge collection
is now being produced and brought to market
by Geiger Brickel. The pieces—a club chair,
single-end seats with or without arms, and
two- and three-seat sofas—are differentiated
by arm treatment (either straight-from-the-
back or slanted, as shown) but share a
vocabulary of crisp details and not-over-
stuffed seat cushions. Upholstery options
include leather and a range of new fabrics
designed for Geiger Brickel by Jane
Eschbach. Pricing is described as "moder-
ate." 800/444-8812. Geiger Brickel, Atlanta.

306. Architectural background

John Kordak used his experience in design-
ing architectural interiors on his new Rio
lounge seating: the pieces are large-scaled
yet finely detailed. For example, the Wing
pull-up (306b), with a generous seat-pan
depth, conveys just the sense of a traditional
by-the-fire armchair by the cant to its seat
back and the set and flair of its tapered legs.
704/333-9988. Charles McMurray Designs,
Charlotte, N.C.

307. Metro meets Memphis

New York architects Peter Stamberg and
Paul Aferiat collaborated on colorful chairs,
sofas, and three-seat lounges for KnollStudio
that offer several customizing options:
removable accessory shelves of stained wood,
bright paint finishes on the tubular legs, and
two degrees of squishiness for the seat, back,
and side cushions. 800/445-5045. The Knoll
Group, New York City. ■

304

305

306a

306b
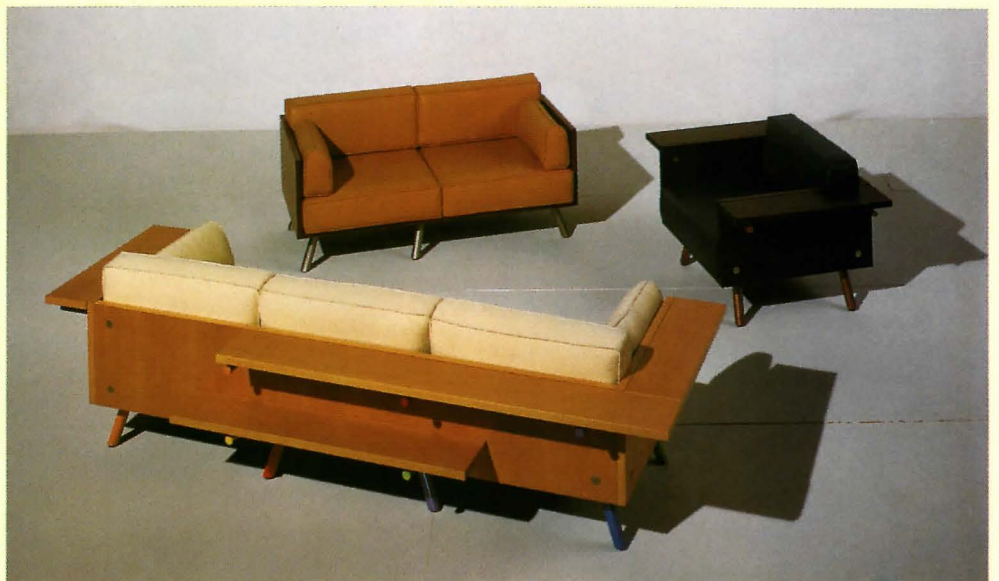
307

308. High-style VCT

An expanded color range offered in commercial vinyl-composition tile now includes stylish colors like eggplant, silver pine, hyacinth, and periwinkle. The palette, said to be the largest available, comes in 12 multifleck patterns and 48 tone-on-tone shades. Sample program for architects and designers. 609/935-3000. Mannington Commercial, Salem, N.J.

309. Nylon tapestries

Nuts & Bolts upholsteries, designed by Susan Lyons in bleach-resistant Zeftron 200 solution-dyed yarn, are said to provide decorative pattern and weave options not formerly available in fabrics that could meet the abrasion-resistance and cleaning requirements of healthcare and hospitality environments. Swatches available. 718/533-2291. DesignTex, Woodside, N.Y.

310. Wall-mounted desk

A versatile foldout writing desk can be hung where needed in factory, hospital, or office. Less than 4-in. deep when closed, the 29-in.-wide writing surface folds down to the horizontal at the touch of a finger, and folds up automatically when weight is removed. Made of laminate with rounded edges, with a restraining bar that holds notebooks and forms. 800/638-4111. LUI Corp., Baltimore.

311. Fire-resistant shades

Available in five colors, Symphony Metro double-honeycomb shades meet State of California, Department of Transportation, and NFPA 701 standards for flame-retardant window coverings. Shades are said to have excellent thermal-insulating values, good light diffusion, and a single-exterior-color option. 800/843-4151. Comfortex Corp., Watervliet, N.Y.

312. Line extension

The concave back and wedge-shaped seat characteristic of the original Vik-ter chair (pictured) has been translated into an expanded line of institutional and office seating. Though lighter in weight and less expensive, the new stacking chairs have identical maple seats and backs stained in Matisse-inspired colors. 718/786-8600. Dakota Jackson, Inc., Long Island City, N.Y.

313. Privacy with a view

Levolor's new Sheerview blinds have a pattern of pin holes in the metal slats that permits 6 percent of the daylight and an external view to filter through a fully closed blind without compromising glare control and energy efficiency. Offered as an option on both Mark 1 and Riviera-style blinds. 800/222-8830. Levolor Contract, Greensboro, N.C.

314. Versatile furnishings

Confair components have been designed to work as flexible conference furnishings—lecterns, meeting tables, monitor and A-V carts, chart holders—that can roll, fold, and stack. The table pictured, designed by Andreas Stoeriko, folds in half for storage and seats eight. 800/249-5441. Wilkhahn, Inc., New York City.

315. Managed modular

A new patterned-carpet collection incorporating design influences from Europe, America, and the Far East, Affiniti 18-in. modular carpeting comes in over 60 geometric and figurative shapes, shadows, textures, and botanical patterns that give a monolithic appearance to the installed floor. Complete sampling program. 706/880-5511. Milliken Commercial Markets, LaGrange, Ga.

Short takes

Glass to glass. Schuller International announced that its fiberglass building-insulation products are now made with at least 25 percent recycled glass, retrieved from melted-down bottles and glass scrap.

More glass. The latest glass manufacturing, treatment, and installation technologies, for both automotive and architectural applications, will be showcased at the National Glass Association Show May 18-21, to be held at the Georgia World

Congress Center in Atlanta. Phone 703/442-4890 for exhibit and seminar information.

Cutting-edge tile maker.
American Marazzi Tile, headquartered in Sunnyvale, Tex., outside of Dallas, hasconverted its entire tile-manufacturing process to isostataic pressing. Using new Italian equipment developed to make porcelain tile, the hydraulic press is said to insure much greater consistency in color, shape, and size from tile to tile,

and to permit a greater range of surface characteristics in the finished product.

Masonry design guide.
The Thermal Mass Handbook: Concrete and Masonry Design Provisions Using ASHRAE/IES 90.1-1989 shows architects how to take advantage of thermal mass in meeting the provisions of the Energy Act of 1992. National Concrete Masonry Assn., Herndon, Va. 22070; 703/713-1900. ∎
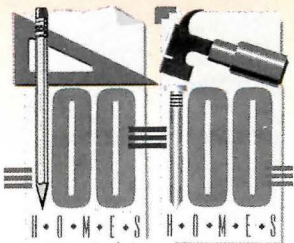
DESIGNING AND BUILDING A LEGACY:
THREE HABITAT HOUSES FOR ATLANTA

A IA Atlanta's mission is to "Advance the profession of architecture." Our goals, "through INVOLVEMENT, enable our membership to":Provide leadership and participation in the public policy process and thus help to improve the quality of life of our community. Engage in life-long learning and thus respond to the evolving nature of our profession. Benefit from support, information and professional tools that enhance their success. The relationship of these goals and "Designing and Building an Atlanta Legacy" along with the theme of the 1995 AIA Atlanta national convention, "Revisioning" — seeing ourselves as collaborative leaders — is evident. Through INVOLVEMENT, AIA Atlanta is taking a leadership role in building three houses for Habitat for Humanity Atlanta for two reasons. The first relates to our wish to present a gift to Atlanta as a lasting legacy of our convention. The other addresses revisioning. Architects can no longer afford to isolate themselves from allied industries nor industry from architects. We are working hard at being collaborative leaders. This spirit of cooperation can produce tangible results and be an AIA/industry tradition. Future convention cities, we challenge you!

Roberta L. Unger, AIA
Chair, Legacy Committee

Why Don't We Build a Habitat House?

The AIA National Convention Committee of Atlanta wanted a program for the 1995 national convention in Atlanta that would be distinctive and long-lasting, something of consequence.

The two co-chairs of the committee, Peter Hand and Stanley Daniels, asked the members of the Atlanta Chapter's Legacy Committee to form and define an activity, event or idea that would embody the meaning of a legacy, something that would be a gift to Atlanta.

"We really weren't interested in doing an exhibit or a seminar," said the committee chair, Roberta Unger, of The Architecture Group Inc. "We wanted to do something that would be around for a long time, mean something to the community. At a meeting last June five of us gathered to discuss possibilities. That's how the idea started, although it exploded into a larger activity."

Within a short time, the plan to build one home for Habitat expanded to three homes.

Habitat for Humanity International was founded in 1976 by Millard and Linda Fuller to eliminate poverty housing from the world and to make decent shelter a matter of conscience and action. It is a non-profit organization dedicated to building low-cost housing in partnership with the working poor. Habitat, through its regional chapters in the U. S., has built houses and the busiest chapter is Habitat Atlanta.

Last year Habitat-Atlanta began a special program, "100 Homes: Building An Atlanta Legacy." Its goal is to honor the 1996 Centennial Olympic Games in Atlanta by constructing 100 homes in Olympic venue neighborhoods before the games begin.

The first step for AIA Atlanta was to seek participation with Larry Arney, the executive director of Habitat-Atlanta

"We wanted to do something that would be around for a long time, mean something to the community"

"Is there anything we can do for you that you can't provide on your own?" Unger asked.

"Yes, there are two things," said Arney. "Habitat-Atlanta works in the city and most of the lots we can build houses on are long and narrow. The usual Habitat house isn't adapted to a lot like that. We need a design that can be adapted to the inner city lot. "The other problem we've run up against has been that some of the families that live in our Habitat houses say that they now can afford to expand their houses. But the standard Habitat house isn't very adaptable to expanding, building an extra bath or bedroom. We need a design that can accommodate expansion."

Given this charge, AIA Atlanta decided that the best way of getting the design that Habitat needed was to stage a national design competition. Invitations went out nationwide through the AIA Housing Committee. From all over the country, 170 architects paid $50 to enter the competition. The result was the submission of 81 designs, all of which were turned over to Habitat for use in its program.

When presented to the jury, the designs were identified only by numbers. Unlikely coincidence occurred not just once, but twice. The two designs the jury chose as winners came not only from Atlanta, but from two design teams working for the same Atlanta firm, Design Traditions.

The winners are:
Ken Rich, AIA, team leader
Stephen Fuller
Steven McCall

Lance Carlson, AIA, team leader
Alex Shapleigh
Joe Herman
Marc Mosley

Two houses will be built from one of those designs and one from the other. But the design competition was only the begin-
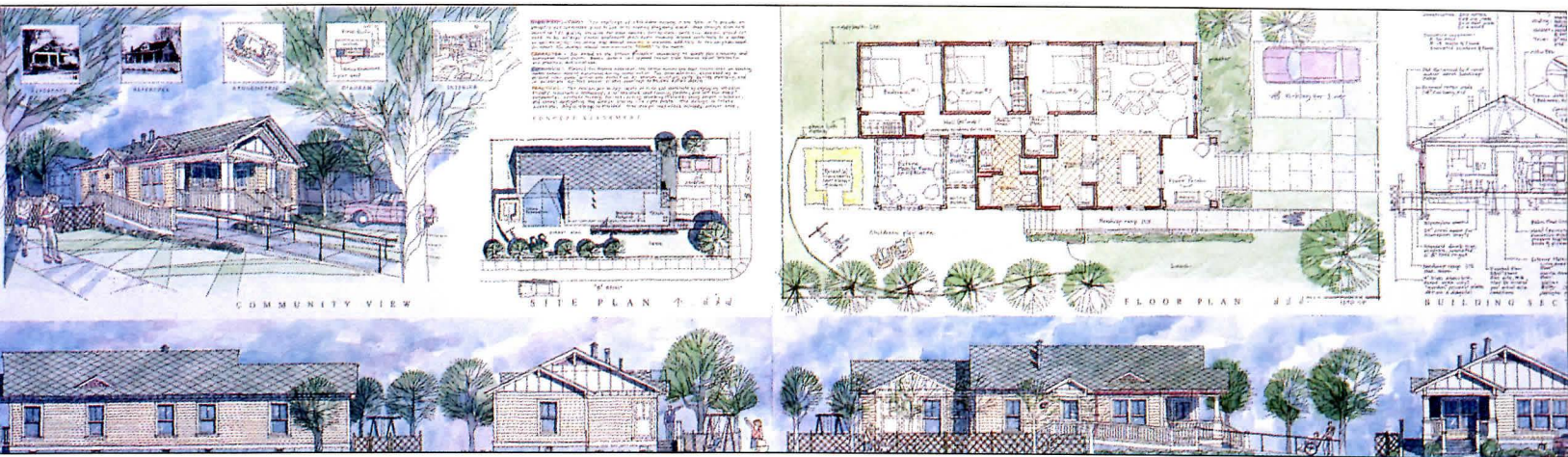
The winning Habitat house designs were by a team led by Ken Rich (upper) and a team led by Lance Carlson (lower).

SITE PLAN
1" = 10'-0"

B · STREET

A · STREET

PLAN

PESPECTIVE

FRONT ELEVATION

REAR ELEVATION

SECTION

RIGHT SIDE ELEVATION

LEFT SIDE ELEVATION
1/4" = 1'-0"

We'll soon get our chance, thanks to the "Designing And Building An Atlanta Legacy" design competition. The project will support Habitat for Humanity, Atlanta through the design of a home that's both affordable and buildable. Working with the Atlanta Chapter of the AIA, the competition was opened to architects across the U.S.

G-P is not only a major sponsor of the competition. We're also the only manufacturer sponsor. And because it is our corporate challenge that the house be built, we'll donate a major portion of materials, like Wood I Beam™ Joists, Grand View® Vinyl Windows, Summit® Shingles, PrimeTrim® engineered trim, hardboard siding, and gypsum drywall and joint compound. Not only that, G-P employees will volunteer time and effort toward building the house.

Georgia-Pacific Can't Wait To Take A Hammer To One Firm's Well-Laid Plans.

Of the 81 finished plans received, two clearly stood out. Those entries were both submitted by teams from Design Traditions, led by architects Ken Rich and Lance Carlson.

Soon, some lucky family will move in. But in the meantime, we'd like to thank everyone who believed in making a difference. Because while we can't wait to start building, there's a family who can't wait to have a place to call home.

Georgia-Pacific

AIA/Atlanta   Habitat For Humanity

Circle 26 on inquiry card

The Biggest Housebuilder in Atlanta

" I was very interested in housing, particularly affordable housing."

Habitat houseleader Don Shaw (red jacket, below right) displays a house under way to its owners, Andre and Yvette Johnson. Habitat executive director Larry Arney (white T-shirt in bottom photo) discusses construction with aides

The largest builder of single-family homes in Atlanta never makes a profit. The builder is Habitat-Atlanta, the most active of 1,100 regional affiliates in the U. S. of Habitat for Humanity International. Since 1983 it has been building affordable housing for low-income families.

The homes are sponsored by corporations, churches, civic organizations and individuals and built mostly by volunteers. The architectural community has played a significant role in Habitat-Atlanta. Thompson Ventullett Stainback, of Atlanta, sponsored a house, the North Georgia AIA Foundation has been a financial supporter and many architects do pro bono work. The homes cost $40,000 to $45,000 to build. But the only profit for the builders is spiritual, the satisfaction of provid-

ing decent housing for a deserving family. Families preselected by Habitat buy the houses with modest monthly payments, typically $275, through a non-profit, no-interest loan. Homeowners must put in at least 150 hours of work on their house or help build other Habitat houses.

Habitat-Atlanta is currently operating a special program, "100 Homes: Building An Atlanta Legacy". The goal is to honor the 1996 Centennial Olympic Games, which will be held in Atlanta next year, by building 100 homes in the Olympics area before the games begin. Sponsor commitments have been made for almost all of the 100 houses. AIA Atlanta is committed to the design and construction of three homes for the program.

"100 Homes is an effort to leave a legacy in Atlanta that reaches far beyond the 1996
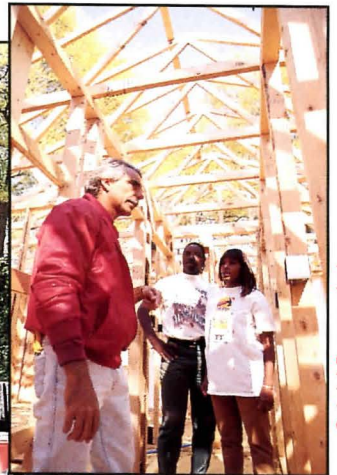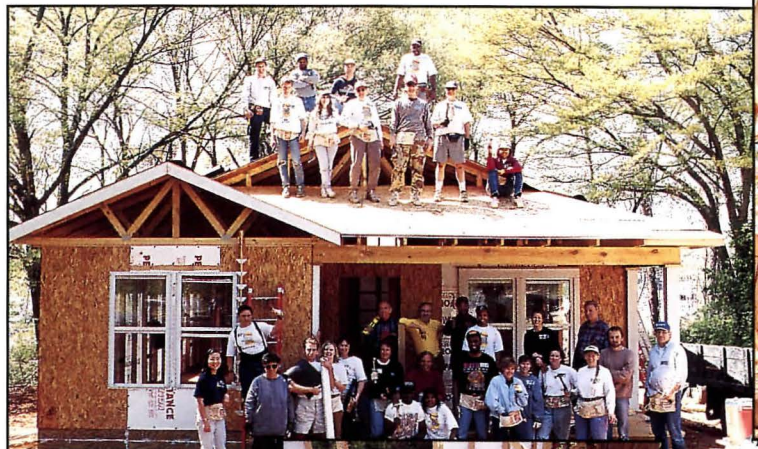
Gabriel Benzur photos

Petersen Aluminum Corporation

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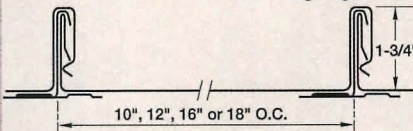
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   Metal Co., Inc.
Color: Sandstone

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> *"We hope these 100 homes lead to hundreds more for many Atlanta families that desire home ownership."*

Olympics," says Larry Arney, executive director of Habitat-Atlanta. "Affordable housing is vital to a city like Atlanta. We hope these 100 homes lead to hundreds more for many Atlanta families that desire home ownerships."

Prominence as a home builder didn't come quickly for Habitat-Atlanta. In 1983, one home was built. In subsequent years three, four, and seven homes were built, and production rose almost every year. Early in May, Habitat-Atlanta began building its 250th house. Habitat-Atlanta works from eight basic house plans and makes variations on these plans on porches, roof slope and trim to have them fit better into the neighborhoods where they rise. All of the houses are one-story with three or four bedrooms, a bath and a front porch. Habitat has developed a system through which unskilled labor can

build most of a house. Anyone healthy enough to lift a hammer is welcomed as a volunteer. The volunteers work under the supervision of Habitat construction staff.

It takes eight Saturdays with a force of 20 volunteers each Saturday to build a house. On the first Saturday, half the volunteers work at the site on the foundation and the other half work at the Habitat warehouse assembling the interior and exterior stud walls. On subsequent Saturdays the work follows a logical progression. Habitat hires craftsmen — sometimes their services are donated — for concrete work, drywall, electrical, plumbing and carpet laying. Habitat-Atlanta tries to cluster its new houses. The appearance of a few new homes tends to have a tonic effect on the rest of a neighborhood. Older houses get new paint jobs and front lawns produce
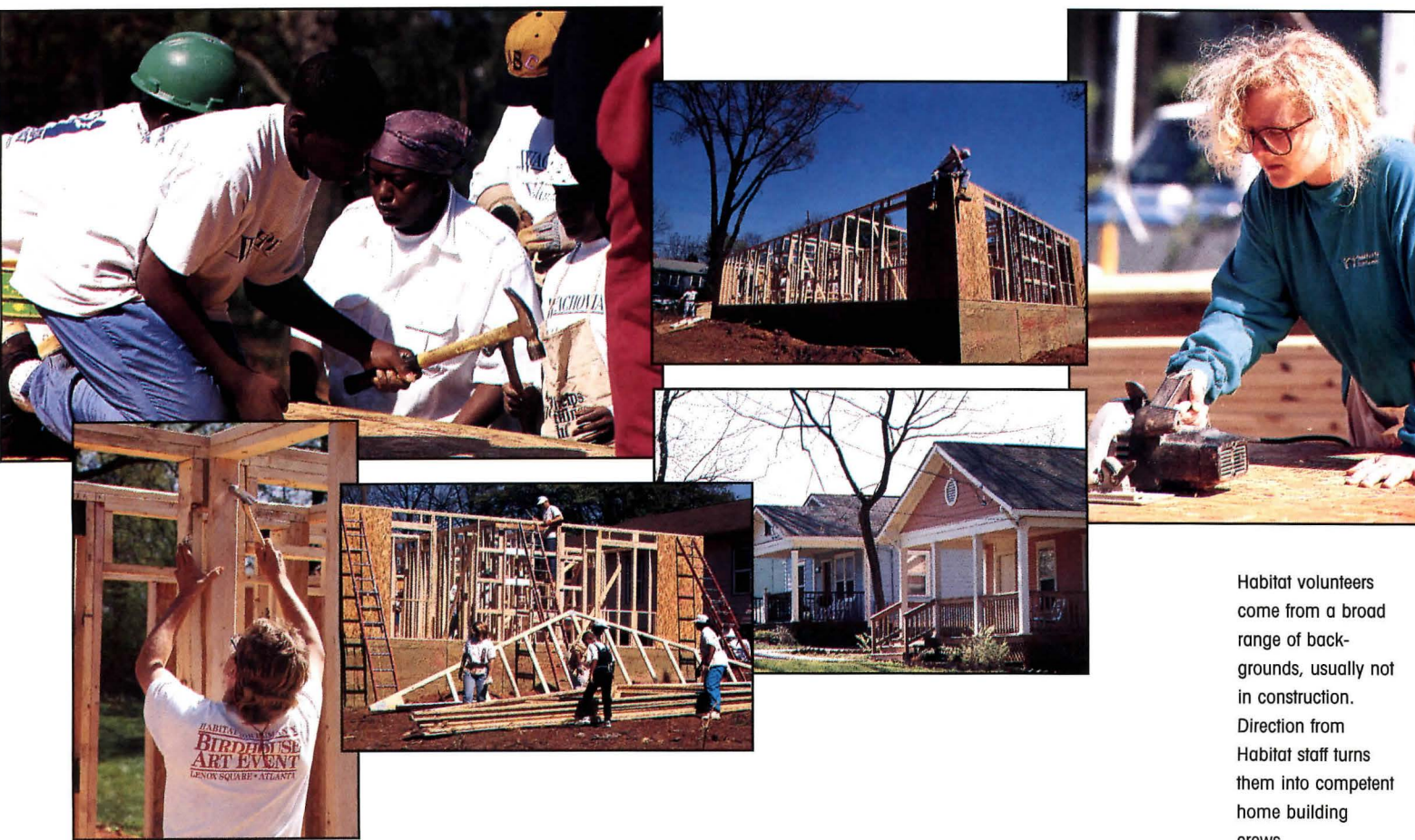
Gabriel Benzur photos

Habitat volunteers come from a broad range of backgrounds, usually not in construction. Direction from Habitat staff turns them into competent home building crews.

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Through the generosity of the McGraw-Hill Construction Information Group, support is being provided to AIA Atlanta via Accent on Architecture for the construction of architect-designed Habitat for Humanity houses during the 1995 AIA convention in Atlanta.

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"A hand up, not a handout."

The owners of two new Habitat Atlanta houses, Linda Stevens (top) and Sarah Jones (bottom), take pride in the appearance of their new homes and gardens.

healthy growths of grass and flowers. A recent problem for Habitat-Atlanta has been finding affordable, available properties on which to build.

"Being the largest home builder in Atlanta is kind of a dubious statistic," says Larry Arney. "The main reason we are the largest is there aren't many for-profit builders that are actually building in the city. They're mostly building in the outer, metropolitan Atlanta area. And people building houses for profit don't build them in what are essentially declining inner-city neighborhoods. Last year there were 325 houses built within the Atlanta city limits and we built 50 of them."

Larry Arney, is an architect, a graduate of the University of Tennessee. He worked for seven and a half years at Thompson Ventulett Stainback, Atlanta, before joining Habitat.

"I was very interested in housing, particularly affordable housing, and I followed the work of Habitat. I applied for a position, mostly to find out more about Habitat. I ended up getting very interested in it and became the director. I'm now in my seventh year here." Arney directs a staff of 26 Habitat employees. Habitat-Atlanta's board manages a $2.1-million budget and 85% of the funds raised is invested in actual house construction.

Gabriel Benzur photos

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No More Shacks!

Linda and Millard Fuller established Habitat for Humanity International in their search for spiritual fulfillment.

Ray Scioscia photo

Former President Jimmy Carter, working with Millard Fuller, has been a frequent volunteer on Habitat projects.

Habitat for Humanity International, an organization whose aim is to eliminate all poverty housing from the world, was founded in 1976 in Americus, Ga., by two former millionaires.

Millard Fuller was a successful lawyer and entrepreneur in Montgomery, Ala., in the early 1960s. By 1965, when he was 30, he had made his first $1 million and his goal was $10 million. His wife, Linda, was unhappy with a husband who was married to his work and felt that the accumulation of money was not the basis of a marriage. She left him, taking their two children with her. Millard followed her and in the reconciliation they decided to sell everything they owned, give the proceeds to charity and seek a more fulfilling life.

The Fullers lived and worked in various ministries for several years, seeking spiritual renewal. They spent five years at Koinonia Farm, a Christian community near Americus, Ga., that built houses for people in need. In 1973 they went to Zaire to start a housing program. When they returned to the U. S. and Americus in

1976, they led the formation Habitat for Humanity International (HFHI).

"We want to make shelter a matter of conscience," said Fuller. "We want to make it politically, socially and religiously unacceptable to have people living in substandard housing."

Habitat got off to a slow start. Its program was to develop Habitat affiliates around the world to build low-cost houses through donations of money, material and manpower. Millard and Linda Fuller walked around the U. S. and traveled in third world countries to spread their gospel, "no more shacks."

Gradually, Habitat accrued thousands of volunteers from churches, colleges, corporations, civic organizations and non-aligned individuals to help. By 1987, Habitat's annual construction rate reached 1,000 houses in the U. S. and abroad. By 1993, production was 8,000 units and the target for 1995 worldwide is 10,000. So far, more than 12,000 houses have been built in the U. S.

The same intelligence and energy that made Fuller a successful businessman in his youth have carried over to HFHI, which a recent survey called the 17th

Special Advertising Section

Like you, most people work hard at their jobs. But for some, their reward is a squalid shack. Though hard to believe, thousands work hard to pay for "housing" with no plumbing, no heat . . . and no hope. Trapped by a situation that takes their hard-earned wages just to subsist, the dream of decent shelter begins to die.

We at Habitat for Humanity are working to break the cycle. A non-profit ecumenical Christian organization, we work as partners with those needing simple, decent, affordable shelter. We mobilize volunteer help and solicit donated resources to build low-cost houses, sold at no-interest with no profit.

Our new home-owners don't seem to mind the 400-500 hours of "sweat equity" work that's required of them. In fact, many continue to work on the homes of others long after their commitment has been met. They can see that all the hard work pays off.

To learn more about Habitat for Humanity's work, simply contact us at the address or number below. As you'll see, Habitat works.

Sometimes, working hard just doesn't work.

Habitat for Humanity International

121 Habitat Street   Americus, GA 31709-3498   (912) 924-6935

"We want to make it politically, socially and religiously unacceptable to have people living in substandard housing.

largest home builder in the U. S. The HFHI headquarters in Americus has a staff of 300 and an annual payroll of $5.75 million. There are more than 1,100 Habitat affiliates in the U. S. There is a Washington office that serves as liaison between Habitat and national and international entities that have impact on Habitat's work.

The Habitat houses are the result of volunteering, which can include labor, money, materials and skills. Currently, about 70% of HFHI revenue comes from donations of individuals and 7% to 9% each comes from corporations/foundations, affiliates and donations of materials. Under the Habitat program, families in need of housing invest 300 to 500 hours of work, sweat equity, into building homes for themselves, working side by side with Habitat volunteers. When a home is complete, the partner family buys it at cost on a 20-year, interest-free mortgage.

A Habitat slogan is: A hand up, not a handout.

By investing themselves in the building process, homeowners gain self reliance, self esteem and new skills. Home ownership has been found to have a strengthening effect on family life. Children's grades improve. Neighborhoods have seen crime rates fall and businesses develop after the introduction of Habitat houses.

The bulk of Habitat construction is carried out through local affiliate organizations, such as Habitat-Atlanta, which develop construction programs in their areas and pursue donations of money, materials and labor. Housing designs reflect local custom, wood frame, clapboard houses in the U. S., brick in Australia and Colombia, mud brick in Uganda and concrete block in India.

Although the Habitat houses are built for the most part by untrained volunteers, they don't lack substance. When Hurricane Andrew struck Florida in 1992, it damaged or destroyed more than 130,000 homes. There were 27 Habitat houses, either new or rehabilitated, in the direct path of the hurricane, but none of the 27 suffered more than minor damage.
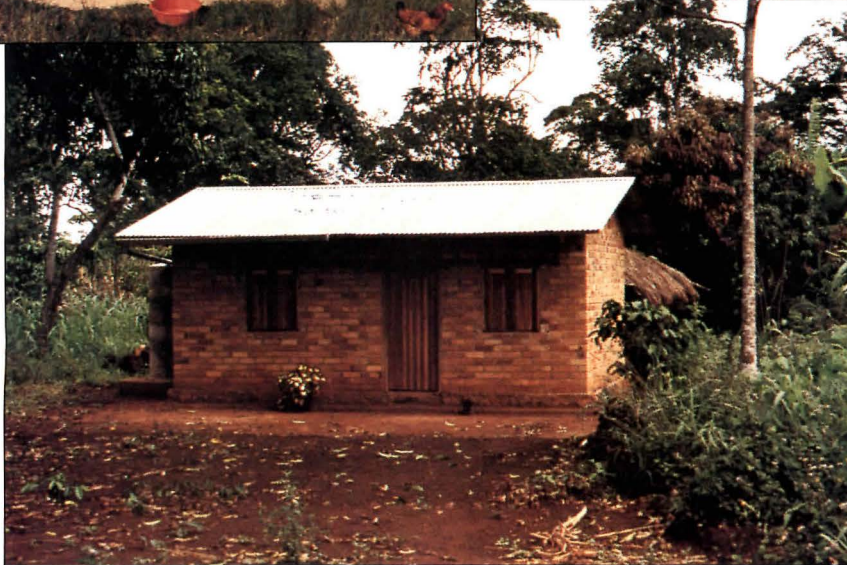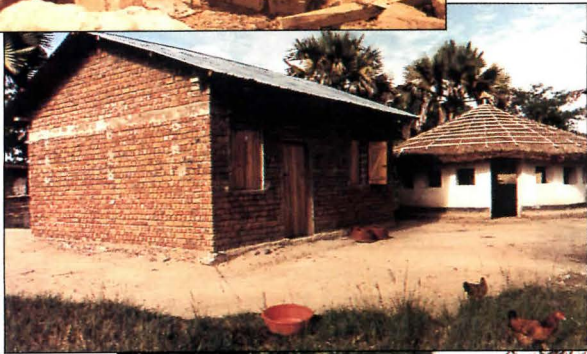
Julie A. Lopez photos

Sy Fassman photo

Construction of Habitat houses abroad reflects local building practices. Houses here were built (counterclockwise) in Burnudi, Burundi, Bolivia and China.

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The German word "Gesamtkunstwerk," or
total work of art, used by associate editor
Clifford Pearson to describe Cologne-based
architect O.M. Ungers's new residence for the
German ambassador in Washington, D.C.
(page 96), is also a fitting summary of other
projects in this issue. The Cy Twombly Gallery
(page 78), an annex to The Menil Collection in
Houston, Texas, combines the artistry of
Twombly and the architecture of Renzo Piano
in a cohesive whole. A portfolio of recent work
by Swiss architects Jacques Herzog and Pierre
de Meuron (page 84) traces what correspon-
dent David Cohn calls "a new direction in
European architecture," specifically a move
"toward a poetic minimalism" that fuses the
material qualities of architecture with contem-
porary conceptual art. Susan Maxman's
Women's Humane Society Animal Shelter in
Bensalem, Pennsylvania (page 92) also leaves
nothing to chance: the architect's choice of
recycled and environmentally sensitive build-
ing materials is in keeping with the facility's
humane mission. Building Types Study
726/Local Courthouses (page 104) reviews a
mini construction boom spurred by changes in
the courtroom, a revealing portrait of current
judicial practices. *Karen D. Stein*

Art House

*A building devoted to the
paintings and sculptures of
Cy Twombly is as subtle and
evocative as the artist's work.*
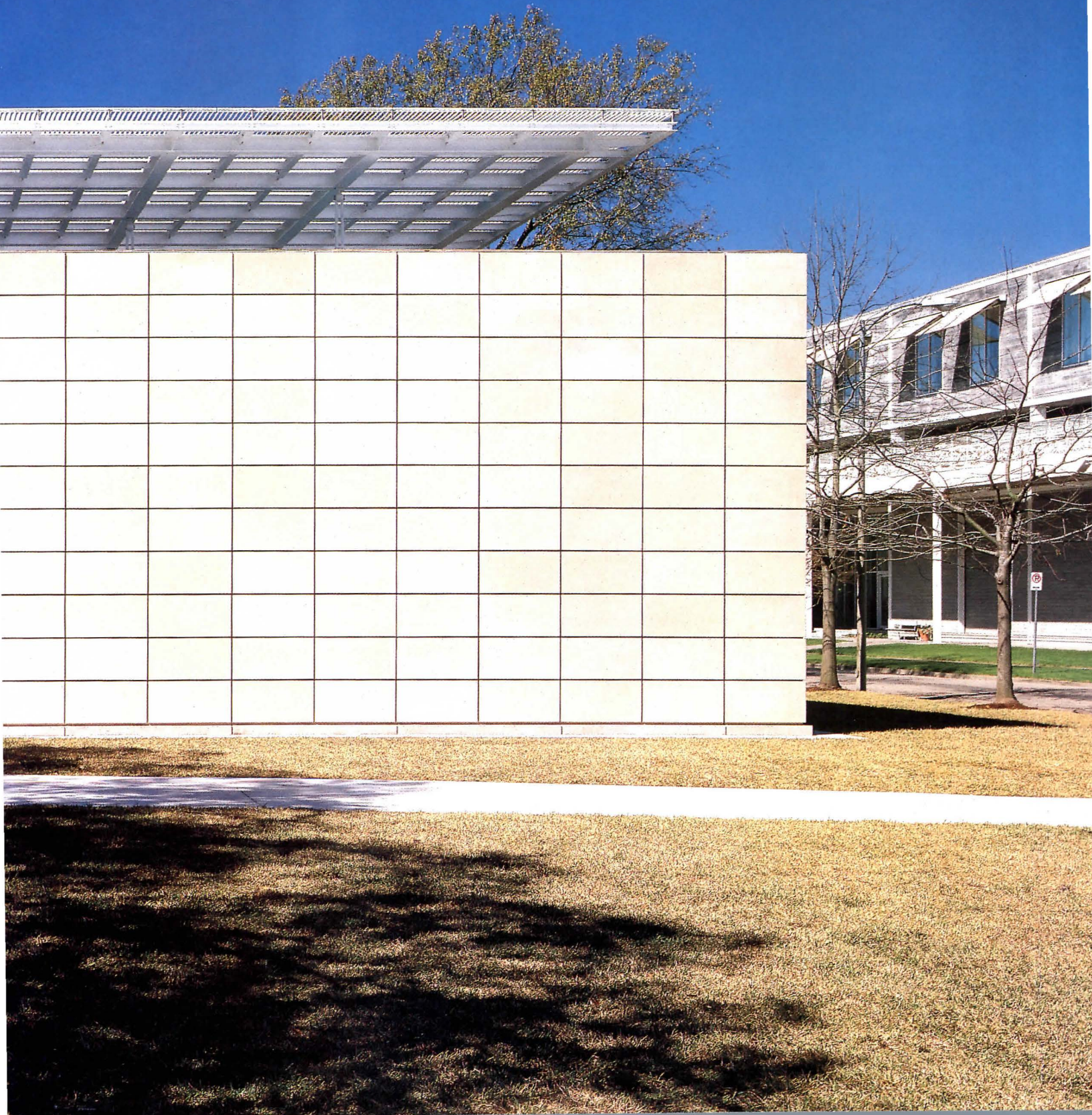
W hen it comes to museum design, artists and architects often disagree about who should get the spotlight. Not so for the Cy Twombly Gallery in Houston, where Twombly and Renzo Piano share top billing for overall good effect. Though credit goes to Twombly for conceiving the nine-square grid plan with one double bay to accommodate huge canvases, it's Piano who gave the scheme three-dimensional form. The Italian architect had designed The Menil Collection, which opened in 1987, and was asked by museum director Paul Winkler to add an annex devoted exclusively to the work of Twombly, who is prominent in the 15,000-piece collection. Although Winkler considered other architects, from his previous experience with Piano he approved of the architect's sensitive use of natural light and his unwillingness to sacrifice art to overly assertive architecture. Says Piano of the assignment: "You accept that you are doing something that is more important than your personal desire to express yourself."

Still, Piano was able to convey his own power and authority. He placed the entry to the gallery perpendicular to the street, creating a garden forecourt sympathetic to the residential neighborhood. His solid, almost bunker-like exterior consists of 16-feet 6-inch-high walls of precast concrete block—making the structure, in his words, "not big enough to compete with The Menil Collection or small enough to disappear." The walls contrast with an elegant and seemingly floating roof that incorporates an elaborate skylight and sun-shading system (drawings right and opposite), which diffuses light through a seamless cotton scrim mounted below. Inside, the opaque fabric conceals the intricacy of the roof, giving a mysterious luminescence to the galleries and Twombly's often delicate pencil and bristle strokes. Says patron Dominique de Menil: "Piano has built a jewel." *Karen D. Stein*

Credits

Cy Twombly Gallery, The Menil Collection
Houston, Texas
Architect: *Renzo Piano Building Workshop—Renzo Piano, principal-in-charge; Shunji Ishida, associate-in-charge; Mark Carroll, Michael Palmore, Shelley Comer, Allison Ewing, Steve Lopez, Maurizio Bassignani, project team*
Associate Architect: *Richard Fitzgerald and Associates—Richard Fitzgerald, principal-in-charge; George Krezinski*
Engineers: *Ove Arup & Partners (structural, services)—Jane Wernick, Sarah Meldrum, John Hewitt, Duccia Farnetani, Tom Barker, Andy Sedgwick, Katherine Holden, Alan Locke, project team; Haynes & Whaley (structural)—Larry Whaley, Robert Tyler, Charles Eggert, and Frank Lo, project team; Lockwood, Andrews & Newman (civil)—Herbert Weisend*
Consultant: *Mojtaba Navvab (services)*
General Contractor: *Miner-Dederick constructors—George Miner, John Czapski, Gordon Scott*

Across the street from the Piano-designed 100,000-square-foot Menil Collection, the Cy Twombly Gallery, while a more modest 9,300 square feet, is still a giant stripped-down version of the surrounding renovated 1920s bungalows. Piano continues to design other small museums in Europe.

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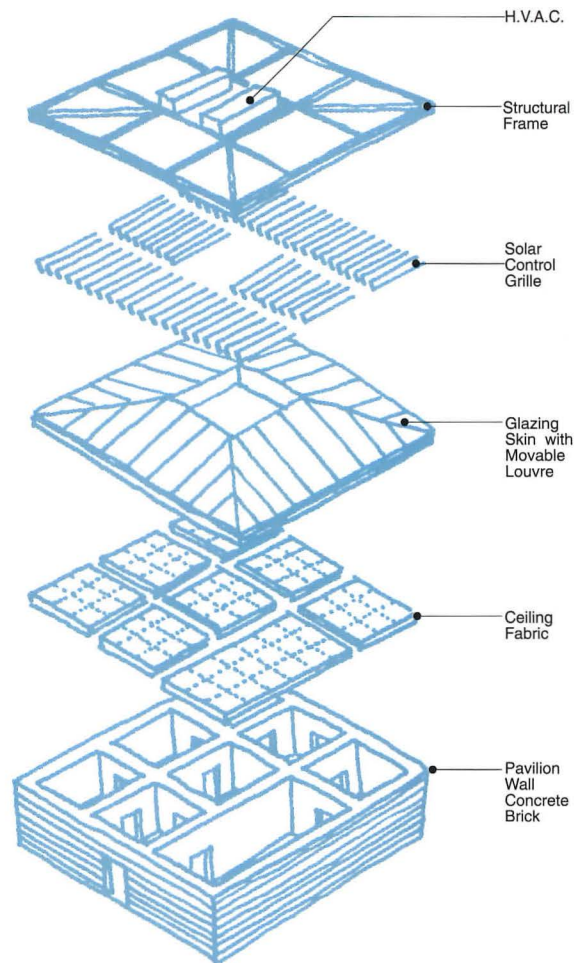
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ENLARGED SECTION B-B

3 FT.

1 M.
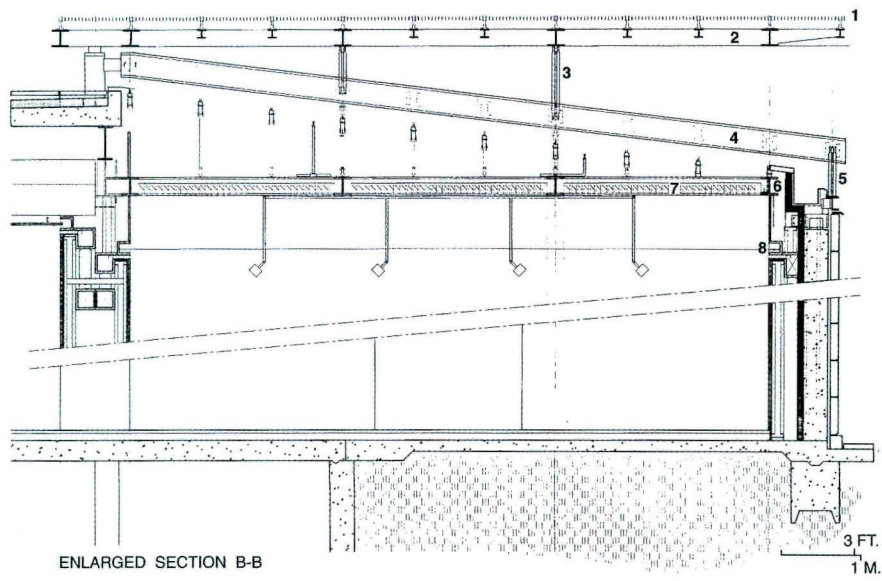
1. Stationary, sloping aluminum louvers block south light
2. Steel truss
3. Ductal iron support members
4. Double-member steel beam supports skylight system
5. Steel struts
6. Steel beam
7. Light-activated motorized louvers
8. Slot for cotton ceiling

GROUND FLOOR

N

10 FT.

3 M.

SECTION A-A
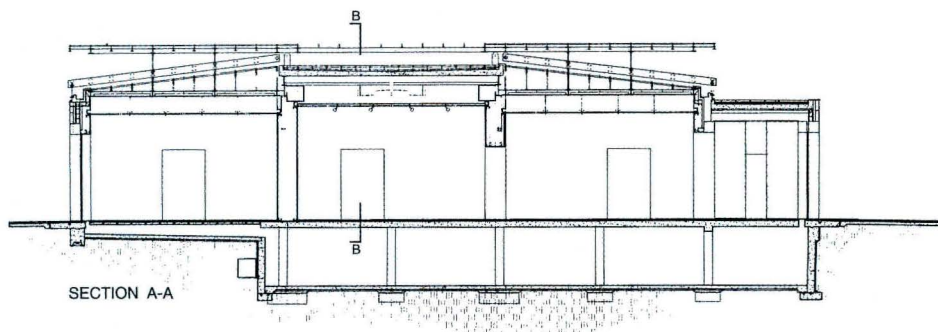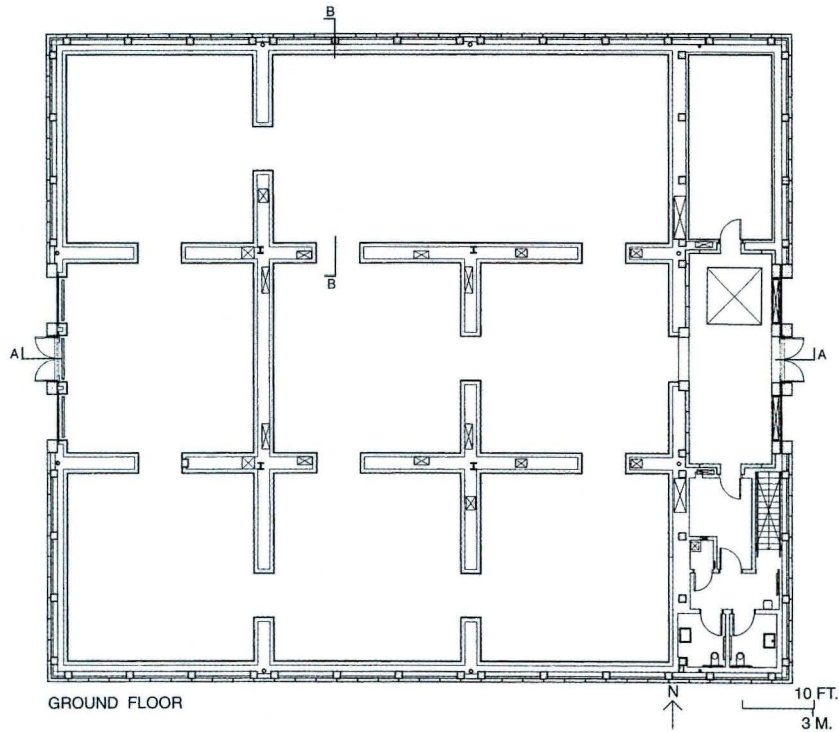
Quiet Front

A portfolio of work by the Swiss firm Herzog & de Meuron reveals a sense of strength and calm.

Twenty-four years ago, the unknown architectural team of Richard Rogers and Renzo Piano won an international competition to build the Centre Georges Pompidou in Paris, launching their careers and making architectural history. Last February, London's Tate Gallery made a similar bid for history when it selected little-known architects Jacques Herzog and Pierre de Meuron to design the new Tate Gallery of Modern Art, which will be installed in the former Bankside Power Station across the Thames from St. Paul's Cathedral (opposite). Chosen over finalists Rem Koolhaas, Tadao Ando, Rafael Moneo, David Chipperfield, and, yes, Piano, the proposal by the two 44-year-old architects represents a new direction in European architecture: away from the brilliant technological effects of the Centre Pompidou and toward a poetic minimalism. (Appropriately, Herzog and de Meuron's work is the subject of an exhibition on view at the Pompidou this month.)

Building a firm foundation

After graduating from Zurich's ETH (Advanced Technical School of Architecture) in 1977, Herzog and de Meuron built their reputation with modest houses, apartment buildings, and industrial structures primarily in their native city of Basel. Like many European architects practicing today, their work falls within the broad confines of Modernism, incorporating references to a wide array of sources: Mies van der Rohe, Louis Kahn, and Robert Venturi. But their working method and their goals have more in common with contemporary conceptual and minimal art. In fact, they have collaborated on projects with German painter Gerhard Richter and the late Joseph Beuys, and their work has affinities to the perception-bending installations of American artists Robert Irwin and James Turrell, or to Robert Ryman's paintings of white horizontal stripes. Like many of these artists, they explore the material qualities of architecture—the rhythm, texture, and light created by building elements and construction systems.

In writing about their own work, Herzog and de Meuron explain that their aim is to discover, through analysis and purification, the depth and coherence of nature and obsolete craft traditions, which Herzog describes as belonging to the "distant Utopia of a complete and integrated culture." In this sense, their small apartment building in a Basel courtyard (following pages) creates a dialog with traditional construction methods. Herzog compares its assembly of wood, steel, and glass to a musical instrument in its careful construction and in the unity of its elements.

But Herzog insists that the building's reference to the past is not nostalgic, just as its use of a distilled modern vocabulary is not stylistic. Rather, he says, the work is conceived in strictly "conceptual" relation to its sources. "Architecture," he declares, "creates its own reality." The architect's experience of the world is transformed into an independent esthetic object. "What else can we do," asks Herzog, "but carry within us all these images of the city, of pre-existing building forms and materials, the smell of asphalt and car exhaust and rain, to use our pre-existing reality as a starting point and build our architecture in pictorial analogies?"

Early projects

Herzog and de Meuron's concept of depth and coherence is powerfully conveyed in an early project, the Stone House in Tavole, Italy (following pages). Rough fieldstone walls infill a crisp grid of concrete partitions and floors. It's an ambiguous play between surface and depth, between the facades of the building and its inner structure—a strategy characteristic of the architects' subsequent work. Each facade, with its cross-shaped intersection of wall and floor edge, is thus a mirror of the plan and section, transforming the facade into both mask and veil. In the words of the architects: "The finished outer form is determined to a very large degree by the pushing out of the inner structure, analogous to a form of growth."

The mysterious, seductive quality of a closed and apparently mute container is especially effective in the architects' industrial buildings. The galvanized metal skin of the Ricola warehouse (following pages), built for a manufacturer of cough drops, is wrapped in a second skin of horizontal boards, which are set at an angle on cantilevered "shelves" that mimic storage shelving inside. The composition recalls both the stacks of lumber at neighboring sawmills and the coursing of the abandoned limestone quarry where the building is located.

The railroad signal box in Basel is similarly encased in a screen of horizontal copper strips, which the architects twist open slightly over glazed areas of the facades. The copper protects the electrical switching equipment from outside interference and relates both functionally and allusively to what is inside.

"Like many conceptual artists, they explore the material qualities of architecture—the rhythm, texture, and light created by building elements and construction systems."

Architects Jacques Herzog (far left) and Pierre de Meuron (near left).

In projects with more conventional programs, Herzog and de Meuron inevitably turn to the properties of glass, screens, and other light-transmitting materials to pursue similar effects. The seven-story commercial and apartment building in Basel (following pages), sandwiched between modern buildings on a narrow medieval lot, has cast-iron exterior shutters modeled on street gratings. The open slots in the shutters curve slightly, creating vibrant patterns of light and shadow.

Achieving international prominence

Now, as the architects begin to achieve international prominence, their delicate precision is being used to dramatic effect. The Tate Gallery, their first major foreign commission, represents a calculated gamble by Tate director Nicholas Serota, who hopes to shake up what he sees as the insularity of the British architectural scene and the current dominance of High Tech practitioners such as Rogers, Sir Norman Foster, and Nicholas Grimshaw. The Tate program calls for 120,000-square-feet of exhibition space inside a monumental power plant designed by Sir Giles Gilbert Scott in 1947. Its $125-million budget will be partially covered by Britain's new National Lottery, the so-called Millennium Fund, which is sponsoring a host of major cultural projects to celebrate the year 2000. The Tate will consolidate its collections of British art in its existing buildings in Millbank, London, and dedicate the new facility to modern and contemporary art from around the world.

Herzog describes the architects' intentions for the Tate as both "minimal and maximal": intervening as little as possible in the existing building to introduce natural light and draw out the unrealized potential of the existing space. The centerpiece of the design is the 500-foot-long, 85-foot-high Main Turbine Hall, a magnificent atrium for large-scale artwork. It is lined on its north side by the multi-layered glass wall of the galleries, which are arranged on three levels on either side of an existing 325-foot-high central chimney. On the roof, a glass addition runs the length of the building, housing a restaurant with views of the river and city. Herzog and de Meuron are not alone in the understated quality of their architecture; schemes by nearly all the Tate finalists avoided bravura gestures. They may be leading international architecture into a more modest and introspective period. *David Cohn*
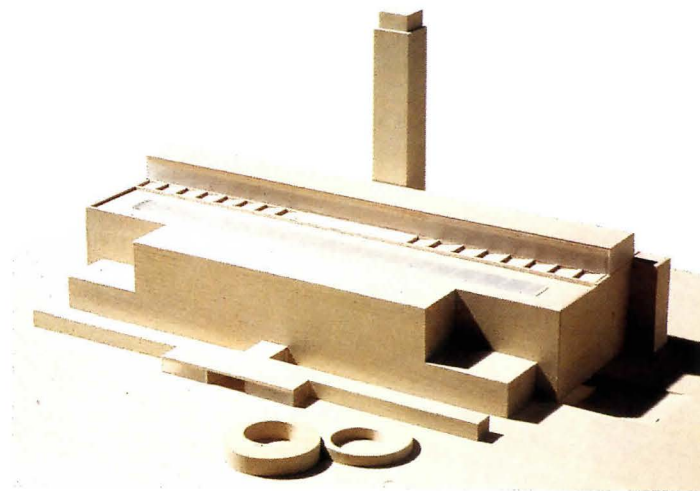
The Tate Gallery of Modern Art will be installed in a former power plant. Herzog and de Meuron seek to exploit the potential of existing spaces, while introducing natural light to interior spaces. Galleries overlook the 500-foot-long Turbine Hall; the rooftop restaurant overlooks the Thames.

Stone House
Tavole, Italy
1982-1988

The stone rubble walls of this rustic country house, built in the middle of an olive grove on an old stone terrace, act as texture and allusion rather than structure, filling in a concrete frame and wrapping corner columns. The main floor has four rooms arranged in a pinwheel around cross-shaped partitions; the top floor is open with windows on three sides.

© Margherita Spiluttini photos

Ricola Storage
Building
Laufen, Switzerland
1986-1989

The building's wooded setting in an old quarry is reflected in its materials, which are combined with sophistication and originality. The sheet-metal warehouse is wrapped in a second skin of horizontal boards, set at an angle on cantilevered "shelves" that mimic the storage shelving inside.

Larger built work includes student dormitories in Dijon, France, with blocks of rooms alternating along a continuous corridor; a second project for Ricola built as an independent structure straddling an existing warehouse; and a public-housing project near Vienna, featuring L-shaped units arranged in continuous rows.
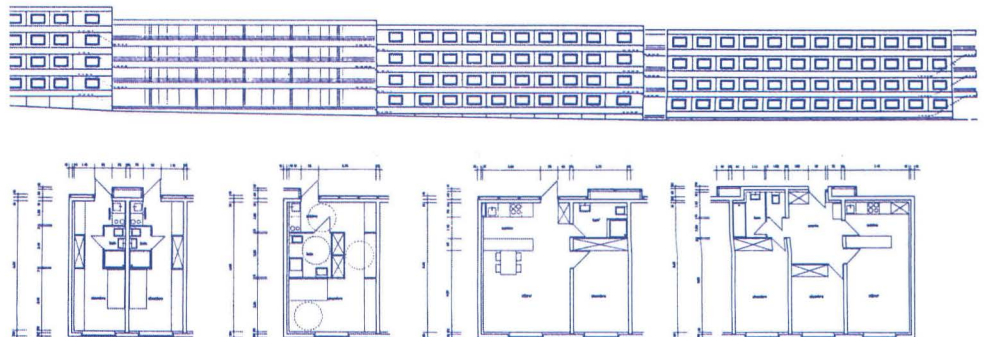
Student Housing: Dijon, France, 1990-1992

Apartment Building
Basel, Switzerland
1984-1988

Apartments are arranged in a line facing a rear courtyard with a central stair. The structure, which is raised off the ground, is fragile-looking, with the shallow wood balconies and turned-oak columns of the first two floors giving way to thin steel posts on the third floor.

Art Gallery
Munich, Germany
1989-1992

The birch enclosure of the upper floor rests entirely on two concrete "tubes"—one the entry lobby and the other a gate to the garden and house. These tubes span the sunken lower gallery at mezzanine level. The clerestories are composed of separate interior and exterior layers of matte-finished glass, with motorized light-control screens between them.

Ricola Factory addition: Laufen, Switzerland, 1987-1991

Residential complex: Vienna-Aspern, Austria, 1987-1992

Ricola Europe
Mulhouse, France

Pop Art. This facility for producing, packaging, and storing herbal cough drops is an homage to Robert Venturi's "decorated shed" and Andy Warhol's serial lithographs. The deceptively *large structure*, which is 100 feet wide by 200 feet long with 25-foot-high ceilings, is supported by a steel frame and braced at its ends by reinforced concrete walls with cantilevered canopies supported by hidden cables. Rainwater on the roof cascades over end walls, which are darkened with iron peroxide stain (middle right).

Interior partitions, the two long exterior walls, and the canopies are a sandwich of honeycombed polycarbonate panels, silkscreened with images of an herbal leaf sprig, a company symbol. The images, at times brilliantly backlit and interrupted by structural members and openings, sometimes opaque and reflective like the water-grazed end walls, help give the building an ethereal presence. Other unrealized firm projects use the building skin as a media screen, including a 1989 proposal for a Greek Orthodox church in Zurich that has marble panels etched with religious icons.

Credits
Client: *Ricola Europe, Inc.*
Architect: *Herzog & de Meuron Architekten—André Maecler, project manager*
Consultants: *Marc Weidmann (silkscreen); Dieter Kienast (landscape)*
General Contractor: *Art et Industrie, Hésinque*
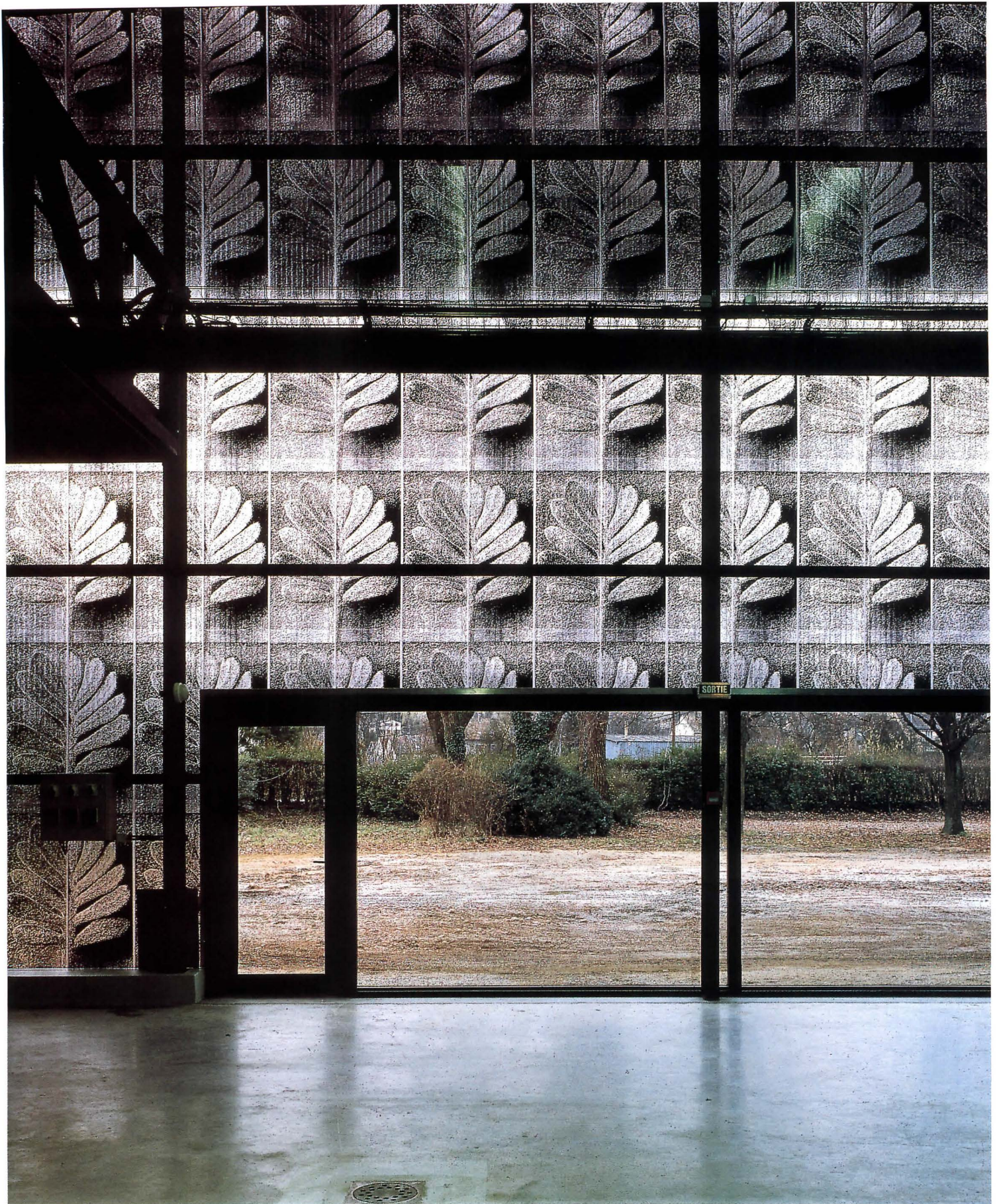
Commercial and Apartment Building Basel, Switzerland

Heavy metal. Exterior shutters modeled after tree gratings are a cast-iron filigree on the front facade of this mixed-use building. The double-height elevator lobby is paved in asphalt, with an exposed-stone medieval party wall opposite a sheet-glass partition. Above the ground-floor commercial space, apartments overlook a neighboring rear yard from a light well, which is staggered in section like a periscope. The floor-to-ceiling sliding rear windows are protected by metal balustrades and rolling wooden exterior shutters, allowing either total transparency or total closure.

Credits

Client: *Pensionskasse der Basler Staatsangestellten*
Architect: *Herzog & de Meuron Architekten—Dieter Jüngling, Andreas Stöcklin, Mario Meier André Maeder, project team*
Engineers: *Helmuth Pauli (civil); Gerber und Vogt (facades)*
Consultant: *Von Roll (cast-iron)*

©*Margherita Spiluttini photos*

Signal Box
Basel, Switzerland

Sending strong signals. Part of Herzog and de Meuron's master plan for the Basel rail yards, which also includes an engine depot and a control tower now under construction, the Signal Box houses electrical switching equipment for tracks, signals, and related work areas in a six-story insulated concrete structure. It is sheathed in strips of 8-inch-wide copper, which is mounted on vertical framing with angled spacers that gradually twist the strips open, like venetian blinds, over the center of each facade where window openings are located. (The detail was tested at full scale to overcome the builder's skepticism.) The copper cladding also acts as a Faraday Cage, insulating equipment from electrical interference.

Credits
Client: *Swiss Federal Railway*
Architect: *Herzog & de Meuron Architekten—Harry Gugger, partner-in-charge*
Project Manager: *Proplan Ing.*
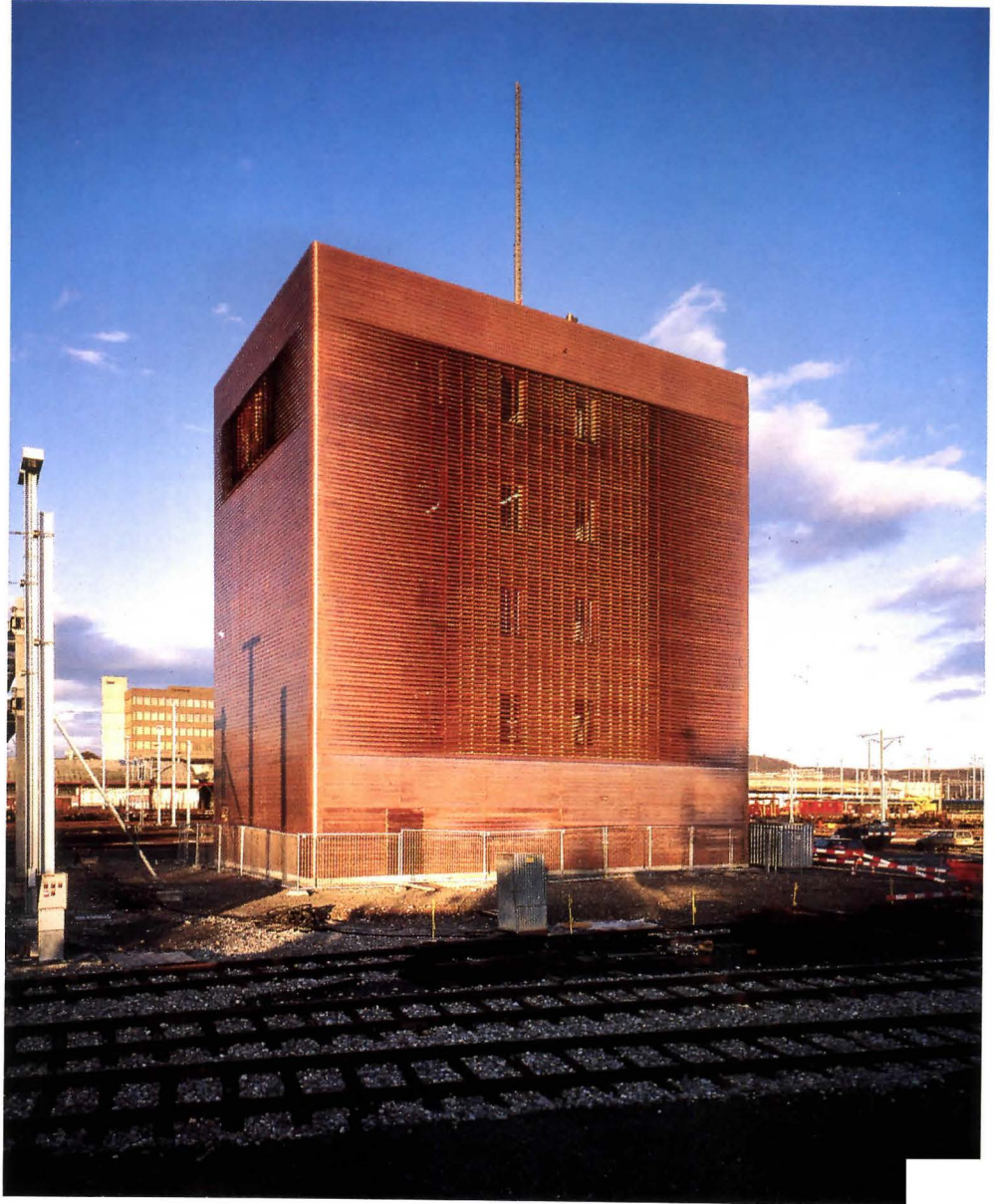
Animal House

Susan Mossman

The Women's Humane Society is the oldest organization dedicated to the humane treatment of abandoned dogs and cats in the nation. But its previous shelter was located in a Philadelphia neighborhood so rough that the "throwaway" site they chose for a new building must have seemed glorious by comparison, despite its drawbacks. The new site was bound by a turnpike on one side, a road on another, and further hemmed in by wetlands, a stream, and a power line supported by massive towers. Architect Susan Maxman made the most of these disadvantages by clustering the new building and its parking area on the buildable portion of the site, leaving the wetlands areas open for a wildlife preserve that will one day become part of the Society's community outreach programs.

Maxman's choice of steel as an exterior building skin draws on several influences, including the power-line towers, but also reflects her preference for building with recycled and recyclable materials. On the interior, she chose a number of building products that are either made of recycled materials or were chosen for their environmentally sensitive makeup: ceramic tiles made of waste glass; CFC- and formaldehyde-free insulation; mats made of tire rubber, and homasote bulletin boards, to name a few. The interior of the building is organized into three zones: a veterinary clinic, a kennel area, and an administrative area complete with a large community room, where outreach and educational programs are conducted. The hard-edged interior reflects the use of long-wearing materials that are necessary where animals must be housed, but is softened by the abundant daylight flowing through the building's many clerestories and skylights.

In keeping with the Women's Humane Society's non-profit nature, Maxman and her consultants made the most of energy-conscious design to keep future operating costs to a minimum. Some of their practices employed are low cost to say the least—deciduous trees were planted where they can shade the building, and the structure was oriented to optimize winter heat gain and maximize daylight. A mechanical system more sophisticated than might typically be found in a building this size uses a variable-volume air system in the administration zone to allow maximum flexibility for individual temperature control, and to meet the zone's need for a flexible operating schedule. A heat-recovery wheel is utilized in the kennel zone, where 10 changes per hour of 100-percent outside air is supplied to keep air-quality levels high. The puppy kennel has radiant floor heating to keep the space from being drafty, without raising the room temperature. Most of the lighting is fluorescent, eliminating incandescent lamps. As Maxman says, "If you can make a building energy efficient, why not do it? There's just no reason not to." *Charles Linn*
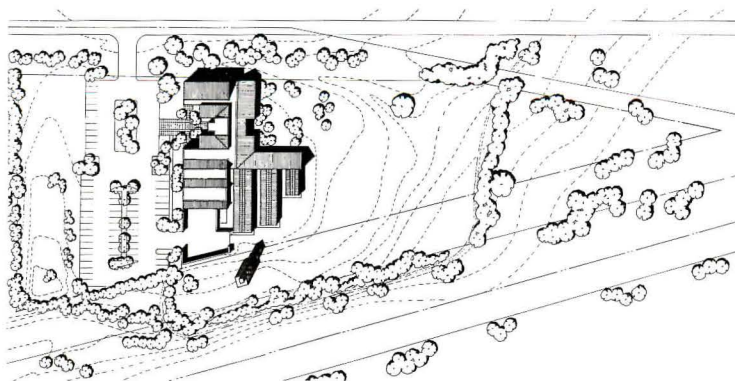
The Women's Humane Society Animal Shelter does not look particularly high tech, but it incorporates many sustainable design principles, starting with its use of a "throwaway" site. Not only does the shelter employ materials made from a high percentage of recycled waste, it also has energy-efficient mechanical, electric lighting, and daylighting systems.

Continuous ridge skylights over the corridor in the kennel area (right) offsets the need for electric lighting during daylight hours as well as providing a more pleasant environment for the animals. Clerestories (opposite) were also used to provide daylighting. Both windows and clerestories were glazed with insulated glass units supplied with a low-e film between panes. Windows on the north, south, and east are "tuned" to allow more light in than those on the west.

1. Entry courtyard
2. Reception
3. Clinic waiting
4. Exam rooms
5. Surgery
6. Isolation kennel
7. Kennel area
8. Cat adoption
9. Cat holding
10. Puppy holding
11. Conference room
12. Community room

FIRST FLOOR   → N   16 FT. / 5 M.

Embassy Suites

More than just housing the ambassador, this new residence by O.M. Ungers is intended to serve as Germany's cultural representative.

German Ambassador's Residence
Washington, D.C.
O.M. Ungers, Architect
Lockwood Greene, Associate Architect

he Germans have a word for it—*Gesamtkunstwerk*—or total work of art. And by most measures, the new residence for the German ambassador in Washington, D.C., earns the title. From silverware and china to siting and landscaping, every aspect of this building has been either designed or supervised by architect O.M. Ungers. Even door handles. Nothing has been left to chance or last-minute improvisation.

"This is a building that represents Germany," says Ungers. "The Ambassador is only a guest here. It is not his private house." Indeed, an important challenge in the official program was to showcase German culture and somehow express a national identity. Rejecting a futurist approach with all kinds of flashy new technology as inappropriate for a country with a 2,000-year history, Ungers believed that a restrained Modern design employing the highest quality craftsmanship would be the best way to represent his native land.

The official residence is also intended to respond to the cultural history of the country in which it is located. Having taught at Cornell University for much of the 1970s and '80s, Ungers was familiar with the Greek Revival architecture popular in 18th- and 19th-century America. In fact, a late-19th-century mansion was on the site when he entered the design competition that led to his selection. Although his original design preserved the old mansion, the German government determined that the old structure was too deteriorated to be saved. In the end, Ungers maintained at least the memory of the old house by incorporating a Modern version of a Greek Revival portico, coffered and barrel-vaulted ceilings, and a great Palladian window in the main reception hall.

A concrete-frame structure faced with Vermont limestone that is 6 inches thick, the residence is a formal presence sitting atop a terraced hill. A 25-by-25-inch module provides a constant for all of the building's dimensions, while precise joints, reveals, and edges bespeak a German love of detail and accuracy. Because every line and edge has to align perfectly to maintain the architect's strict esthetic, the residence has a tolerance for error that approaches zero. When asked about the severity of the building, Ungers is unapologetic. "It has a certain restraint, coolness, and formality that is proper for an official German building."

The 30,000-square-foot building cost $18.9 million to build, landscape, and furnish. Located next to the existing chancery or office building (designed by Ungers's teacher Egon Eiermann in 1964), the residence includes the ambassador's living quarters and guest rooms on the second floor and official reception areas and support services on the first. The basement has a bar and lounge, as well as mechanical rooms. On the first and second levels, outdoor rooms are carved out of the building's mass: a skylighted portico that acts as an extension of the main reception and dining areas on the ground floor, and two square terraces off the ambassador's living quarters on the top floor.

In the public rooms on the ground floor, the work of contemporary German artists is integrated with the architecture. Rather than being added after the building was completed, each painting, mural, rug, and screen was part of the architect's plan. In fact, paintings are not hung in the traditional way, but are recessed so they are flush with the wall. Doors, windows, cabinets, and all other details are also flush with whatever surface they touch. No detail escaped the architect's attention, not even covers for thermostats. A lifelong Modernist, Ungers says, "I'm not interested in new directions. I want to refine what I do. And this residence is my most refined and complete work to date." *Clifford A. Pearson*

1. Garage
2. Residence
3. Reflecting pool
4. Sunken plaza
5. Pergola

106.6 FT.
32.5 M.

N

©*Eduard Hueber photos*

Built for formal receptions, the residence has a large porte-cochère on its west side (opposite bottom) and a reinforced lawn that allows parking around the driveway. To handle parties of 700 people, the covered portico facing southeast (above) can act as an extension of reception areas inside. The south elevation (opposite top) has a residential look in keeping with the area.
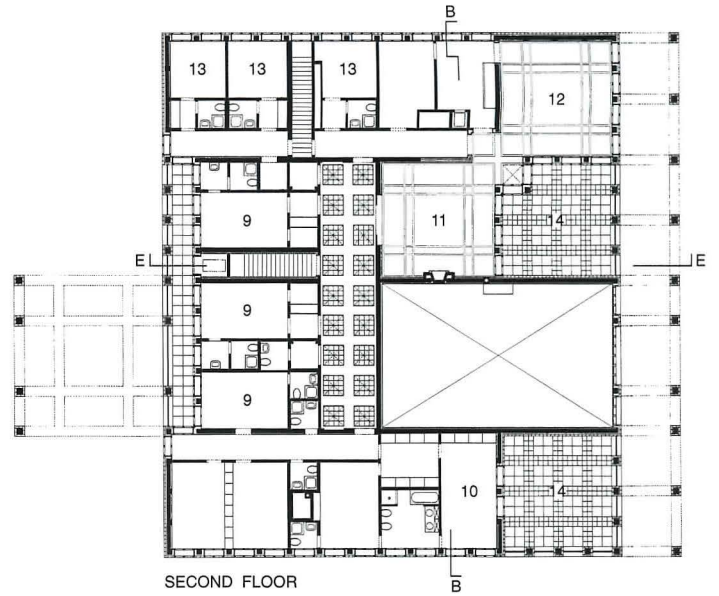
SECOND FLOOR

GROUND FLOOR

N   25 FT.

7 M.
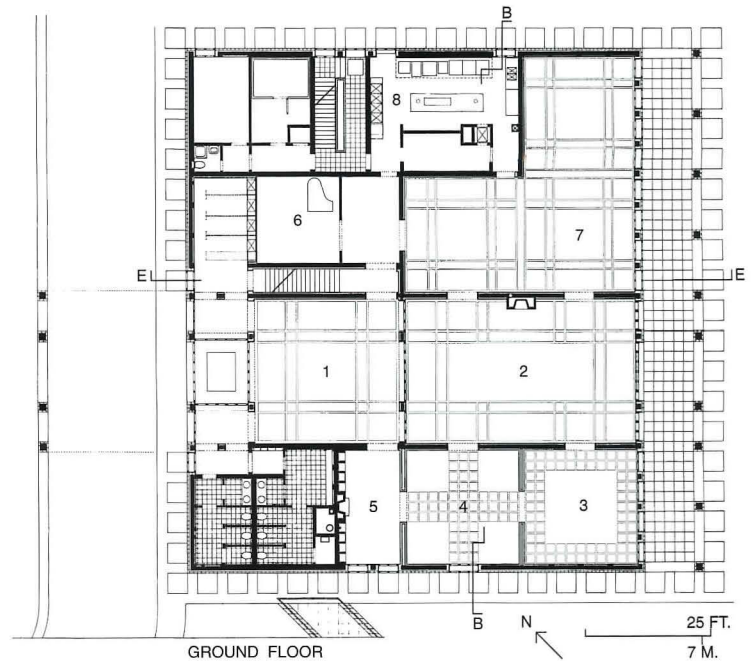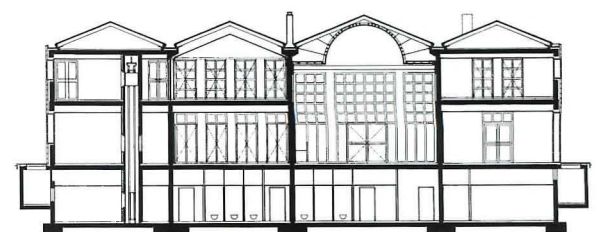
1. Entry
2. Reception
3. Women's sitting room
4. Men's sitting room
5. Library
6. Parlor
7. Dining
8. Kitchen
9. Guest
10. Ambassador's suite
11. Living room
12. Dining

SECTION E-E

SECTION B-B

Ungers relied on natural materials and neutral colors for interior surfaces. "We used artwork to bring strong colors into the building," he explains. The only double-height room, the main reception hall (left top) is a grandiose space enlivened by a series of 12 paintings by Markus Lueppertz, set flush into the wall.
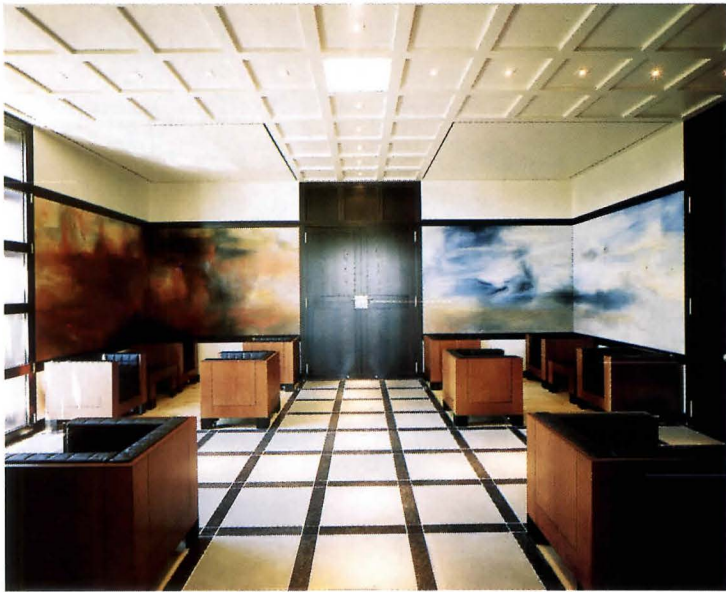
The men's sitting room (left middle) has wall paintings by Christa Naeher. The hallway to private quarters on the second floor receives sun from pyramidal skylights (left bottom). A screen by Simon Ungers can divide the dining area (below). In the entry hall (opposite), a painting by Gerhard Merz provides a dose of color.

Credits

German Ambassador's Residence Washington, D.C.
Client: *Federal Republic of Germany*
Architect: *O.M. Ungers, Architect—O.M. Ungers, Ingo Schrader, Peter Kretz, Ricardo Sargiotti, Simon Ungers*
Associate Architect: *Lockwood Greene*
Landscape Architect: *Bernhard Korte*
Engineer: *Lockwood Greene (structural and m/e)*
General Contractor: *Structure Tone, Inc.*
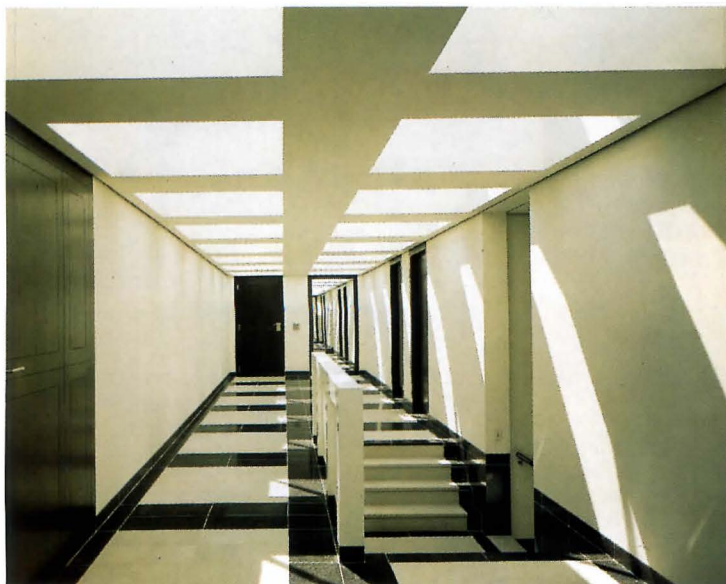
Justice for All

Courthouse construction is in a miniboom. Along with city-hall and state-capital work, it forms a diminutive, but fast-growing category in which, according to F. W. Dodge, the number of projects completed each year leapt forward almost 100 percent during just the four years ending in 1994. In 1995, many more courts are likely to be built or greatly remodeled and expanded as government at every level races to catch up with a burgeoning backlog of criminal prosecutions and civil

© Alan Karchmer photos

District Court

*Ocean City, Maryland
Ayers/Saint/Gross Architects*

Ocean City is far from being a typical town. Located on a barrier island nine miles long and only five blocks across at its widest, its population, sparse in winter, often swells to more than 300,000 in summer, when the town becomes Maryland's second largest city. Many of this seasonal influx are young people who seek beach pleasures. They are often rambunctious—straining

police and emergency-medical services beyond even the normal demands created by such a large multitude.

In many respects, this town's new state district court exemplifies the latest in judicial-design approaches nationwide. First, while maintaining its own distinct visual identity (right above), it is built in combination with a large

vertical steel tube welded atop steel tube beam at midspan

vertical steel tube

diagonal tube strut

double steel plate to receive diagonal strut at midspan of beam

steel tube beam (cont.) spanning between masonry piers flanking entry vestibule

steel beam

masonry pier beyond

interior face of masonry bond

aluminum window wall

vestibule steel structure

aluminum and glass entry vestibule

steel wing plate for cross bracing top and bottom

double plate pin connnection

continuous bent plate

38°

double plate

vertical steel strut

aluminum window wall

strap type anchors each side

steel deck

concrete slab

concrete piles

LOBBY - SOUTH WALL AT ENTRY VESTIBULE

NORTH WALL AT COURTROOM

5 FT.

1 M.

structure that houses a number of related municipal functions. These include emergency medical treatment, disaster control (primarily for major storms), and—most important to the courts—a police station, complete with holding cells and the latest in fortified electronic surveillance and security-control centers (plan overleaf). This center serves the courts as well,

and is part of the greater efficiencies that combined facilities can produce, including shared maintenance and ease of prisoner transfer between detention and judicial process.

A second characteristic of many new courthouses is the scrupulously tight control over isolated circulation paths for the public, the judge, and especially those
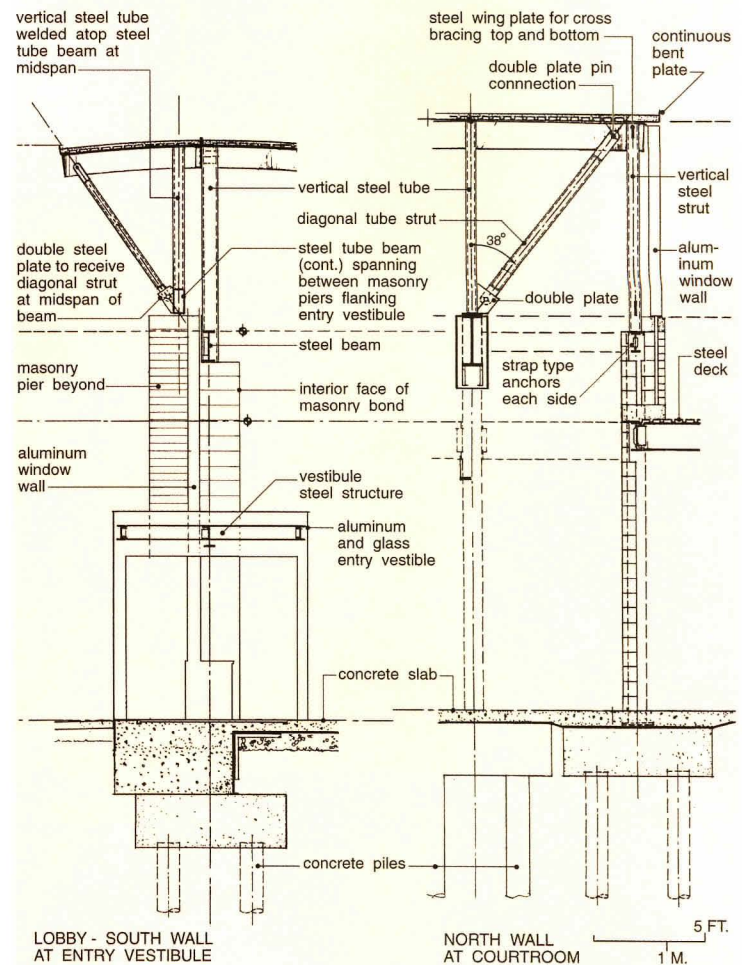
under arrest. Entry and exit to and from the building, interior areas designated for each type of user, and major spaces are through at least a single set of two successive doors, each opening only after the previous one is shut. This sally-port arrangement is controlled by the security-center operator, who can lock both doors when electronic surveillance indicates a problem.

A third new judicial standard shows in the large size of the courtroom itself. Its 2,000-square-foot area exceeds most states' pre-1989 standards by some 40 percent. The area in front of the judge for lawyers and district attorney's staff has grown as well. While the arrangement of judge's bench, witness stand, and jury box does follow the tradition of being ele-

vated above the floor, the required handicap access is supplied by ramps (below left). The architects have created a bright courtroom atmosphere, consistent with the building's overall design, through suspended overhead lighting that seemingly floats in high-tech clouds. They have also provided an amenity increasingly difficult to achieve in the face of current isolated-access requirements, which

virtually enclose courtrooms with corridors: during the day, outside light streams in—not through eye-level windows that would violate security requirements, but through clerestory windows high above the judge's bench. These windows are detailed to resemble those above the lobby (sections previous page) and extend design consistency of public areas from front to back. A final element required by current judicial

process is the large area devoted to hearings, legal counseling, and arraignments located between the courtroom and the Public Safety Building. Because of the strict national requirement for the separation of juvenile, women, and men prisoners in criminal courts, Ayers/Saint/ Gross has divided this area into individual rooms and clustered those rooms into isolated groupings.

Although typical of new court standards in most ways, Ocean City's court differs from many other judicial facilities due to its unique location. First, its short season of intense use means that for long periods there is no use for many ancillary facilities in both buildings. To respond to this potential maintenance problem, the architects placed a self-sufficient grouping of some functions for year-round use

1. Entry
2. Lobby
3. Offices
4. Records
5. Holding cells
6. Booking
7. Security center
8. Sally port
A. Lobby
B. Courtroom
C. Judge
D. Jury
E. Hearing rooms

LEVEL 1

20 FT. N
6 M.
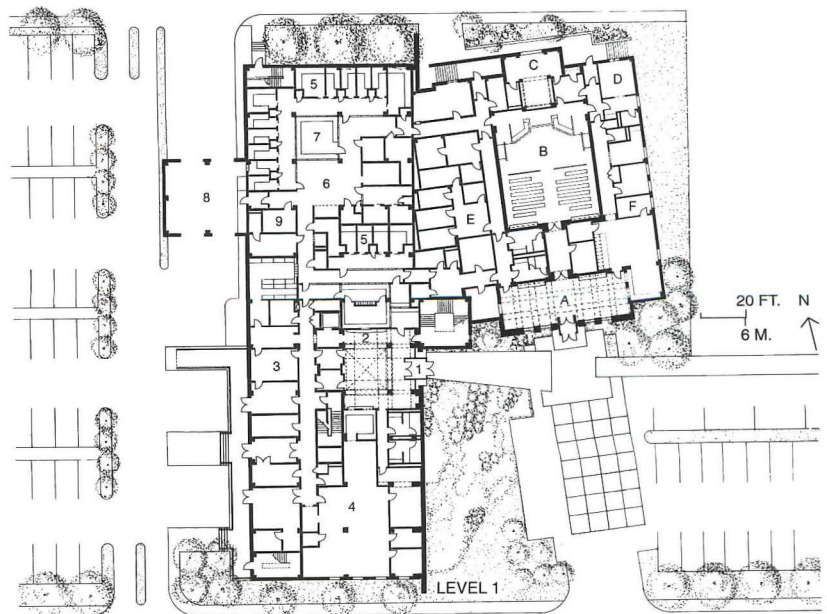
around the square stairwell leading to the disaster-control tower between the two public lobbies. These include four holding cells monitored from the reception desk in the Public Safety Building and several adjacent hearing rooms near the court's lobby. This allows many of the other spaces in the northwest corner of the complex to be shut down. Another unusual aspect of the complex is its structure.

Concrete in the public-safety building and steel frame in the courts (to span the large main room and give a lighter visual effect), both systems were built with the strength to withstand heavy storms even if a five-foot depth of sand around their pile foundations eroded away. *C.K.H.*
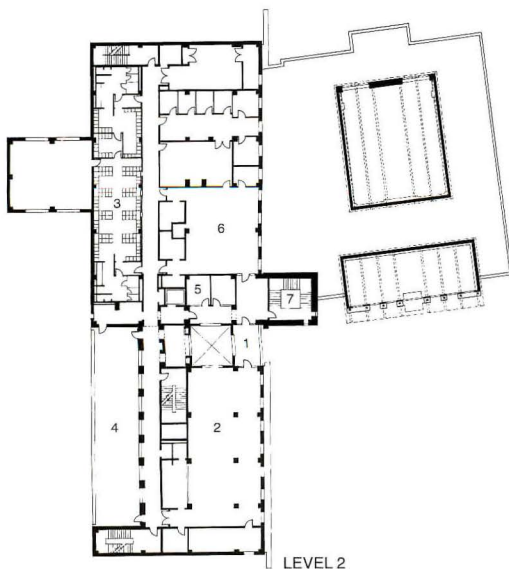
1. *Pressroom*
2. *Dispatch*
3. *Lockers*
4. *Staff terrace*
5. *EMS offices*
6. *EMS training*
7. *Stairs to disaster control and observation tower above*

LEVEL 2

Ocean City's new $8.5-million, 55,000-square-foot District Court and Public Safety Building creates a civic presence where there were once only city departments in scattered makeshift quarters. Both buildings have split-block cladding, and the architects have differentiated the courts by a lighter color (similar to traditional limestone), a larger scale, and a slightly shifted axis. A disaster-control center (opposite right) is located in a tower between the two structures and is topped with an enclosed observation deck. Court lobby is above, left, and Public Safety lobby above, right.

West Roxbury District Court

Jamaica Plain, Massachusetts
Elkus/Manfredi Architects

Jamaica Plain's 1922 courthouse is a symbol of strong civic identity that the town was anxious to preserve—complete with noble steps and colonnade entrance that clearly speak of the dignity of the law. "The building has a clear parti, including its axial circulation, that we did not want to change," says Elkus/Manfredi Architects partner-in-charge David Manfredi. The state called in his firm because the building was not only badly lacking vital mechanical and electrical systems to meet current usage, but also in the number of hearing and courtrooms, administrative offices, detention and processing areas, and required separation of functions—including juvenile from adult proceedings, and isolated circulation for judges, public, and accused. A new program called for more than doubling existing space on a tight triangu-
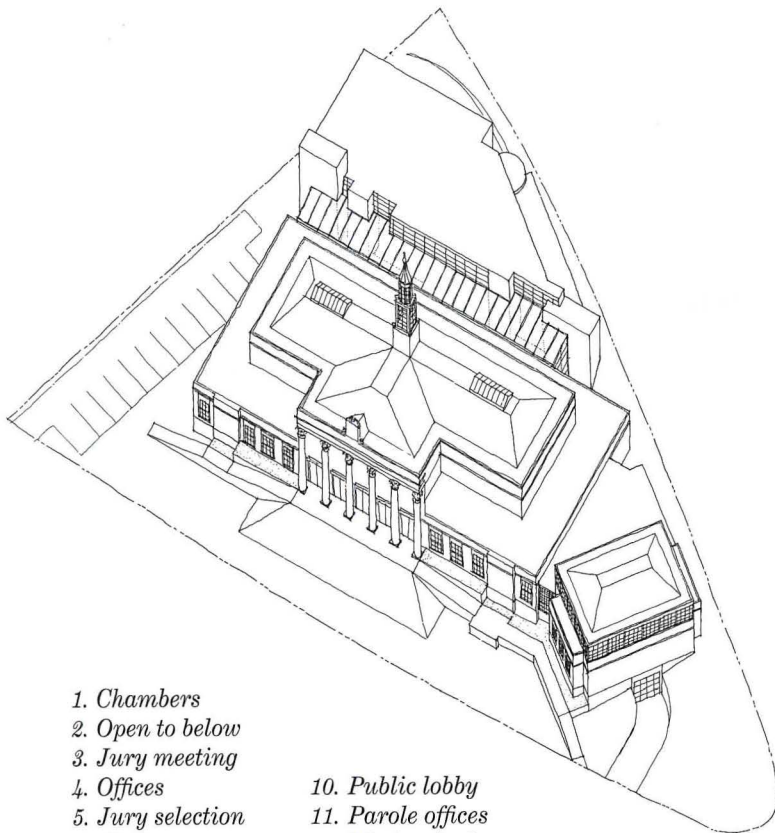
1. Chambers
2. Open to below
3. Jury meeting
4. Offices
5. Jury selection
6. Civil court
7. Criminal court
8. Juvenile court
9. Holding
10. Public lobby
11. Parole offices
12. Mechanical
13. Security center
14. Crawl space
15. Sally port

© Peter Vanderwarker except noted

BASEMENT

FIRST FLOOR

THIRD FLOOR

N

33 FT.
10 M.
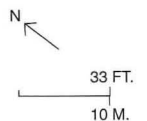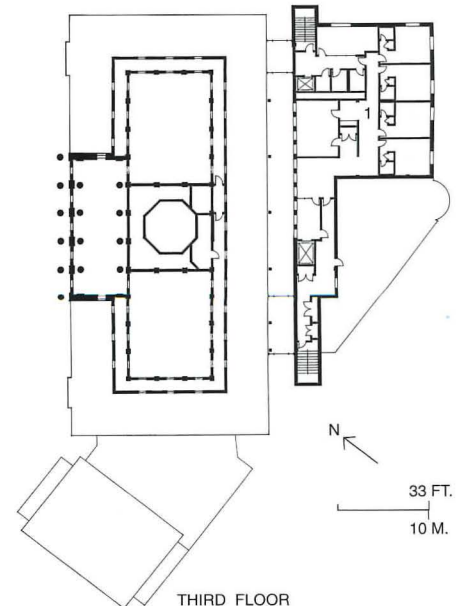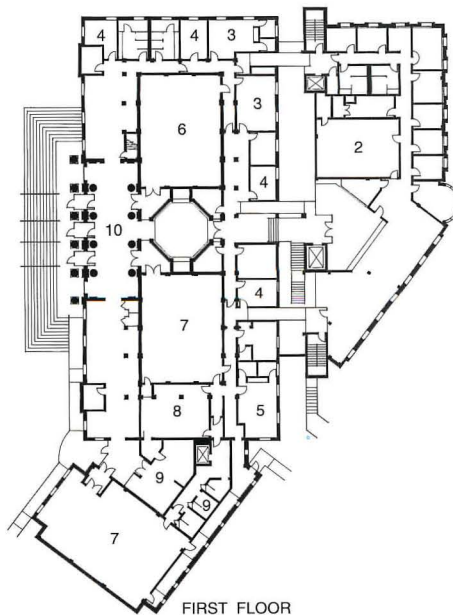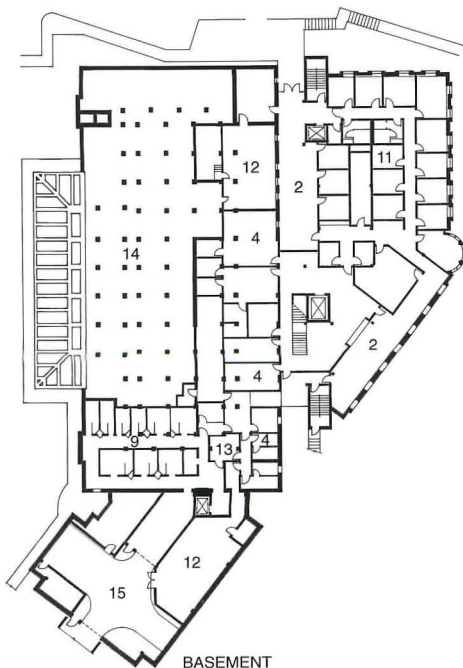
lar site surrounded by houses. Manfredi's team determined that additions should not just enhance the existing building's character, but clearly express current usage and have a scale transitional to the residential neighborhood. The ample original courtrooms were re-stored. The eastern room was designated for civil cases and the western one for criminal. This way, an addition to provide isolated prisoner access

and an all-new courtroom could be confined to one side of the building. Extensive holding cells and a sally port serve this area from the floor below. Along the south side of the original building, a private corridor for judges was created from former public space. It connects with a three-story addition housing their chambers on the top floor and offices on the floors below.
C. K. H.

© Marco Lorenzetti, Korab/Hedrich-Blessing

© Marco Lorenzetti, Korab/Hedrich-Blessing

The architects added offices and judges' chambers in a rear addition reached across a three-story atrium (above right) that brings light to lower level offices— some carved out of crawl space under the original building. The atrium also clearly shows old and new by revealing an original exterior wall. The architects have carried the concept of clerestory lighting from restored courtrooms (left) to the new one (above left).

New Courthouse

Ithaca, New York
Perkins Eastman Architects

Ithaca's new courthouse replaces a former court in an adjacent 1930s police station (right in plan), which Perkins Eastman Architects has remodeled to expand police use in the freed-up spaces. The new court also creates a civic presence by facing the downtown area to which the original building turns its back. A prefabricated-steel pedestrian bridge across a glacial creek now forms an added link to the business district, and public parking and transportation. While security normally dictates enclosed court buildings, Ithaca's is surprisingly open. An arcade at ground level is the start of a walkway along the creek, which had long been inaccessible and neglected. The courtroom itself has floor-to-ceiling windows that make the legal process highly visible to passersby and as pleasant as possible for the

© *Jon Reis Photography photos*

participants. This unusual openness is possible because the facility is intended for misdemeanor cases, which seldom come to full trial. Arraignments are conducted in the large hearing room on the second floor, where serious cases are sent on to higher courts. This room doubles as a small court for hearings before judges. It also houses jury selection. This ad-hoc adaptability applies to circulation as well. Public paths are clear, but the two judges and the accused share the same route from secure parking behind a fence at grade, up an elevator to the north, and along the same hall. Or the judge may simply walk through the front door. The new $2.2-million, 12,000 square-foot courthouse has only one facade. The other two sides of the triangular building abut the original building and an embankment.

The architects took advantage of firmly compacted soil behind a solid WPA retaining wall to save many tons of concrete on foundations. The structure is steel and cladding is concrete panels to match the limestone police station. *C. K. H.*

Credits

New Court and Police Facilities
Ithaca, New York
Architect: *Perkins Eastman*
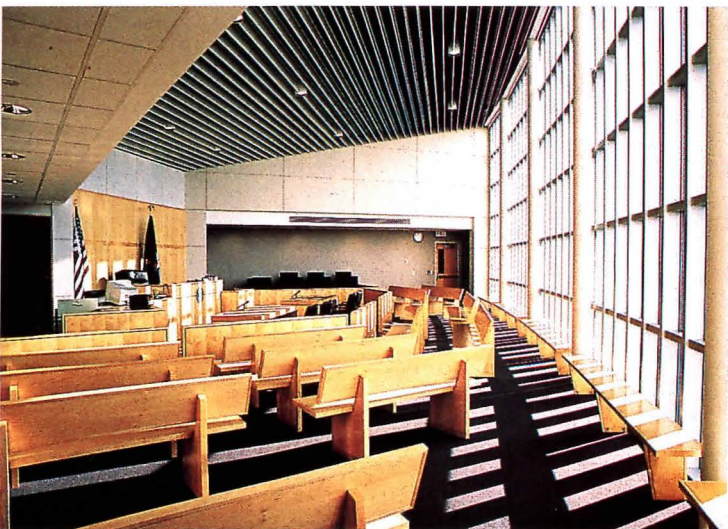
1. *Public lobby*
2. *Secure lobby*
3. *Courtroom*
4. *Hearing room*
5. *Conference room*
6. *Chambers*
7. *Office*
8. *Jury room*
9. *Detention*
10. *Interview*
11. *Storage/copy*
12. *Lunchroom*
13. *Administration*
14. *Toilets*
15. *Mechanical*
16. *Parking*
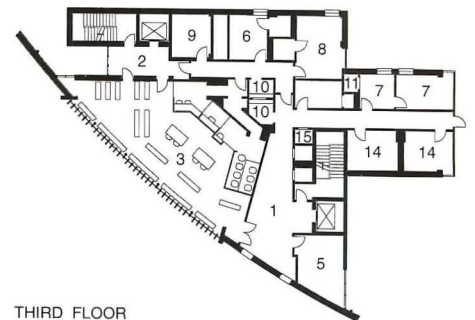
THIRD FLOOR

SECOND FLOOR

N

GROUND FLOOR

32 FT.
10 M.
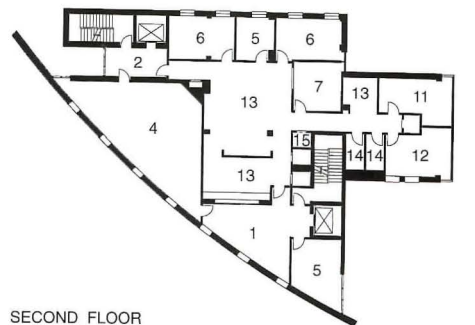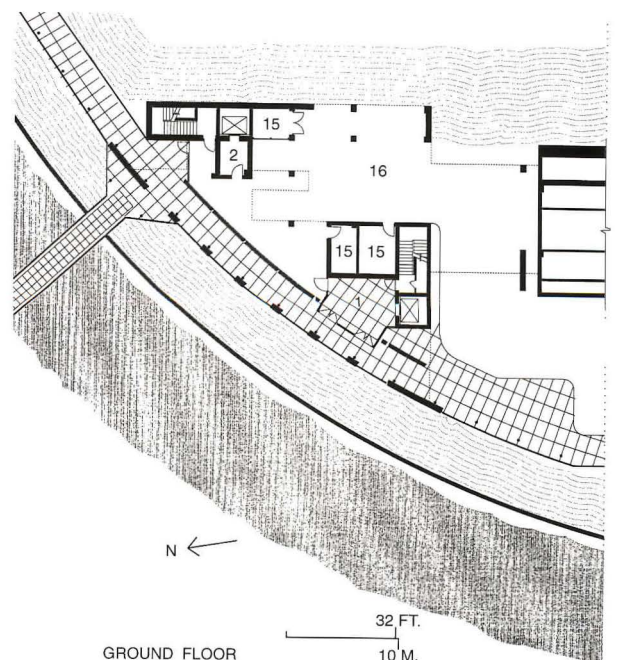
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Topping For (
And Chun

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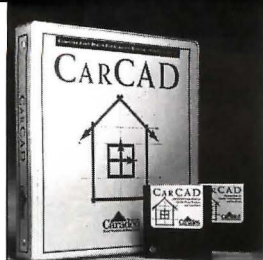
401. Door and window CAD
A CAD package for dealers, architects, remodelers, and specifiers, CarCAD includes elevations, sections, product specifications, and window schedules. Runs on Windows 3.1, with a point-and-click interface that details any Caradco wood window and patio door. Creates an exportable .DXF file for use in AutoCAD drawings. 800/238-1866. Caradco, Rantoul, Ill.
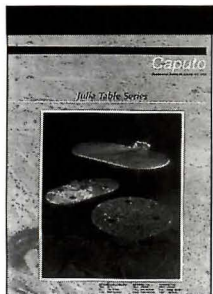
402. Stone tabletops
A brochure illustrates conference and dining tables custom-fabricated from marble and granite slabs; color photos show various stones. Julia table tops come in 14 shapes and almost any size, priced according to the stone type, edge detail, and base configuration selected. Architectural stonework a specialty. 908/225-5777. Caputo International, Edison, N.J.

403. MRI shielding systems
Prepared for the architect as well as the hospital manager, a binder offers technical and design information on magnetic-resonance imaging shielding systems that can solve the patient-care and space problems involved with this diagnostic equipment. Detail drawings available on diskette. 708/307-7200. Lindgren RF Enclosures, Inc., Westmont, Ill.

404. Curtain-wall guide
This maker's new Architectural Reference Manual incorporates all the information formerly found in detail and specification publications into two "easy to use" volumes. Special tabs and color coding allow quick access to product and test data on all EFCO windows, curtain-wall systems, storefronts, and entrances. 800/221-4169. EFCO Corp., Monett, Mo.
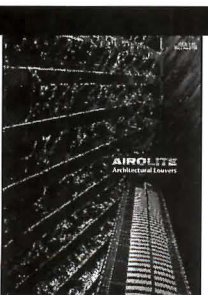
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A 20-page catalog includes photos, detail drawings, and technical data on architectural louvers, grilles, sunshades, equipment enclosures, and penthouses constructed with an all-welded technique said to produce stronger blade and frame connections and to reduce vibration noise. Shows factory-finish colors. 614/373-7676. Airolite, Marietta, Ohio. ∎

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A partial list of sources for special glasses referenced in the Fundamentals article, page 35.

Stained Glass/ Textured Glass

S.A. Bendheim Co.
61 Willett Street
Passaic, NJ 07055
201/471-1733

Bullseye Glass Co.
3722 S. E. 21st Ave.
Portland, OR 97202
503/232-8887

Creative Central
P.O. Box 6410
Portland, OR 97228-6410
503/639-6678

The Gray Glass Company
139-24 Queens Blvd
Jamaica, NY 11435
800/523-3320

Pilkington Sales North America Ltd.
10 Gateway Blvd.
Don Mills, Ont. M3C 3A1
416/421-9000

Rambusch Company
40 W. 13th St.
New York, NY 10011
212/675-0400

Kiln-Formed Glass

Stephen Knapp
74 Commodore Road
Worcester, MA 01602
508/757-2507

Dichroic Glass/ Dichroic Glass Block

Liberty Mirror
851 Third Avenue
Brackenridge, PA 15014
412/224-1800

Spectrum Block Products, Inc.
Suite 128
2081 Business Center Drive
Irvine, CA 92715
714/252-1978

Glass Block and Pre-fabricated Panels

IBP/Acme Brick Co.
2821 W. 7th St.
Ft. Worth, TX 76107
817/390-2454

Circle Redmont, Inc.
2760 Business Center Blvd.
Melbourne, FL 32940
800/358-3888

Pittsburgh Corning Corp.
800 Presque Isle Drive
Pittsburgh, PA 15239
800/992-5769

WeckGlass Blocks/ Glashaus, Inc.
415 West Golf Road, Suite 13
Arlington Heights, IL 60005
708/640-6910

Cast Glass

Fenton Art Glass Company
700 Elizabeth Street
Williamstown, WV 26187
304/375-6122

Blenko
Box 67/Fairground Road
Milton, WV 25541
304/743-9801

Mr. John Lewis
10229 Pearmain Street
Oakland, CA 94603
510/635-4607

Commercial Glass Installers

Trainor Glass Company
11700 S. Cicero Ave
Alsip, IL 60658 708/388-5700

Laminated & Architectural Glass

Cesar Color Inc. (*ChromaFusion,
ChromaScreen*)
880 Hinckley Road
Burlingame, CA 94010
415/259-9700

Leucos USA Inc. (*Murano Glasses*)
70 Campus Plaza II
Edison, NJ 08837

Monsanto Co. (*Opticolor*)
800 N. Lindbergh Blvd.
St. Louis, MO 63167
800/248-6844

Schott Corp. (*Opal glass*)
3 Odell Plaza
Yonkers, NY 10701
914/968-8900 ■

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Manufacturer Sources

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 78-83
Cy Twombly Gallery, The Menil Collection
Renzo Piano Building Workshop, Architect
Richard Fitzgerald & Associates, Associate Architect
Concrete block: Redondo Mfg. Pivot hinges and closers: Rixon. Exits: Russwin. Framing of laminated-glass skylight: Fischer. Vision and fritted glass: Pilkington. Motorized sunscreening: Technical Blinds International, Inc. Fixed louvers and glazing fabrication: Haley-Greer, Inc. Seamless cotton-fabric ceiling: Farley Fontenot, UK Sailmakers. Natural-finish gypsum plaster: United States Gypsum Co. Gallery lighting: Edison Price. White-oak flooring: Gilson Stanley Floors. Reception desk and oak benches: Megatrends.

Pages 92-95
Women's Humane Society Animal Shelter
Susan Maxman Architects
Corrugated-steel siding and standing-seam roofing: Smith Steelite, Inc. Ground-face block: Anchor Concrete Products, Inc. Cavity-wall insulation: Air Krete, Inc. Extruded EPS insulation: Amoco Foam Products Co. Roof insulation: NRG Barriers, Inc. Windows and entrance: EFCO Corp. Membrane roofing: Carlisle SynTec Systems. Upward-acting doors: Overhead Door Corp. Locksets: Best. Suspended ceilings: Mineral-base:

Armstrong World Industries; metal: Alpro Acoustics. Interior glazed CMU: Burns & Russell (Spectra-Glaze II). Paints and special coatings: Sherwin-Williams Co. Reception benches: Kroin, Inc. Lighting: Litecontrol; Zumtobel: Simkar: Hubbell; Lithonia. Outdoor: Hubbell; Kim Lighting. Task fixtures: Luxo.

Pages 96-103
German Ambassador's Residence
O.M. Ungers, Architect
Lockwood Greene, Associate Architect
Oak windows and glazed doors: Philip Holzmann. Locksets: Hans Grimberg. Quartered-oak, cherry, and pearwood flooring: Kentucky Wood Floors. Tile: Vileroy+Boch. Reception furniture, portable lamps: Sawaya+Moroni. Interior fixtures: Staff Lighting. Bollards: Se'lux.

Pages 104-107
Ocean City District Court Building
Ayers/Saint/Gross Architects
Aluminum-frame curtain walls and windows: Wausau Metals. Glazing: Guardian Industries. Carpeting: Prince Street Technologies. VCT flooring: Armstrong World Industries. Office furniture: Steelcase, Inc. Reception seating: Bernhardt. Locksets: Sargent. Detention ceilings: Steel Ceilings, Inc. Cell doors: Southern Steel Co. Courtroom casework and paneling: Beitzel.

Pages 108-109
West Roxbury District Court
Elkus/Manfredi Architects, Ltd.
Curtain wall and entrances: Kawneer Co., Inc.

Cladding panels: Reynolds Metal Co. Brick: Belden. All glazing: TempGlass. Windows: EFCO. Roofing: Supradur. Skylights: Fisher Skylights. Wood interior doors: Algoma. Locksets: Best. Hinges: Hager. Paints: Benjamin Moore & Co.; Sherwin Williams, Inc. Acoustic panels: Conwed. Window treatments: Springs Window Fashions (Bali). Courtroom benches: Sauder. Special fixtures (courtroom): Newstamp Lighting. Elevators: Dover. ■

Clarifications/Corrections

•The extension to the existing Hong Kong Convention & Exhibition Center [RECORD, January 1995, page 15] is a collaboration with SOM's Chicago office. Wong & Ouyang Ltd. did the conceptual study and is project architect and engineer for the design/build phases of the project.
•In the February 1995 RECORD, all color photography of the Carl and Ruth Shapiro Admissions Center at Brandeis University, pages 94-97, should have been credited to Steve Rosenthal.
•Also in February, the Design News story on the Ca' d'Zan [page 14] contained two errors: the original owners of the residence were John and Mable Ringling; the restoration, by Ann Beha Associates, is to cost $5.8 million.
•For the Drager Residence [RECORD, April 1995, page 82] Frank Israel is project designer and Annie Chu is project architect.
•In the same issue, photography of the Barry's Bay Cottage designed by Hariri & Hariri should have been credited "courtesy of *Elle Decor*". ■

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General Services Administration Building, Oakland, CA. *Architect:* Kaplan, McLaughlin & Diaz. *General Contractor:* Walsh Construction Co. *Products:* Custom 5600 Curtain Wall, Series D-500 Entrance, Series 2000 Sliding Glass Doors, Custom Series 890 Equa-Vu™ and System II™ Windows.

The GSA contract called for random testing to verify the air infiltration and water resistance specifications of the building's glazing systems. The curtain wall, storefront, doors, and windows all had to perform to spec or they would be rejected. We wanted to work with a manufacturer that could give us the kind of products and performance we needed to keep the job moving on time and on budget.

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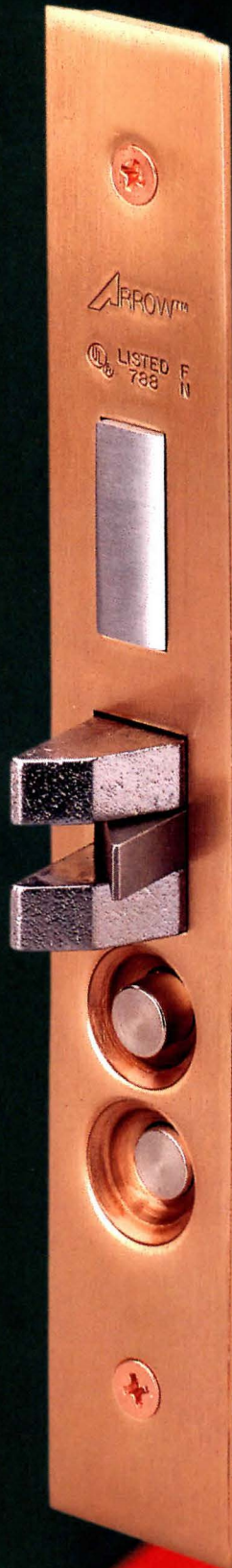
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Portland Skyline Lovers See Green

© Stephen Cridland photos

To make the new Bank of America Financial Center a night time standout on the Portland skyline, lighting designer Robert Dupuy, of Interface Engineering, traced the peaked roof of the new building with a thin green line of cold cathode. To protect the lamps and hardware, he designed a custom plastic cover and reflector. The assembly was granted a UL listing from Underwriters Laboratory in the field, a rare event. Folks found the lighting controversial at first, but now, like other things green, it's growing on them. ■

A Facelift for Mr. Frick

In Pittsburgh, Burt Hill Kosar Rittelmann Associates and Horton • Lees Lighting Design have restored the Henry Clay Frick Building's shimmering glamour. Built in 1907, gas lights gave way to a plethora of lighting fixtures over the years, including magnificent pendant fixtures, sconces, and ceiling fixtures. Now rebuilt, the pendants' vertical panels are lit by 3000K T8 lamps, and highlight the coffered ceiling above with MR16s. An AR70 spot concealed in the bottom of one the pendants lights a bust of Mr. Frick, while other pendants flood the floor with Q250W PAR38s. Sconces were repaired and fitted with compact fluorescents, while the new spherical ceiling fixtures, also compact fluorescent, were custom-designed. The stained-glass window was backlit using 3000K slimline fluorescents. "Now the benevolent Mr. Frick really glows," says Jules Horton. ■
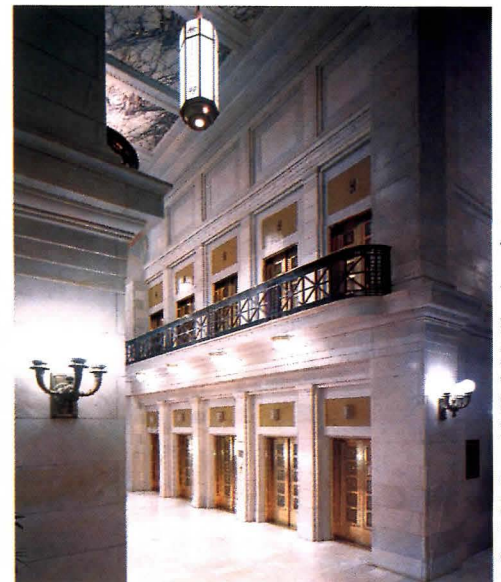
© Scott McDonald, Hedrich Blessing photos

Fordham's New Tower of Light

A glowing stair-and-elevator tower now links Fordham University's rooftop sculpture garden to the street below. The designers, John Gillis Associates, used 4-in.-thick glass block for the 20-ft-tower's facade, which is backlit by white neon bars spaced about a foot apart. A cantilevered stair wraps gently around the tower, while its steel structure is carefully hidden to emphasize the tower's lightness and leave the view of the glass-block column unobstructed. At night, the glow of the stair tower gives off an eerie light and also offers safe access to the garden. The vast, two-block-long garden sits atop the school's library and auditorium. Until now, it could only be accessed through the building below. ■

© Wade Zimmerman photos

Lava Lamps Hit the Spot

© Robert Pisano photo

Adams Mohler Architects took a collection of Lava Lamps and transformed them into centerpieces for the Spot Bagel restaurant. The Lava Lamps are suspended over the tables with aircraft cable, and a metal shade shields a halogen lamp for downlighting the tables. ■

Bartle's Bangles and Beads

Kansas City's $100-million Bartle Hall, designed by HNTB Architects Engineers, has been crowned with four beaming, surreal, giant lanterns. Designed by the artist R.M. Fischer, the ornaments sit atop four 200-ft-tall concrete pylons, which support the cables suspending the convention center's roof. The monumental "Sky Station" sculptures have a futuristic wackiness. One was described by a local reporter as "a great big hair roller." But according to HNTB's Richard Farnan, Kansas Citians are particularly conservative about building the unusual, especially after a couple of serious construction failures there. To ensure the structures would not topple in a strong wind, during installation or afterward, no field welding was allowed. Welding had to take place in a plant, but it was hard to find a plant big enough. The next challenge was finding a helicopter that could carry both the weight of the sculptures and the necessary fuel. Now that they're complete, people are more at ease about about the structures. Locals hope the towers will do for their city what the Gateway Arch did for St. Louis and, in fact, the results can be seen clear to the Gateway City. ■

© Mike Sinclair, Sinclair/Reinsch photo

Briefs

New Induction Lamps Stand Test of Time Lighting Big Ben Clock Faces

Changes

•Kristina Selles has been made partner at the lighting design firm Wheel Gersztoff Friedman Shankar, Inc. The firm's new name is Wheel Gersztoff Shankar Selles, Inc.

•Horton•Lees Lighting Design has named three new associates: Mark W. Harris, Ann L. Schiffers, and Alex Pappas Friend. Gary Gordon has been appointed vice president.

•Jim Benya, a regular contributor to the lighting design and technology columns found in these pages, has relocated his firm, James R. Benya Lighting Design, from Sausalito, Calif., to West Linn, Ore. Benya will maintain an office in Sausalito to serve his clients in the Bay Area.

•Ross De Alessi has relocated his firm, Ross De Alessi Lighting Design, away from the rain (!), from Portola Valley, Calif., to Seattle.

Meeting Place

•LightFair International will be held June 7-9 at McCormick Place in Chicago. Call 800/856-0327 to join the mailing list. ∎

Since 1859, a light has shone from the top of London's Big Ben—the House of Parliament's clock tower—whenever a session drags on into the night. Now the tower's four clock faces also shine brightly. Philips Lighting was asked to replace the old cold-cathode lamps with something more energy-efficient and maintenance-free. One-hundred-twelve new induction lamps have made the clock faces three times brighter and—perhaps more important to the clockmaster—they will not have to be changed for 15 years. ∎

The Real Energy-Efficient Thing

Education the Focus of New Lighting Lab

A new Coca-Cola sign towers over the Ginza Shopping district—Tokyo's version of Times Square. The circular sign, nearly 50-ft tall, uses more than two miles of neon tubing. According to Coca-Cola, it also uses one-third less electricity than conventional signs. ∎

Osram Sylvania has opened a laboratory for lighting at its main headquarters in Danvers, Mass. The multimedia center—called Light-Point, the Institute for Lighting Technology—is an education facility that will offer regular seminars and exhibits on lighting design to customers, architects, engineers, interior designers, and contractors. Three, two-and-a-half-day foundation courses will focus on lamp technology, the "art and science" of lighting design, and up-to-date, energy-efficient lighting technology. For those engaged in the world of entertainment, the 6,400-sq-ft center will also be a place to explore television and theatrical lighting. For information on attending workshops and seminars, contact the LightPoint Manager, Osram Sylvania, 100 Endicott Street, Danvers, Mass. 01923, or phone, 508/750-2225. ∎

Light and the Human Animal

By James R. Benya

Those who design lighting generally strive to achieve basic principles of good design, such as proper task levels, attractive appearance, energy efficiency, and the like. In addition, the lighting designer should understand the human-vision system and should factor in this understanding during design. Today, most of the emphasis is on minimizing disabling and uncomfortable glare.

But throughout the modern period of electric lighting, little design consideration has been given to the "non-visual" aspects of light. Most design professionals would probably agree that light is vital to human health, just as is a well-balanced diet. As professionals, we probably don't do enough to design lighting to take into account these non-visual effects, which include some fairly well understood principles of human health, sense of well-being, and emotional response to the environment.

Light and the body clock

Thirty years ago *Health and Light* was written by John Ott, a photographer, who observed health changes in himself and, later, changes in laboratory animals when exposed to different kinds of light. A number of Ott's scientific methods and conclusions were flawed, but millions of Americans read the book and its successor, *Health, Radiation, and You.* His claims about light and health inspired the development of "healthy" lighting products, and instigated recognized scientific research into the field.

The products aimed at the light and health market based on Ott's "full-spectrum" lighting theories emphasized the use of halophosphor lamps of 5,500K and 90+ CRI, some even designed to emit an extra amount of long-wavelength UV. Health and light specialists still promote and sell full-spectrum lighting equipment, but the FDA's 1985 order directed at the largest makers of these lamps, barring them from making health benefit claims, fortunately curtailed most of this type of business and the confusion it caused among consumers.

James Robert Benya, PE, IALD, is a lighting designer who lives and practices in West Linn, Oregon.

On the other hand, the recognized scientific research inspired by the early full-spectrum advocates has contributed to the understanding of how the human endocrine system, triggered by light entering the eye, regulates body chemistry, and in particular, the secretion or suppression of melatonin. Melatonin levels in the body determine a person's activity and "energy" level. High melatonin levels cause drowsiness, while low melatonin levels correspond to an alert state of consciousness. Relatively high illuminations (250 fc or more) entering the eye can suppress melatonin levels.

It became quite apparent that light therapy could be used to treat seasonal affective disorder (SAD), the so-called winter depression associated with the short daylight hours during winter in the extreme north and south latitudes by introducing light of greater intensity and duration than is provided by the sun in these locales. Assuming most people won't want to wear self-contained "light hats" around the office, there could be many architectural applications of light therapy. Creating light therapy in 24-hour operations, for instance, is a terrific idea. San Diego Gas and Electric is presently testing an installation of this type for nuclear power-plant control-room operators.

Another good idea is perhaps introducing similar light-therapy systems into exercise rooms, break rooms, breakfast rooms, and similar spaces, especially in the colder climates. Studies in architectural applications are presently being conducted to determine just how well they work.

There may also be a very important architectural lesson here. People seem to need exposure to the outside, sunshine especially, and architects have generally treated fenestration as a device for fulfilling this need. Perhaps now we understand why.

But the real lesson here may be what many people have suspected all along: that designers need to introduce more daylight into building interiors. The needed suppression of melatonin may very well occur with a glance out the window. No wonder people who work in spaces with windows appear to be happier and more productive than those who do not.

Light and cancer

About three years ago researchers in Genoa, Italy, wrote the editor of *Science* magazine, claiming that they had determined that high levels of unshielded halogen light caused cancer in laboratory rats. The press picked up the item and it was republished worldwide. Lighting designers' phones rang off their hooks from terrified clients.

In fact, these scientists had rediscovered the fact that exposure to UV radiation causes cancer. The laboratory rats were exposed to high levels of light from tungsten halogen lamps without the generally required protective glass. Because high light levels were used, yes, the rats developed skin cancer from the UV inherent in halogen lamp radiation. But even though the letter did report that rats exposed to lamps with glass covers over them did not develop cancer, they failed to report that it was UV light that caused the cancer, or that most halogen lamps in the U.S. are required to have UV-absorbing glass covers.

There have been further studies throughout the world attempting to link electric lighting with cancer. We know for sure that UV light causes skin cancer, and can damage the eyes. But there is little evidence of any other relationship. In fact, the low-frequency electromagnetic radiation (EMF) emitted from lights is much less than that caused by most electrical appliances.

Light and low-frequency modulation

Anyone who has experienced a strobe light knows of the potential for disorientation, nausea, and other side effects. Generally the frequency of dance-floor strobes is very low, on the order of 5 to 20 cycles per second (hertz). But it would be reasonable to suppose that some physiological effect might occur at higher frequencies, in the 100 to 120 hertz range where fluorescent and HID lighting equipped with magnetic ballasts operates. The lack of research prevents conclusions from being drawn. One fairly good experiment from England determined that fluorescent office-lighting systems operating on standard magnetic ballasts might contribute to "office headaches." The physio-

Designing lighting means more that crunching numbers; it means understanding how human psychology and physiology react to light. Lighting designer Jim Benya reviews some of the basics.

logical effects of lighting may very well turn out to be of great concern. Fortunately, lighting designers can now use high-frequency electronic ballasts for fluorescent and some HID loads, which will make flicker a very minor issue in the future. As a side benefit, the potential for conflict between flickering lights, computer screens, and vision will be eliminated.

Light and the psyche

The late Professor John Flynn's pioneering work attempted to understand the human response to light and lighted spaces. Flynn used classic psychological testing methods to correlate the reactions of test subjects to lighting applications in test rooms. These were among his most widely studied works. Those continuing this research understand its profound significance.

The architect's vision, understanding, and intuition has been applied to predicting people's reaction to the built environment for centuries. People can often be heard using emotive terms to describe space that are consistent with those Flynn tried to create through lighting. Lighting designers intuitively use Flynn's principles in their work. For instance, lighting upper walls and ceilings create airy, friendly, spacious rooms; dark upper walls and ceilings make rooms seem smaller and less comfortable.

One of the most often requested lighting design effects is "drama," an intangible sensation one experiences upon entering a room. Drama is, in fact, easily created using high-contrast lighting effects. What differentiates dramatically lighted spaces from the ordinary is the emotional response. Flynn's idea was that drama is a measurable human response to an environment.

A better way to understand drama, and for that matter, a number of human reactions to lighting, might be to consider instinct. Human beings probably possess instinctive behavior that lingers on in the brain through millions of years of evolution. We are sort of like bears with brains—although we supposedly think about our actions, there are a lot of things we just do. This could perhaps explain a lot of our reactions to light in environments. For example:

• The lighting we have described as "dramatic" is high-contrast, and its visible bright sources cause vision to be lost in dark corners, and trigger a frightened reaction.
• The security of light gives humans a better chance to defend themselves against nocturnal predators, hence the preference for a night light or fireplace.
• A full moon illuminates the night landscape, which makes hiding from predators under the cover of darkness impossible, hence people don't sleep well during a full moon.

Light and romance

The expression "candlelight dinner" conjures up images of warmth and comfortable drama the world over and, indeed, clients often ask for lighting that recreates this effect, in which several elements are involved:

"Light is as vital to human health as a well-balanced diet. As professionals, we probably don't do enough to design lighting for what we do know of these non-visual effects."

• The low color temperature of the light creates a very red-rich spectrum, flattering to human skin tones.
• The absence of blue light in the spectrum causes the eyes to "soft focus," which of course almost always causes someone to look better.
• Finally, the location of the light source at eye level or below tends to eliminate wrinkles and shadowing over the entire face.

Only recently has electric lighting successfully been used to create this ambience. Pin spots on table centerpieces bounce light off the tablecloth, creating not only drama but the color and omni-direction of candlelight. To achieve this effect properly, be certain to use a low-voltage spot; a 120-volt lamp will probably spill direct light onto the diners' faces, causing deep shadows under the nose, chin, and eye sockets that will ruin the appearance of even the loveliest of companions.

Drama is the the most important first step in creating a romantic setting. Traditional chandeliers create diffuse light that tends to wash out contrast. That's why people tend to put chandeliers on dimmers and light candles for effect.

Design for human beings

Misleading information regarding the potential benefits and damage of lighting products is capable of producing confusion among our clients and the public. Most of the simple solutions, like "healthy" light bulbs are clearly not the answer—there is no product used in lighting design today that is especially healthy or unhealthy when used properly.

On the other hand, light is a powerful stimulant to the human endocrine system, and does set the body clock and activity levels. At a minimum this should tell us of the importance of daylighting and fenestration, as well as encouraging us to spend more of our time out of doors. In the extreme, it means in some situations electric illumination can be used therapeutically to reset melatonin levels and compensate for the lack of daylight. By carefully specifying products like electronic ballasts to eliminate the few side-effects of electric lighting, we can combine day and electric lighting to provide the best possible lighting for people.

As for human instinct, the challenge of dealing with its mysteries will remain what the art of lighting design is truly all about for quite some time—at least until research can distill into some sort of quantifiable formula exactly what causes people to like the best designs so much.■

The Latest on Fiber-optic Lighting Technologies

More than ever before, new materials and better sources are making lighting with fiber optics an efficient, more practical alternative to conventional light sources.

By Lindsay Audin

A growing array of commercially available products is making fiber optics a simple and economical way to create dazzling lighting effects. While initially an offshoot of communications technology, fiber-optic lighting is rapidly moving ahead on its own, much as personal computers did in the early 1980s. Once little more than technical toys, some of these systems are now serious contenders for the neon market, and may supplant other forms of display and decorative lighting. Competition is now cutting prices as more and more standardized products become available.

The hydra of light

Several packaged systems are now available that greatly simplify specification and application, but all share the same basic technology. Each starts by generating light at a central point (typically called an "illuminator," "projector," or "light engine") and sending it into the ends of gathered fibers (see photo 1). There are two methods of light distribution: fibers disperse light out of their loose ends (light-directing, see photo 2); or the fibers themselves become a glowing element by instead distributing light out of their sides (side-emitting, see photo 3).

Most systems consist of bundles of many thin strands, ranging in diameter from as thin as a human hair, up to about a sixteenth of an inch. While plastic fibers dominate the market, more expensive glass fiber has become popular for higher-quality installations.

Lumens go round and round...

Two important principles prevail when trying to put light into a fiber and getting it back out where you want it. First, most strands lose much of the light that enters them due to internal reflections (i.e., the light is converted to heat and radiated). Second, a fiber's ability to accept light is limited by how narrowly one can focus a beam into its end. Much of the development work in this field has been devoted to addressing those challenges.

Lindsay Audin is the energy manager for Columbia University, and lighting research consultant to E-Source, a Colorado-based energy consulting firm.

...And come out here

At the loose end of light-directing fibers, spotlights (also called "heads" or "diffusers") focus the output. Without such devices, the beam emitted from the end of a fiber can spread out 70 degrees or more. While that may be useful when creating a faux candle out of frosted glass, seeking a tighter beam requires a lens-shaped head. Like flood and spot lamps, fiber-optic heads are available to supply beams between 16 and 50 degrees.

Depending on the number of heads, intensity of the illuminator, and other factors, the brightness of each head is somewhere between that of a good flashlight and the smaller incandescent reflector lamps (R20 or MR11). Light-directing systems usually have multiple spotlights only a few inches apart on a track or a bar, however, allowing the practitioner to focus several of these miniature spotlights onto one object, lighting it simultaneously from several angles. The subject then appears bright from any position, especially if it has specular facets, such as jewels.

Early versions of side-emitting fibers were best seen in darkened spaces (e.g., nightclubs or outdoors after sundown) due to their relatively low luminance. Newer models, however, are almost as bright as neon lighting. Changing their colors is as easy as changing a gel placed between the illuminator and the fiber's end.

The obvious advantages

Because the fibers do not directly utilize electric current, they can be applied in wet locations (even under water) much more easily than standard lighting. Energy and wattage savings abound when higher efficacy sources (such as metal halide) are used, and less light is needed since it can be tightly focused without using inefficient baffles.

All light sources (including the sun) produce much more heat than visible light. Even high-efficiency lighting systems emit over three times more energy as heat than as usable light. Fiber's ability to filter out damaging infrared and ultraviolet rays (which do not transmit well through the strands) opens up new opportunities for lighting artwork, museum pieces, and delicate materials such as silk. The Mona Lisa, for example, is now illuminated through fiber optics.

Neat special effects

By placing a color wheel between the illuminator and the fibers, it is possible to continuously change the colors emitted from the ends or sides of the fibers, an effect that gives the appearance of rhythmic waves of color in motion. Some illuminators are also designed to strobe or otherwise change their output over time, creating a pulsing or lightning-like appearance. When hooked up to a sound system, the fibers can flash and surge with the music, bringing new pizzazz to nightclubs. Better metal-halide models feature "instant-on" circuitry, providing powerful sources without the usual starting and re-strike delays.

Nudging aside neon

Side-emitting fiber-optic systems can produce the same effects as neon lighting at lower installation, energy, and maintenance costs. These systems should prove competitive for a number of reasons.
• They are cheaper than custom-bent glass tubes.
• There is no gas fill to leak out.
• Color is easily changed.
• No electric current or interference is emitted.
• Fiber systems use one-half (or less) energy.
• Fibers are much more resistant to damage.
• Centralized lamp replacement is simple.
• Fiber is safer to apply in many indoor areas.
These advantages allow creation of outdoor design elements, such as building outlining and fountain illumination, that would have been impractical or prohibitively expensive if done with neon.

Lingo specifiers need to know

Describing fibers involves some high-tech lingo borrowed from the fiber-optic communications industry. "Line loss" is measured in decibels per kilometer, most commonly referred to just as "DB." "Acceptance angle" (measured in degrees) and "numerical aperture" (a unitless quantity) describe the ability of a fiber to accept light into its end.

Here's what it all means. As with any conducting medium, some energy is lost passing through fibers. Line losses range *widely*, and are typically much higher for plastic than

glass. In general, the cheaper the fiber, the higher the line loss. Plastic fibers often lose one percent (or more) of the light entering them for every foot of length. That does not mean 100 percent loss at 100 feet (since the loss is exponential, not linear) but it does mean that all fibers convert some of their light into heat, or send the light out of their sides. By comparison, a high-quality glass fiber of the same length and diameter may lose only a fifth as much, but costs more and may require more expertise during installation. Many applications do not, however, require very high quality and thus use the higher-loss varieties to limit cost.

Acceptance angle is the maximum beam spread of light (measured from the fiber's axis) that will successfully enter one end of a fiber. Any light striking it at a higher angle will be reflected away. More efficient fibers (those with low line loss) have lower acceptance angles, meaning that the illuminator's output must be focused in a tight beam. Lasers work well in fiber-optic communications because they have very tight beams so almost all their light easily enters fibers. To achieve similar results with metal halide or quartz-halogen sources, reflectors and optics are employed to create "pin spot" beams into the ends of fibers.

Numerical aperture is just the sine of the acceptance angle, and is thus another indicator of the beam spread that a fiber will accept. Once again, a low number indicates that only tightly focused beams will enter the fiber.

One of the most dazzling fiber-optic techniques is the concentration of many high-quality beams from one hidden light source. Jewelry cases conceal miniature tracks (see photo 4) along their interior edges which hold many tiny spotlights focusing beams on individual pieces displayed within the case. Since little or no light lands away from the jewels, such pieces appear to sparkle from within. The illuminator is hidden in the base of the case.

Practical limitations
As with any technology, there are limits. Fibers cannot be bent through very tight radii without causing damage or increasing

1
Courtesy of Lumenyte International

2
Courtesy of Pinpoint Fiber Optics, Inc.

3
Courtesy of Fiberstars, Inc.

4
Courtesy of Fiberstars, Inc.
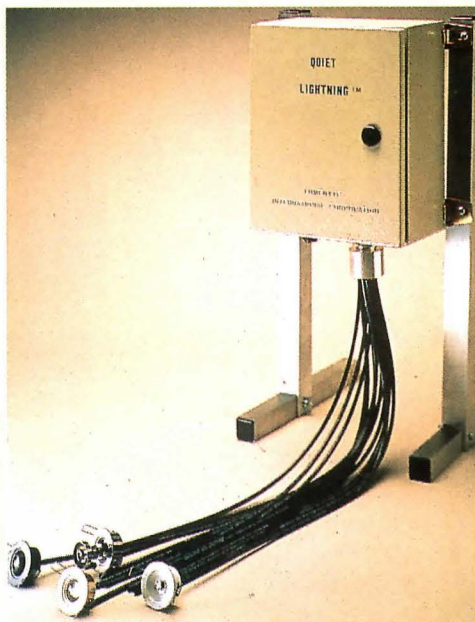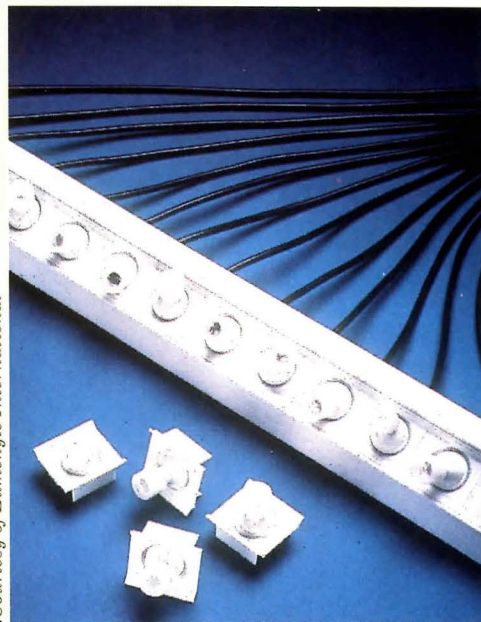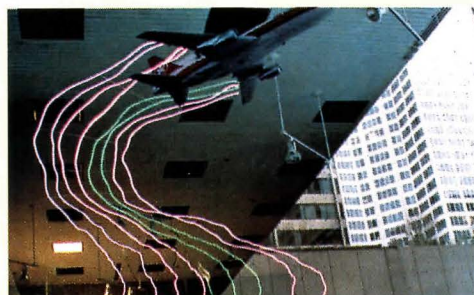
losses, though few applications require tight bends. All fibers (especially cheaper plastic varieties) absorb blue light, making colors appear "warmer" as fiber length and line-loss rates increase. Light sources with higher color temperatures (those rich in blue light, such as metal halide) are thus well suited for use with fiber optics.

Even the best fibers have line losses too high to offer a practical way to widely distribute standard lighting, and installation costs still limit this technology to specialty applications. Do not expect your local lighting equipment rep to have a grasp of this technology just yet: the only way to be sure that a job comes out right is to hire a specialist familiar with the technology, and test a sample unit in the field.

One suggestion to the fiber-optics industry: product literature needs work and standard-

ization. Comparing this technology to standard lighting methods would be greatly simplified if, for example, brochures were more descriptive of equipment photometrics. Describing fiber luminance using a standard light source would, say, make it easier to discern what illuminator wattage would be needed to achieve a desired effect. At this point, many possible users are stymied because they have no way to figure out what to install without already having expertise in this field.

Sharing the knowledge
George Washington University, in Washington, D.C., now offers four-day classes in glass fiber optics, and some local chapters of the American Society of Interior Designers (ASID) are also providing courses. Such training will provide clever designers with new ways to make their work shine. ■

316. Angular sconces
Designed by Ron Rezek in three different sizes and shapes, the Wedge sconce accepts energy-efficient fluorescent lamping. The 580 (10-in. wide by 10-in. deep) takes two PL-13 lamps; models 581 and 582 each use one 39W biaxial lamp. Housing is powder-coated steel that can be ordered in custom colors or a faux finish. 516/694-9292. Artemide, Inc., Farmingdale, N.Y.

317. ADA-compliant
One of four new sconces that meet Americans with Disabilities Act requirements for public-access corridors, Luna has a crescent-shaped diffuser of poured opal Murano glass set into a blue, gray, or crystal yellow-dotted glass band. Designed by Roberto Pamio, the fixture may be specified for incandescent or fluorescent sources. 800/832-3360. Leucos USA, Inc., Edison, N.J.

318. Sinuous outdoor spot
Metamorphosi, new interior/exterior (UL listed for wet locations) luminaires, take a range of sources including metal-halide, HPS, and quartz-halogen lamps. The 26-in.-high light pictured is made with three individually adjustable segments. Designed by Fabio Reggiani, Franco Roman, and Pino Usicco; housing is cast aluminum. 212/421-0400. Reggiani, New York City.

319. Undercabinet mix/match
The Little Inch Connecting System are modular, plug-together components that can put halogen accents next to fluorescent strips in the same row: only the first unit needs hard wiring. Snap-together connectors let the system turn corners, round broad curves, or "jump" over columns or partitions. Housings are aluminum; circuitry permits single or all-on operation. Alkco, Franklin Park, Ill.

320. Pulldown pendants
An updated version of a '50s classic, pulldown lights have glass shades in matte opal or alabaster. Metal canopy and glass-holder can be ordered in white or polished-brass finishes; fixtures take a single 60- to 100W G-25/G-40 lamp. Spiral cord and tensioned cable allow the lamp to be positioned at any height from 26 to 65 in. from the ceiling. CSL Lighting Mfg., Inc., Valencia, Calif.

321. Sharp-cutoff area lighting
A 21-in. housing size has been added to the CC/CCS luminaire series, a cylindrical shape said to "maintain a relationship to contemporary architecture". Model CC has reveals that can be custom finished; the CCS has smooth sides. Horizontal-burn lamps in field-rotatable reflectors solve individual illumination problems within a constant fixture geometry. Kim Lighting, City of Industry, Calif.

322. Nostalgic feel
G-5 luminaires are said to be equally useful as reading lamps in a library or as direct lighting for restaurant patrons. An unusual, through-table bolt attachment secures the disk-shaped base and lets the lamp qualify for its UL listing. Cone-shaped diffusers may be green, as shown, or white; G-5 pendants and sconces also available. 203/966-9559. TSAO+CLS, New Canaan, Conn.

323. Punchy CFL luminaires
Elliptipar's new 4X fixtures are said to combine the controlled illumination of incandescent lighting with the energy efficiencies of CFL sources. An asymmetric reflector and precise centering of two twin-tube compact-fluorescent lamps focuses all light output on the target surface. Available in configurations for all types of mountings. 203/931-4455. Elliptipar, Inc., West Haven, Conn.

324. Machine-age lamps
Tuxedo lamps, designed by Piotr Sierakowski, have diffusers of Triplex opal blown glass set on knurled-stainless-steel stems. The table-lamp model stands 40-in. tall, with a 13-in.-diameter, 5/8-in.-thick glass table at armchair height. List price: $579 for the standing lamp; $379 for the table-top version. 718/204-5700. Baldinger/Lowy Partnership for Design, Astoria, N.Y.

325. Metal-halide downlights
To be introduced at Lightfair, Arclites are accents, wallwashers, and downlights designed specifically for the new energy-efficient metal-halide PAR-38 lamps. Suggested applications include lobbies, retail stores, auditoriums, airports, and public spaces with medium- to high ceilings. 212/838-5212. Edison Price Lighting, New York City. ∎

Why Good Lighting Turns Up In Good Renovation Projects

I wrote in the last issue of RECORD LIGHTING that it was just a coincidence that all of the feature stories in that magazine were renovation or rehabilitation projects. Once again, almost all of this issue's feature stories have some renovation angle, with the exception of the Joslyn Art Museum Addition—and even that building had extensive lighting work done later when the existing building was renovated.

Is this another coincidence? I don't think so anymore. There are a number of reasons really good lighting design tends to appear in renovation projects. Sometimes after putting up with bad or merely mediocre lighting long enough, owners insist that lighting play a significant role in adding a renewed sense of place to their renovated buildings, and are willing to put money in the budget for the work. Ripman Lighting Consultants' collaboration with Communication Arts at the Prudential Center's Retail Arcades (page 30), is a good example of how how much a lighting upgrade can contribute to bringing alive a sleepy retail development. And although the Ahmunsen Theater (page 32), had such extensive work the project was almost like new construction, this project shows how much Horton•Lees Lighting could creatively accomplish on a budget when an owner had a commitment to good lighting and gave the designers an opportunity.

Sometimes architects imbue their clients' pride in a historic building with what I see as a strong sense of "lighting ethic." Gerald Allen and Jeffrey Harbinson show such strong principles in the lighting design and custom fixtures for Christ Church at Oyster Bay, New York (page 35). And, though the new galleries at the Joslyn Art Museum (page 28) are new construction, the collaboration between Sir Norman Foster and lighting designer Claude Engle are another great example of commitment to excellence in lighting design.
Charles Linn

Manufacturers' Sources listed on page 49

Dramatic Impact

Ahmanson Theater Reconfiguration
Los Angeles, California
Ellerbe Becket, Architect
Horton • Lees Lighting Design

A diaphanous screen of perforated metal hangs like a giant chandelier over the Ahmanson Theater, a dramatic device used to create a sense of dimension and scale. The theater, a part of the Los Angeles Music Center Complex, was a rather featureless black-box theater of 1960s vintage. The design team was asked to transform the huge space into a performance hall with the level of intimacy of the turn-of-the-century theaters of Broadway, but on a strict budget.

The effect was achieved by moving in the walls and ceilings, creating a movable partition, and adding the metal screen at the ceiling, whose "diaphanous and kinetic qualities are brought about by a combination of dimmable, colored light and perforated metal," according to Richard Kuhn, senior designer for the project for architect Ellerbe Becket.

Working with little money and a strict energy code, the lighting designers, Horton•Lees Lighting Design, achieved the sense of illusion and drama that sets the mood for the performances. "It was extremely challenging in that everything had to be simple, yet have a dramatic impact," says E. Teal Brogden, principal at Horton•Lees.

The metal screen, treated like a sculpture in the space, is lit in two ways. A sense of illusion and mystery has been created by PAR38 dichroic-blue lamps mounted in inexpensive porcelain sockets shining up onto the blue-painted ceiling. Groups of four 50-watt PAR30 HIR (halogen infrared) lamps sparkle like stars on the metal screen below, providing a comfortable 25 fc 50 feet below. PAR20 track fixtures mounted in specially created slots in the balconies also do double duty by scalloping the wood veneer of the balconies, as well as lighting the underside of the perforated metal scrim at its edge.

The drama is carried through to the exterior, where, once again, the black box has been deconstructed. The original opaque glass curtain wall has been replaced by a combination of translucent and transparent glass, so that the perimeter walls of the theater and lobby, lit by 60-watt PAR38 track with spread lenses in architectural coves, cast a warm glow on the street outside. *Nayana Currimbhoy*

Conceived as a sort of giant chandelier, a perforated metal screen (opposite) adds drama and scale to the theater. The screen—which also works as a scrim for theatrical lighting—conceals blue-dichroic PAR38 lamps uplight the ceiling above.

The translucent glass of the curtain wall (top) creates a showcase for the glowing lobby walls within. The entrance canopy is uplighted with pairs of MR16 lamps. An ingenuous "welcome mat" of light is created by tiny MR16 downlights at each doorway.

Track fixtures lamped with 50-watt PAR20s (opposite) accentuate the slots in the wood veneer of the balconies, while also uplighting the metal ceiling. In the bar area (bottom left), fluorescent lamps with blue gels light a blue-painted ceiling to continue the design theme of the ceiling inside the theater. They are complemented by quartz wall washers. The only custom luminaires on the project (photo bottom right and drawing below) are mounted in the lobby. Each is illuminated by a 100-watt frosted quartz T4 lamp mounted inside a frosted glass sleeve, and wrapped with a twist of perforated metal that echoes the auditorium's ceiling.

Credits

Ahmanson Theater Reconfiguration
Music Center of Los Angeles
Los Angeles, California
Architect: *Ellerbe Becket—Richard Kuhn, Randy Guillot, Tom Goffigon, Mike Hallmark*
Lighting Designer:
Horton•Lees Lighting Design—E. Teal Brogden, design principal; Becky Bowen, assistant designer
Electrical Engineer: *Ellerbe Becket—Marc Sevelle*
General Contractor: *Rudolph & Sletten—Bart Ropers*

painted
perforated metal
half shield

two painted 3/8 in.
aluminum plates

sandblasted
glass cylinder
with 150 W T4
quartz lamp

painted
steel rod

CUSTOM LIGHT FIXTURE
for the Amudsen Theatre
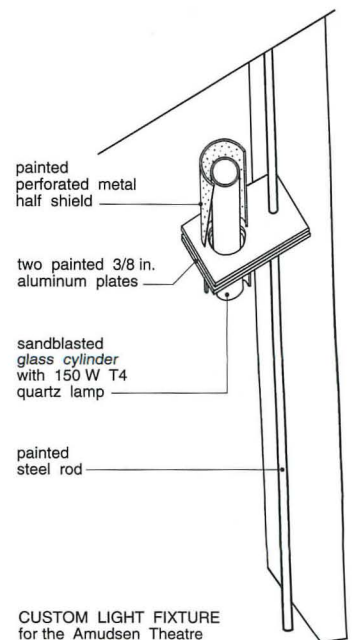
The Art of Daylighting Art

Joslyn Art Museum Addition
Sir Norman Foster and Partners;
Henningson Durham Richardson
Architect
Claude R. Engle Lighting Design

Outside, the Joslyn Art Museum addition (right in photo above) gives no hint of the complex daylighting system at work in the galleries (opposite). The system of vaults and airfoil-like structures (drawing below) only allows indirect, reflected light in, providing a soft glow while minimizing any chance of damage from ultraviolet light.

T he addition to the Joslyn Art Museum in Omaha is a surprising departure from what one expects of Sir Norman Foster—none of the structural expressionism seen in his Hong Kong and Shanghai Bank is at work here. Yet the addition borrows little from the Joslyn either, save for its crispness in detailing, parts of the materials palette, and a studied sense of the 1931 Art Deco original's proportions. But the Joslyn's new exterior does bring to mind Foster's 1977 Sainsbury Centre at the University of East Anglia, England [RECORD, Mid-August 1977, pages 60-63]. Substitute pink granite for the Sainsbury's windows and metal panels, and there would be a definite family resemblance. And gallery spaces in the interior of both buildings have a similar function: the temporary exhibition of art.

But where daylighting is concerned, there is no resemblance. At Sainsbury, strip skylights run the length of the building, shielded by "tunable" louvers hung beneath a massive space frame. The louvers were intended to be adjusted for varying light conditions, but almost every photograph shows direct sunlight penetrating into the gallery. Daylight control was considered, but seems to have been left subservient to keeping the roof and ceiling structure pure and flat.

Claude Engle worked with Foster to design the lighting and daylighting for the Joslyn's new temporary exhibition spaces. At issue was the desire for a strong daylight component, while meeting the severe limitations on light and UV levels set by the owners of art on loan. Engle's and Foster's solution, in contrast to Sainsbury, expresses the daylighting system over all else (photos opposite). "The problem of controlling the daylight and UV was solved by introducing the natural light by reflection only," says Engle. "This permits the space to be enhanced by natural light, with lower levels on the art, and reduces the UV exposure which is, to an extent, absorbed by the paint."

Track fixtures were to be hung on the curved portion of the ceiling that would be washed with daylight, so Engle elected to recess the track itself, to hang smaller than normal PAR30 fixtures, and to use more of them to get the proper coverage. The tracks were positioned so fixtures could be placed to give the proper incident-light angles for art on the gallery walls and for front- and backlighting free-standing sculpture. Installation of bulky transformers was avoided through the use of the PAR30 track heads, and a custom knuckle joint on the fixtures' stems allows them to be properly aimed from any point on the curved ceiling. *Charles Linn*

Credits
Joslyn Art Museum Addition
Omaha, Nebraska
Client: *Graham Beal, Director*
Architect: *Sir Norman Foster and Partners—Sir Norman Foster, Nigel Dancy, David Nelson, project architects*
Architect of Record, Interiors, and Engineers:
Henningson, Durham & Richardson—Patrick Mc Dermott, project principal; Bruce Carpenter, project manager; Douglas Wignall, Jeff Cramer, Patrick Leahy, Greg Gensler, architectural team.
Lighting Designers: *Claude R. Engle, Lighting Consultant—Claude Engle and Danielle Engle, principal lighting designers*

north facing glazing
manually operated blackout shade
fluorescent lighting fixture
catwalk
curved gallery ceiling
recessed lighting track
daylight reflector

SECTIONAL DETAIL
@ LIGHT SCOOP

© *Mary Kocol photos*

From the Arcane To the Arcadian

A lthough it was located between two prime shopping areas in downtown Boston, the Prudential Center Retail Arcades lacked the street presence needed to attract passing pedestrians. Built over the Massachusetts Turnpike in 1965, the arcades were accessible by escalators, open to the elements, and bathed in the harsh green glare of mercury-vapor downlights.

An ambitious and expensive renovation program has transformed the arcades and the land around the Prudential Center into a warm, inviting environment. As a result of a close collaborative effort between architects Sykes Jennings Kelly & Brewer of Houston, Communication Arts of Boulder, and Ripman Lighting Consultants of Boston, the new arcades have achieved a grandeur reminiscent of markets and train stations of Europe. High, pitched planes of glass, fritted to soften the impact of the direct solar load, bring daylight streaming into the arcades, supported by great steel beams.

Within this massive volume, the lighting is used to create a more intimate sense of scale. Seven custom-fixture types set the style of the project, and establish a visual plane midway between the peak of the glass roof high overhead and the people below. Designed initially by Communication Arts, the fixtures were then developed through drawings, models, and prototypes by Adam Kibbe of Ripman Lighting. The sconces and pendants (photo opposite) are lit primarily by 26-watt 2700K compact fluorescents, though the pendants incorporate shielded 250-watt quartz PAR38 floods to accent planters below.

In addition, the lighting designers created layers of light which invest the arcade with the glamour and excitement sought in a shopping arcade. The junctions of the roof beams and columns are uplit by hidden, self-ballasted, open-reflector compact-fluorescent retrofit lamps. Where the supporting steel beams join at the apex of the roof, one pair of cylindrical downlight cans uses 250-watt quartz PAR38 lamps to complement the pendants, while a second pair of cylinders uses energy-efficient, long-lived 250-watt metal-halide lamps for after-hours operation and clean-up. Quartz sources at entries, signage, and over planters are used to create drama by producing contrasting sharp, dense shadows.

The lighting program continues to the exterior. An enclosed bridge (top photo right) is flanked by light towers lit by metal-halide and high-pressure sodium, adding ceremony and drama to the passage and giving shoppers a foretaste of the pleasant experience that awaits them inside. An entry canopy (center photo) of fritted glass is accentuated by 90-watt halogen PAR38 down- and uplights, which are louvered for glare. Zigzag metal banners on the columns (bottom photo) are backlit by 240-watt 12-volt PAR56 very narrow spots. *Nayana Currimbhoy*
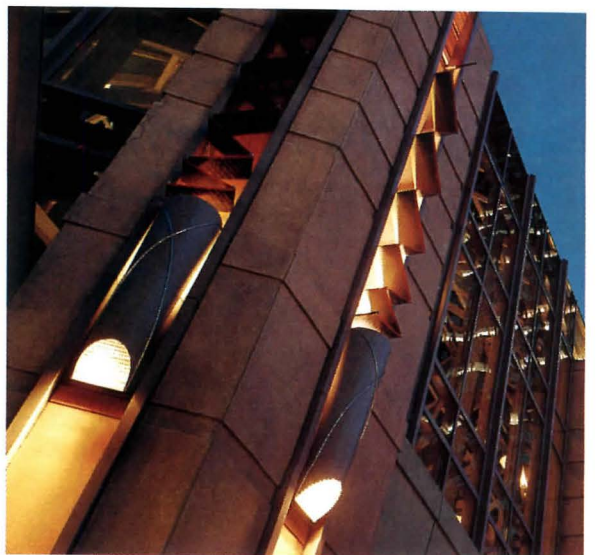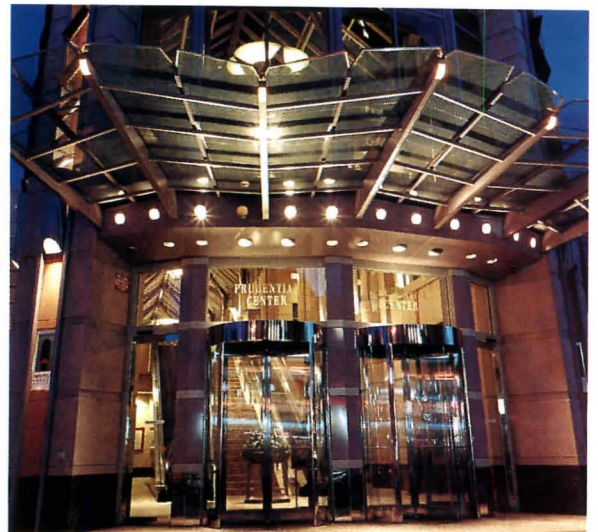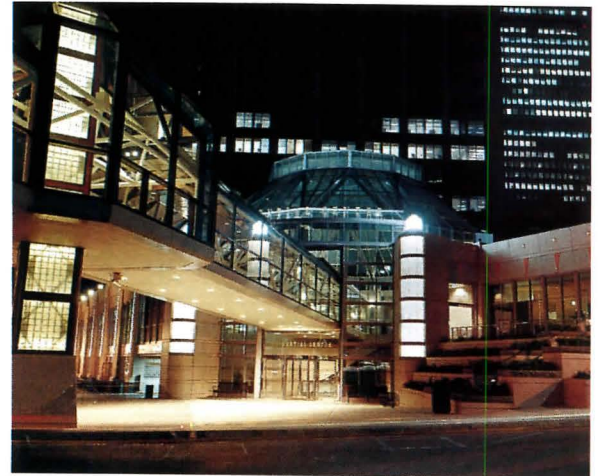
Custom sconces lit with 26-watt 2700K compact-fluorescent lamps (left), and open-reflector compact-fluorescent pendants hung beneath the junction of the supporting steel beams (opposite) create layers of light within the large arcade. The custom light fixtures, made of acrylic, polished brass, and painted steel, were designed by Communication Arts and developed by Ripman Lighting Consultants. Since the arcades are used as a circulation spine, they remain open all night at the request of the community. To save energy during off-hours, however, they are lit by 250-watt metal-halide fixtures mounted at the peak of the ceiling.

Credits

Prudential Center Retail Arcades
Boston, Massachusetts
Architect: *Sykes Jennings Kelly & Brewer*
Architect of Record: *Benjamin Thompson & Associates*
Lighting Designer: *Ripman Lighting Consultants—Chris Ripman, principal; Adam Kibbe, project manager*
Retail Designer: *Communication Arts—Henry Beer, John Ward, Ken Lewandowski*
Engineers: *LeMessurier Consultants (structural); R.G. Vanderweil Engineers (mechanical/electrical)*

etched acrylic lens

three 26W, 2700K CFLs

3/8 in. bronze rods

metal sconce base metallic finish

1 in. O.D. metal tube carries power

1/2 in. thick metal plates carry sconce, metallic finish

existing splines

existing column
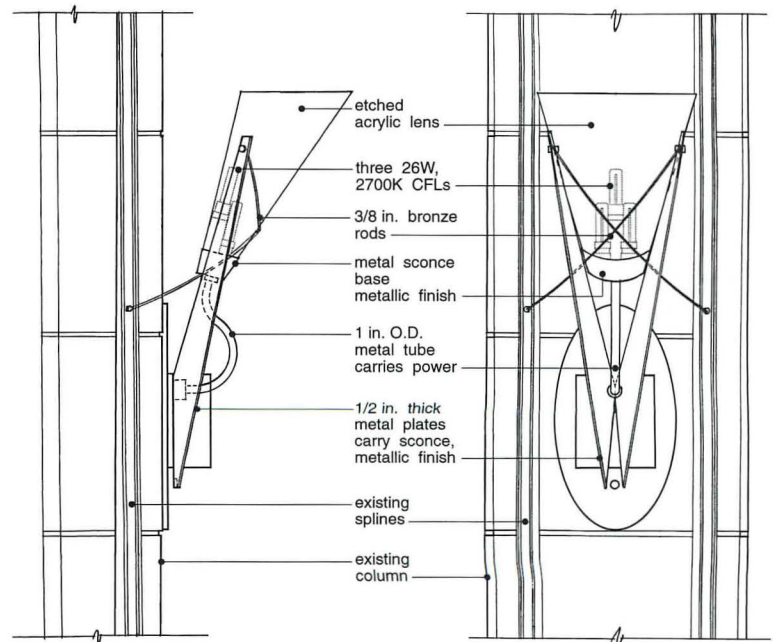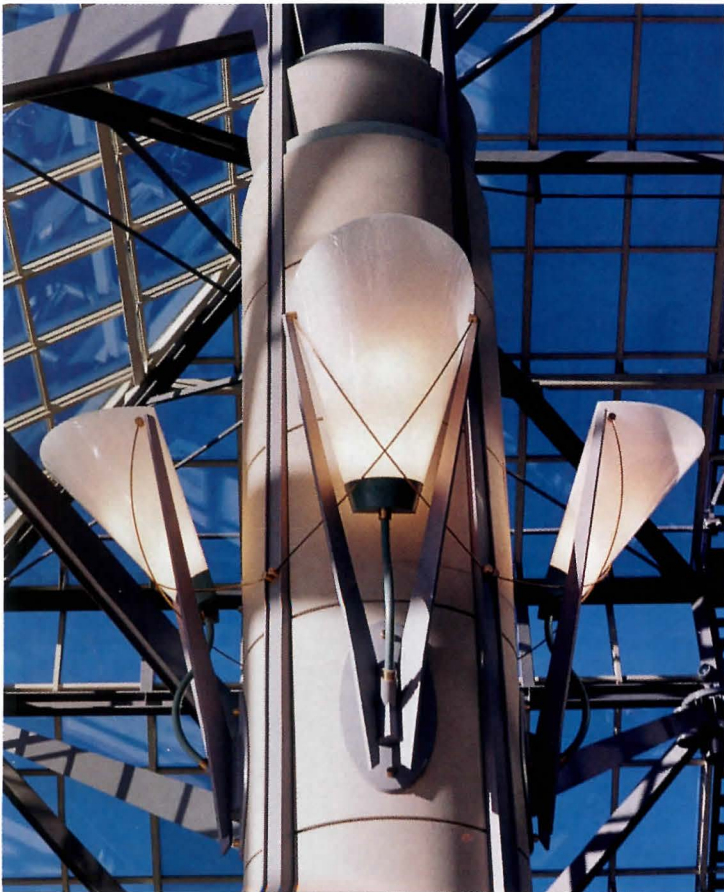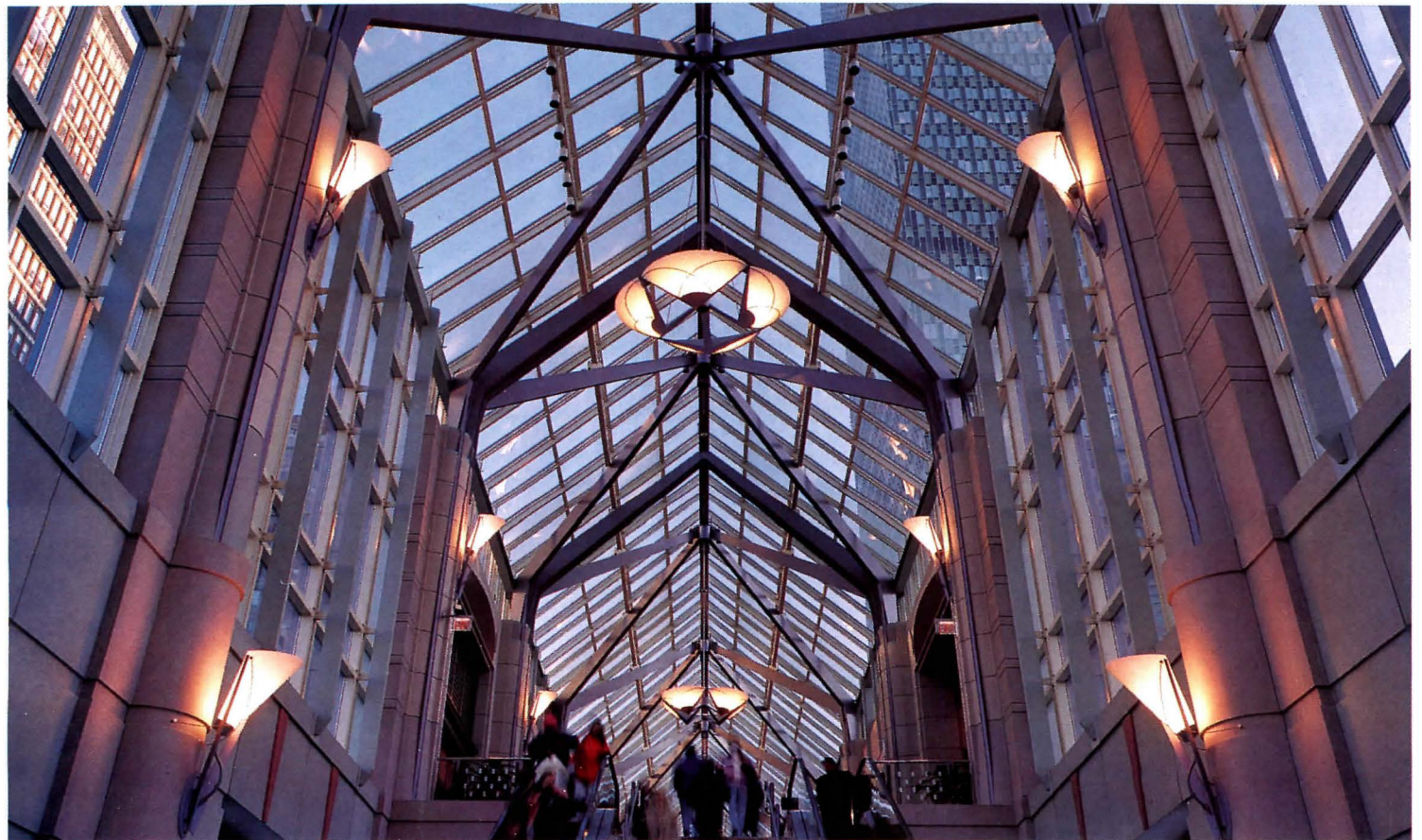
Quiet Revival

Christ Church
Oyster Bay, New York
Gerald Allen and Jeffrey Harbinson
Architects and Lighting Designers

hrist Church of Oyster Bay, New York, has had a curious evolution. Legend has it that the original design came from the drawing board of William Potter in 1878. Potter was a proponent of the American version of High-Victorian Gothic, and vintage photographs of the church, where Teddy Roosevelt and his family worshiped, show a small cottage-like structure trimmed in delicate Victorian gingerbread. No one knows exactly why, but when the church was remodeled in 1925 by the firm of Delano and Aldrich, all traces of the Victorian were stripped off, or simply covered over with an extremely austere veneer of roughly squared-off stone, set in courses.

Gerald Allen, of Gerald Allen & Jeffrey Harbison, architects of the church's most recent renovation, offers one explanation. "I think [the parishioners] were just plain embarrassed by the Victorian once it got to be 1925. They had heard about Ralph Cram and Bertram Goodhue, but just didn't quite get it. I figure they were just trying to good-tastify themselves." At the same time the exterior was given a new skin, which stylistically gave the church the appearance of being older than the original; the sanctuary was gutted as well. "We don't know what the lighting was like originally," says Allen, "but from the photographs it looks grim. It was made even grimmer later on by the installation of some of those big old sheet-metal lanterns with 1000-watt A lamps in them, and spotlights at various places."

Allen's views on how other churches were lit historically influenced the new work at Oyster Bay. "If you look at the early lighting of really important buildings like St. Thomas Church in New York City, you realize the early versions were quite crude. Electric lighting was a very new thing, and they were still in a 'let's hang up a light bulb' stage. Then they started seeking out what the figurative image of this light bulb should be: chandeliers, censers, and all kinds of ecclesiastical objects. In the 1950s almost all churches got relit, and for good reason. But they used as the model the lighting of a proscenium theater, concealing spotlights and aiming them toward the front. The hanging fixtures generally became places to hide up- and downlighting, and the fixtures themselves only provided twinkles."

Retaining the idea of the multi-function lanterns (see middle photo and drawing, right), the architects designed new fixtures that slyly insert a tongue-in-cheek reference to the church's Victorian past into its otherwise almost unadorned interior. The lanterns are fabricated of green-painted, laser-cut sheet metal with complex, rather Victorian-Gothic cut-outs, and alpha-and-omega finials on top. They are fitted with A lamps for uplighting, PAR lamps for downlighting, and candle lamps for sparkle. The architect rejected the proscenium-lighting approach, however, and the use of recessed downlights. "It seems indecorous to treat a church as if it is a display window," concludes Allen. "Liturgically oriented churches are not used as proscenium theaters—worshippers walk around in them. When a person takes communion, turns around and looks into a battery of stage lights, it does terrible things to their sense of the room. And, if there were ever a room whose ceiling was made to be looked at, it is a church sanctuary. But if there are downlights up there, the ceiling goes dark from the glare when a person looks up. They can't see it." *Charles Linn*

Credits
Christ Church
Oyster Bay, New York
Architect and Lighting Designer: *Gerald Allen and Jeffrey Harbinson Architects*
Electrical Engineer: *Hillmann DiBernardo and Associates— Mike Castelli, project engineer*
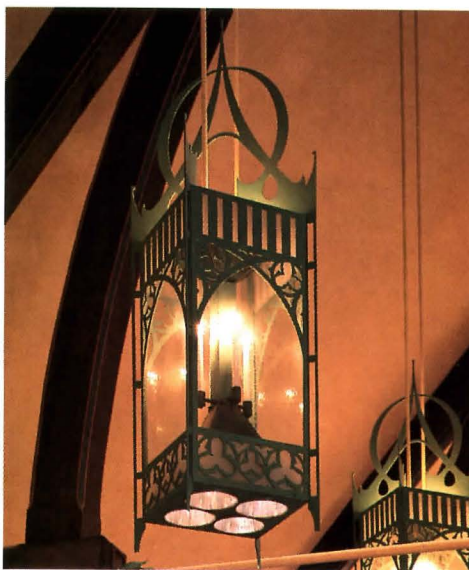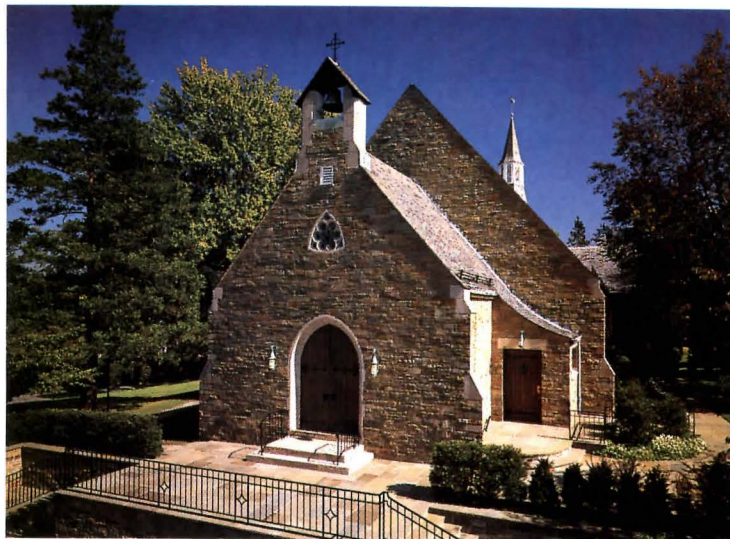
Gerald Allen and Jeffrey Harbinson's new lighting for Christ Church makes a tongue-in-cheek reference to the fact that the austere Gothic Revival church is not what it used to be. The church was once American High Victorian Gothic before being stripped of its trim and covered with stone by Delano and Aldrich in 1925.
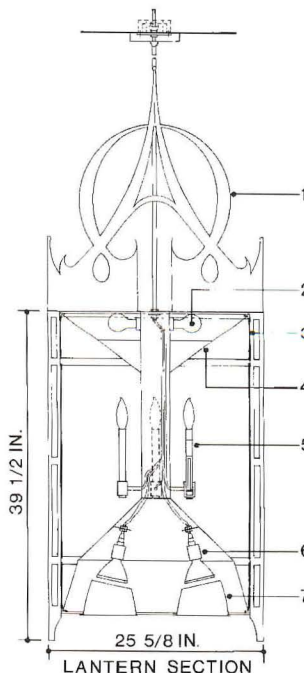
1. Metal trim
2. A lamp uplight
3. Metal trim
4. Reflector
5. Electric candelabra
6. PAR lamp
7. Reflector

39 1/2 IN.

25 5/8 IN.

LANTERN SECTION

406. Arena-scale floodlights

A color brochure describes some of the high-performance, theatrical characteristics of the new Infranor Para II flood, achieved by a motorized shutter system that gives instant on/off capability to the HID lamps. This lets the fixture function as a follow spot in an otherwise dark area. 612/485-2141. Sterner Lighting Systems, Inc., Winsted, Minn.

407. Low-voltage accents

A 32-page Lighting Concepts catalog details a new product line for this distributor. Items offered include low-voltage under-cabinet strip lights and adjustable spots; track systems for both low- and line-voltage; customizable cove-lighting systems; an architectural light rail; and picture lights. 800/543-3217. Outwater Plastic Industries, Inc., Wood-Ridge, N.J.
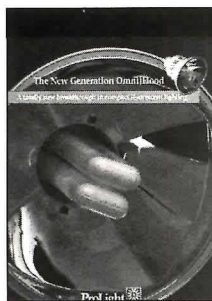
408. CFL retrofit floodlight

The QCR Omni/Flood, with a new CAD-designed reflector, is said to generate superior center-beam light intensity from 13W quad bulbs, delivering high fc readings even at 12-ft heights. The bulb nests within the cool-running ballast/adapter, bringing the overall length of the retro unit in line with the R40 floods it replaces. ProLight, Holland, Mich.
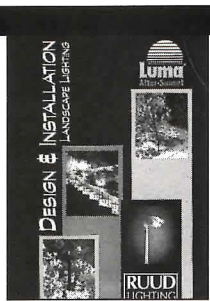
409. Landscape lighting

A 20-page guide illustrates how Luma lighting products achieve diverse nighttime effects, using a step-by-step approach to the techniques, planning, and installation of landscape lighting. Fixture connectors are said to cut labor time; all finish and housing options are shown. 414/886-1900. Ruud Lighting, Racine, Wis.

410. Architectural fiber optics

A manufacturer's newsletter offers an update on innovations and new applications of fiber-optic lighting systems. The current issue offers a look at why fiber optics work, and illustrates the challenges of creating Cesar Pelli's 2,000-point "chandelier" illuminating an 8,000-sq-ft ceiling in Charlotte, N.C. 800/443-8823. Starfire Lighting, Inc., Jersey City, N.J.
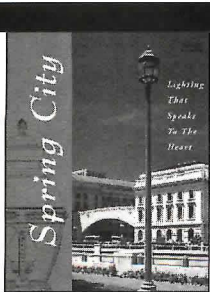
411. Cast-iron luminaires

A four-page brochure highlights custom-manufacturing capabilities that create posts, standards, bollards, and other site-lighting components in low-maintenance cast iron. High-performance optics are incorporated in any luminaire style; photometric data on IES-format disk. 215/948-4000. Spring City, Spring City, Pa.

For more information, circle item numbers on Reader Service Card.

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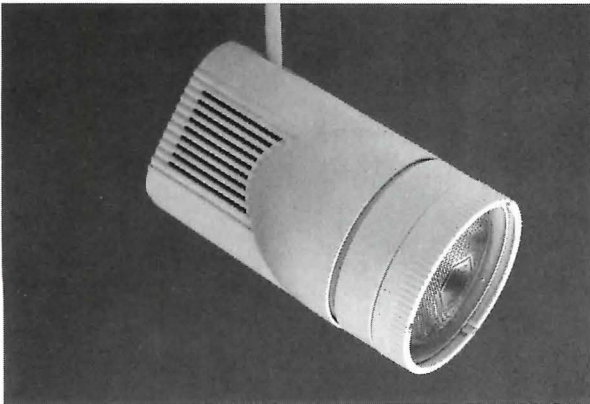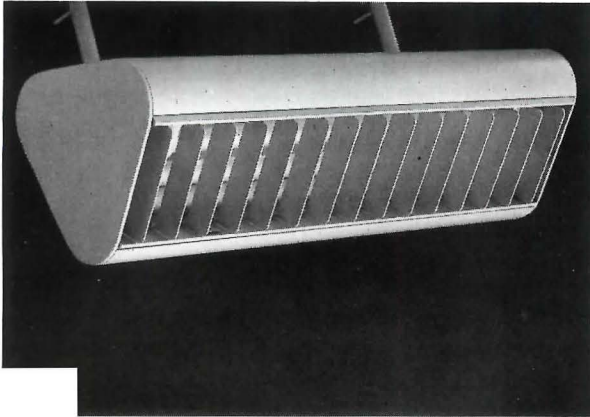
326. In the spotlight.

A collection of brand-new track fixtures from newly combined Zumtobel Staff Lighting offers luminaires designed specifically for the "newest generation" of low-voltage incandescent, compact fluorescent, and metal-halide lamps. Intended to provide a range of beam-control, lamp-temperature, and accessory options for merchandise-display lighting in retail stores, all fixture types can work on Staff's curve-capable track system. Four of the eight new luminaires are shown, left.

For general but still adjustable illumination requiring a high CRI, the 1350/1360 (1) has wide light distribution from two 2G 11 or twin-tube T-5s CFL lamps. Fixtures (2) and (4) are low-voltage versions of the low-profile Par Star track line introduced in 1989. They take, respectively, either the AR-111 or AR-70 halogens. Model 8820 (3) is a classic Staff track-head design redone specifically for the efficacious 70W PAR-38. A 64-page catalog includes complete photometric data for all track lights. 914/691-6262. Zumtobel Staff Lighting, Highland, N.Y.

INSTEAD OF TINKERING WITH CURRENT MET

Formulated with special salts for improved CRI of 85 and heightened operating efficiency.

Hardened ceramic material resists damage from heat and chemical attack to sustain superior color performance.

Ceramic seal structure locks in gases, produces consistent color over the lamp's life.

Constructed of precisely engineered ceramic material, the arc tube provides outstanding lamp-to-lamp color uniformity.

Standard threaded base fits easily into existing sockets for a direct retrofit.
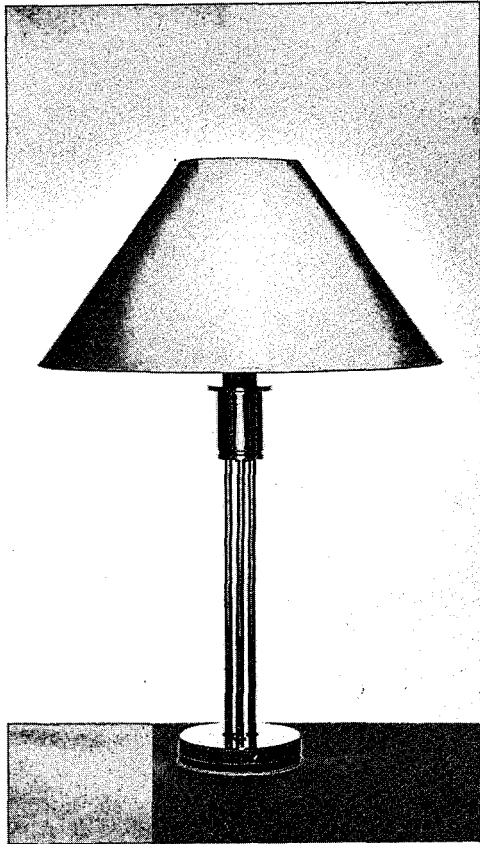
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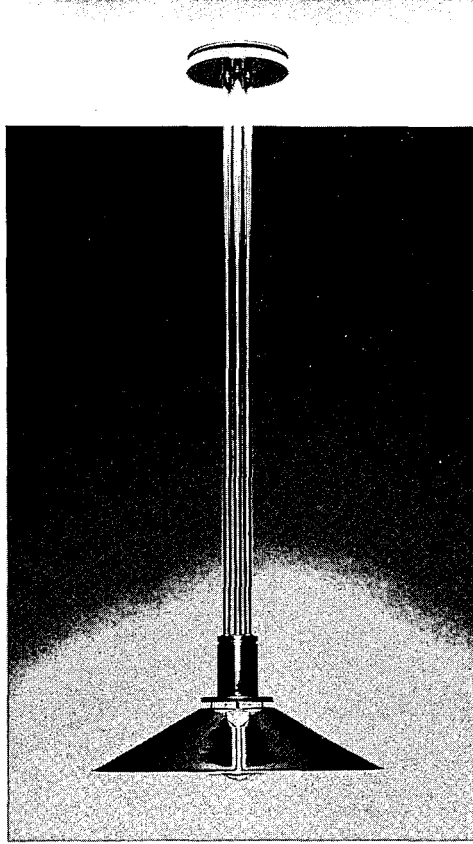
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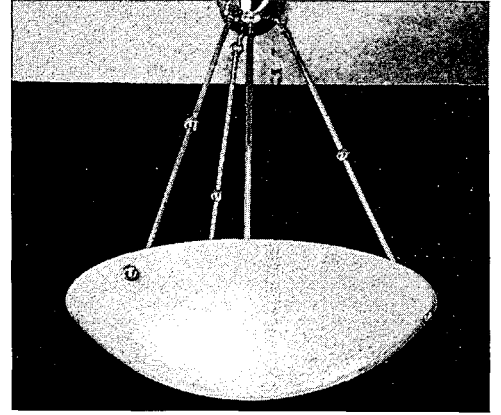
3

327. Brass bound. Rated for both contract and residential use, lamps and pendants designed by Shelton, Mindel & Associates have a lot of brass. Parallel-rod stems, bases, and fittings are made of solid brass a choice of four finishes. The triple-column table lamp (1) stands 27-in. high; its paper shade comes in color combinations to match the metal finish selected. The pendant (2) is similar, with a metal shade. The chandelier (3) has a deep bowl of Spanish alabaster 32 in. across; quartz-halogen or CFL lamping. 914/698-7799. Nessen Lighting, Mamaroneck, N.Y.

AL HALIDE TECHNOLOGY, WE TRANSFORMED IT.

Philips had a goal: Come up with a metal halide lamp featuring consistent color, a lamp better able to control its vivid color from lamp-to-lamp and over time. Make it fit existing fixtures. Do all of this – and more – without sacrificing metal halide's legendary efficiency.

Impossible? Philips did it. Thanks to its exclusive ceramic arc tube, the new Philips MasterColor™ family takes metal halide technology to unimaginable heights. For more information on the metal halide lamps that will positively challenge every negative perception you ever had of this technology, call 1-800-631-1259. MasterColor from Philips, the first and only metal halide to master color.

OPENING THE WORLD'S EYES TO LIGHT.™

**Philips
Lighting
Company**

Circle 123 on inquiry card

PHILIPS

Product Literature/Lighting

DAZOR

412. Ornamental lamp posts
A color brochure explains the advantages of fiberglass-composite lighting poles and ornamental lamp posts. The round tapered designs are said to be more durable, stronger, non-corrosive, non-conductive, and to have lower life-cycle costs than other pole types. 303/287-8053. W. J. Whatley, Inc., Commerce City, Colo.

413. Industrial task lights
A line of work lights includes a new compact-fluorescent fixture that produces much less uncomfortable heat than incandescent sources. Arm types include rugged steel friction arms that move at the touch of a finger. Lights have applications in machine lighting, assembly, magnification, and quality inspection tasks. Dazor Mfg. Corp., St. Louis, Mo.

REJUVENATION LAMP & FIXTURE

PL
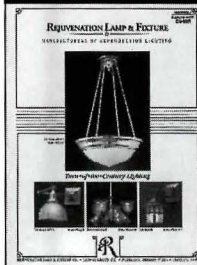
414. Period reproductions
A four-page Sweet's catalog introduces authentically detailed brass reproductions of light fixtures, table and floor lamps, chandeliers, pendants, and porch lights from the late 1800s into the '50s. Luminaires are UL listed, and many can be specified for compact-fluorescent sources. 503/231-1900. Rejuvenation Lamp & Fixture, Portland, Ore.
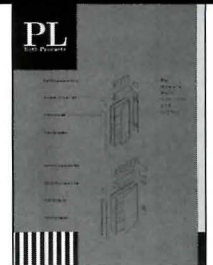
415. Efficient vanity lighting
The PLLF light is a color-corrected 9W CFL placed in a proprietary reflector that directs all light downwards for even, more comfortable facial illumination. For use with "moderate price" PL bath cabinets, the unit meets California Title 24 energy-code requirements. 800/488-2284. PL Bath Products, Bensalem, Pa.

BEAUTIFUL LIGHTING BEAUTIFUL HOME

FIRE & Water

416. Residential downlighting
Beautiful Lighting, Beautiful Home, a 24-page guide, helps homeowners select recessed downlighting. Covers fixture types designed for general illumination, task work, accent, and wall washing, and discusses the esthetics of various trim options such as baffles, eyeballs, lenses, reflectors, and cones. 703/382-6111. Hubbell Lighting, Inc., Christiansburg, Va.
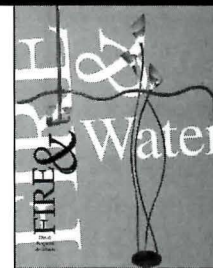
417. Highly styled lighting
Catalog pages illustrate architect David Bergman's newest Fire & Ice luminaires, still within his copper-tube and metal-mesh vocabulary. Lamps, pendants, candelabras, and torchieres can take dimmable compact-fluorescent sources, as well as MR16s and other incandescent lamps. 212/475-3106. David Bergman Architects, New York City.

For more information, circle item numbers on Reader Service Card.
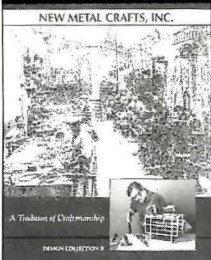
418. Custom luminaires

A six-page color brochure illustrates recently done custom-design lighting fixtures, all on a lobby-size scale. Materials used include white-opal and etched glass, stainless steel, cast brass, and crystal, made for projects from cathedrals to casinos in a range of styles. Restoration work a specialty. 800/621-3907. New Metal Crafts, Inc, Chicago.

419. Crystal-bead chandeliers

A foldout poster gives some idea of the illumination effects possible with the Rivendell Collection, lighting that uses motifs of leaves, flowers, and buds interpreted in gilded, hand-wrought metal and hand-strung crystal beads. Line includes chandeliers, sconces, and ceiling designs. 800/836-1892. Schonbek Worldwide Lighting, Plattsburgh, N.Y.
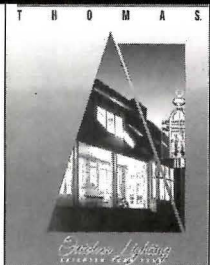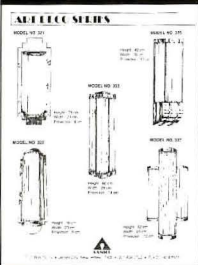
420. Art Deco luminaires

Large-scale sconces of solid brass, polished nickel, and reme-styled glass incorporate the feeling of Art Deco in ADA-compliant designs. A catalog page supplies dimensions and line drawings for each fixture. Lights can be ordered for fluorescent, halogen, or incandescent lamping. 201/434-0722. AAMSCO Lighting, Inc., Jersey City, N.J.

421. Residential outdoor lights

A 32-page catalog covers a full line of outdoor lighting products for use around the house, including post lights, by-the-door sconces, spotlights, and decorative pendants. Styles range from modest to extravagant, in finishes such as textured rust, antique brass, and verde. 502/893-4600. Thomas Industries, Inc., Louisville, Ky.
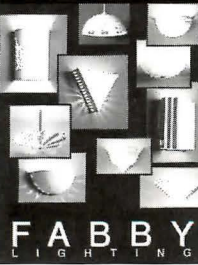
422. Bisque lighting

Over 400 designs by Ian Arthur are shown in a color catalog. The collection, made of pottery finished in white bisque, includes wall and ceiling-mounted fixtures, post lamps, pendants, downlights, and bathroom lighting, with decorative edge treatments and show-through cutouts. 213/939-1388. Fabby, Inc., Los Angeles.

423. Blown-glass designs

Colorful, multilingual catalogs display new lighting by Renato Toso, Noti Massari, and other Italian designers responsible for many Leucos products, such as Vittoria lamps and pendants, many using the firm's hallmark jewel-tone Murano glass. 908/225-0010. Leucos USA, Inc., Edison, N.J.

For more information, circle item numbers on Reader Service Card.

LUXO

Borens

Northern Lights

Urania
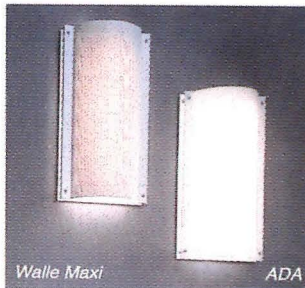
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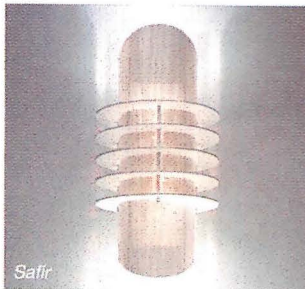
Safir

Ellen Lang

*Classic Elegance
in the Scandinavian Tradition*
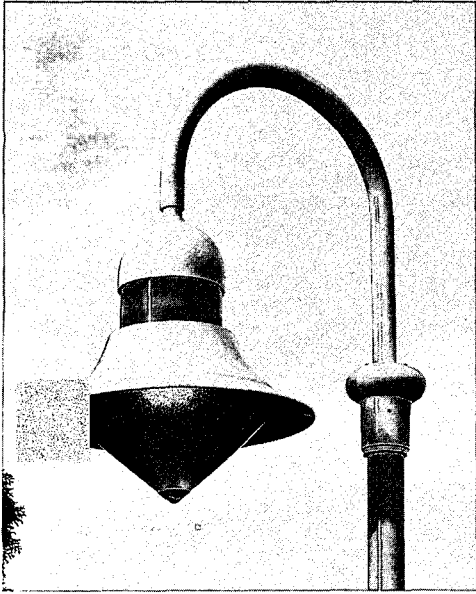
328. New-look lantern. Part of a dramatic line of exterior lighting from Germany, Histo 21 blends with traditional-style streetscapes. Luminaire incorporates optics said to reflect any given angle of light from energy-efficient lamps; a frosted diffuser defines the lantern shape. All designs shown in a 26-page catalog. 800/735-8927. Se'lux Corp., Highland, N.Y.

329. White light. VeArt's Arpasia series lights come in models for ceiling, wall, and on-the-floor use, as well as the table/bedside lamp version shown above. Designed by Jean-Marie Valery with an etched-glass diffuser and mahogany stem set into an anodized-aluminum base, lamp is 20 in. high. 516/694-9292. Artemide, Inc., Farmingdale, N.Y.
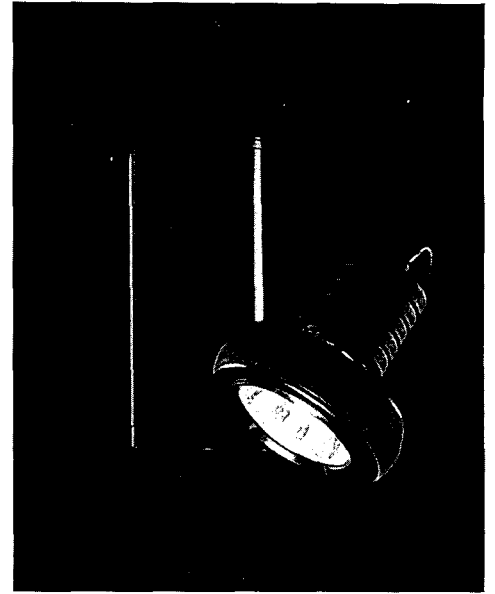
330. Low-voltage spot. Extending the Sof-Tech line-voltage track system into a miniature size range, Sof-Tech Low Voltage fixtures incorporate a slim, vertically oriented electronic transformer. Silicone band on the lamphead permits comfortable lamp-on aiming. Retail price: $110-$155. 800/223-0726. Lightolier, Inc., Fall River, Mass.

331
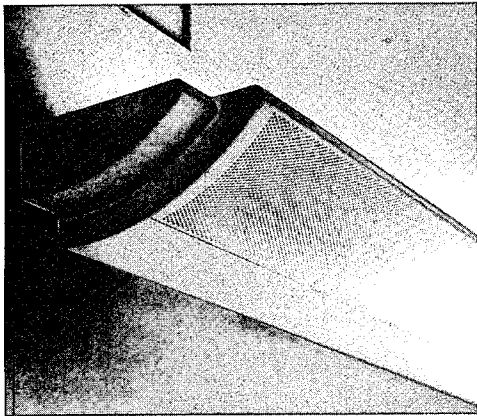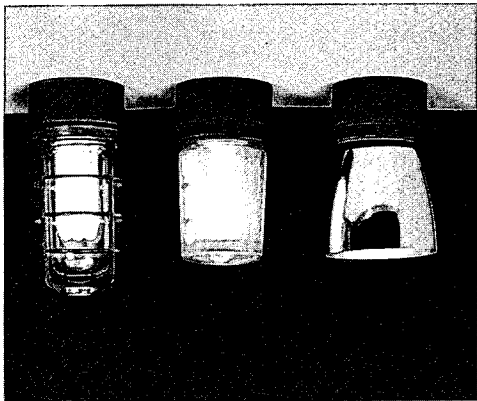
331. Perimeter ambient. A new wall-mount luminaire matches the look of Litecontrol's Classica pendant, with a similar perforation pattern distributing gentle, fixture-defining light. Housing cross-sections are designed for one or two T8 lamps; end-cap profiles may be sculptured, as shown, or flush. An articulated joiner connects individual sections to create longer installations in lobbies, hallways, or offices. 617/294-0100. Litecontrol Corporation, Hanson, Mass.

332. Non-metallic fluorescents. New compact fixtures made without any metal are said to prevent premature ballast failure in wet or corrosive conditions. Vapor-proof integral-ballast lights, for use in the harshest environments such as tunnels and animal-confinement areas, come in 18-, 26-, and 32W CFL versions. 800/743-9148. MiTOR Industries, Mankato, Minn.

333. Landscape lighting. Made of cast aluminum with an impact-resistant glass lens, Aries outdoor lights may be ordered for incandescent or compact-fluorescent lamping. A two-lamp model is shown; a single base-mount and a wall fixture are also available, in matte black or white. 201/882-5010. Amerlux Lighting Systems, Fairfield, N.J.

332

333

Product Literature/Lighting

424. Lighting truss system
A brochure describes the basic Lightruss System, a series of indirect light modules with HID lamps evenly spaced on a continuous truss structure. Pre-wired and pre-focused sections are said to be easy to install and particularly suited to the lighting needs of large spaces such as shopping malls and airports. 414/242-1420. SPI Lighting, Mequon, Wis.
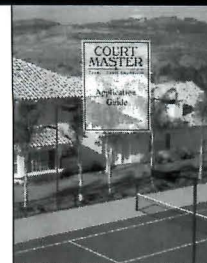
425. Tennis-court lighting
The CourtMaster 1000W luminaire is designed to provide efficient illumination and beam control for club, recreational, and tournament-level playing conditions. A rotatable reflector is said to eliminate unwanted spill light. A color brochure supplies photometrics, and lays out fixtures for all types of tennis-court setups. Lumark Lighting, Vicksburg, Miss.

426. Recessed downlighting
A 34-page catalog covers all Lite Box products, including new high-wattage fixtures for insulated ceilings, downlights and trims for sloped ceilings, and housings designed to take advantage of efficient compact-fluorescent lamps. Illustrates fixtures with color photographs and detail drawings; photometrics given. 510/562-3500. Prescolite, San Leandro, Calif.

427. Step, rail, and cove
A 12-page brochure demonstrates interior and exterior applications of this low-voltage system, which can provide 5-, 10-, or 25 fc of continuous, uninterrupted light from a concealed source in single lengths of up to 25 ft. Lamp life is said to be over 50 years; can be ordered in 12- or 24-volt systems. 800/654-8268. Roberts Step-Lite Systems, Oklahoma City, Okla.
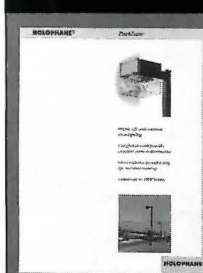
428. Parking and area lighting
Individual eight-page catalogs describe the ParkLane and Crestwood area-lighting luminaires, and supply photometric data, construction diagrams, performance specifications, finish and mounting options, and ordering instructions for each design. 614/349-4116. Holophane Corp., Newark, Ohio.
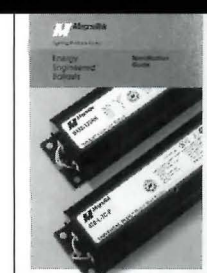
429. Ballast Guide
A new *Specifications Guide for Energy Engineered Ballasts* gives performance data for both Triad electronic ballast and Universal electromagnetic ballasts. Data such as total harmonic distortion, minimum starting temperatures, and sound ratings are matched to ballasts. 615/316-5186. MagneTek, Inc., Nashville, Tenn.

For more information, circle item numbers on Reader Service Card.

New Products *continued from page 43*
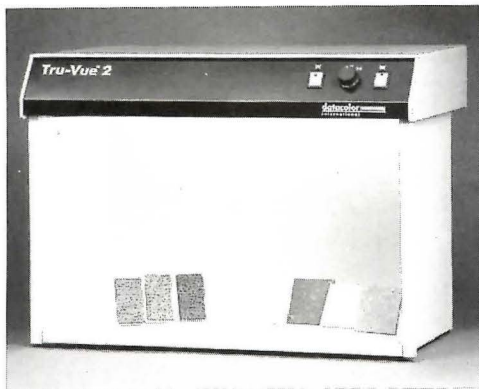
334. Color assessment. The Tru-Vue 2 cabinet is described as a lightweight (29 lbs), low-cost tabletop unit that can simulate on-site lighting conditions to evaluate the color of fabrics, paints, laminates, and other materials. Comes with four light sources; meets ASTM D 1729-89 for critical viewing. 609/924-2189. Datacolor International, Lawrenceville, N.J.
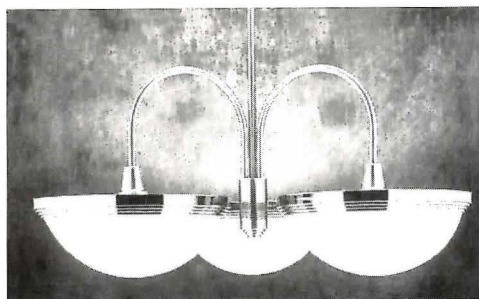
335. Fluorescent option. Lam's Imperial Series pendants, sconces, and cluster fixtures (pictured) can now be specified for biaxial CFL sources in place of HID lamps. The number and placement of the CFL sources permits diffused downlighting as well as indirect uplight illumination. 800/732-5213. Lam Lighting Systems, Santa Ana, Calif.
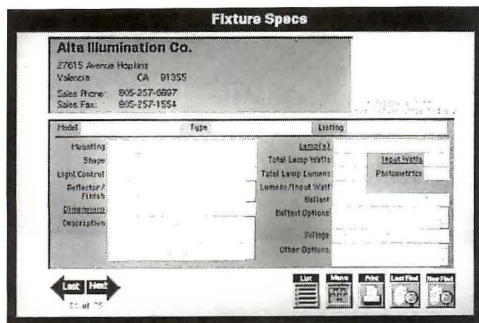
336. Fluorescent guide. The CFL Directory is said to be a comprehensive source of information on compact-fluorescent lighting products. Windows/Mac disks hold over 8,000 15-part standardized descriptions of fixtures, lamps, and retrofit kits. 800/346-0104. Iris Communications, Eugene, Ore.
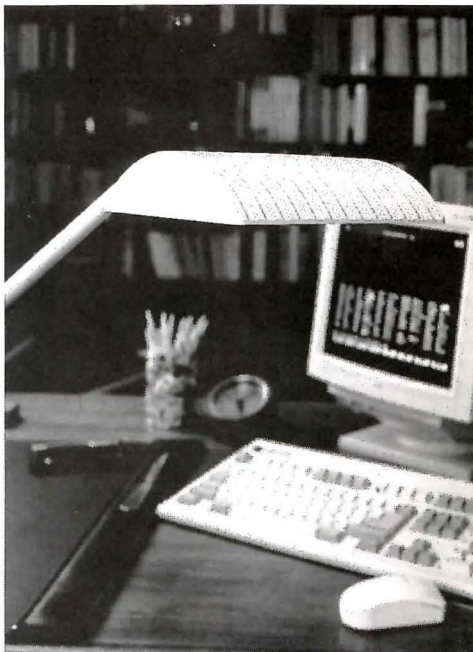
337. No-flicker task. The Barcelona E is the newest version of Waldmann's parabolic-louver light, with an instant-on electronic ballast incorporated in the lamp head. Fixture takes two 9W PLs. Several articulating-arm styles; mounting options include a universal bracket for panel systems. 800/634-0007. Waldmann Lighting Co., Wheeling, Ill.
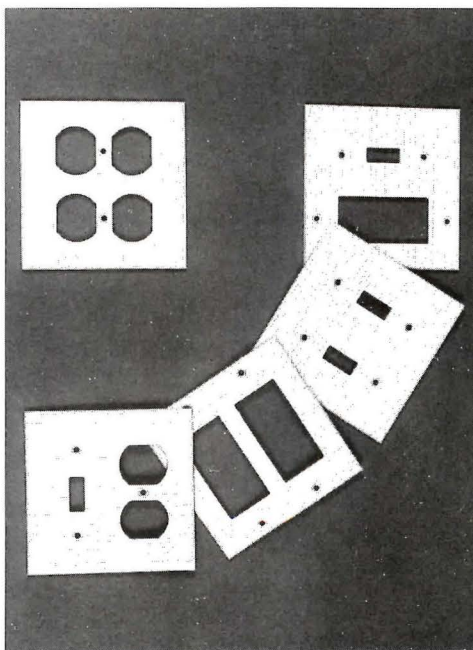
338. Real-wood coverplates. Decorative switchplates made of oak, ash, maple, or cherry come sanded and ready to finish. Sized to NEC dimensions, plates are said to fit neatly to the device; over 60 styles offered. 303/232-8909. A Better Coverplate, Denver. *Continued on page 46*

339. Multipurpose patient light. The Clairance light combines fluorescent and incandescent for up to four lighting functions. Ambient and reading functions can be controlled by the patient from the bed; the examination light and a nurses' night light are controlled by staff at a wall switch. 800/833-3321. Medaes Systems, Norcross, Georgia.

340. Fluorescent wall washer. This fluorescent wall washer is only 5-in. wide. It's specifically designed to place a strong, even, vertical beam of light on the face of a wall, from a point much closer than would be possible with a conventional wall washer. Very effective for display work. Engineered Lighting Products, El Monte, Calif.
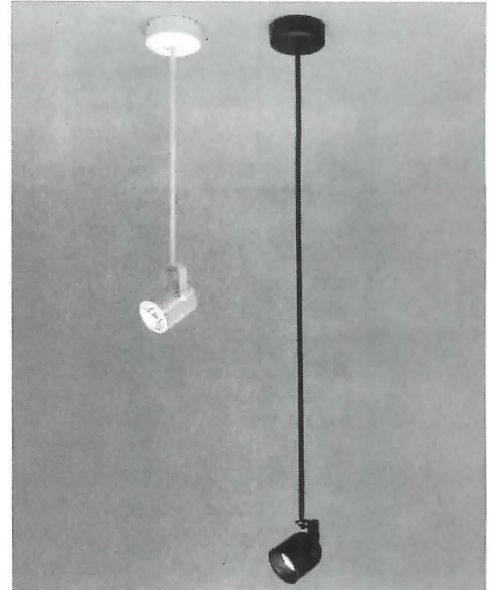
341. Extended track heads. W.A.C. manufactures extension rods of 18-, 24-, 36-, and 48-in. lengths that attach to their low-voltage track heads. Track heads may be set onto two- or three-wire track mounted on high ceilings or other difficult-to-reach areas. Available in black or white. 800/526-2588. W.A.C. Lighting, College Point, N.Y.

Circle 131 on inquiry card

New Products

342. Silver-film laminate. Specular+, a UL-listed sputter-coated film, is described as efficient at directing and focusing light output. When used as reflectors in new or retrofitted fluorescent fixtures, the laminate can reduce the number of lamps and ballasts needed to maintain original light levels. PreFinish Metals, Inc., Elk Grove Village, Ill.

343. LED exits. The Precise exit line now includes models with LED illumination, said to last over 25 years while drawing only 1.5 watts. Both LED and standard 8W fluorescent exits come in line-voltage and emergency versions. Lithonia Lighting, Conyers, Ga.

344. Edge-lit exit. Sterling exits are described as ideal for upscale interiors such as corporate offices, restaurants, and hotels. Available with red or green LED illumination for recessed or surface mounting. Options include special wording or graphics. Chloride Systems, Burgaw, N.C.
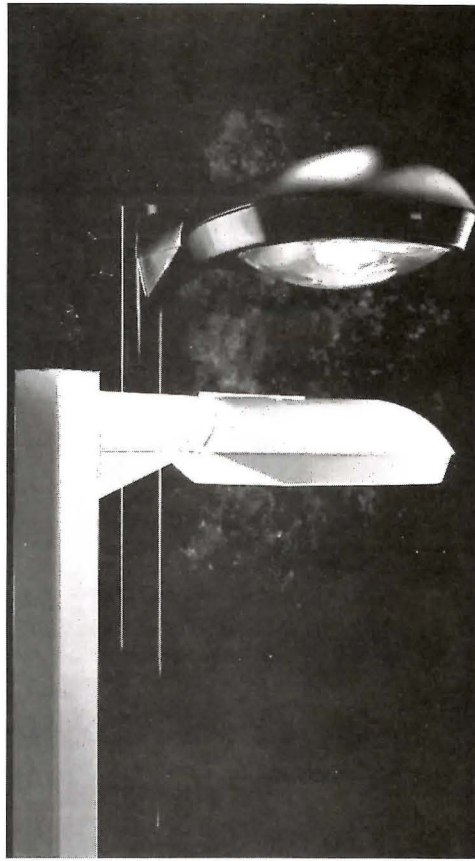
345. Low-profile area lights. Constellation series luminaires come in metal-halide (with a drop glass lens) and flat-lensed high-pressure-sodium versions to illuminate parking lots, entry drives, and walkways. Its low-profile design is said to greatly reduce wind resistance, to a .71 EPA level, while reflecting a look of 21st century design. A two-position latch system permits tool-less re-lamping. McGraw-Edison, Vicksburg, Miss.
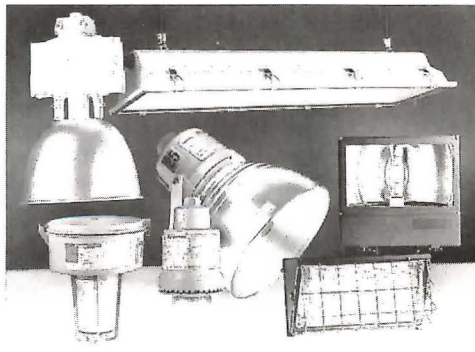
346. Rugged lighting. Mercmaster fixtures, made with all-stainless-steel construction, are said to offer outstanding corrosion resistance in harsh environments. Photometrics and other data available on diskette. Appleton Electric Co., Chicago.

Product Literature/Lighting

430. Consistent-color halide
Product-data sheets give lamp-performance and other data on new MasterColor metal-halide lamps, said to offer uniquely consistent color control and excellent (80 CRI) color-rendering ability compared to other low-wattage halide sources. Offered in ED17, 35W PAR 30s, and 35- and 70W T6s. 908/563-3039. Philips Lighting Co., Somerset, N.J.
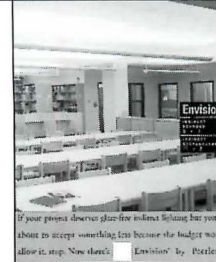
431. Glare-free optics
A brochure on the Envision system illustrates how the extruded-aluminum sections connect and turn corners; cutaway views detail lamping options for the rounded and rectangular shapes offered. Color photos convey a sense of system performance in office and industrial environments. 510/845-2760. Peerless Lighting Corp., Berkeley, Calif.
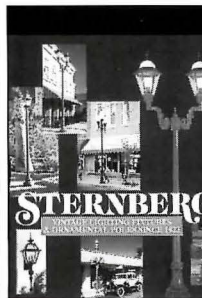
432. Aluminum light poles
A 38-page color catalog gives an overview of all Sternberg "Vintage Lighting" pole and luminaire designs, using detail drawings and installation photos of sites from Chicago to Disney World. Styles are primarily traditional, with a wide range of pole, fixture, and lens options. Lamping and ordering information. 312/478-4777. Sternberg, Chicago.
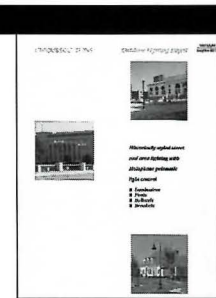
433. Area-lighting standards
A 20-page Unique Solutions catalog shows post-top luminaires and bollards in residential, school, retail, and public-space settings. Posts can be made in cast iron, cast aluminum, concrete, fiberglass-reinforced polyester, and a combination of cast-iron base and a steel shaft. 614/349-4194. Holophane Co., Inc., Unique Solutions Div., Newark, Ohio.
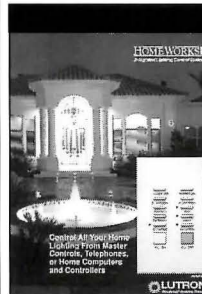
434. Residential lighting control
HomeWorks is described as a stylish, state-of-the-art integrated lighting system that allows users to recall preset lighting levels at the touch of a button. Status indicators show which lights are on; panels can work with other maker's keypads for media, security, and hvac devices, eliminating "switch clutter." 610/282-3800. Lutron, Coopersburg, Pa.
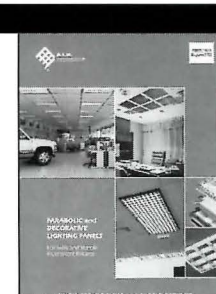
435. Custom lenses and louvers
A.L.P.'s 20-page catalog describes a range of louvered fixtures and other lighting components, including wrap-around lenses, Kwik Change retrofit louvers, and all types of parabolic louvers. Finish options, blade profiles, photometric data, and dimensions are listed. 800/633-7732. A.L.P. Lighting & Ceiling Products, Chicago. ■

For more information, circle item numbers on Reader Service Card.
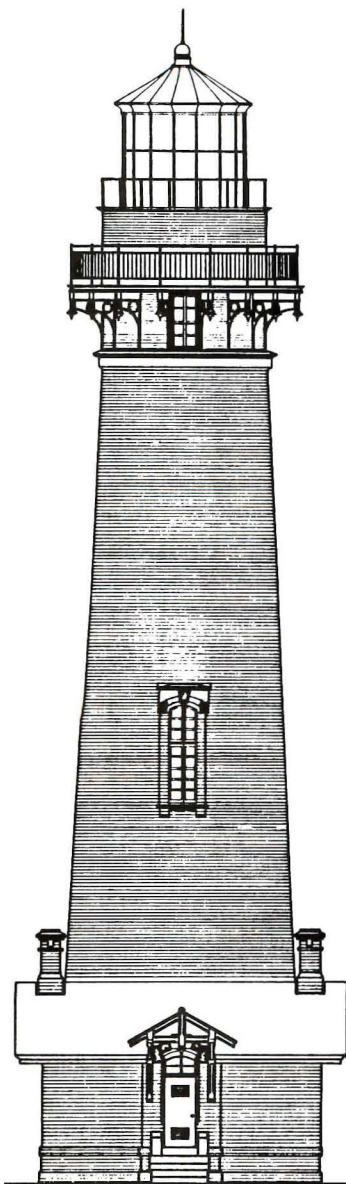
PIGEON POINT LIGHTHOUSE, SAN MATEO COUNTY, CA.

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Manufacturer Sources

For your convenience in locating lighting fixtures and other products shown in feature articles, record has asked the architects and lighting designers to identify their sources.

Pages 24-27

Ahmanson Theater Reconfiguration, Los Angeles
Ellerbe Becket, Architect
Horton • Lees Lighting Design
Lobby downlighting: Lightolier, Inc. (quartz ellipsoidal). Lobby cove lighting and theater downlights: Lightolier, Inc. (PAR38 track with spread lens). Custom lobby fixtures: C.W. Cole & Co. Ceiling uplights: General Electric (Dichroic blue MR16 lamp, porcelain socket). Sconces at box seats: LSI (PAR20 Spacebird). Lighting controls: Strand Century. Exterior downlighting: CSL. Canopy uplights: Elliptipar, Inc. In-grade uplights: Hydrel.
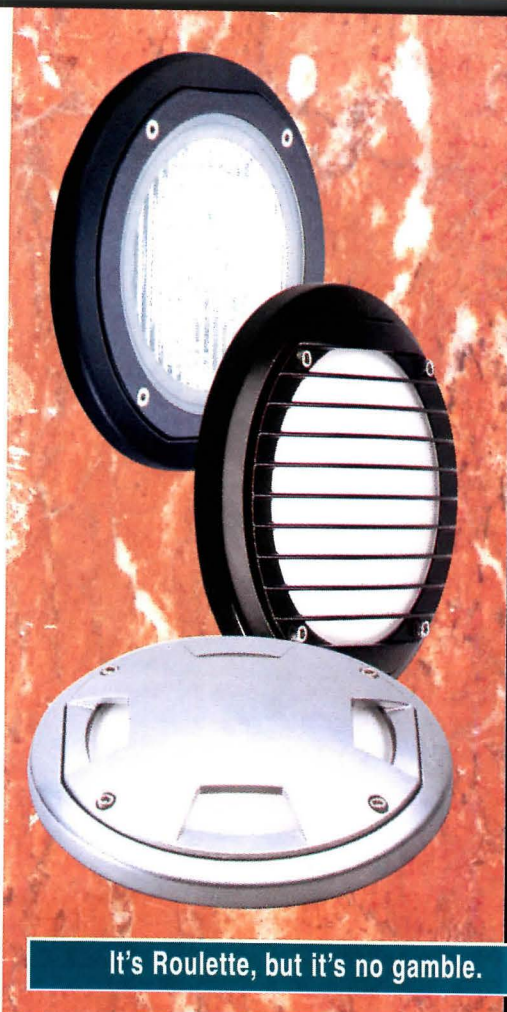
Pages 28-29

Joslyn Art Museum Addition, Omaha, Nebraska
Sir Norman Foster and Partners; Henningson Durham Richardson, Architect
Claude R. Engle Lighting Design
Architectural lighting fixtures and gallery lighting: Edison Price, Inc.

Pages 30-33

Prudential Center Retail Arcades, Boston
Sykes Jennings Kelly & Brewer, Architect
Communication Arts, Designers
Ripman Lighting Consultants, Lighting Designers
Custom-design standards: Winona Lighting. Cove fixtures: Kurt Versen. Downlighting: Lightolier, Inc.; Omega; Elliptipar, Inc. Other fixtures: Sterner Lighting Systems, Inc.; Kirlin. Exterior lighting: Hydrel; McPhilbin; Sterner Lighting Systems, Inc.; Stonco. Sources: General Electric (F26 CFLs; Q250 PAR38/FL, 50 PAR30, and other incandescents). Philips: SDW-100W/LV/D coated ED17 (White SON).

Pages 34-35

Christ Church, Oyster Bay, New York
Gerald Allen & Jeffrey Harbinson, Architects, P.C.;
Sconces; chandeliers at nave and narthex: Michael's Lighting, Winona, Minn. Lighting control system: Lutron Electronics Co.

New Products *continued from page 47*

347. PAR38 replacement kit. The Quicklite is a UL-listed, socketless compact-fluorescent retrofit for 6- and 8-in. recessed downlights, replacing the banned-after summer 75- and 150W incandescents. The reflector is said to maximize light output and distribution; includes a high-power-factor electronic ballast. Available in wattages from 10W to 32W. 813/288-0334. Lighten Up Products, Tampa, Fla.


348. Lighting control system. The Impressions line of wiring devices now offers a microprocessor-based lighting control system that permits preset dimming and switching of scenes for up to 256 lighting loads, to be programmed by the installer. Matches look of other devices. 800/223-4185. Pass & Seymour/Legrand, Syracuse, N.Y.
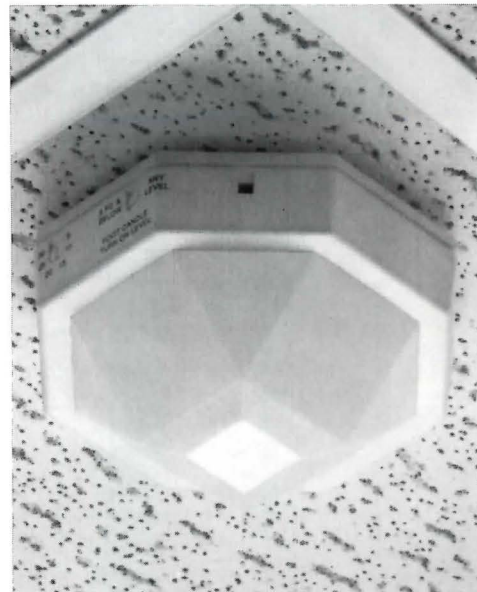
349. Large-area occupancy sensor. At a cost basis of 8 cents per kilowatt hour, the HC-3600 is said to pay for itself in savings within a year of installation. A square coverage lens was designed to eliminate dead spots in corners; five dual-element sensors improve response sensitivity. 616/925-2896. Heath Commercial, Benton Harbor, Mich. ■
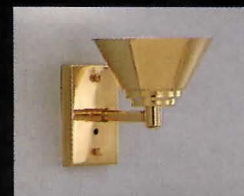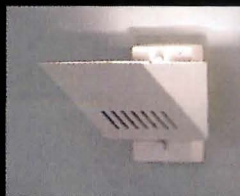
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