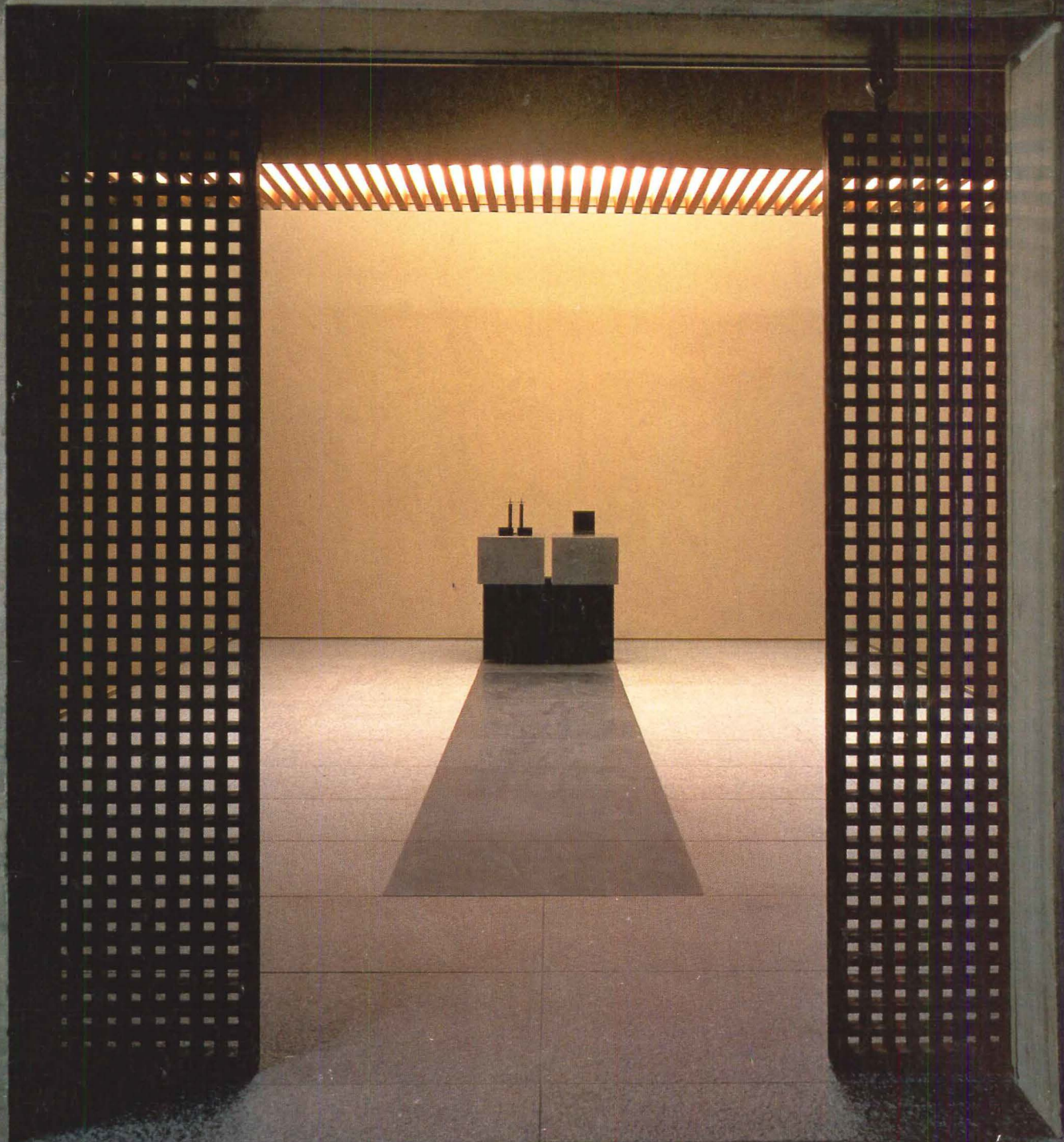


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EDITORIAL

A Building Lasts a Lifetime

BY ROBERT A. IVY, FAIA



At the height of the Christmas season in 1997, the sky rained bricks on a busy block in midtown Manhattan. It was amazing that no one was killed on Madison Avenue, which had to be closed off, denying hungry shoppers the opportunity to spend and retailers significant revenue. Investigation pointed to construction flaws: somewhere along the line, masonry ties had been omitted from certain courses of brick. Invasive moisture or thermal shifts had taken their toll, and at a given moment, the loosened bricks broke free.

Although the New York story is an anomaly, subject to an ongoing investigation and probable litigation, it dramatizes something that architects and their clients sometimes take for granted: public health, safety, and welfare remain fundamental, defining characteristics of the architectural profession. When properly executed according to plans and specifications (which the New York building was not), structural frames are expected to stand up; details are intended to hold, despite an array of stresses.

Nature is unforgiving. However, her physical laws, while non-discriminatory and universal, are rational. We can understand those laws and although we cannot control them, we can build in harmony with them. Cases of extreme stress can prove instructive. Following the 1994 Northridge earthquake in Southern California, architects and engineers discovered that steel, which had been widely understood as strong enough to withstand earthquakes, actually tore under the strains. Several new methods of softening the inevitable forces resulted.

There is a tendency to assign the onus of building safety to others, such as engineers, who are perceived as experts. Architects are aesthetes, after all, or businesspeople, the argument goes. Structural engineers perform the calculations on which a building's integrity rests. Electrical engineers devise the systems that monitor each building's security and light its exit corridors. Mechanical engineers are responsible for fire-suppression systems. Code consultants know the law and often help frame the governing regulations.

No one, however, is in a better position to render thoughtful judgment about building safety than the architect. The architect's position on the building team is unique, offering perspective, an ability to compare systems and offer advice on appropriateness at varying levels of decision making. While legal liability rests with each discipline, architects may, in fact, shape a building's material safety.

More important, they organize the flow of people and goods, lay out the floors for habitation or industry and for safe entry and exit, and devise strategies for healthful light and ventilation. Code consultants do not encompass this holistic understanding; engineers, locked within a single discipline, do not benefit from such synthetic vision. Interior designers, concerned primarily with inside surfaces and movable objects, cannot alter a poorly conceived dead-end corridor.

The approaching century promises revised building codes, both prescriptive and performance-based, with the hope of a single, national resource that all parties can point to and use. Unfortunately, no written document can make up for poor advice: no subsequent decision can reverse the problems faced by a building erected in a region plagued by hurricanes, for example, or along a well-known seismic fault; no legal formula or insurance policy can substitute for prudence when a builder wants more structure for less money.

Architects propose that the buildings we erect should enhance our health, at every scale; safety is our charge. A building lasts a lifetime, and our lives are growing longer. The skies should not be raining bricks.

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CIRCLE 7 ON INQUIRY CARD

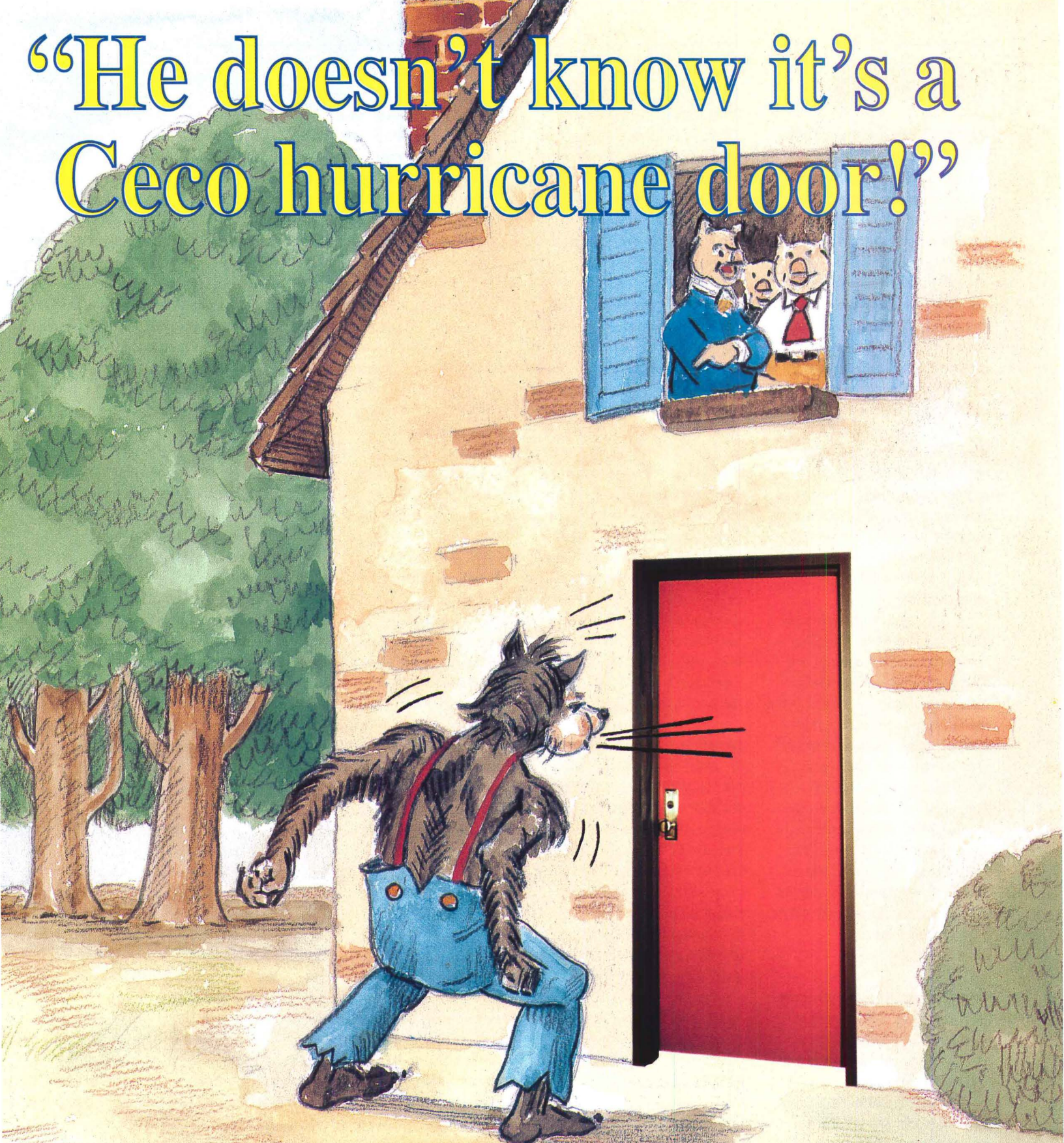


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CIRCLE 8 ON INQUIRY CARD

LETTERS

Competitions and the public

David Dillion's otherwise comprehensive article on architectural competitions [November 1997, pages 62–67] did not include one important issue: public accountability. Well-run competitions offer a much more sensible and public means of selecting a project and an architect than the various conventional political processes that often carry the taint of favoritism and back-room deals and result in disappointing architecture.

In San Antonio, most recent state- and locally funded projects not awarded by competition have ranged from laughably mediocre at best to dysfunctional at worst. In contrast, two recent competition-winning projects are among the best buildings constructed in this city in years, if not decades.

Firms genuinely interested in good design have nothing to fear from participating in well-run and adequately funded competitions. When the awarding of projects is not open to public scrutiny, too often the process seems skewed toward firms with the best public relations personnel, at the expense of architectural merit as a serious consideration. As a tax-paying citizen, I demand that my tax dollars go to quality design, rather than into the pockets of well-connected lobbyists representing mediocre design talent.

—Darryl Ohlenbusch
San Antonio, Tex.

Niemeyer and the Modernists

Oscar Niemeyer is disingenuous when he says: "The Modernists acted as if architecture consists only of rational processes and straight lines" [December 1997, page 35]. Spatial freedom was the driving impulse of Modernism; the use of straight lines was a reasonable and practical response to the realities and economics of production and construction processes of its time.

—Paddy Lynch
New York City

Inspired architecture

It is interesting to learn that Charles Price, a graduate of Colorado College, intends to bring inspired architecture to the college's planned science building and new arts complex [December 1997, page 33]. Price, according to your article, "would like to give the commissions to world-class architects."

Some of the credit for what author David Hill calls "less than inspired" buildings on the college's campus rests in the hands of architects who, I'm sure, the college as well as the architectural community consider to be "world-class": Skidmore, Owings & Merrill designed Tutt Library; Caudill, Rowlett & Scott designed Olin Science Hall and Boettcher Health Center; Edward Larrabee Barnes designed Packard Hall for Music and Art.

I hope that Price and the college's board of trustees realize that giving the commissions to world-class architects or to a nationally renowned architect may not result in inspired architecture.

—Charles Campbell, AIA
Colorado Springs, Colo.

Architecture for the long term

The difference between Frank Gehry's Guggenheim in Bilbao [October 1997, pages 74–87] and Richard Meier's Getty in Los Angeles [November 1997, pages 72–107] is the difference between presenting a city with something dubious scraped from the bottom of an architect's shoe and presenting a spectacular jewel from the heart of the architect's imagination.

I am sure that both buildings will contribute to the cultural life of their respective cities, but only Meier's will be considered of lasting value a century from now. It is a shame that Gehry has turned his back on architecture in favor of self-indulgent folly masquerading as art.

—D. S. Locicero
San Francisco, Calif.

More on becoming an architect

Robert L. Morgan, the author of "Becoming an Architect: Motivation

to Fail" [November 1997, page 28], needs to set aside the image of Howard Roark and take a more objective view of his profession. To whom should practitioners 20, 30, or 40 years his senior assign the "unrewarding work"? The road to becoming a professional architect is supposed to be tough, which is why the ones who survive are the best.

Clearly, Morgan does not understand that his education is in its infancy. College did not make him an expert; he will not have expertise for many years. High wages will come with experience, increased abilities, and personal risk. Let the hardships of the architectural life motivate you to excel. How you face those hardships will show us the stuff you are made of.

—Randy W. Bright, AIA
Tulsa, Okla.

I read Morgan's article with great interest and some sorrow. The architecture schools are failing to provide realistic learning skills—skills that would make young people more valuable to firms.

I am trying to address this problem by creating a specifications-writing class, which would help students learn how to draw and detail more realistically, understand concrete and structural steel classes more thoroughly, and offer many other advantages.

—Jerry D. Wright, AIA, CSI
Gittels Associates
Southfield, Mich.

It is true that architectural interns incur hefty school expenses, often work too much for too little, and consummate this experience with a costly professional exam. But it doesn't have to be this way, and we don't have to wait for educators and practitioners to break their old habits before things can get better. Every intern has the ability to enjoy rewarding, valuable work experience and reap moderate wages by finding a good firm and increasing his or her value within that firm.

In today's healthy economy, interns have more leverage than we

think we do. A good firm will encourage its interns to use the intern development program to expand their professional experience; many firms offer assistance on completion of the A.R.E. If your firm does not operate this way, take the time to explain to your employer how the firm could benefit from assisting you.

I share Morgan's concern about college tuition, hostility in the studio, and the subjectivity of evaluations, but I don't believe that these problems are unique to architecture.

—Casey J. Wyckoff
LSW Architects
Vancouver, Wash.

Building to code

I find it interesting that RECORD, the publication representing the AIA, should publish work that does not conform to code, such as the courtyard stairway in Dean/Wolf's loft [September 1997, page 109]. As design professionals, we must remember that "good and innovative" design is not only aesthetically pleasing but also functional. A floating stairway that does not include required life/safety elements, such as a handrail, should not be published as an example of good design.

—Gary J. Ahern, AIA
Menlo Park, Calif.

Where is the third world?

I love RECORD and read it with interest. However, I am critical of the fact that it lacks anything and everything on "third world" architecture.

—Murat Soygenis, AIA
Istanbul

Corrections

On page 139 of the January 1998 issue, the architect Tim Andreas should have been credited as working independently on the master bath remodeling project in Hollywood, California. ■

RECORD may edit letters for grammar, style, and space availability, taking care not to change the author's meaning. Letters sent by post or electronic mail must include the sender's full name and address.

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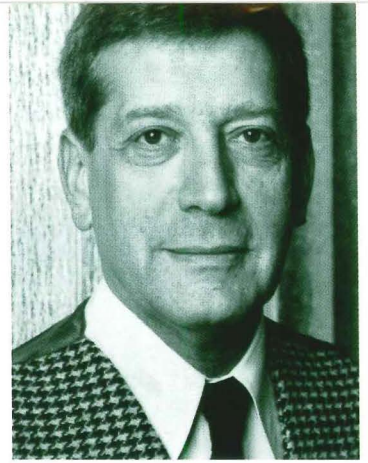
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SPEAK OUT Adaptive reuse deserves its own category in the AIA Awards.

MALCOLM W. HOLZMAN



Malcolm Holzman is a principal with Hardy Holzman Pfeiffer Associates, in New York City. He served as chairperson of the jury for the 1997 AIA Honor Awards for Architecture.

Much like the Oscars, Emmys, and Grammys, the annual AIA Honor Awards present the best projects built by American architects as determined by a distinguished peer group. Although the process has been disparaged from time to time, it is one of the few significant measures of excellence for the profession and has been so for 48 years. Therefore, it is important that the awards system reflect today's architecture.

Before the millennium, the AIA should consider dividing the current award for architecture into two categories. There has been, and continues to be, an increasing number of culturally and historically important buildings and other sound structures that are being adapted and updated for continued use. The profession should recognize the distinction between new buildings and reuse projects and acknowledge its importance by creating two separate classifications. The same standards of judgment cannot apply to both types of building projects.

Jury members for the AIA awards are normally confronted with a stack of submissions that includes several project types—residences, hotels, schools, hospitals, factories. Entrants can submit their projects for consideration in one of two categories: design resolution or design advancement. Entries may be further considered for “technical, societal, [or] environmental advancement [or] preservation/restoration.” Under the current system, only level of excellence and building type now distinguishes one project from another. But there is a

big difference between existing buildings and new ones, and it is significant enough to warrant a separate awards category.

Because of current submission requirements, jurors cannot adequately review reuse projects. To fairly consider an older building for an award, its original life must be documented and described. Why it was originally conceived and built, how it was subsequently used and modified over time, and its condition prior to restoration and reuse are all important factors. How the structure has been restored, altered, or extended must be conveyed. In many instances, the project may need to be evaluated by the Secretary of the Interior's standards for rehabilitation and guidelines for rehabilitating historic buildings. All these topics and others must be succinctly illustrated. A jury must act quickly but reasonably based on a sound understanding of the projects' general characteristics and specific areas of excellence. The present AIA system does not allow for this kind of scrutiny.

To function as a useful environment, an existing structure requires special expertise from the professionals adapting it. These skills range from a knowledge of history to the special application and installation of materials. It also necessitates the unique ability to understand the design intentions of a previous architect and to allow these to influence, in part, the development of a reuse project.

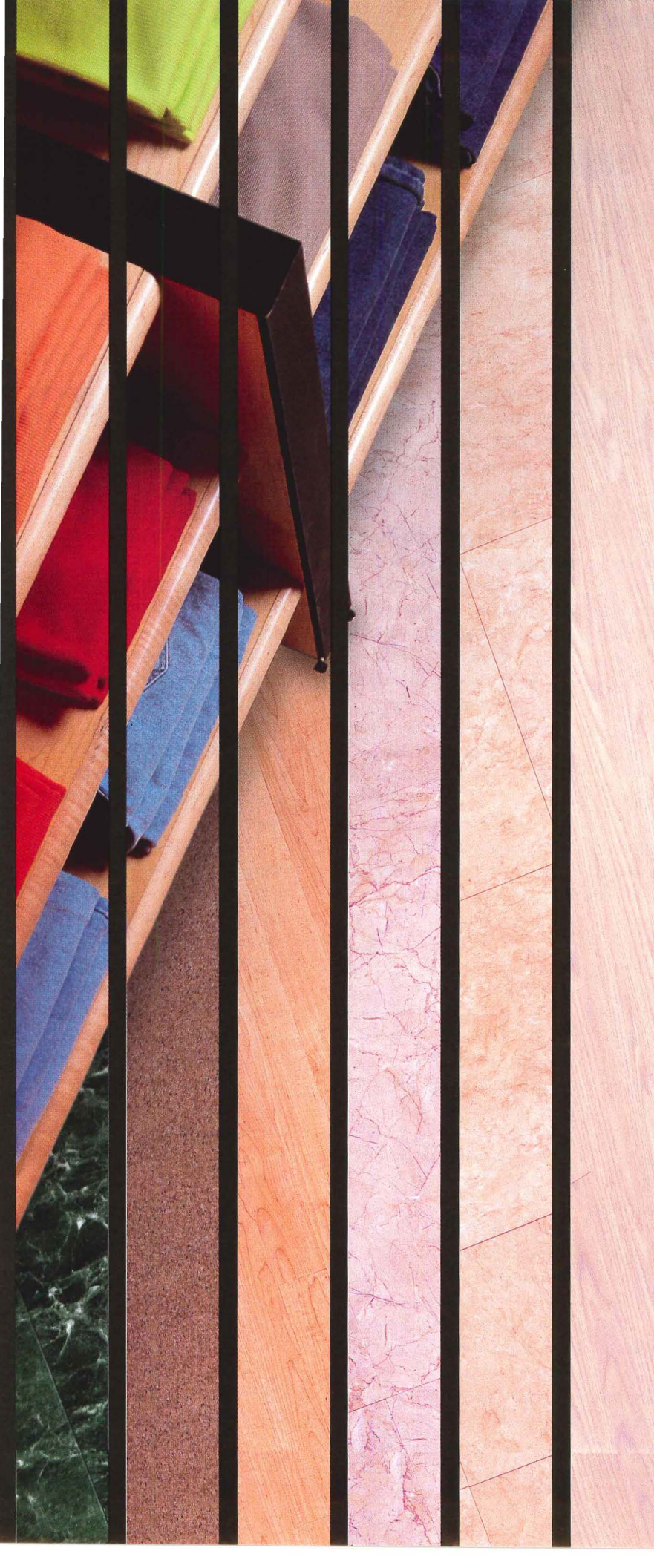
Changes in the architectural profession validate revising the awards system: the quantity of proj-

ects involving older buildings during the past two decades has increased significantly. In fact, several architecture firms across the country have dedicated their practice exclusively to reuse and preservation. And consultants with particular areas of historic expertise are in demand nationwide by architects undertaking assignments that involve older structures. There is even an accepted distinction among those in the field as to the fees commanded to design projects of this kind.

Moreover, our schools of architecture have responded to the need for curricula specifically designed for this area of architecture. Separate historic preservation programs are now flourishing at institutions around the country.

As America's vast stock of existing buildings continues to grow, it follows that more and more construction projects will start with existing structures. Preservation is meritorious. Currently, the AIA awards program does not provide an adequate way to honor these endeavors. This should change. ■

Contributions: *If you would like to express your opinion in this column, please send submissions by mail (with a disk, if possible) to Speak Out, Architectural Record, 1221 Avenue of the Americas, New York, N.Y. 10020; by fax to 212/512-4256; or by E-mail to rivy@mcgraw-hill.com. Essays must not exceed 700 words. The editors reserve the right to edit for space and clarity. Where substantial editing occurs, the author will receive final text approval.*



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CIRCLE 9 ON INQUIRY CARD

MENTORS Addressing a common dilemma: how to balance firm size, staff experience, and quantity of work.

Susan L. Harris, Ph.D., a member of the leadership faculty at the Advanced Management Institute for Architecture and Engineering in San Francisco, has a broad-based consulting practice that has worked with numerous A&E firms over the last seven years.



ARCHITECTURAL RECORD asked Susan Harris to answer a question that often confounds architects. Her response follows.

The question I hear most often from architects in this boom period is, “How do I effectively work with inexperienced new staff members when clients demand that everything be done fast and well?”

To meet project demands, many firms staff up quickly, hiring less experienced people because competition for more experienced people is pushing salaries to a level that is perceived to be unsupported for equity as well as profitability. Inexperienced new hires then require more support than overstressed managers feel they can provide. Quality suffers—not only in documentation and client satisfaction but in design itself.

The question is serious indeed. Whether an inexperienced person performs unsatisfactory work or a manager ends up doing too much of the work, neither quality nor employee development is served. New staff may either experience inefficient and ego-damaging training or a lack of appropriate learning opportunities. Managers live in a continuous cycle of overwork that may eventually motivate them to leave the firm.

Coaching and competencies

The first thing to establish in addressing this problem is whether your more senior staff members understand that coaching is their

job. Many architects feel that anything other than a directly billable task is not “real work.” Changing this attitude may be a long-term effort, but your firm’s future health depends on it.

The second consideration is whether your senior staff understands what coaching is. It is not the kind of one-way directing that pervades the profession. Rather, coaching is dialogue that brings to the surface what individuals already know as well as what they need, then expands into feedback and advice. This builds on existing competencies to enhance confidence and encourage appropriate growth.

Yes, this process takes time. But it simultaneously assures quality and effectively develops staff, both of which save significant time in the long run.

The third thing to consider is whether, in your rush to hire new staff, you have been clear and rigorous enough about the skills you require. When a new employee’s competencies are thin, even the best coaching will fall short of producing the desired results. You are probably better off not hiring at all than hiring someone who does not have the key abilities you need.

Staff size affects jobs

This brings me to the fundamental dynamic underlying the question. The number of qualified staff members you have—or can realistically hire quickly—ought to act as a limiting factor in your decision-making about the work you accept.

Up to a point, stretching is a good idea: we don’t know what

we’re capable of until we try. But if managers are coaching effectively and still finding themselves overworked and dealing with quality problems, your hiring may not have been as good as you thought. Or you may have exhausted the talent available in your area.

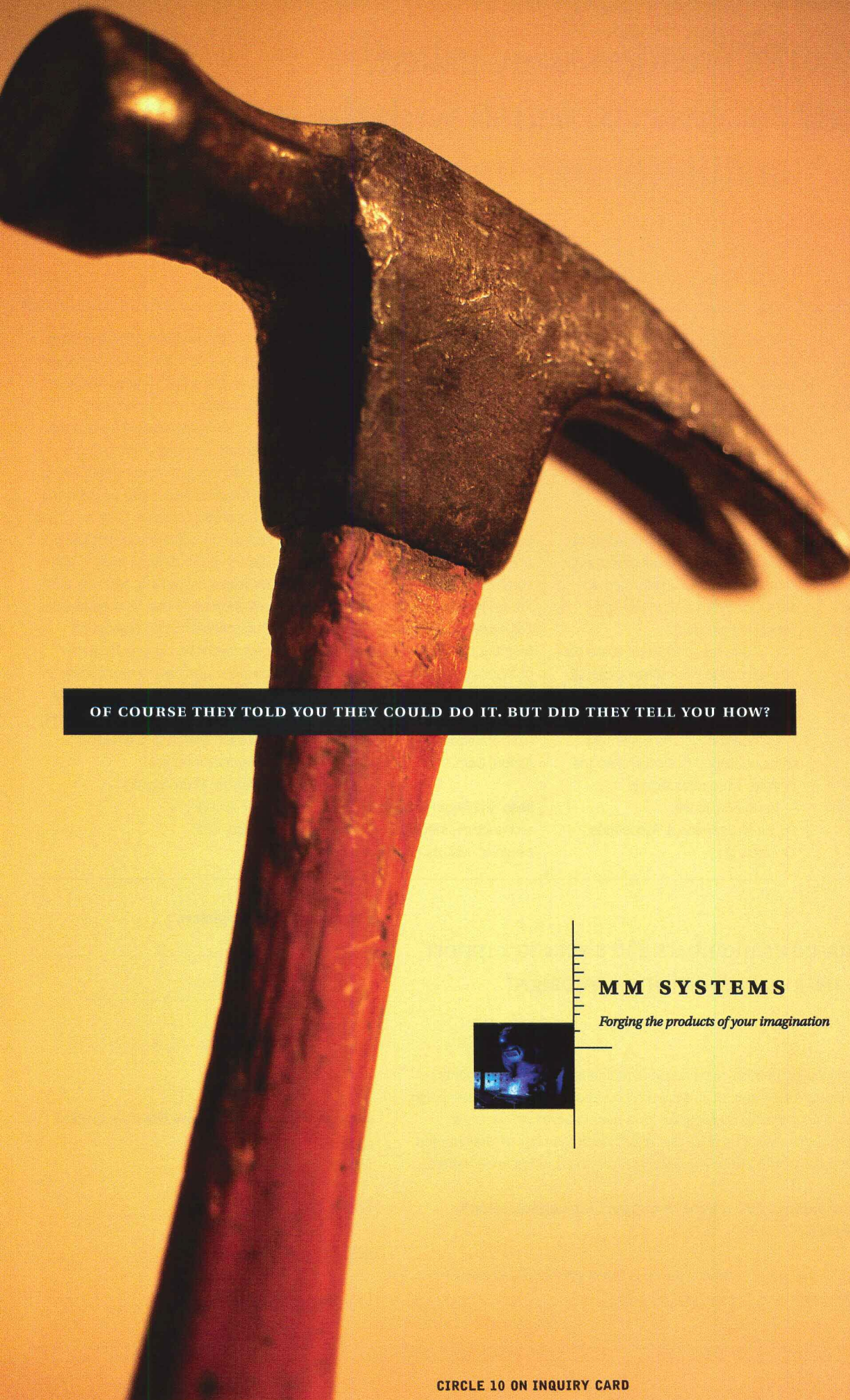
Why do so many firms fail to respond to this natural limit by slowing the influx of work?

Though the industry has always been subject to the boom-and-bust cycle, most firms have not fully built this factor into their strategic thinking. Lean times are often so painful that in fat times no one can bear to turn down work, much less be selective.

Overcoming the fear of not having enough work requires realizing that slippage in quality and client relationships causes damage that may take years, even decades, to repair. When we balance our work with our resources, we naturally regenerate—both at the individual and the organizational level.

We optimize creativity, which in turns builds a compelling confidence that becomes irresistible to clients and talent alike. Firms with this confidence are best equipped to thrive through the lean times. ■

Questions: *If you have a question about your career, professional ethics, the law, or any other facet of architecture, design, and construction, please send submissions by mail to Mentors, Architectural Record, 1221 Avenue of the Americas, New York, N.Y. 10020; by fax to 212/512-4256; or by E-mail to rivy@mcgraw-hill.com. Submissions may be edited for space and clarity.*



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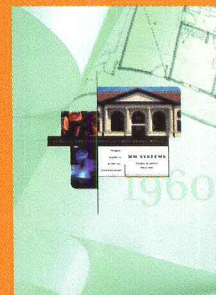


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CIRCLE 10 ON INQUIRY CARD

PULSE RECORD readers were asked: Are today's critics in touch with the issues affecting architects and architecture?

NO: 60%

YES: 40%

No: Most critics do not understand the complexity of producing a building, and they do not recognize the problems associated with a difficult client. Where is Ada Louise Huxtable?
—Arthur Rosenblatt, FAIA
New York City

No: Architecture criticism has increasingly become a vehicle to express personal biases rather than a mode to inform the public and the profession in an intelligent and accurate manner.

Recently, our firm completed a project that was reviewed by an architecture critic for a major publication. The critic made a number of personal observations—no cause for alarm. However, it was evident from his review that he did not understand the fundamental purpose of the building and its

specialized needs. Subjective dispositions aside, an architecture critic should at least understand the building that he or she is reviewing before passing judgment on it. In the story on our building, the critic never called the owner or the architect to discuss the project or request a tour. Instead, the critic wrote carelessly about the project and consequently made comments that stood out as uninformed observations rather than thought-provoking criticism.

There are, of course, some outspoken critics who review projects with a professional, if not an objective eye. In our increasingly media-drenched society, the eagerness to be published has overtaken the need to write responsibly.

—Tomoo Fujikawa
Fujikawa Johnson & Associates
Chicago, Ill.

Yes: Criticism is a link to our subjective/intuitive side and it is paramount that this connection be understood. Criticism today is often more concerned with the analysis of trends than with the real evaluation of how well a design solves a particular set of problems.

I would like to see criticism based on a wider historical perspective—on references beyond those commonly made to Frank Gehry, Peter Eisenman, or Steven Holl. For example, it would be interesting to critique Alvar Aalto's integration of International Modernism into the landscape of Finland and its culture.
—Sven Erik Alstrom, AIA
ALstrom Group P.C.
Aspen, Colo.

Yes: Architectural criticism, like architecture, inevitably reflects the zeitgeist. Just as there are factions

within the practice of architecture, there will be forces and lines drawn within the critical realm. This is neither cynicism nor positivism.

The real question here is the ultimate purpose of criticism. It can be instructive, constructive, or destructive. And it can be ugly when it becomes personal. Criticism must remain an autonomous embattled discipline. Occasional provincialism, favoritism, esoterica, and outright self-promotion can be maddening. But critics who can objectively begin with the big picture, avoid blinders, and have a semblance of wit will be appreciated regardless. Ultimately, critics and practitioners will each march to the beat of a different drummer.

—Jeffrey Scott Stenfors
SPF: Architects
Venice, Calif.

This Month's Question

Should the AIA charge its members \$50 a year to support the organization's national advertising campaign?

AIA members have identified public awareness of the value of architecture as a high priority. Currently the AIA is seeking funding for an ambitious \$3.5 million national advertising campaign for broadcast and print media. (It now spends \$1.5 million for a print advertising campaign aimed at the business community.) In order to pay for this effort, each member will be charged \$50 dollars a year, with a reassessment in 2001. The issue has provoked widespread debate.

Should the AIA charge its members \$50 a year to support the organization's national advertising campaign? Yes No

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GM MOVES TO RENAISSANCE CENTER, POWERING DETROIT'S BUILDING BOOM

Detroit is booming. An open-air baseball park, a domed football stadium, and three casinos are in the works. And the General Motors Corporation is a central force in the revival with its renovation of the 5.5-million-square-foot Renaissance Center near downtown.

GM, currently located in a 1920 Albert Kahn building a few miles from the Renaissance Center, had considered leaving Detroit. Now the company plans to create its global headquarters in the tallest buildings on the Detroit skyline.

"We made a decision that Detroit is the right place for us—it's been our home for 76 years," says Matthew Cullen, general manager of GM's Enterprise Activities Group. "We developed the Renaissance Center scenario ourselves and committed to buying it before even approaching the city of Detroit."

Ever since the complex of four 39-story towers and a 73-story hotel opened in 1976, critics have complained about the design, by John Portman. For the renovation GM hired Chicago-based Skidmore, Owings & Merrill as the master architect, engineer, and planner to fix the problems. GM spokesman Peter Rowe estimates the renovation will cost "hundreds of millions but less than a billion dollars." A Detroit firm, Ghafari Associates, is

the production architect/engineer.

"The biggest challenge is reintegrating the facility into the city so it's accessible to employees and visitors from around the world," says Richard F. Tomlinson, AIA, SOM project partner. At the center's entrance, two 35-foot berms form a barrier that cuts the building off from the city. To make the entry more inviting, GM will pay a hefty \$30 to \$50 million to remove the berms and relocate the heating and air-conditioning systems housed in them, Rowe says. In their place will be a glass-and-stainless-steel entry and a landscaped plaza.

Two new features will also help orient people within the complex: a five-story winter garden with shops and restaurants and a circulation ring connecting the towers. The winter garden will open up to a riverfront promenade with outdoor cafés and bicycle paths—all on 24 acres of land that GM is developing with the city. Additional features of the complex include a GM museum, GM's university, and a food court.

The renovation will be completed in three to five years. When it is done, GM's headquarters will contain operations that had been scattered throughout southeastern Michigan. Once GM has vacated the Kahn building, city government offices will move in. *Susan R. Bleznick*

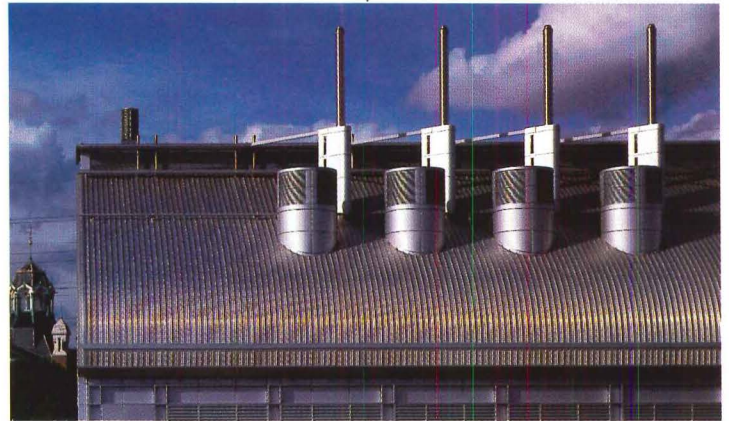
YOUNG ENGLISH DUO EXPLORES THE IMPORTANCE OF BEING MODEST

The Abbey Mills pumping station in London (below), the most visible sign of a major civil engineering project and a vital improvement to the city's infrastructure, is the latest work by the young English architects Allies and Morrison. Although it is a modest industrial building, the pumping station has the detailed precision of a fine metal casting. At night it becomes a delicate, luminous beacon in a desolate urban landscape.

Bob Allies and Graham Morrison formed their practice after winning a competition for a public space in Edinburgh. A subsequent competition for the British Embassy in Dublin, as well as exhibitions of their work in Japan and South America, brought them wider attention. Now a traveling exhibition, on

view at the Rhode Island School of Design in Providence from February 22 to March 21, introduces their work to this country.

In the exhibition catalog, published by the University of Michigan, Allies and Morrison discuss what Nikolaus Pevsner calls "moderation, reasonableness . . . and observation" in their work and cite Carlo Scarpa, Gunnar Asplund, and Alvar Aalto as inspiration. Presented in austere line drawings, photographs, facade studies, and intricate models, the work in the exhibition—from the embassy in Dublin, completed in 1995, to buildings in London and Sheffield and at Cambridge University—demonstrates the impressive range of Allies and Morrison's architecture. *Brian Carter*



PRISON SYSTEM EMBRACES DESIGN-BUILD Among agencies that build buildings, the Federal Bureau of Prisons has been one of the staunchest supporters of separate design and construction contracts. But in a major shift, FBOP is finally beginning to use design-build.

Last year the agency tested design-build on a Forrest City, Arkansas, prison camp, awarding a \$9.6 million contract to architect Reese Associates of Oklahoma City and contractor Flintco Companies of Tulsa. Now FBOP is going further. By summer Scott Higgins, the agency's design and construction chief, hopes to award design-build contracts for a medium-security prison in Petersburg, Virginia, and a maximum-security facility in Coleman, Florida. Each will cost about \$50 million.

The need to add space quickly is one factor behind the agency's move to design-build. Last year Congress added to the prison system's space crisis when it ordered the District of Columbia's Lorton, Virginia, prison complex to close by the end of 2001 and gave FBOP responsibility for housing D.C.'s inmates. Some inmates will be headed to Coleman and Petersburg, but more prisons will be needed. Those probably will be design-build projects, too, Higgins says. *Tom Ichniowski*

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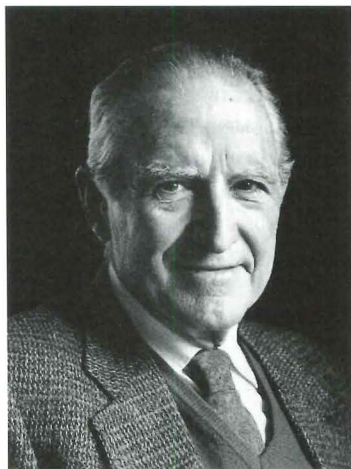
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IN A FINAL INTERVIEW, WRITER BRENDAN GILL SPOKE OF CRITIC'S ROLE

Born in Hartford, Connecticut, in 1914, Brendan Gill started contributing to the *New Yorker* in 1936, shortly after graduating from Yale. He spent the next 51 years there writing on various topics—including film and theater—before becoming architecture critic for the “Sky Line” column, a role he performed until last summer. Gill had the unusual distinction of working with all four editors of the *New Yorker* since its founding in 1925.

Some weeks before Gill died at the age of 83 on December 27, he discussed his thoughts on archi-



tectural criticism with Suzanne Stephens, whose article on criticism will appear in *RECORD's* March issue.

“Today the greatest difficulty in writing architectural criticism is the lack of interest in architecture on the part of most editors. And there is the problem of the availability of space. Buildings are treated as news, as events. Tina Brown [current editor of the *New Yorker*] wants topicality. She doesn't care who writes it. It's a question of journalism: do you want the latest news or the best writing? When William Shawn was the editor, it was a journal of essays.

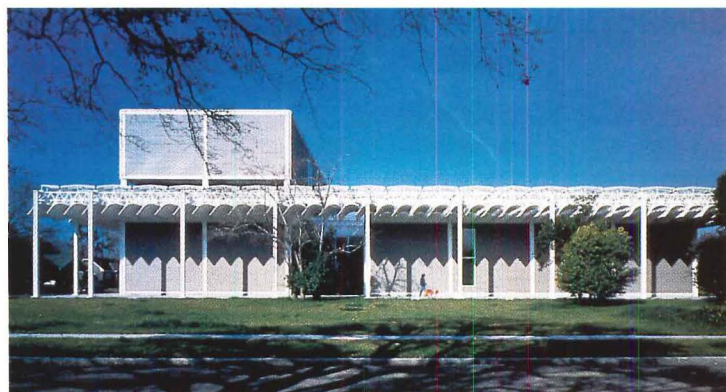
“The *New Yorker* was quite different when I began working there in the 1930s under Harold Ross. It was intentionally funny, which lots of magazines were in those days. Today we are afraid of mockery.

“The magazine achieved its stature under Shawn. He was highly moral, and so was Lewis Mumford, who took over the architecture column in 1931. Mumford not only wrote criticism but reviews of art galleries. Reviewing art galleries or movies and plays is different from criticizing, since you tell the readers what they want to see. It's a journalistic service. Criticism, on the other hand, addresses the work of art and the maker and doesn't give a damn about the reader. That was Mumford's intention with architecture: he worked from the abstract to the particular, instead of the other way around.

“Mumford, who wrote the column until 1963, was viewed as the major architectural critic in America by the 1940s and 1950s. I worshiped Mumford for his noble stance. He sought to transcend our human natures in an Emersonian way. But Mumford did have an evangelical problem; the hortatory is not always practical in use.

“When I was writing the ‘Sky Line’ column I also tried to write criticism, not reviews. I wanted to address the matters that concerned the architect. But you also have to ask yourself how the building affects you. That has nothing to do with the way it works. Do Frank Gehry's buildings work? Kahn's Salk Institute, his Richards Medical Research building, and Wright's Johnson Wax building didn't work.

“While today writers prefer being movie reviewers to being architecture critics, the preservation movement has helped architectural criticism. By preserving buildings, we have become knowledgeable about what we are looking at. As for avant-garde architectural ideas, from what I have seen, there needs to be more rigor, not only in the grammar but in the thinking. You can't invent a grammar that suits your purpose and win the argument. None of us are hard enough intellectually on ourselves.”



DOMINIQUE DE MENIL, HOUSTON PATRON OF ARTS AND ARCHITECTURE, IS MOURNED

Dominique de Menil, a renowned patron of artists and architects and a stalwart supporter of liberal causes and politicians, died on December 31 in Houston at the age of 89.

A daughter of a founder of the oil services corporation Schlumberger, she and her husband, John, moved to Houston in the 1940s. Once there, the couple helped transform a political and artistic backwater into a culturally sophisticated and politically tolerant community.

But it was as a patron of artists and architects that de Menil, once called a Medici of Houston, is best known. In the 1950s she took the fledgling University of St. Thomas under her wing and hired Philip Johnson to produce its master plan and first buildings. A decade later she commissioned Abstract Expressionist Mark Rothko to paint 14 brooding purple canvases and hired Johnson to design a chapel around them. He and Rothko had a falling out, and the chapel was completed by Howard Barnstone and Eugene Aubry. But Johnson still refers to de Menil as the best friend he ever had.

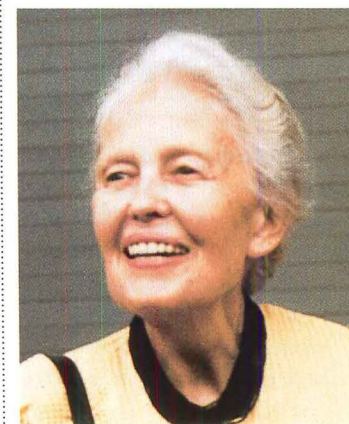
In the 1980s she gave Renzo Piano his first American commission, a gallery for the Menil Collection (designed with Ove Arup & Partners), her extraordinary holdings of Cycladic, African, and Surrealist art. She later brought Piano back to design a home for the paintings of Cy Twombly, one of the many artists she championed before the rest of the world caught on.

“The Menil is the best private museum in the world,” says Johnson. “The collection is so fine, and so personal, that it justifies her way of building an institution. She wasn't interested in blockbusters. It was always quality, quality, quality.”

Her final architectural project was the Byzantine Fresco Chapel, down the street from the Menil. Designed by her son Francois, it displays two 13th-century frescoes that she rescued from thieves and restored.

No single word can describe the role of Dominique de Menil. Patron, teacher, advocate, conscience—she was many things simultaneously. “She gave so much to Houston that it will take a long time for the city to understand it,” says Eugene Aubry. “She got a lot of people to understand art and make it part of their lives.” *David Dillon*

The Menil Collection (above), commissioned by Dominique de Menil, was Renzo Piano's first work in the U.S.



COMPUTERS SHED DRAB DUDS FOR HANDCRAFTED DESIGNER WEAR

Denver architect Robert Savi is betting clients will pay top dollar for a computer as beautiful as it is powerful. His new company, TechStyle, wraps computer components in rich, handcrafted solid-wood casings to match clients' homes.

"People have been grumbling for a while about how awful computers look," says Savi, who used to design health clubs for an architecture firm. Clients often asked him to conceal their drab, putty-colored computers. Manufacturers have responded to similar complaints by offering a line of black computers.

TechStyle sends an interior designer to clients' homes to help select the best wood casing—including exotic woods—for the surroundings. But Savi says his handiwork is not just a pretty face; it's top quality



on the inside too. TechStyle uses the best components for its IBM-compatible systems, and sends trained technicians to set them up on site.

The price for marrying custom woodworking and 20th-century technology is anywhere from \$4,900 to \$7,000 per system.

Debra Morgenstern Katz

MAUSOLEUM TOWER RISES IN CANADA

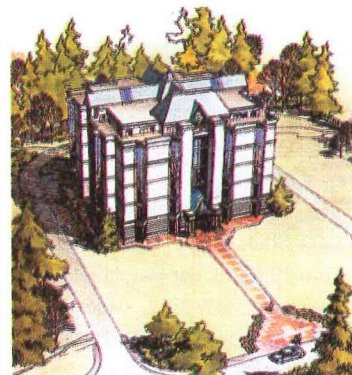
A nine-story, earthquake-resistant mausoleum that may ultimately house the remains of 90,000 people in crypts and urns is under construction in Vancouver, British Columbia. The concrete structure covered in white marble will be Canada's first mausoleum tower and North America's largest single mausoleum when it is completed in the summer of 1999.

Alvin Mitchell, president of Season Memorial Park and a former high-rise condominium developer, saw more opportunity and certainty in the funeral home business. He says the government approval process for the mausoleum took three years. The land and planning/design preparations cost \$6.5 million, and Mitchell expects to spend another \$20 million on construction and start-up. The architect, Robert Isaac-Renton of Vancouver, specializes in church design.

"We've been approached by a Second World War veterans' group that wants to buy an entire floor of the mausoleum and decorate it to honor the memory of fellow veterans; they want to put their medals permanently, and securely, on display," Isaac-Renton says. "There is also some interest among local Italian and Asian communities in having their own floors."

A penthouse with a memorial chapel will look out on the splendor of the Pacific Ocean and the Cascade Mountains—a view, real estate agents might say, to die for.

Al Warson



NEW URBANISM TRIUMPHS IN WASHINGTON, D.C. On an unremarkable stretch of Kenilworth Avenue in Northeast Washington, D.C., remarkable things are happening. Twenty-six acres of land, bordered by what had been one of the capital's most crime-ridden neighborhoods, are being transformed into a new middle-class oasis called Parkside and its sister community, Paradise at Parkside.

Forty years ago, in response to crowding and segregation in the city, developers began to build housing on the urban fringe, creating new communities, like Parkside and Paradise, for the black middle class. But by the mid-1980s, according to a report by the National Task Force on African-American Men and Boys, the "combination of joblessness, drugs, and crime overwhelmed the neighborhood . . . [and] brought chaos and despair to the community." Rather than succumb to these urban ills, residents, businesses, and patrols by the Nation of Islam formed an alliance and took action. When an unarmed citizens' patrol turned back an armed drug dealer, the media picked up the story. That victory was the first in the neighborhood's economic and physical rehabilitation.

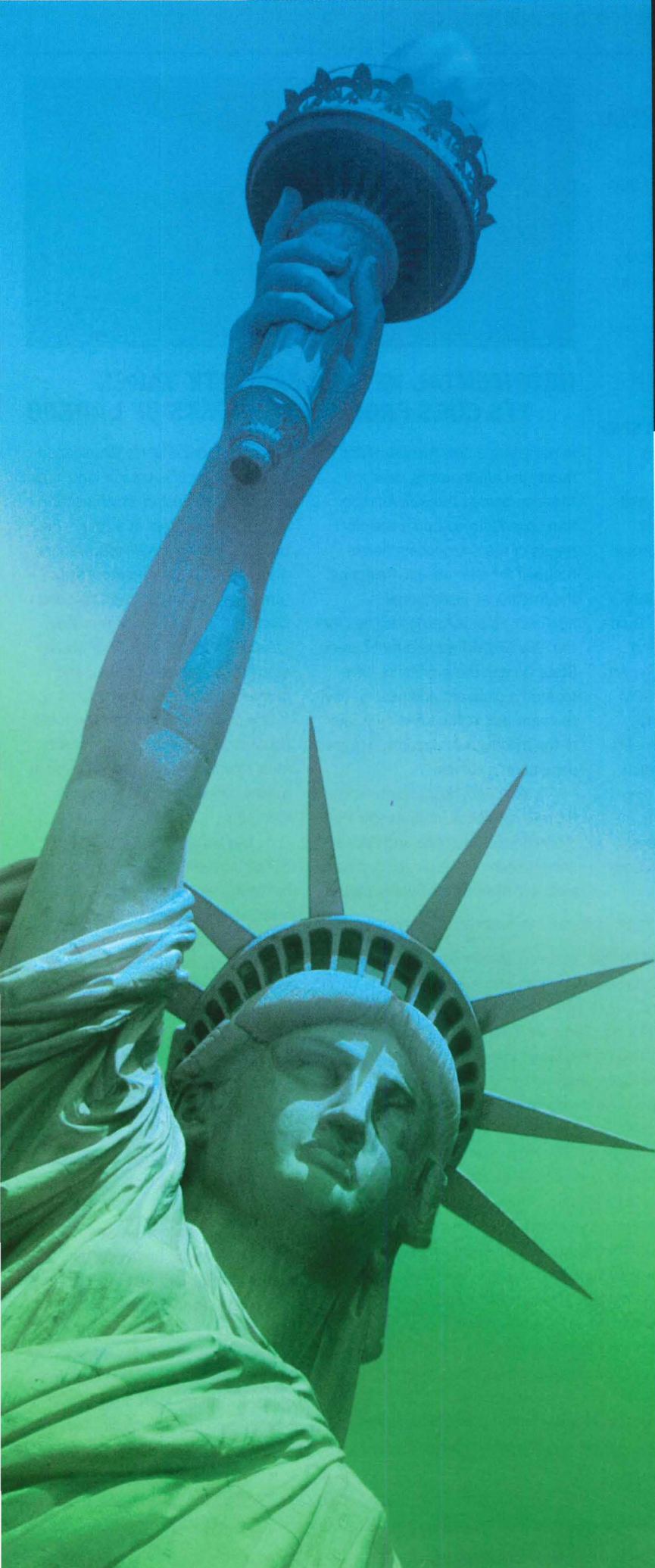


In 1987 Telesis Corporation, a Washington-based community development company, organized public and private investors to redevelop the existing housing at Paradise. Vacant land from a demolished housing project was deeded from the city for the construction of Parkside. The U.S. Department of Housing and Urban Development, Fannie Mae, the AFL-CIO, and local banks provided more than \$35 million in construction and mortgage loans.

Paradise, the renovation, is almost two dozen low-rise apartments dotting a tract of barren grass. While the buildings have been refurbished and are now well maintained, they remain examples of a Modernist sensibility whose failings have been well documented. At Parkside, by contrast, architect Suman Sorg, of Sorg and Associates, got the city to reestablish a traditional Washington street grid,

complete with a park square. Individual town houses and, marking the corners, larger condominium buildings, all with small yards, provide a cohesive street fabric. Landscape architects Oehme & van Sweden provided lush plantings that spill out of yards and soften edges. With a construction cost of \$42 per square foot, the quality of materials is modest, yet the overall result is so much better than its surroundings that it's hard to criticize.

With its comfortable houses, pleasantly scaled streets, and landscaped yards, the four square blocks of Parkside are a re-creation of what city living used to be. And the neighborhoods' architectural improvements have had positive repercussions beyond their borders. According to the task force report, crime in the area has dropped significantly. Drug arrests have plummeted from 700 in 1987 to less than a dozen in 1996; robberies from 33 to five; homicides from six to zero. *Ellen Sands*



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RESIGNATION AND LAWSUIT UPSET SKIDMORE, OWINGS & MERRILL

For years Skidmore, Owings & Merrill has crafted its image as meticulously as it designed office towers. But now the firm's polished reputation is threatened by two unrelated matters: the resignation of one of its top designers and an \$11.5 million lawsuit filed against the firm by a dozen former partners.

Late last year award-winning designer Joseph Gonzalez left SOM's Chicago office and his position as acting chairman of the Commission on Chicago Landmarks, which is charged with safeguarding architectural treasures. Gonzalez's resignation from the commission came after the *Chicago Tribune* disclosed that his appointment to the panel had been bolstered by a biography (furnished to Mayor Richard Daley by SOM) containing false statements. Among them: Gonzalez was a registered architect in Illinois and Wisconsin. He wasn't.

Gonzalez blamed the inaccuracies on clerical errors. But SOM partners say that he had ample opportunity to correct the mistakes.

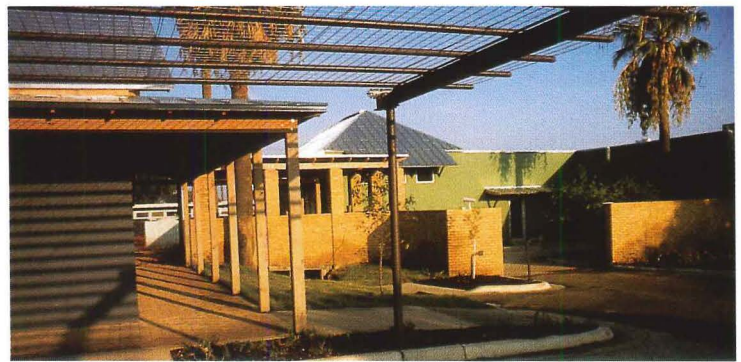
For years, Gonzalez's lack of a license did not matter. SOM was an

Illinois general partnership, which meant that its members could practice if two-thirds of them were licensed. But in 1995 the firm became a New York limited liability partnership, requiring all partners to be licensed.

Gonzalez gave up his partnership then and in 1997 failed the structural engineering section of the Illinois licensing exam. Last October Gonzalez abruptly left SOM, saying he wanted to work for a medium-size firm.

Having put the Gonzalez matter to rest, SOM now finds itself enmeshed in a dispute with former partners of the firm.

In their lawsuit, filed in 1996, the ex-partners—who include Bruce Graham, James De Stefano, and John O. Merrill (son of founding partner John Merrill)—claim that SOM played a financial shell game to deprive them of retirement benefits and other compensation to which they are entitled. Lawyers for the firm flatly deny the accusations. They are expected to take depositions from the former partners early this year. *Blair Kamin*



NEW MENTAL HEALTH FACILITY TAKES ITS CUES FROM THE STREETS OF LAREDO

In designing a new mental health facility in Laredo, Texas, near the Mexican border, the San Antonio firm Lake/Flato co-opted the elements of the surrounding neighborhood for their design. Rejecting the traditional, institutional approach to psychiatric facilities for the new 55,000-square-foot Laredo State Center, the architects have created a pleasant and healing environment that reflects the character of the mostly lower-income, Mexican population it serves.

Lake/Flato, best known for the Carraro residence, near Austin, and the Witte HEB Science and Education Museum, in San Antonio, placed a cluster of small, interconnected

buildings around lushly landscaped courtyards on 15 acres of land. Four units—the largest of which accommodate 18 patients at a time—fan out from a central *sala* (Spanish for “living room”). The one-story structures are ringed with open porches, which are shaded by overhanging, galvanized-metal roofs. Brightly colored stucco in yellow, green, and purple is the predominant cladding. “Color is very important to the local population,” says project architect Matt Morris, AIA. Courtyards contain mostly native trees, flowers, and fountains.

The budget was tight, at \$5.5 million. Lake/Flato kept costs down by using stained concrete floors and traditional, inexpensive stud-wall framing, which was bid out to several local contractors.

The designers' most important mandate was, perhaps, organization. “It had to be easy to find your way around,” says Morris. “A lot of people come in disoriented, and many of them can't read, so we couldn't rely on an elaborate signage system. Instead, a particular building can be spotted easily by color and form.”

The airy spaces are vastly different from the uninviting old facility, a low-slung and overcrowded Air Force hospital building from 1948, and the change has affected admissions dramatically. Says Morris: “The number of people who come voluntarily for treatment has tripled since the new facility opened.” *Marina Isola*

PORTLAND FIRM DEMONSTRATES ERGONOMICS ON A SHOESTRING When companies use architectural excellence in the workplace to show respect for their employees, the payoff can be dramatic. A well-designed setting can improve both the physical comfort and the attitude of workers.

Yet how often is design for those at the bottom of the totem pole a high corporate priority? Telephone operators are routinely shunted away into “egg-crates,” according to Karen Niemi, project architect with Yost Grube Hall Architecture, in Portland, Oregon. Such working conditions are conducive to low productivity and high rates of repetitive strain injuries (RSI).



In designing a regional call center for PacifiCorp, a Portland-based electric utility, Niemi and her staff sought a visually lively, comfortable environment on a modest budget. The 40,000-square-foot center, which is used around the clock, is splashed with primary colors and images of both eastern and western Pacific Rim cultures. Backlit colored fiberglass partitions reminiscent of shoji screens contrast with rusticated black Vermont slate floors.

Workstation heights are adjustable, so workers can sit or stand as they work. Operators can change position frequently throughout the day, reducing the potential for RSI and increasing their sense of control over the environment. Curved walls group the workstations into “neighborhoods.” No workstation is more than 50 feet from an exterior window.

The rewards of the new design have been great. The architects won an award from the International Interior Design Association, PacifiCorp customers have enjoyed shorter wait times per call, and the employees appreciate the vitality of their new workplace. *B. J. Novitski*



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SMALL AND MIDSIZE FIRMS ARE MORE LIKELY TO PIRATE SOFTWARE

A New York architectural firm paid big last December for a transgression that many firms, intentionally or simply out of carelessness, do not take steps to avoid. Milo Kleinberg Design Associates (MKDA) was caught operating design software on more workstations than it had purchased licenses for. An employee had reported the firm, calling a software-piracy hotline operated by the Business Software Alliance (BSA), a software industry interest group. Asserting its innocence, MKDA agreed to pay BSA \$150,000 to avoid litigation.

BSA says the design industry is comparable to other industries in its use of unlicensed software. Overall, says BSA, about a quarter of the programs installed on computers in this country are unlicensed. However, AutoDesk, the largest supplier of CAD software, estimates that 85 percent of its software on computers in the United States is unlicensed, and even more overseas.

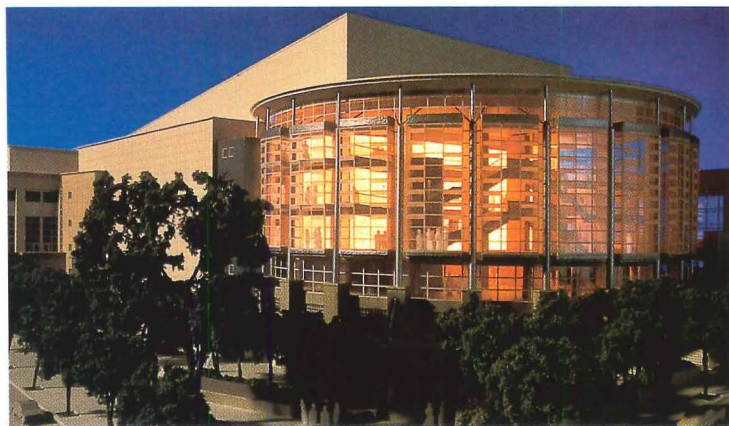
According to sources in the design and software industries, the most likely transgressors are, like MKDA, small or midsize firms—those with fewer than 50 employees. Larger firms benefit from bulk-rate software packages. They also have employees dedicated to software management who ensure that no unlicensed software is installed. Smaller firms, however, generally cannot benefit from bulk rates and

are therefore more inclined to copy software. Even if owners and employees of small and midsize firms aren't dishonest, they're less likely to have a dedicated information technology manager to guard against unintentional piracy.

Midsize firms, those with between 10 to 50 employees, have greater turnover than the smallest firms. Since the BSA hotline capitalizes on vengeful former employees seeking retribution, these firms are more likely to get caught pirating software.

Linda Joy Weinstein, AIA, chair of the Computer-Aided Design Professional Interest Area of the AIA, says the software industry exaggerates the extent of piracy among design firms. (AutoDesk's estimate is based only on firms that have been caught.) "[The problem] can be handled by the software industry and the courts," says Weinstein. She places a share of the blame on software companies: they secured market share by flooding firms with free software, fostering an atmosphere of noncompliance.

"There should be empathy among design firms for the situation," says Sandy Boulton, who heads the antipiracy unit at AutoDesk. "We are all selling intellectual property. The only way we can fund research and development and make better software is by having people buy software." *David Simon Morton*



WHILE SOME SYMPHONIES STRUGGLE, SEATTLE BUILDS A CONCERT HALL

Quick! Name the next major American concert hall to open in the 20th century. No, it's not Frank Gehry's Walt Disney Concert Hall. It's Benaroya Hall in Seattle, to be completed this year. At one point the two projects were scheduled to open within months of each other, but budget controversies have postponed Disney Hall's completion until 2001.

As simple as Gehry's project is complex, Benaroya Hall will cost significantly less at \$118 million. The 187,000-square-foot project, designed by Loschky Marquardt & Nesholm, of Seattle, has a 2,500-seat main auditorium and a 538-seat recital hall. The design is a large rectangular box clad with alternating bands of precast concrete and limestone. A semicircular glass atrium will welcome concertgoers from a new public plaza.

Built directly over an active rail-

road tunnel downtown, the project proved particularly challenging for acoustical engineer Cyril Harris, who has also worked on the Metropolitan Opera House in New York City. To address this problem, the entire auditorium is acoustically isolated within a concrete box resting on 310 vibration-dampening rubber pads. The pads sit on top of a two-level underground parking garage that spans the tunnel.

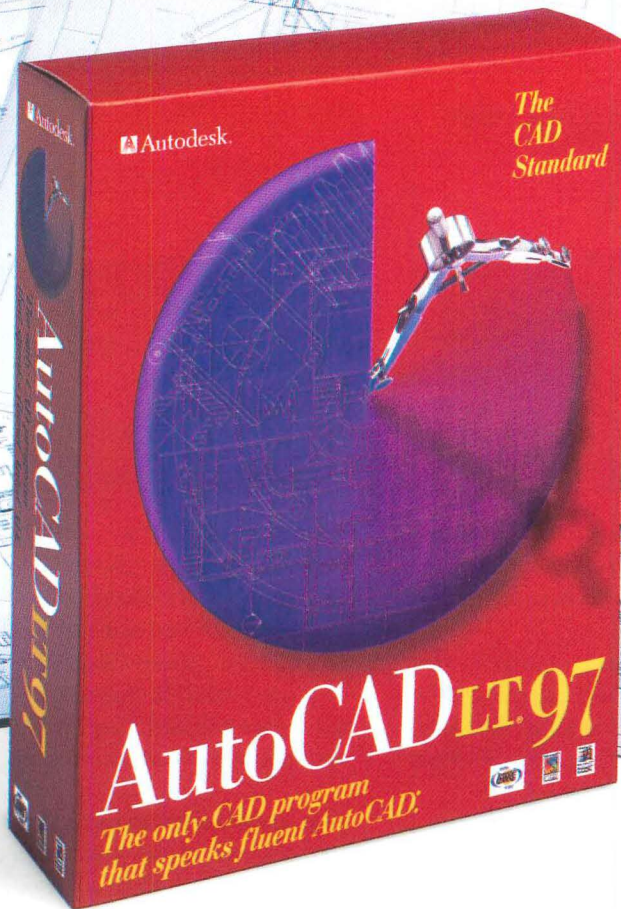
"New concert halls may be a dying breed as symphonies struggle for audiences," laments Mark Reddington, AIA, of LMN. Luckily, Benaroya Hall has received financial support from local companies such as Boeing, which is donating project-management services. Although there is potential for a clash between art and industry, Boeing's hard-nosed approach is helping keep the project on track. *Sheri Olson, AIA*



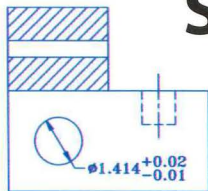
BOFILL'S BARCELONA THEATER OPENS AFTER YEARS OF DELAYS

Ricardo Bofill's National Theater of Catalunya in Barcelona, one of several cultural projects originally planned to be completed in time for the 1992 Olympic Games, finally opened last fall. It was commissioned in 1986 by the regional Catalan government as a center for Catalan-language theater. Construction began in 1991 but was halted for lack of funds.

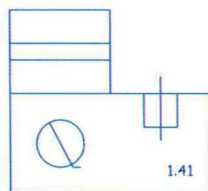
Bofill thus finds himself inaugurating a design from his "classical" period, a structure shaped like a Greek temple on the scale of a railroad station and supported by 40-foot-high precast-concrete Tuscan columns. The 900-seat main theater stands inside a mammoth glass-walled lobby like a jewelry box. Shaped like an amphitheater, it is finished in walnut and maple with classical detailing. The complex also includes experimental and outdoor theaters as well as a drama school. The cost was reportedly a relatively modest \$40 million. *David Cohn*



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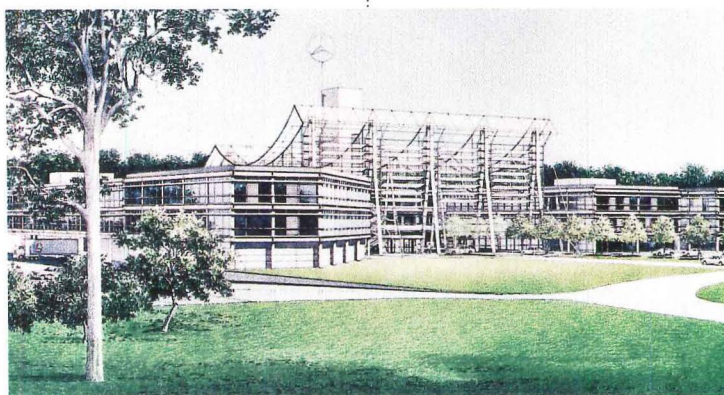
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NEWS BRIEFS

Boom times Of the 48 chapters of the AIA that responded to the Boston Society of Architects' annual survey of business conditions, 34 reported that business is booming for their member firms. Only the Hawaii and Buffalo-area chapters reported flat business; the rest reported that business is "purring along OK." Last year 21 chapters reported booming conditions. Four years ago, none did.

A unique competition in Cincinnati Zaha Hadid, Daniel Libeskind, and Bernard Tschumi have been selected as finalists in a competition to design a new \$25 million home for the Cincinnati Contemporary Arts Center. In narrowing the field from 12 architects to three (from an original 97), the selection committee refused to look at models or drawings, relying solely on interviews with architects about proposed approaches. The museum



Lauber + Wöhr's scheme for Mercedes-Benz's North American headquarters in Pearl River, N.Y.

wants to develop a program with the winning architect the same way the museum develops site-specific installations with artists. A winner will be selected this month.

Mercedes-Benz builds in U.S. Mercedes-Benz selected Lauber + Wöhr Architects of Munich over five American firms to design the auto giant's new North American head-

quarters. At the heart of a design Mercedes-Benz calls "low-key and restrained" is a dramatically upturned atrium roof reminiscent of Eero Saarinen's Dulles Airport. The three-story, 400,000-square-foot building will be built in Pearl River, New York, at a cost of \$50 million.

Best architecture schools The 1997 Gourman Report, which ranks undergraduate and graduate programs, rates Harvard as having the best graduate program in architecture. In descending order, the next

best programs are at MIT, Princeton, the University of California at Berkeley, the University of Pennsylvania, Carnegie Mellon, the University of Michigan, the Georgia Institute of Technology, Rice, and Columbia. *U.S. News* ranks programs differently, focusing more on reputation and using fewer criteria—it's a "beauty contest," says one program director. On this scale, Yale ranks fifth (12th in Gourman's ratings), Carnegie Mellon does not rank at all, and Harvard again takes the top spot.

Centennial for women in architecture One hundred years ago Illinois held the nation's first licensing exam for architects. Marion Mahoney, an associate of Frank Lloyd Wright and future wife and collaborator of Walter Burley Griffin, was one of only three architects to pass the exam. This year is therefore an important centennial for women in the profession—and, of course, for test takers.

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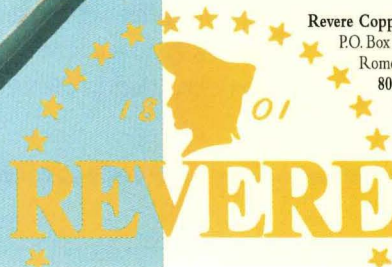


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Landscape architecture award

The American Society of Landscape Architects bestowed its inaugural Award of Excellence on Rolland/Towers of New Haven, Connecticut, citing the firm's frequent and fruitful collaboration with architecture firms. Rolland/Towers has collaborated with Kohn Pedersen Fox Associates; Shepley Bulfinch Richardson and Abbott; Kieran, Timberlake and Harris; Perry Dean Rogers & Partners; and Mitchell/Giurgola, to name a few.

A gang-proof youth center

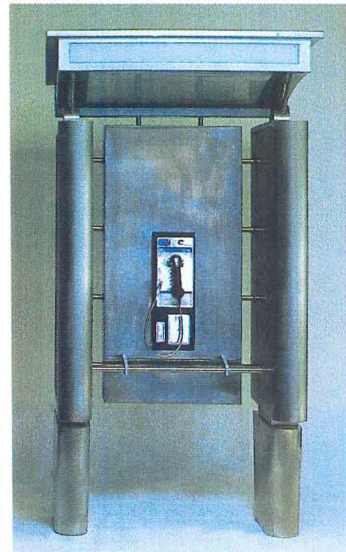
Shubin + Donaldson Architects, a Los Angeles firm used to designing homes for the stars, has almost finished converting a South Central police substation into a 14,000-square-foot youth center. Using a great deal of donated material and labor, the architects installed a library and a gym and made classrooms from jail cells. The color scheme of rust reds, greens, and yellows was intended to be both inviting

to kids and "gang neutral." A plan by the architects to leave one of the jail cells unconverted as a symbolic gesture was nixed by the client, the L.A. County Sheriff's Youth Foundation.

Blockbuster Frank Gehry will team with Rem Koolhaas and Jean Nouvel to design a 1.5-to-1.9-million-square-foot mixed-use complex on the northern periphery of Düsseldorf, Germany. The collaboration was Gehry's idea. His project manager says he wanted to work with the other architects "for the differences among them as much as the similarities." Next month the architects present a scheme to the clients, Commerz Leasing and Mercedes-Benz.

Architect introduces better

telephone booth A small New York telecommunications company is counting on its well-designed booths to help it break into the local pay-phone market. Telebeam hired Rudy Fabiano, AIA, who designed



A new telephone booth designed by Rudy Fabiano for Telebeam.

the company's offices, to come up with a booth that was more attractive and more durable than the Bell Atlantic booths all over the city. "The roof is lifted to create a larger pool of light around the phone at night. It also gives it an iconic look," says

Fabiano. The Mayor's Office and the City Council helped push the design through the approval process, and seven of the stainless-steel kiosks are now in operation, with 100 planned by the end of the year.

Renovating Kahn's last project

After a year's worth of repairs are done, the only noticeable change to the Yale Center for British Art, Louis Kahn's last project, will be a fresher-looking roof surface. Below the surface, however, Kahn's 24-year-old roof will have been redesigned and reconstructed. It leaks from the inside, not the outside, due to humid gallery air condensing on metal roof panels. Wiss, Janney, Elstner Associates, a Chicago-area engineering and architecture firm, designed a vapor-retardation system to fit below the panels. The renovation will cost \$3 million and will also include the installation of new carpeting and wall coverings. The museum's public galleries will be closed for the duration. ■



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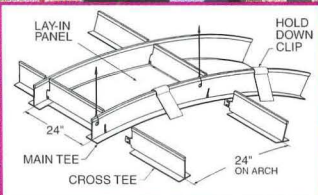
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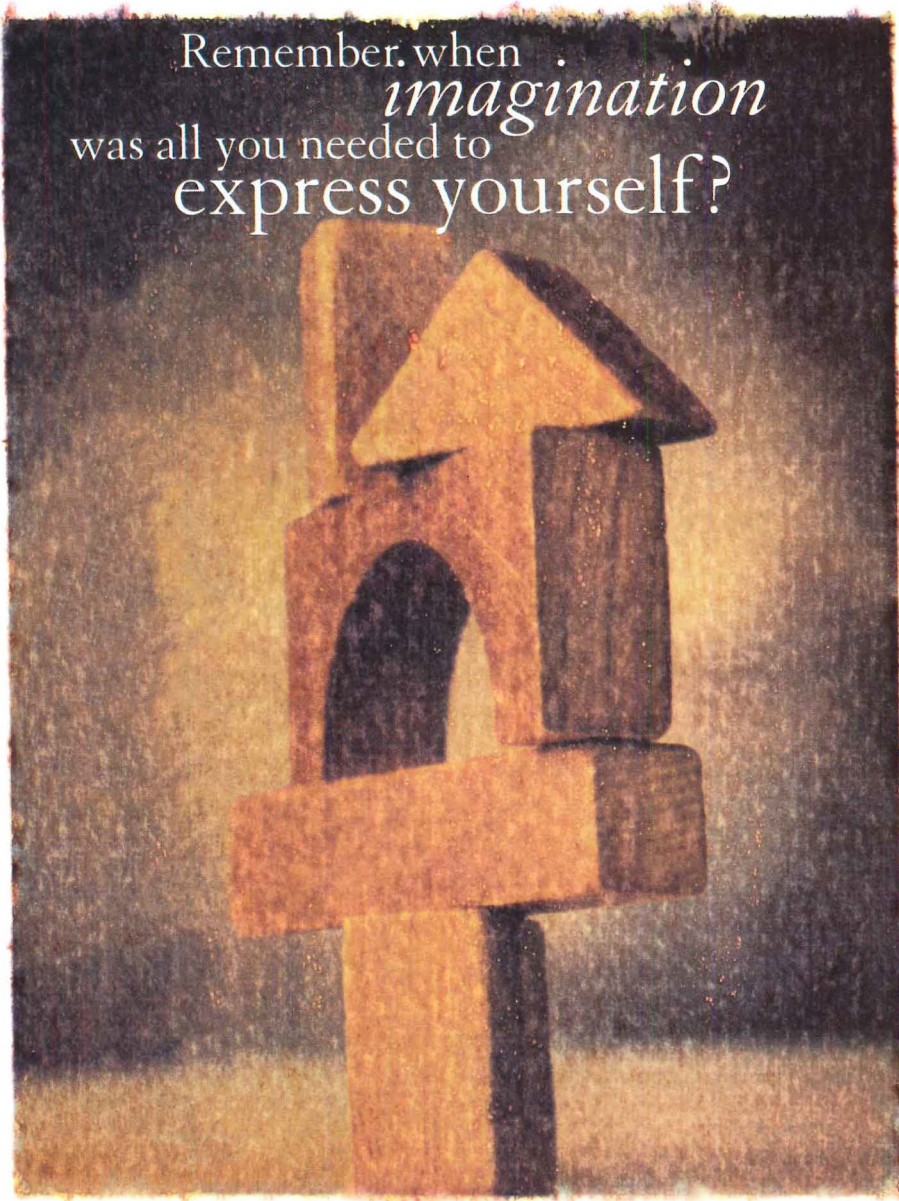


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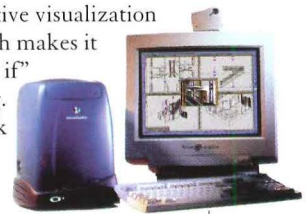
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CIRCLE 21 ON INQUIRY CARD

CORRESPONDENT'S FILE Culturally sensitive and environmentally friendly architecture is changing the face of German cities.

BY CLAUDINE WEBER-HOF

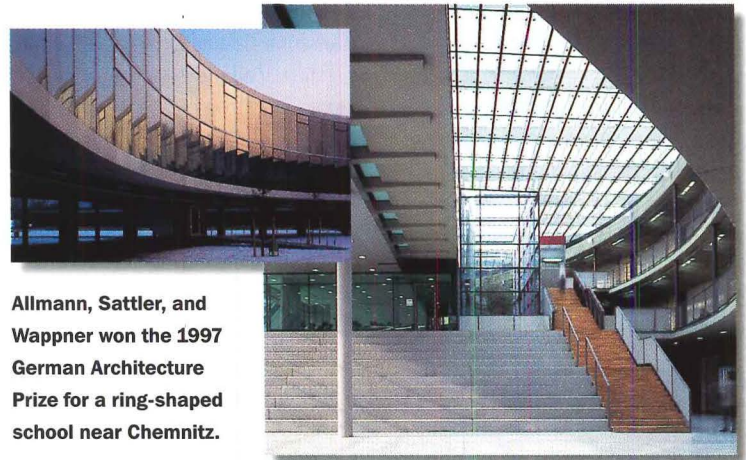
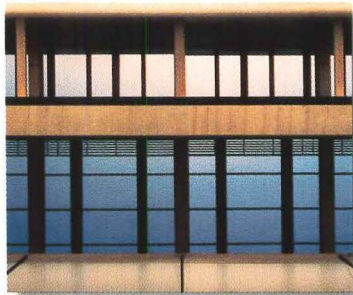
Claudine Weber-Hof is a freelance journalist and editor of books on architecture for Prestel Publishing in Munich, Germany.

The architectural wave Germany is riding is really a tectonic tsunami, a phenomenon unparalleled anywhere else on the continent. With the single currency looming large on the horizon, state agencies here are scrambling to prepare themselves for a more integrated Europe. This means pumping support into the school system, shoring up the country's cultural and political identity, and improving the infrastructure. The result has been a flood of architectural commissions.

Underlying the current construction frenzy is the drive to build sustainably. Competition among designers to develop energy-efficient strategies is fierce; many are promoting historic preservation as culturally sensitive and environmentally friendly. And most designers are employing the "zero-energy" principle, aiming for structures that derive all the power they need from sun and soil.

The former East Germany is still straggling behind her more sophisticated Western sister in thinking green, but change is well under way. A massive transfer of

Bauhaus revisited: Von Gerkan, Marg's Weimar Congress Hall (model below), due for completion next year.



Allmann, Sattler, and Wappner won the 1997 German Architecture Prize for a ring-shaped school near Chemnitz.

technology is taking place, not only to East Berlin, where whole city blocks are being rebuilt from the ground up for the coming of the new capital, but also to growing urban centers such as Chemnitz and Weimar. And, as the 1997 winners of the German Architecture Prize demonstrate, architects from the West are taking exactly the right kind of know-how with them to the German frontier.

A radiant, circular school

The students at Samuel von Pufendorf prep, which recently opened in the former East Germany, have been doing the strangest things. "These kids are happy to go to school," reports architect Amandus Sattler of the Munich firm Allmann, Sattler and Wappner, who received the 1997 German Architecture Prize for the school.

Situated near Chemnitz, in a cow pasture crisscrossed by creeks, the school's 49,000-square-foot circular, sustainable structure embraces a community of 1,000 students, offering sun-filled

classrooms and a tree-lined inner courtyard for breaks and outdoor instruction. "The dynamic form and idyllic setting promote their general well-being, and the result is that there is a lot less violence than in regular schools. The kids haven't wrecked the toilets or written on walls because they see this as a worthwhile place and they leave it intact," says Sattler.

Because of its transparent steel-and-glass construction, the architects have fitted out the main building with the means to control temperature naturally: metal shutters provide shade, and generous windows and balconies welcome the sun and air. The neighboring gymnasium, a 37,000-square-foot sports hall that is fully glazed on three sides, depends on similar strategies to moderate interior conditions. A special feature here is the floor, a two-layer slab comprising a concrete-and-steel plate with a stone covering. This dense platform absorbs the warmth of sunlight like a baking brick and radiates it back into inhabited space.

The ghost of Gropius present...

Von Gerkan, Marg+Partner are racing against time to build the Weimar Congress Hall, scheduled to open next spring when the city is inaugurated as the 1999 European City of Culture. They recently garnered the commission when the original designers ducked out because of disagreements with preservationists over the early Modernist Weimarahalle next door. GMP is saddled with the double load of erecting the assembly and concert hall at lightning speed while honoring the legacy of Walter Gropius, whose 1925 Bauhaus headquarters in the same region shaped the character of modern architecture, and whose strict functionalist spirit haunts the project.

Says design team leader Doris Schäffler, "From the get-go we envisioned the building as simple and elegant, so that constructing it in a short time would be easy. But what has developed is an eerie coincidence: we met the civic assembly's functional requirements, and that, in a nutshell, gave us the design. It's Bauhaus revisited."

GMP takes Bauhaus functionalism a step further with an old-fashioned sensitivity to landscape. Instead of addressing the city directly, the new design faces, sphinxlike,

onto parkland, with wings at either end of the building. In this respect, the complex has more in common with 19th-century exhibition halls than with strict Modernism.

But in composition and materials, it is a thoroughly up-to-date design, with generous wood cladding inside and out paying homage to the German craft tradition that gave birth to the Bauhaus.

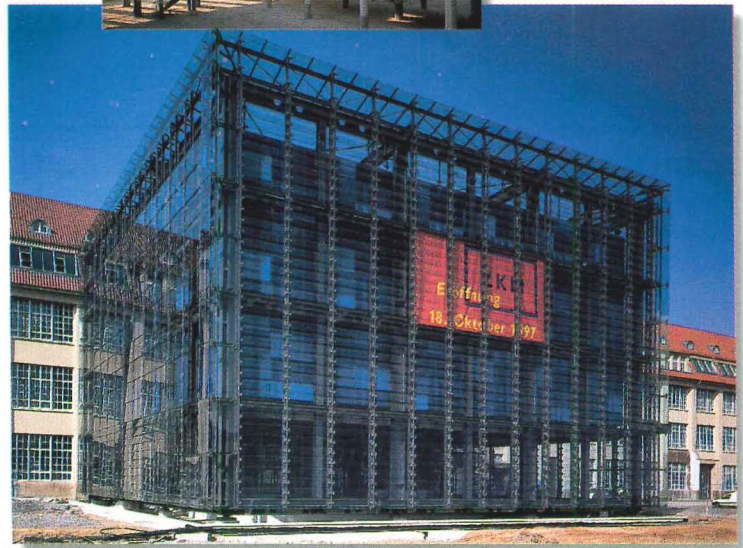
...and the spirit of future past

Zentrum Kunst und Media, the Karlsruhe Center for Art and Media, has finally opened after a torturous eight-year struggle. Rem Koolhaas won the design competition in 1989 with his blue glass box. But the city couldn't afford the swank arrangement and hired Hamburg architects Schweger+Partner to renovate a World War I munitions factory instead. A tiny rendition of Koolhaas's cube adorns the entrance, a weak and weary monument to a splashy commission gone awry. German critics are calling the ZKM building "unspectacular at best," and this after 80 years of planning.

But for enthusiasts of industrial architecture, ZKM is a grand success. Where machines once made weapons under 10 rhythmically arranged glazed atria, electronic media moguls now discuss the



ZKM, an arts center in a renovated munitions factory in Karlsruhe, has opened after years of controversy. The project was designed by Schweger+Partner.



shape of art in the next millennium. The ungainly contrast of old and new is resolved in the science of the structure itself: the nineteen-teens behemoth, all 450,000 square feet of it, was one of Germany's first steel-and-concrete skeleton buildings; as a former pioneering structure, it brings its new occupants full circle to address technology past, present, and future. Schweger+Partner honored the city's complex layout demands with an emphasis on the Media Museum, the aspect of ZKM concerned primarily with virtual reality and cyberspace. The architects designed it to host interactive installations and simulation technology, using steel girders to build slim bridges and including catwalks to improve circulation and create a futuristic feeling of dematerialization.

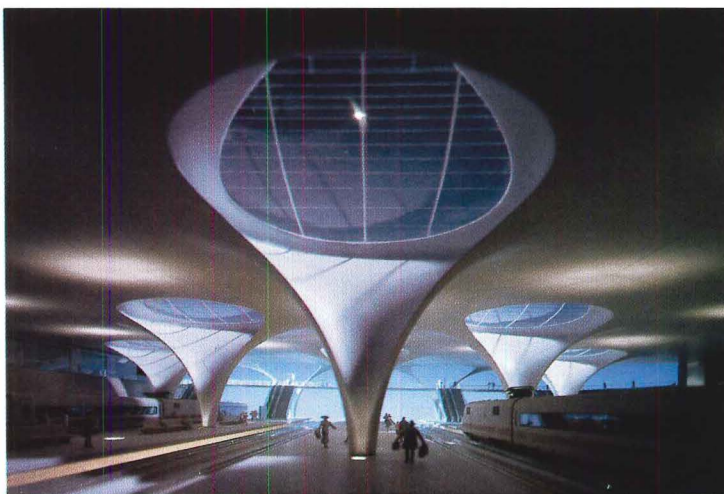
21st-century Stuttgart

As part of an initiative to revamp Stuttgart's transportation network, the city has hired the Düsseldorf firm of Ingenhoven, Overdiek, Kahlen and Partner to sink the Stuttgart Railway Station underground. Coupled with a \$2.74 billion

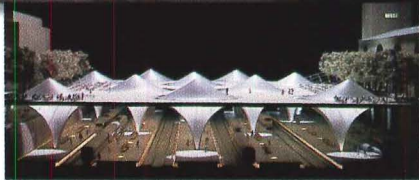
tunnel project to ensure the smooth flow of trains through the terminus, the architects have been given \$55 million and 10 years to construct the mammoth hub. To American eyes the design is preposterous: a 1,500-foot-long by 300-foot-wide exoskeleton with 32 glass lenses peeping up out of a green park on the building's surface. It's as though Eero Saarinen's TWA terminal had sprouted eyes.

As otherworldly as the design appears, it is utterly ecological and energy-efficient. Modeling their design on the fan vaults of Wells Cathedral in England, the architects, in conjunction with designer Frei Otto, developed a state-of-the-art structural support system that opens a concrete cavern under the city to house trains, tracks, shops, and offices. The "eyes," or glazed cupolas, make up more than 10 percent of the ceiling, allowing light and warmth to penetrate to the platforms 15 feet below the surface.

Says Christoph Ingenhoven, "This is a zero-energy structure, and as the largest train station project in Germany, it will set the example for the 21st century." ■



The Stuttgart Railway Station by Ingenhoven, Overdiek, Kahlen: a "zero-energy" underground structure.



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CIRCLE 23 ON INQUIRY CARD

DATESEVENTS

Calendar

Philippe Starck Designs: Reinventing the American Hotel Philadelphia

Through March 1

A sampling of the French designer's objects and interiors, featuring everything from furniture to utensils. Also on view are elements from a guest room at New York's Paramount Hotel. Philadelphia Museum of Art. 215/763-8100.

Signs and Wonders: The Lights of Times Square

New York City

Through March 8

Actual signs as well as photographic records are on display in this exhibition tracing the development of technology and imagery in Times Square advertising. New-York Historical Society. 212/873-3400.

International Interior Design Association Leaders' Breakfast

New York City

March 6

IIDA's Greater New York Chapter will hold its 10th anniversary Leader's Breakfast at the St. Regis Hotel. "Who's Leading Now—Facing an Economy of Competing Global Giants" is the scheduled panel discussion. For information or reservations, call Jeannie Bochette at 212/445-8891.

A. G. Rizzoli: Architect of Magnificent Visions

New York City

Through March 8

Drawings by the late draftsman, including his vision for a mythical city, YTE (Yield to Total Elation). Museum of American Folk Art. 212/977-7298.

Zaha Hadid: Painted Projects

San Francisco

Through March 10

The first solo museum presentation of the work of the Iraqi-born British architect includes two dozen paint-

ings of cities and buildings in assemblages of exploded lines and planes. San Francisco Museum of Modern Art. 415/357-4000.

Temple Bar: Dublin

New York City

Through March 11

Several buildings designed by young Irish architects, all planned in 1991 by Group 91 for an area of Dublin's medieval city center, are presented. Urban Center. 212/935-3960.

New Courthouses in Historic Contexts

New York City

Through March 15

Models and renderings of 16 new courthouses designed by New York architects are displayed in this exhibition, sponsored by the AIA's Committee on Architecture for Justice. United States Court House at Foley Square. 212/683-0023.

A. James Speyer: Architect, Curator, Exhibition Designer

Pittsburgh

Through March 22

Models, drawings, and photographs document the work of this Pittsburgh native, including a number of the city's noteworthy private homes. Carnegie Museum of Art. 412/622-3131.

Robert Adam: From Sketch to the Finished Drawing

New York City

Through April 5

An exhibition of the work of architect Robert Adam (1728–1792), considered the father of the Classical Revival in Britain, includes 65 drawings, models, objects, and books on loan from the Sir John Soane Museum in England. Frick Collection. 212/288-0700.

Fabrications

New York City, San Francisco, and Columbus, Ohio

Through April 12

Organized jointly and presented

simultaneously at the Museum of Modern Art in New York, the San Francisco Museum of Modern Art, and the Wexner Center for the Arts in Columbus, Ohio, this exhibition features full-scale commissioned projects by such architects and designers as Mockbee/Coker, Eric Owen Moss, Smith-Miller + Hawkinson, Hodgetts+Fung, and Williams and Tsien. 212/708-9400 (MoMA).

Fresh Furniture

Pittsburgh

Through April 18

A survey of contemporary furniture designed and crafted in the United States. Society for Contemporary Crafts. 412/261-7003.

DX Permanent Collection

Toronto

Through April 19

Works in the collection by 20th-century Canadian industrial designers, including Jan Kuypers. Design Exchange. 416/363-6121.

Civics Lessons: Recent New York Public Architecture

Washington, D.C.

Through May 11

Projects in New York initiated by public agencies working with architects from 1985 to 1995. Organized by AIA/New York and the New York Foundation for Architecture, the show emphasizes the link between public investment in architecture and the economic, social, and aesthetic quality of the city. National Building Museum. 202/272-2448.

Toy Town

Montreal

Through May 31

An exhibition exploring how toys from several cultures have represented the village, town, and city. Twenty-six toy towns from the Canadian Centre for Architecture's collection—ranging from early 19th-century German wooden villages to recent CD-ROMs—are on display. Canadian Centre for Architecture. 514/939-7000.

Build Safe '98

Rosemont, Ill.

February 17–19

The eighth annual Construction Safety Conference is to be held at the Holiday Inn O'Hare International. Call Gayla Bockrath, conference manager, at 800/552-7744.

Arquitectonica: The Times Square Project

New York City

February 17–May 10

The first solo exhibition in New York of work by the Miami-based firm. The show focuses on the architects' design of a mixed-use complex combining a hotel with entertainment and retail components, to be built at 42nd Street and Eighth Avenue. Cooper-Hewitt Museum. 212/849-8300.

Alvar Aalto: Between Humanism and Materialism

New York City

February 19–May 19

Marking the 100th anniversary of Aalto's birth, this large-scale retrospective is the first in the United States to present original drawings and models of work by the renowned Finnish architect, designer, and town planner. Museum of Modern Art. 212/708-9400.

Japan 2000: Architecture for the Japanese Public

Chicago

February 21–May 3

This exhibition features architectural drawings, models, and photographs representing approximately 15 structures, including museums, dams, bridges, police stations, health-care facilities, and stadiums by well-known and emerging Japanese architects. Co-organized by the Art Institute of Chicago and the Japan Foundation. Art Institute of Chicago. 312/443-3600.

Shiro Kuramata

New York City

February 25–May 2

Works on view by the late Japanese designer Shiro Kuramata include 35 notable (*continued on page 238*)



From: [New Microsoft Project 98](#)

Date: Wednesday, 10:45 a.m.

To: Project Manager

Re: One more little thing...

If we could download what you know about project management to the rest of your company, we'd do it. Instead, we did the next best thing: we designed the new [Microsoft® Project 98](#). So now, no matter how complex the project, no matter how many projects are going on, Microsoft Project 98 is all over the details. Managing [every project](#) in your company. Charting all the [resources](#) you have at your disposal. [Tracking every task](#) on every job in every project. With [multiple views](#) that let you look at every project from every angle. With the [drill-down detail](#) that tells you instantly what's wrong, whose beeper gets beeped, and when you'll be back on track. So on the outside, Microsoft Project 98 may look like the [easiest project management software](#) ever developed. But on the inside, it'll build the Panama Canal. For the details, check out our Web site at www.microsoft.com/project/.

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LISTENING TO:

CON

by Andrea Oppenheimer Dean

The tension—some would say friction—between architects and contractors probably began around 2630 BC, the date ascribed to the first documented pyramid and first structure credited to an architect; it was the burial place of King Zoser near Saqqara, Egypt. Yet at the conclusion of a panel discussion among five contractors, which ARCHITECTURAL RECORD convened in New York City last fall to learn about the industry's concerns as they affect architects, J. Glenn Little, an executive vice president of Turner Construction Company, said, "If you took a group of architects from small, medium, and large firms, I bet they'd agree with everything we said." Throughout the discussion, moderated by Robert Ivy, FAIA, RECORD's editor in chief, the ambient goodwill toward architects was as palpable as it was unexpected. Areas of disagreement revealed themselves more fully in the panel members' responses to questions I asked them in follow-up telephone calls.

The fact that the construction industry is thriving—it's seeing its best period since 1984–85, according to Little—probably contributed to the contractors' benevolent attitude. Turner, the nation's largest construction company, projected that its 1997 sales would exceed those of 1996 by more than 10 percent, while F. W. Dodge's market forecast anticipates a 6 to 8 percent increase in 1998 construction over 1997. Such figures concur with the

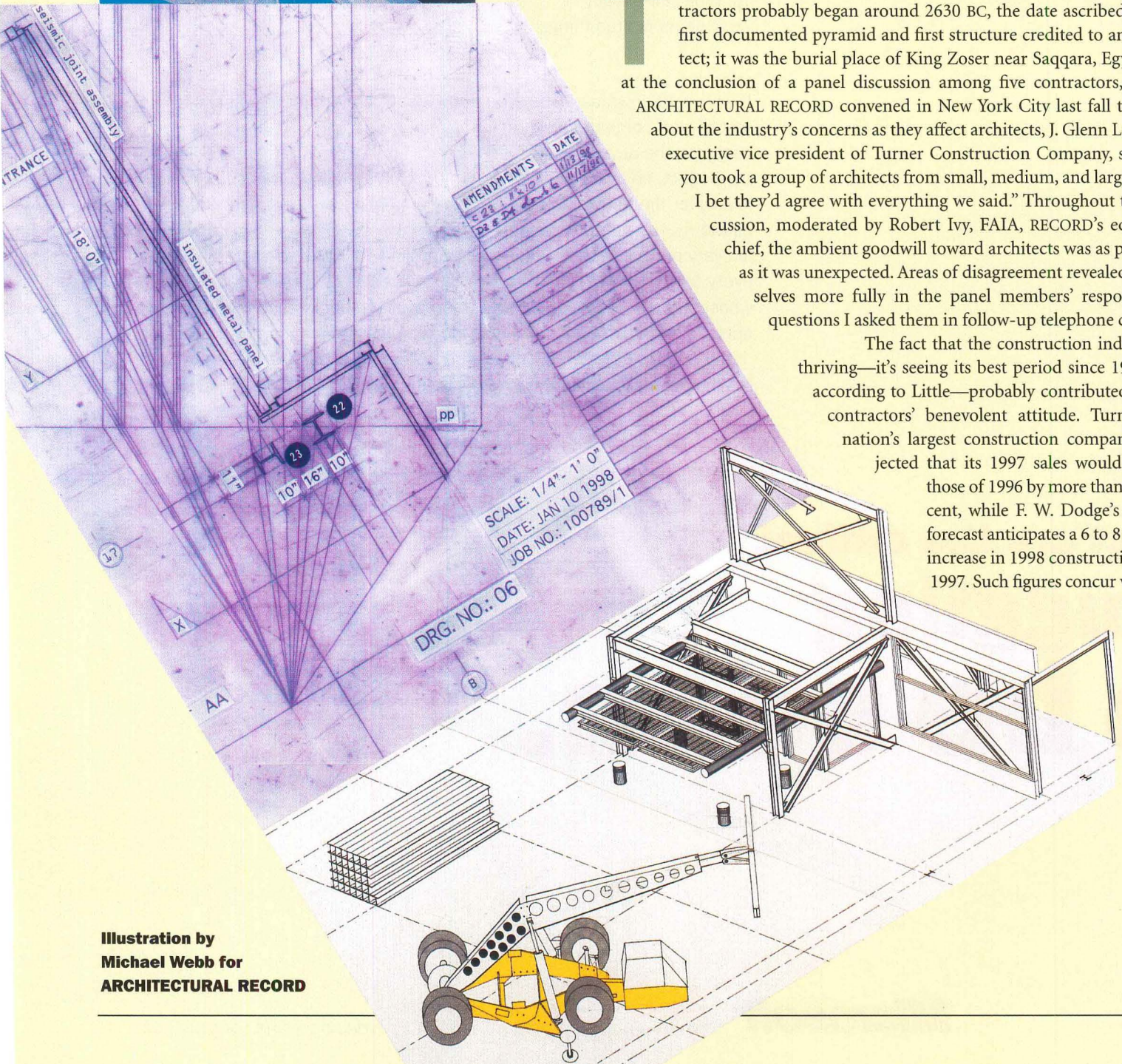


Illustration by
Michael Webb for
ARCHITECTURAL RECORD

GOODWILL ABOUNDS AS CONTRACTORS DISCUSS THEIR WORKING RELATIONSHIP WITH ARCHITECTS.

TRACTORS

overall assessments and expectations of all five panelists. Richard Wolf is a principal of Alexander Wolf + Son, a New York City family-run business with an annual volume of \$10 to \$20 million, which specializes in renovations and other interior work. Desmond D. Emanuel is president of Sante Fe Construction, a minority-owned, privately held, unionized New York City company with an annual volume of about \$100 million and a staff of 46 that “builds anything humans can function in,” says Emanuel. George M. Grant is a vice president of Halmar Builders of New York, a Mount Vernon-based firm that earned \$100 million last year building mainly highways, airports, and commercial buildings. Joseph M. Stella is an officer of P. J. Stella Construction, which is beginning its third generation of existence as a Wakefield, Massachusetts-based, family-owned, nonunion general contractor with an annual volume of \$15 to \$18 million. Although all the panelists are based in the New York and Boston areas, they believe that their opinions are representative of those of contractors nationwide. They also agreed that all members of their industry grapple with the same issues, whether their companies are big or small, regional or international, unionized or not, privately owned or publicly held.

There was, similarly, a general nodding of heads when Stella said that although there is more work than ever, there is also “far more competition than there needs to be. Sometimes it seems that a couple of firms are always keeping the margins down for everybody else. You have one or two lowballs, and they’ll get the job. You see what the final pricing is, and you walk away scratching your head. Egos are involved. The question when you see another contractor is not ‘How much money did you make?’ but ‘How much work are you doing?’” In fact, contractors are close-mouthed when it comes to their margins; that is why, when I inquired in follow-up conversations, most of the panelists treated the annual profits as classified information.

(According to the Construction Financial Management Association’s 1997 Construction Industry Annual Financial Survey, the overall net profit for all types of contractors nationwide was 2.1 percent. It was 1.6 percent for “industrial/nonresidential” construction, 3.2 percent for “heavy and highway work,” and 2.8 percent for “specialty trades.”)

Architects should raise fees

Perhaps most unexpected, the five participants agreed that the solution for many of their problems is to raise architects’ fees. These are depressed, they concurred, by owners’ attempts to achieve the lowest possible costs

Andrea Oppenheimer Dean is a contributing editor of ARCHITECTURAL RECORD. Michael Webb is an architect in New York who teaches at Cooper Union and Columbia University. He was a member of the Archigram Group in the 1960s and early 1970s.

and shortest possible schedules. But there’s something else: “A lot of owners view architects as necessary evils; they don’t see them as adding value to the project,” said Wolf. He was not the only one to point out that the biggest losers from this drive to cut costs and increase speed are the owners themselves. “You end up with disappointed owners of poorly designed and constructed buildings,” explained Wolf, a past president of the General Building Contractors of New York State, which, he says, has taken the position that the architect should receive a reasonable fee.

Why should contractors care so much? According to Little of Turner Construction, “The bottom line is that architects are not paid enough money to practice their art and craft to the level they believe achieves excellence. Excellence doesn’t mean wasting money; it means making a set of drawings that is full and complete.” Here it is, our panelists’ most pervasive complaint: The documents they receive from architects are neither clear nor comprehensive. “There isn’t the attention to detail on either the exterior or interior of buildings, and many architects skimp on construction administration,” said Grant.

During a follow-up conversation Wolf expressed his frustration in greater detail: “It’s not unlike what Detroit was doing before the Japanese put the pressure on them. They would send out a car 98.5 percent complete and expect the dealer to tidy up the remaining 1.5 percent.” He reported receiving documents in which architectural and engineering responsibilities remained uncoordinated. And, Grant said, he has had more than one brush with architects and their consultants limiting the amount of time they’re willing to spend on the job site because they feel they’re not getting adequate reimbursement. “A contractor,” he pointed out, “can’t go back to the owner and say, ‘I’m sorry, I’ve exceeded my budget and can’t put any more time into your project.’”

Detailing a few of the problems caused by incomplete documents, Stella explained that his company subcontracts a majority of its work and relies on bids by subcontractors when putting together a package. “When subcontractors are not looking at the best set of documents, they make their own assumptions of how they envision the product going together. They bid it to us on those assumptions, and often they’re wrong. The architect doesn’t want to appreciate the position that we’re put in because of the business’s competitive nature. We realize how dependent we are on one another, we architects and contractors, but bad documents can erode the relationship.” Bad documents tend also to erode the quality of specifications writing, said Grant, because the details aren’t there.

Paring down costs and schedules undermines quality

Underlying such complaints is a deeper and more pervasive grievance that by chopping away at costs and schedules, owners have undermined

overall quality. Take, again, the matter of specifications writing. Emanuel, who began his career as an architect, recalled that when he was a young designer, one of the partners in the architectural firm where he worked was a spec writer. Not anymore. Today, he said, word processing allows junior architects to produce specs by collaging together fragments from previous designs. Many of these young architects, moreover, having started their careers at a time when construction work was scarce, have little experience as spec writers, as Emanuel pointed out.

Whatever the reason, said Grant, when specs are unclear, the contractor will “go back to the architect and say, ‘I’m going to build it this way,’ and often the architect tells him no. So the contractor comes back with, ‘This is not what I bid,’ and then both of them have to go back to the owner.” Paradoxically, the paring down of schedules and quality in an effort to achieve cost reductions often results in delays that inflate costs. It’s a vicious cycle, and the ultimate loser, said Grant, is the owner. Emanuel pointed out that the problem is likely to worsen in coming years, as real estate investment trusts increasingly consolidate and once again become major clients. “The directors of these trusts,” he said, tend to be “more bottom-line-driven than chairmen of major banks or businesses, so there’s going to be even more pressure on the profession to produce in a timely way with less cost to the owner.”

That led Emanuel to the thorniest subject of all for architect-contractor relations. Called design delegation in the jargon of the design and building industries, the concept, according to the panelists, has shaped recent revisions to AIA’s flagship contract document, the General Conditions of the Contract for Construction, now designated A201; it describes the architect’s role in administering construction and the rules for the industry. The revised A201 will carry new responsibilities for contractors for such subcomponents as HVAC systems and curtain walls. Little related the changes back to low architect fees. After doing work on a number of projects where the architect hasn’t made any money, Little said, “he decides not only to spend less time but to shift the responsibility across the table.” He added that the changes to A201 also represent a response by architects to threats by insurers to raise premiums or cancel coverage altogether as architects and owners increasingly sue for “errors and omissions.”

Speaking for the American Institute of Architects, Dale Ellickson, the institute’s counsel for the Contract Documents Program, said in a telephone conversation that rather than shifting design responsibility, the new

A201 “clarifies things, makes things more explicit and gives two protections to contractors. One is that they don’t have to do anything that isn’t written in black and white. The other is that they don’t have to do anything against the law.” Nor do the 1997 revisions to A201 posit any changes in liability to the previous edition of 1987, according to Ellickson. He said the updated document is a response to the realities of a building industry in which an owner often saves money by relying on subcontract specialists. That’s not how the contractors viewed the matter.

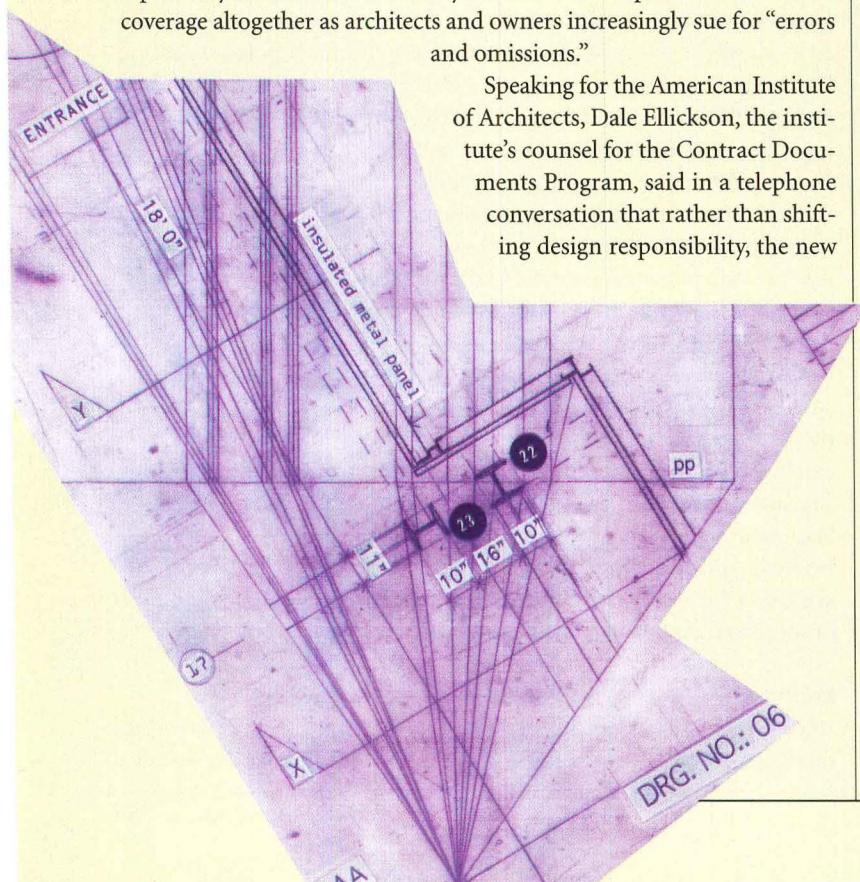
Emanuel was the most vocal. Saying that his objections echo those of the General Building Contractors of New York State, which opposes the revisions, he stated that “there’s no question in our minds that A201, as it is currently being published, will have an adverse impact on our relationship with architects.” In fact, Emanuel characterized the proposed revision as “the hottest topic ever debated within the AGC,” consuming hours of discussion time last September at the Associated General Contractors’ midyear meeting in Albuquerque. A draft was approved at that meeting, said Emanuel, not because the membership liked it, but rather “because an enormous amount of work had gone into trying to get the best document, because it seemed to be the best we could get, and because supporters felt that not endorsing it would further alienate us from the architectural community in the future.” Wolf objected to the way the AIA presented the changes to his industry: “We could nibble away at the draft but we were not part of the discussion process from the beginning.” He also said, “If agreements are actually between the owners and the contractors, and the architect is off on the side, we question why the architect should draft the document—and be allowed to put in these provisions that are really quite onerous.”

Shifting risk management

How onerous are they? “Here in New York State,” said Emanuel, “the architectural community has identified 22 separate items that they’re looking to design-delegate, including roofing.” Design delegation, he said, is spreading from such things as curtain-wall and steel construction to “roofing and heating and ventilation systems, to everything.”

In explaining what he believes will be the effect of the revised document, Little said that liability for errors and omissions made in the drawings—the risk management—is now completely shifted from the architect to the general contractor. Granted, he said, contractors will pass the risk down, for example, to the curtain-wall supplier, but because vendors tend to go in and out of business on a revolving-door basis, the real responsibility and risk will devolve to the contractor. Little also warned that if contractors are responsible for “the building standing up and doing what it’s supposed to do,” they will end up having to hire their own engineers and other professionals “who will be in competition with the architect.” The real question, he concluded, is to define and achieve the optimal roles and relationships of owners, contractors, and architects. The best hope for smooth and productive relationships among the three players, he said, is a return to “professional standards rather than economics. Then we will have established what we should be doing today.”

Not unexpectedly, architects’ tendencies to delegate risk and responsibility to builders have strengthened contractors’ and owners’ growing preference for design-build construction-delivery systems. For contractors its advantages over a traditional design-bid process are obvious, since it includes builders from the start, gives them ultimate authority, and “allows them to avoid cost overruns and delays and everything else that goes along with the bidding process,” said Wolf. For owners, he added, design-build provides one-stop shopping and “fits in



with their desire to lessen the role of the architect, who a lot of owners view as a necessary evil.”

A new twist

An important twist recently has been added to design-build. Called design-build-complete, “it is where the industry’s going to go,” said Little. This is how it works: owners hire an architect to represent them throughout the process, but the architect actually carries out only the first 15 percent of the design. That puts designers in charge of those aspects of the process at which they excel, said Little, such as defining the program, figuring out space relations and adjacencies, configuring shapes, and outlining a seamless process. The owner then turns the process over to the contractor, while retaining the architect as an emissary.

“The idea,” said Little, “is to get contractors in their role and architects in theirs, with each having the liabilities and responsibilities for their separate functions. Design-build-complete prevents the contractor from telling the architect, ‘No, I’m sorry, we have to change this aspect of the design because we can’t afford it.’” Some clients, Little asserted, are adopting Turner’s preferred method in order to avoid court claims resulting from a newly popular, if dubious, practice among contractors. In describing it, Little said, “Contractors didn’t used to look at a set of drawings and say, ‘Well, there’s a mistake here and here and here. I’ll bid no fee, because I’m going to make twice my fee in claims for mistakes.’ There are people who do that.”

Another advantage of design-build-complete, said Little, is that it eliminates a major problem of design-build, namely that it lacks the checks and balances of the conventional architect-contractor relationship. Wolf explained, “Everyone at this table, if they’re honest with themselves,

handle on pricing, who has a consultant who can help guide the process.” Stella said that in his part of the country design-build is not yet popular: “I think part of it is that architects want to keep the process to themselves. What they’re not realizing is that they’re being forced to give it up.” Little added that an incentive for architects to accept design-build-complete is that they usually earn a higher fee, at least when they work with his company. Emanuel noted, however, that many architects are marketing design-build as a way of expanding their services. “They see the trend as something they should lead, as a way to grab market share without really examining what’s involved. I think that’s a disservice to the profession.”

New technologies are not up to speed

New technologies are another source of change in the architect-contractor relationship. The electronic revolution has altered not only the way designers produce drawings but the manner in which they communicate with contractors. For a project in Singapore, for example, a San Francisco-based architect might have the documents produced in Mexico, the curtain wall designed in Malaysia, and the steel detailed in England. “The problem,” said Little, “is that the information usually comes to the architect’s company uncoordinated, because the motivation of the business unit manager in each of the far-flung offices is not to produce the best quality. The question is, how can you get this wonderful technology, high productivity, and low-cost work to a quality level where we can accept it?”

Computer-aided design has similar problems, explained Grant. “The CAD system has been wonderful for architects. But do they know how to build what they’re drawing?” Amid much head shaking, he answered, “Constructibility is one of the biggest problems I find. I don’t know if they have the experience of doing construction or really know

THE CONTRACTORS’ MOST PERVERSIVE COMPLAINT WAS THAT DOCUMENTS FROM ARCHITECTS ARE NEITHER CLEAR NOR COMPREHENSIVE.

would admit they’ve been in a situation where without the architect on the other side of the table, they might have been able to get away with something. In the design-build situation, the architect and the contractor are working together in a business relationship and—let’s be realistic—the architect is going to have a very hard time telling the contractor to put more money into the project. I think there’s a very dark side for the architectural profession in design-build.” In design-build-complete, on the other hand, said Little, the architect has to approve the drawings before the contractor can build. “And he has to approve specifications before we can complete. The owner’s standards and checks and balances are protected much better than in just design-build.” Little finished by asking, “Is the process perfect?” and promptly answering, “No.”

Asked whether he sees design-build-complete as a trend, Robert Peck, commissioner of the General Services Administration’s Public Buildings Service, said that he wishes to reserve judgment until the GSA’s first experiment with the new project-delivery method, the Las Vegas Courthouse, is completed in about 18 months. In the abstract, however, Peck said, he finds the approach, which the GSA calls bridging, attractive, in part because it could allow emerging design firms, with limited document-production capabilities, to compete for major projects. Ed Feiner, the GSA’s chief architect, added, “The GSA really likes to experiment and test everything, but the jury is still out.”

Is design-build or design-build-complete appropriate for all buildings? In Emanuel’s experience, it works well for large projects when “you have a fairly sophisticated client who understands both the design and building process, who is clear about what he wants, who has some

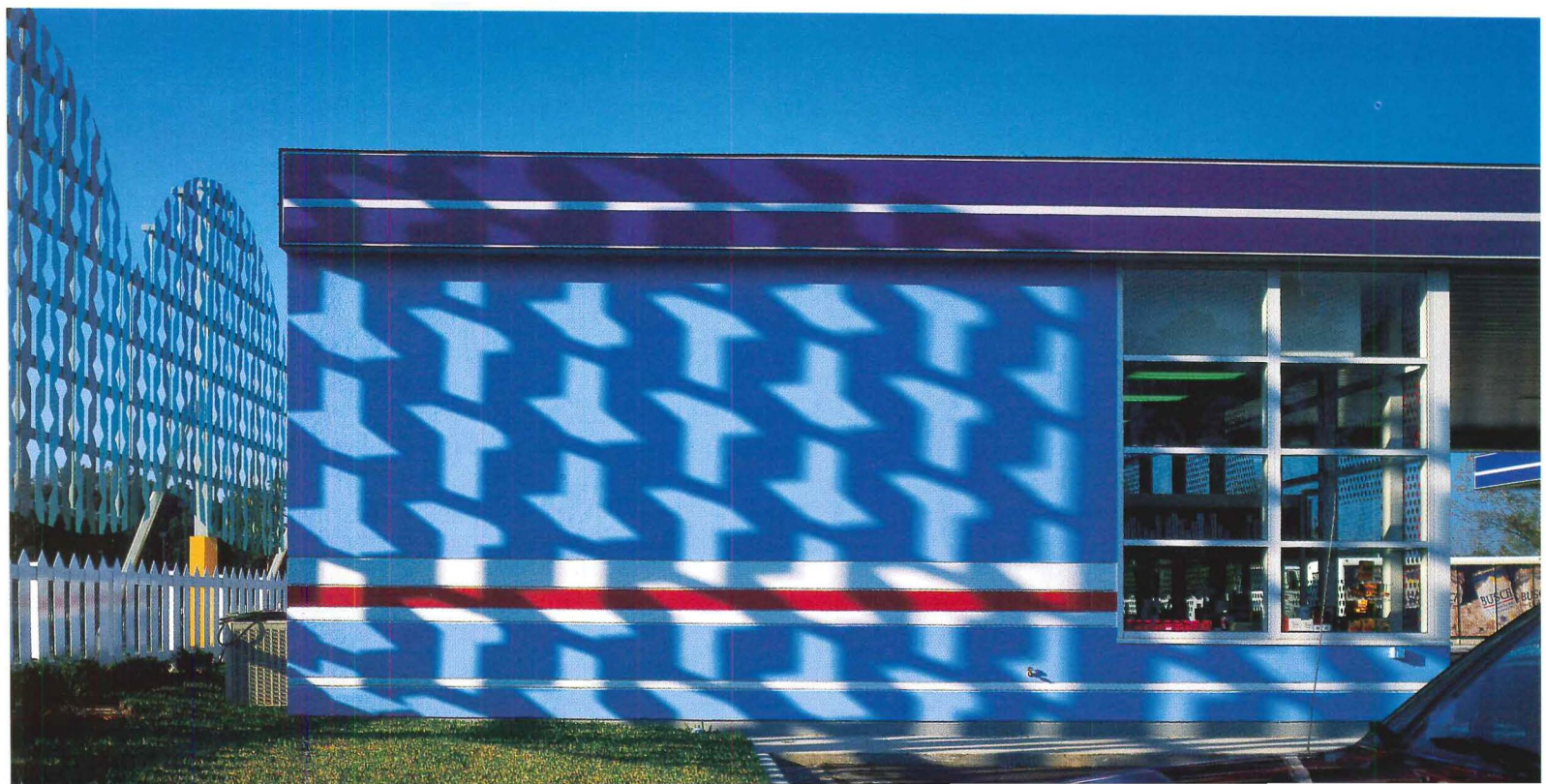
what they’re putting on paper.” The transmission of information is improved, the panelists agreed, but the same cannot be said for its quality.

In Stella’s experience, moreover, CAD allows architects to continually repeat their mistakes. “Designers can pull out the same detail they had problems with before without modifying it. If only they would stop and ask the contractor, ‘Did this make sense?’” Compounding the problem of architects not learning from their mistakes, Grant said, is the fact that many design firms assign inexperienced staff members to the job site. Because greenhorn architects have no authority to make a decision in the field or modify a detail, they will take a problem back to the office and review it with a superior “who doesn’t see the big picture of what’s going on, what the status of the project is, what the scheduling requirements are,” Stella said. Design-build can overcome some of these deficiencies, the panelists indicated. Because it provides designers with a better fee, insisted Emanuel, they will spend sufficient time up front working out details with the contractor, so that costly change orders and extras are avoided.

Ultimately, concluded the panelists, architects and contractors need to put their heads together and come up with ways to market their professional services in tandem to improve quality and streamline the construction process. “The best thing we could do is get architects more respect [among clients]; we need them. And the essence of it for us is that when an architect has the money to put together a good set of documents, it’s easier for us to build and make money,” said Wolf. And how is this to be done? By educating owners, answered Grant: “It’s the owners, after all, who ultimately pay. If they organize their team, pay a decent fee, get the correct design, and the job is built on time, they’re the ones who benefit.” ■

VSBA TODAY

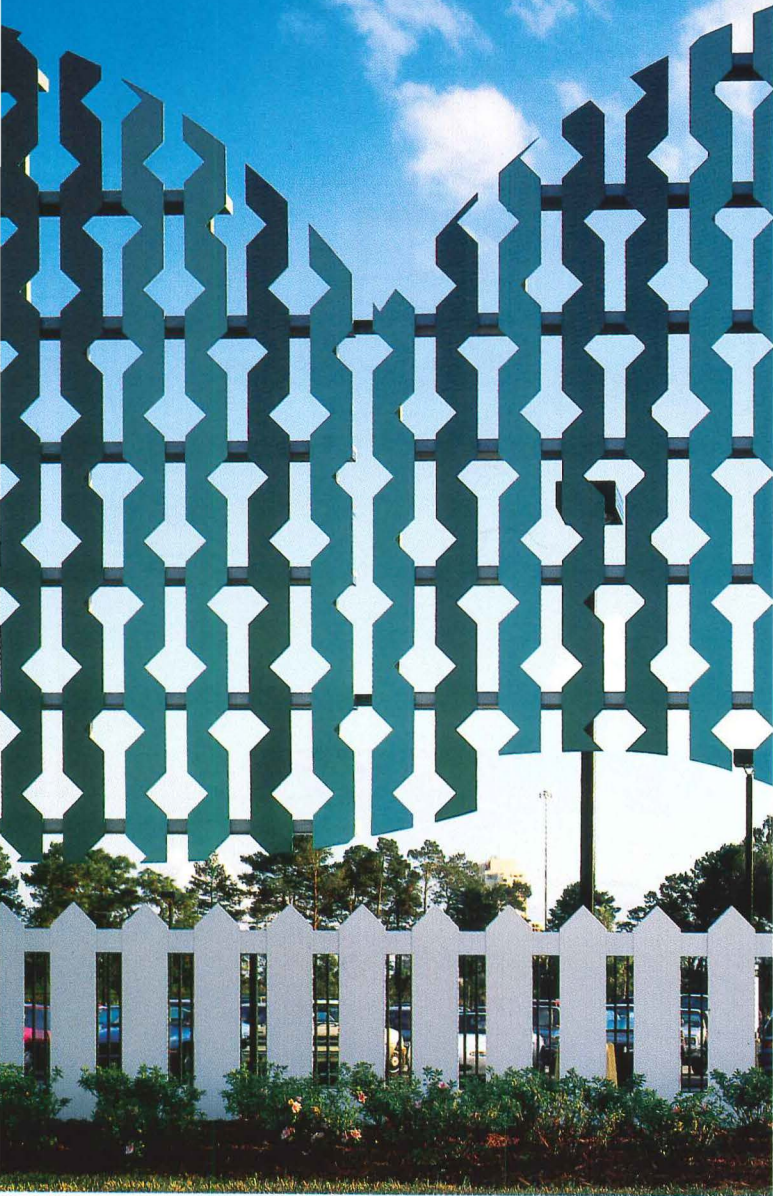
EVEN IN THIS ERA OF "NEW" MODERNISM,
SAY ROBERT VENTURI AND DENISE SCOTT BROWN,
ICONS, SIGNS, AND SYMBOLS SPEAK TO US.



GAS STATION FOR DISNEY WORLD

The architects missed few opportunities to freight this gas station with superscale iconic imagery. Older highway strips are evoked ("high reader" sign, opposite), as is domesticated suburbia (trees

and picket fences, below and opposite bottom). The word EATS fritted into the glass (opposite middle) acts as an informational scrim for the graphics in the convenience store (right).



Postmodernism's bag of tricks—the trabeated quotations, the collaged Classical quips—has over the last few years vanished from the scene. Modernism is back, but it conspicuously lacks an ideological or theoretical basis.

Uniquely among firms associated with Postmodernism, Venturi Scott Brown and Associates have not only stayed the course, but have moved farther into what they see as the future—a malleable architecture of applied electronic information. In excerpts from interviews with RECORD editor James S. Russell, AIA, partners Robert Venturi, FAIA, Denise Scott Brown, RIBA, and Steven Izenour, AIA, reflect on the directions their work has taken within a design culture that only seems to have left them behind.

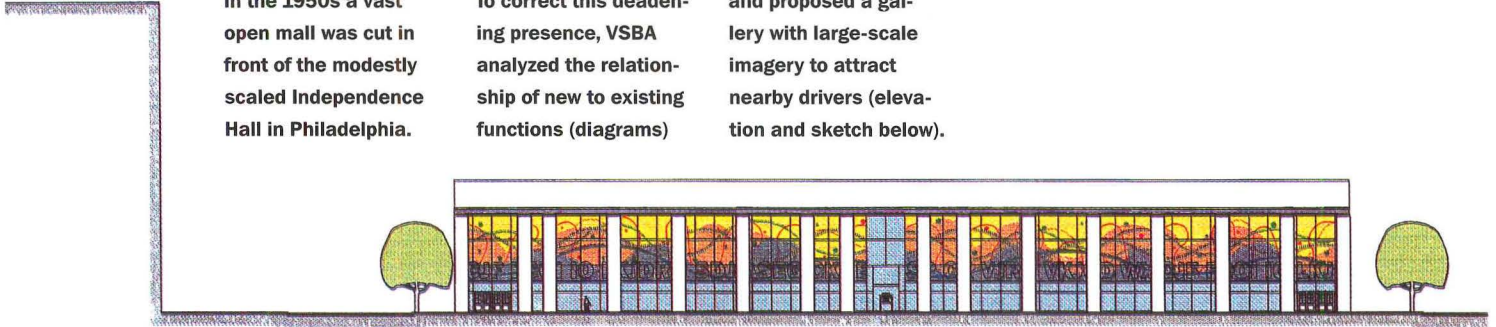


INDEPENDENCE MALL

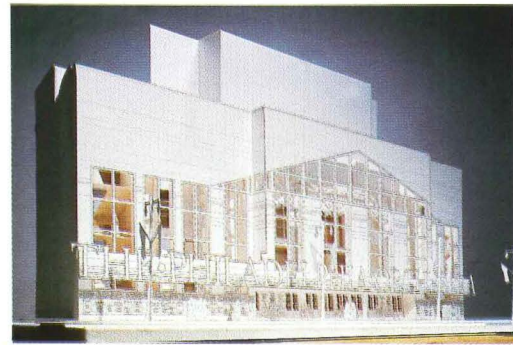
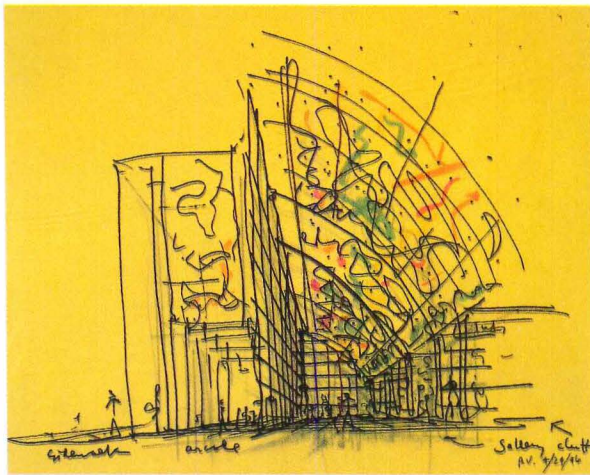
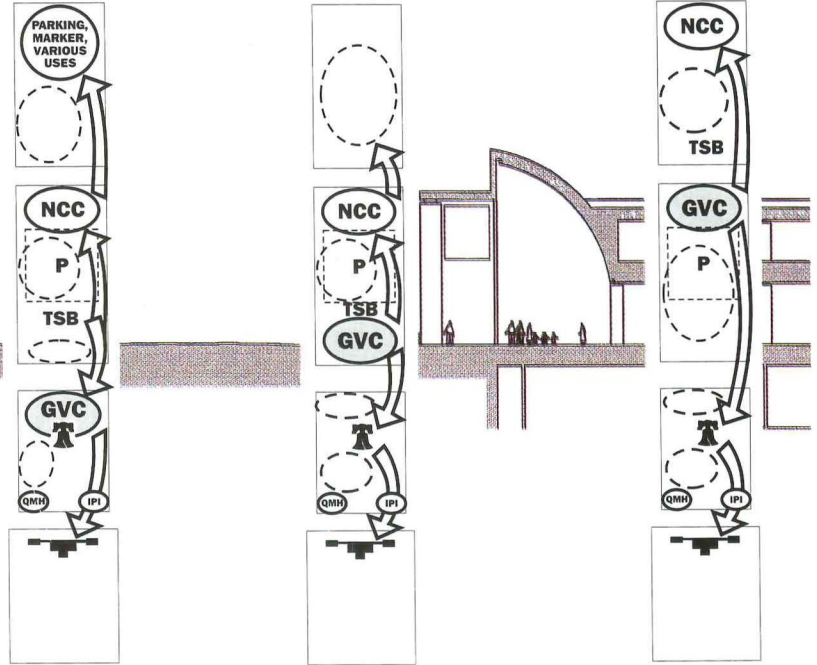
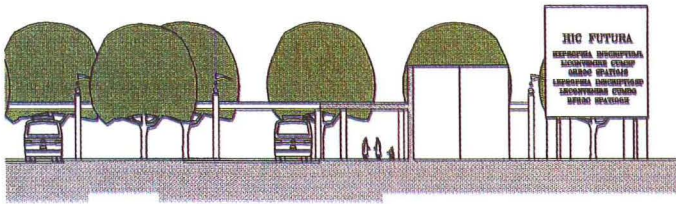
In the 1950s a vast open mall was cut in front of the modestly scaled Independence Hall in Philadelphia.

To correct this deadening presence, VSBA analyzed the relationship of new to existing functions (diagrams)

and proposed a gallery with large-scale imagery to attract nearby drivers (elevation and sketch below).



VISITOR CENTER ELEVATION FROM NORTH



PHILADELPHIA ORCHESTRA HALL

VSBA first designed a simple brick exterior for this new performing arts complex (middle right). Hobbled by fundraising woes (blamed in part on the design's austerity), VSBA redesigned the project with a "gala"

facade that reflected Philadelphia's emerging vision of Broad Street as an "avenue of the arts." Its friezelike zipper sign, reflective metal musical notes, and multicolored backlit glazing mix Classical metaphors (derived

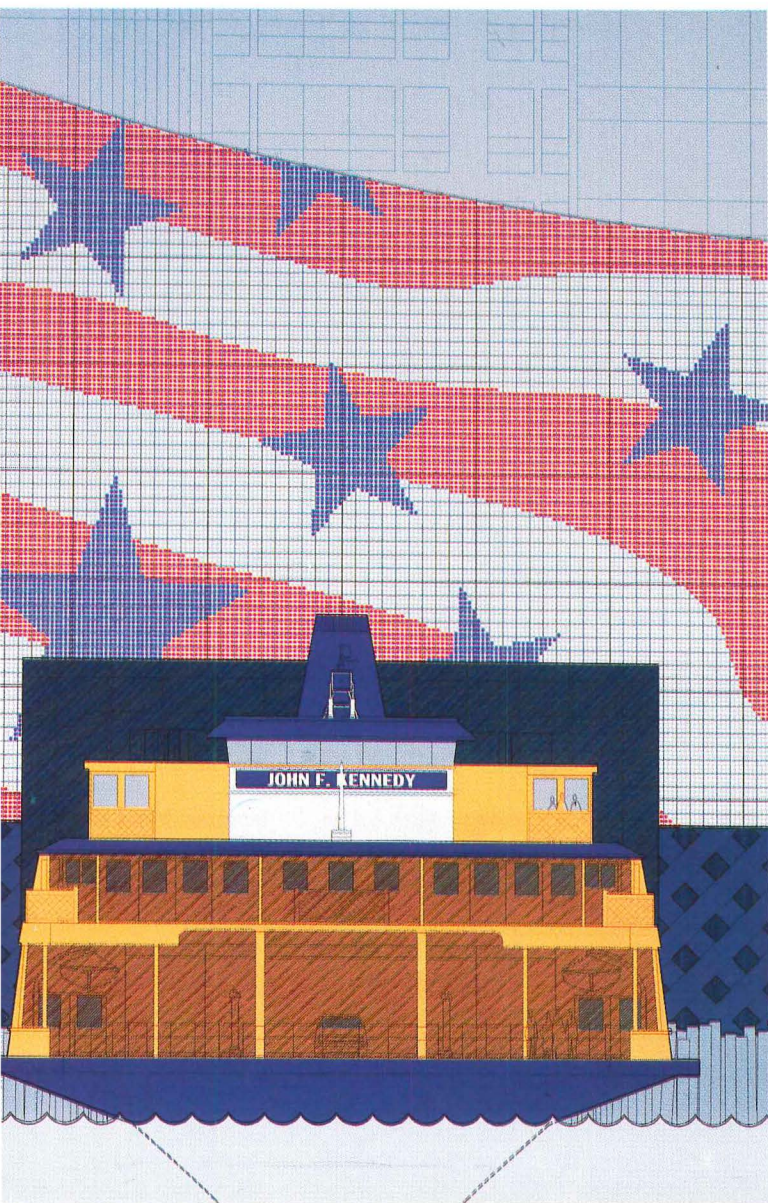
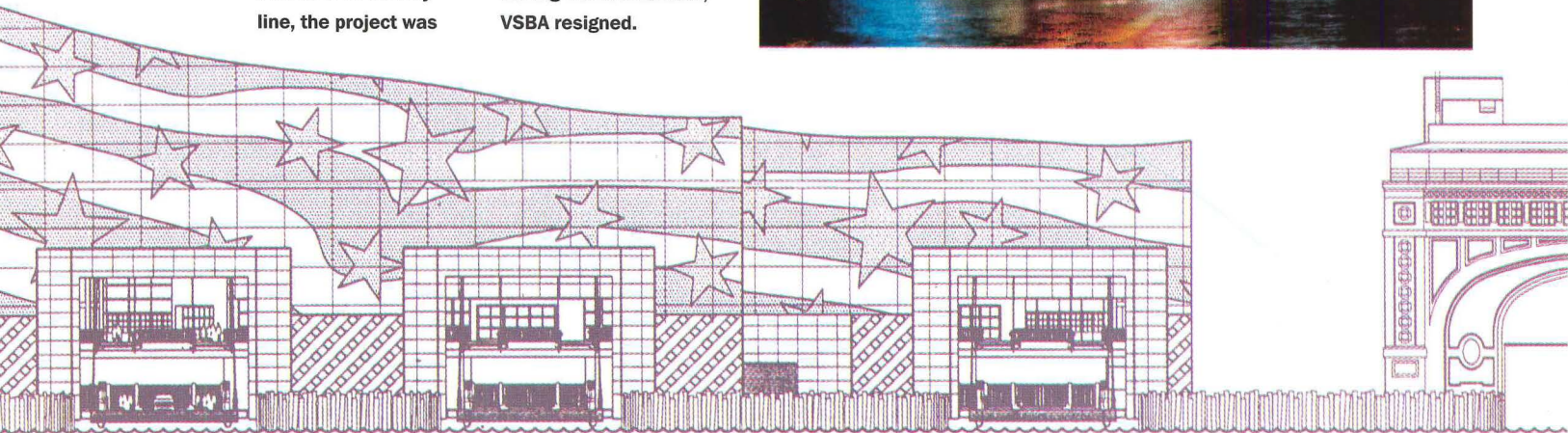
from an adjacent Greek Revival building) with Miesian and multimedia references (right). The Orchestra Association has since selected another architect, Rafael Viñoly, hoping to marshal greater community support.



WHITEHALL FERRY TERMINAL

VSBA won a competition for this project at the southern tip of Manhattan. Based on a design whose super-scale clock referred to the scale of the skyline, the project was

later trimmed for a smaller budget and the waterfront facade became an LED billboard (this page). Later, citing further design-compromising client demands, VSBA resigned.



RECORD: Your recent work shows a new vitality. Does this represent a new direction?

DENISE SCOTT BROWN: It's the same vitality. To think it's new is to misunderstand what we were doing when everyone else was doing Postmodernism. We have always said it is a misinterpretation to regard Postmodernism as coming out of our books *Complexity and Contradiction in Architecture* [Museum of Modern Art, 1966] and *Learning From Las Vegas* [MIT Press, 1972, 1977].

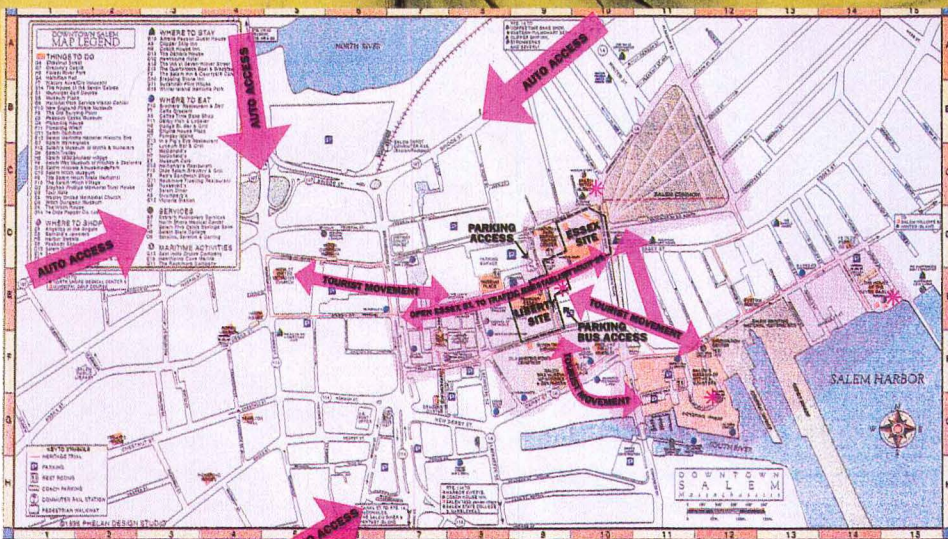
ROBERT VENTURI: Herbert Muschamp of the [New York] Times wrote that *Complexity and Contradiction* served to make history legitimate, but he missed the idea. We used historical analogy to make points. Our use of history is to derive understanding. Just as Mies van der Rohe made buildings that were distinctly derived from an industrial vernacular, so we derive from the commercial vernacular. It's from this that we argue that there is room for a greater use of graphics and iconography on buildings.

DSB: Behind what we did in the beginning was a social planner's critique of architects—the set of values that architects feel the whole world should accept. We asked, what about looking and seeing what things are actually like? We went to Levittown and Las Vegas to see how people voted with their feet. A lot of social planning thought was expressed in these writings, but it was never read or seen by architects.

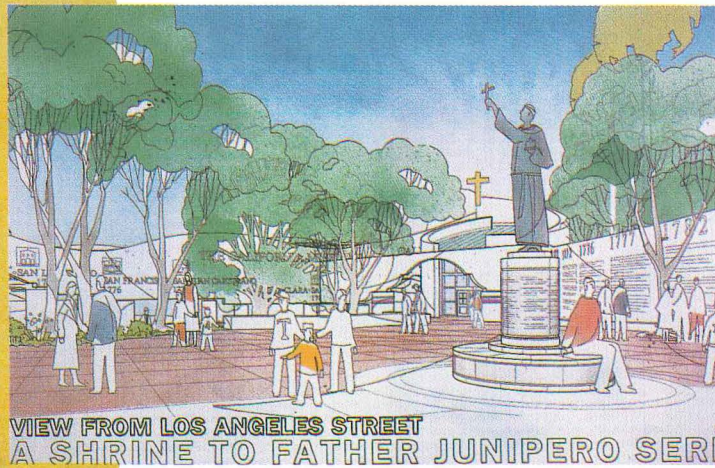
In Venturi's recent book, *Iconography and Electronics Upon a Generic Architecture: A View From the Drafting Room* (MIT Press, 1996), he renews his pleas for an "architecture as shelter and symbol" while decrying what he describes as a Modernist revival, with its "exposed-frame structure symbolizing 19th-century engineering—while everyone knows the Industrial Revolution is dead." Since the fading of Deconstructivism, there seems to have been remarkably little examination of resurgent Modernism's ideological underpinnings.

RECORD: One could see in this Modernist revival a recapitulation of the heroic architectural era that you successfully punctured in the early writings. Is it a rejection of what you've stood for?

RV: Abstraction has dominated the aesthetics of the century, but it's easy to forget that it is an unusual phenomenon. We found that every period



The firm's graphic skills and Denise Scott Brown's urban design experience were brought to bear in a site analysis submitted for the Peabody Essex Museum in Salem, Massachusetts (left). The firm enlivened a large, loftlike building housing Walt Disney Company animators by printing film reels on the enameled metal exterior (opposite bottom). The images are the "fanfare" exception to the building's simple facade rhythm.



A shrine to Father Junipero Serra, in Los Angeles, uses a series of curved, interlocking walls (sketch left) to draw visitors in, protect them from freeway noise, and tell the missionary's story (left).

of history has dealt in the ornate and graphic and the symbolic and the referential—the ancient Egyptians had the equivalent of billboards.

This expressionistic movement is a last gasp at getting some nonboring element into abstraction. Abstraction was great in its day—I worshiped La Tourette and Fallingwater and recognize that they are original and not referential. But there is no theoretical basis left in abstraction. It is expressionism and it is empty, just as Decon[structivism] was totally about that which is exceptional, which means it is not exceptional at all. The funny irony is that architects are reviving an industrial vocabulary that is historicist in a postindustrial age.

In his book Venturi asks us to acknowledge signs, reference, representation, iconography, scenography, and trompe-l'oeil "as the genesis and basis of the art of architecture."

RECORD: Few designers today seem to acknowledge these elements. Are we uncomfortable with symbolism in architecture?

RV: When I was young, the most daring, radical thing you could do in civic art was to put an abstract piece of sculpture in a plaza. Ironically, now that is the safest thing to do. No one gets mad at it because there is no symbolism. We are living in a time of great incivility—it's a talk-show environment. So if we propose to put up something that has meaning and symbolic content, people will get mad, and it won't happen.

I think there is a similar fear among architects. The avant-garde is very old-fashioned. It's still reacting against Victorian symbolism and the Ecole des Beaux Arts.

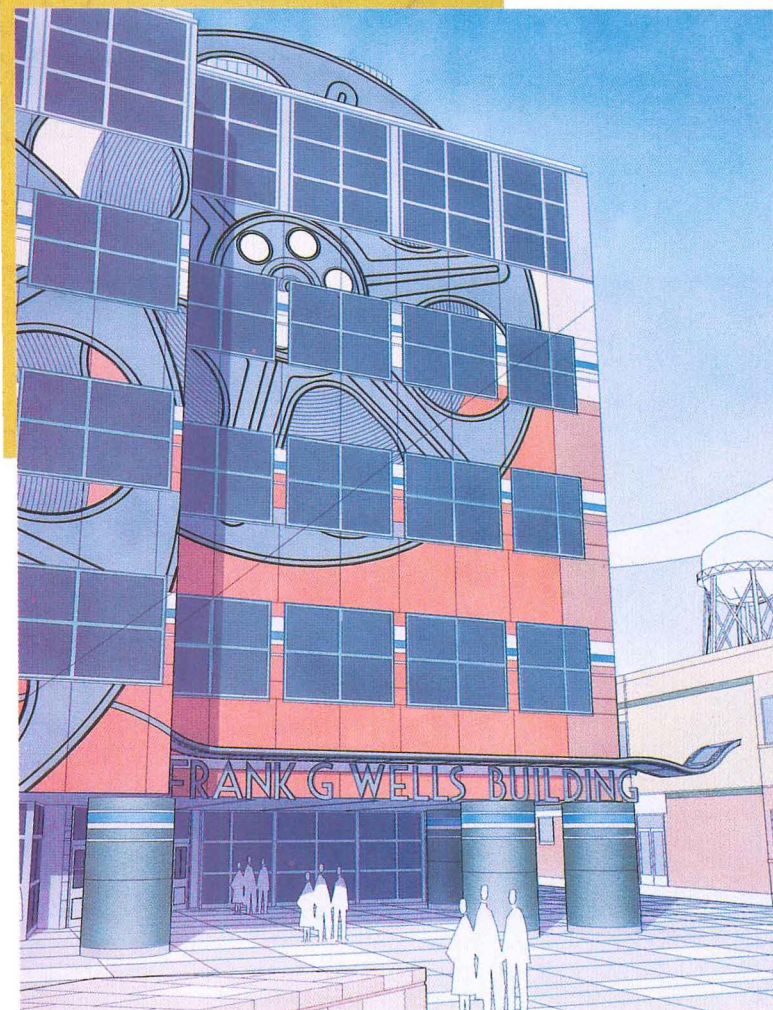
Revisiting Las Vegas, Robert Venturi reflects, in Iconography and Electronics, "we recommended taking a non-judgmental approach to taste and accommodating to pluralism and relativity."

RECORD: When architects first read this, many were furious. If architects were to be merely nonjudgmental and accommodating, what was to be their role?

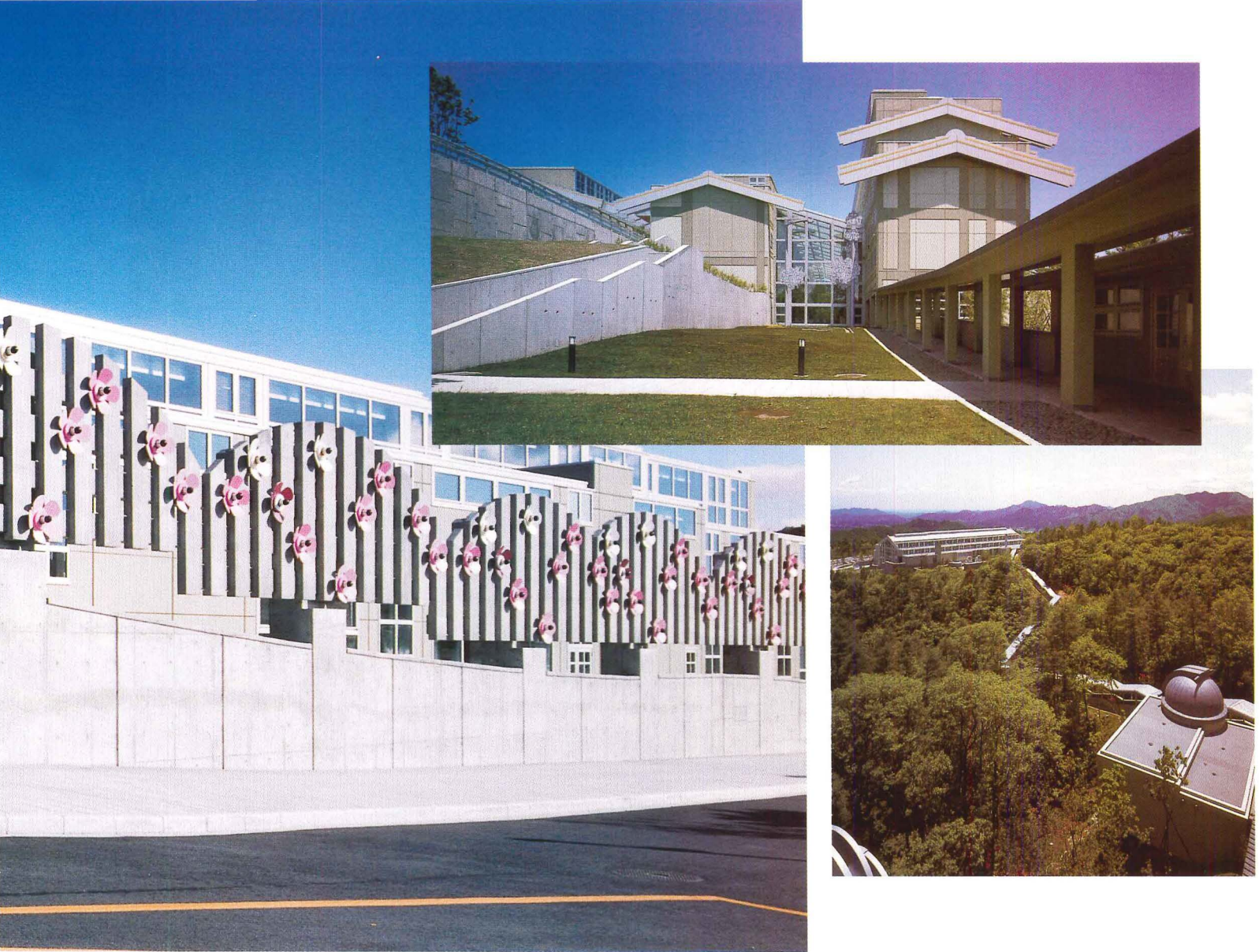
DSB: At the time, people said such things as "If your prescription had been followed, there would never have been voter registration in Alabama." We didn't propose a prescription for society but a working method for architects. I think we've shown that there is very much a role for the architect. But we have always said it is better to defer judgment so that you can make subsequent judgment more sensitively.

RECORD: While deriving a great deal of inspiration from the commercial landscape, you have actually done relatively little commercial work.

STEVEN IZENOUR: When you draw inspiration from popular imaging and popular culture, it doesn't make you easy to market even in dealing with relatively sophisticated people. We still have more unbuilt projects than built ones for [The Walt] Disney [Company]. Clients don't see or don't understand where we're coming from.







NIKKO KIRIFURI RESORT

Working with the landscape architecture firm Andropogon, VSBA choreographed a forest and mountain views in the arrival sequence to this 97-room resort

adjacent to Japan's Nikko National Park, which contains important shrines. Patterns applied to the complex evoke vernacular Japanese architecture.



DSB: We are thinking about the commercial and working with the civic. In our entry for the U.S. embassy in Berlin [RECORD, March 1996, pages 40–41], we have an electronic LED sign as a kind of lining, somewhat hidden behind a very civic facade. This is one way of dealing with the civic dimension. Our institutional clients have been cordial to the idea of electronics on architecture—more than we would have expected—so we've been able to do them, but mostly inside buildings.

RV: Another aspect of our work that people seem to have a hard time getting and makes us so opposite of the “original signature genius,” is how we value the generic building that allows flexibility over time—the New England mill, the loft, the palazzo. The Italian palazzo was the same for 400 years except for the ornament on it. It was a building that could be used in many different ways, which goes against the Modernist notion of making a glove for the hand rather than a mitten. The related point is that the architectural content comes more from fanfare applied, not form-distorting abstraction. You know Princeton University's Nassau Hall is not a mill because it has a fancy door and a cupola on top. It's fanfare that can be more or less graphic or iconographic.

RECORD: It seems to me that the loft idea has not been as criticized as some other aspects of your work. Stewart Brand, among others, has endorsed much the same idea in his book *How Buildings Learn*.



The internal focal point of the Nikko resort is a skylit pedestrian street enlivened by ornamental signage that evokes both rural and urban

traditions (top and right). Metal-framed "leaves" over spa pools (above) are green on one side, autumnal yellow on the other.





Robert Venturi, Denise Scott Brown, and Steven Izenour pose in their offices in Philadelphia's Manyunk district.

DSB: They criticize the idea of the loft because it seems lower class.

RV: I think it hasn't been criticized as much because many people don't get it.

DSB: The people who do get it are college campuses. We have been approached more and more to do campus planning. These plans have a lot to do with patterns of activities and how they must change and how their strategies must therefore be generic. Many campus people recognize that the buildings will be there after their lives are over and will have to change. They get the difference between academic change and physical change.

SI: There's also a new kind of institutional client coming in. They are having to deal with a much more complicated commercial world—call it Disney style—and they want us to show them how they can do something with a great deal of panache. The line between the traditional institutional world and the commercial world has become much vaguer at zoos or aquariums or at the Camden Children's Garden, our client. They realize they are competing for dollars with the amusement park 10 miles away. Everybody has talked about this blur—the so-called Disneyfication of the world. Looked at positively, it is good because it focuses institutions on competing, on attracting people. It forces them to look at their ideals critically.

"I am, as a practicing architect . . . a supplicant to bureaucrats representing clients or agencies, each of whom focuses on enhancing his image, to historical commissions, who fear making history in their time, to design review boards, who promote deadening urbanity (while expounding my partner's and my ideas of some decades ago), to goody-goody community boards with too much time on their hands."—Iconography and Electronics

RECORD: Why have civic projects proven so difficult for you?

RV: Our main clients are institutional, but we're considered too extreme for civic clients because today there is this process of everyone designing the building. Community participation is great, but we are at a point that three of our civic jobs are not going to go ahead because of outside imposition on our ideas that we couldn't accept.

DSB: I came up through the community-activist tradition and used that system and worked with little main streets and impoverished neighborhoods in large cities. We still use that model, but large interests also use the system for private agendas. In every city everyone from the mayor on down has an agenda that is disguised as a public purpose.

RV: Community participation is a beautiful idea that is often misused.

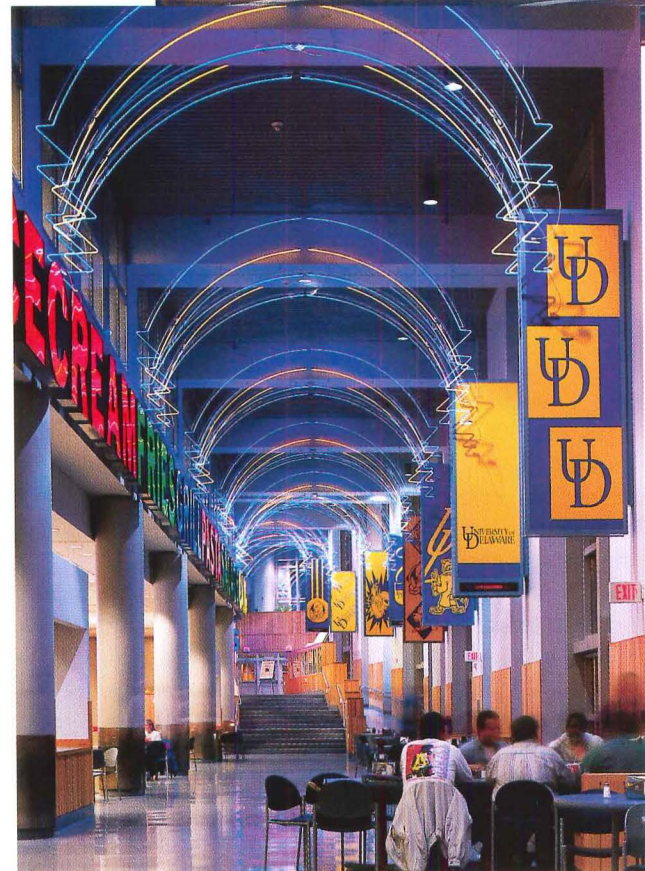
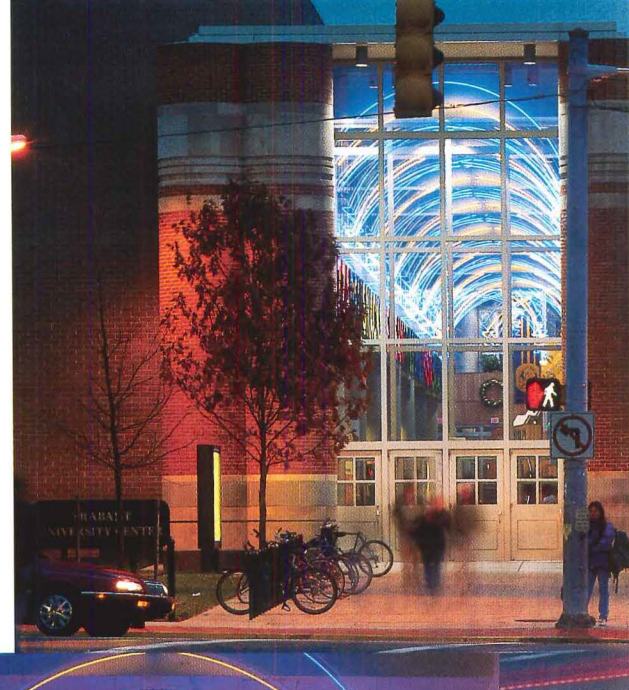
DSB: It's more about upper-middle-class residents these days.

With the very validity of architecture continually being called into question, especially in a world dominated by commercial values and images, public clients may hunger for the very architectural values Venturi and Scott Brown disparage: the heroic statement, the quest for order or a universal language to counter the chaos of the commercial landscape.

RECORD: In restoring the urban context of Independence Hall to an 18th-century scale, you proposed a visitor center with a billboard-scale arcade faced with "whammo" electronic or mural-like imagery. Didn't that undercut the client's intention?

RV: You would never see the gallery and Independence Hall at the same time. It needs to be flashy as hell in a 20th-century way to attract the visitor and the passerby. But you have to be flashy in the right way.

(continued on page 252)



TRABANT UNIVERSITY CENTER, UNIVERSITY OF DELAWARE

This student center is "Georgian in spirit" to match the campus' prevailing style. It presents a narrow facade to the street so as not to overwhelm adjacent house-scaled buildings. A glazed entry

invites students into an arcade, which extends a key existing pedestrian way. Reflecting its mall-like function, the interior is enlivened with scaled-up electric signage and neon arches.

CHANDIGARH

after

CORBUSIER

OUR ROVING CRITIC COMPARES CORB'S CITY TO NEW DELHI AND LUTYENS'S ORDERED WORLD.

by Michael Sorkin



An indelible image of India. As I prowled the New Delhi acropolis, a truck pulled up in front of one of the Herbert Baker ministries flanking the grand, Lutyens-culminated, King's Way axis. On the truck was an enormous model ship—the Indian navy's latest frigate—bristling with plexiglass missiles and guns. Thirty men in ragged kurtas and bare feet, directed by a naval officer in crisp white uniform, shouldered the ship and shuffled, whooping and shouting, through the portal of the vast Euro-Moghul pile.

This surreal sense of juxtaposition is ubiquitous in the daily life of India: the cows on the highway, the bright sari-clad women hoisting baskets of concrete up webs of bamboo scaffolding to build air-con skyscrapers in the merciless haze and heat, the Coke ads on the mud huts. Like that ship, the apparatus of modernity is supported on the backs of huge numbers whose share in its benefits is marginal. India is filled with such reverberating differences, with a colonialism that both imports its own values and coopts sympathetic images from within the culture that are then rebroadcast in transformed guise.

Double Delhi embodies this structure of differences very directly. Old Delhi, the eight-times-rebuilt capital of ancient India—most famously as Shahjahanabad, the last capital of the Moghuls—is a tangle of crumbling buildings, impossible traffic, twisting lanes, warrens of life, and frenetic commerce. New Delhi, built by the British as the last capital of the Raj, inverts all of this, filled with endless tree-lined axes and round-points, stately buildings and white-washed bungalows for the white sahibs, all deployed in insane lateral hierarchy to recognize just where in the civil service their occupants sat.

While this twoness monumentally reflects the center of power of

colonial India, the division was reproduced across the country and, indeed, across the empire. In town after town, the so-called civil lines were established as a parallel urbanism, a formal apartheid that left little question as to who was in charge. In a country whose Hindu tradition was rooted in its own fantasies of untouchability, those revolutionaries who sought to overthrow such structures of permanent inequality must certainly have understood and reviled this division, much as the British found Indian settlements “unhealthy, noisy, and distasteful.”

This repeated pattern of Indian town, military cantonment, and civil lines, each obeying its own systems of order, each imposing its own hierarchy, still resonates, embodied—if in transmogrified form—in the elements of a continuing debate about planning. On one side stands a tradition that favors clarity, the sort of urban functionalism that remains the default mode of global urbanism and architecture. But there's another way, also tremendously “Indian”: the path of synthesis, the embrace and collapse of contradiction. This struck me very powerfully. In much of Indian architecture the combination of motifs, the easy blending of Hindu, Muslim, Buddhist, even Christian symbols is marvelous, even transcendent. But, in a country where internecine massacres are still an almost everyday affair, such blendings can be fraught.

Lutyens's Delhi: orderly space or nadir of colonialism?

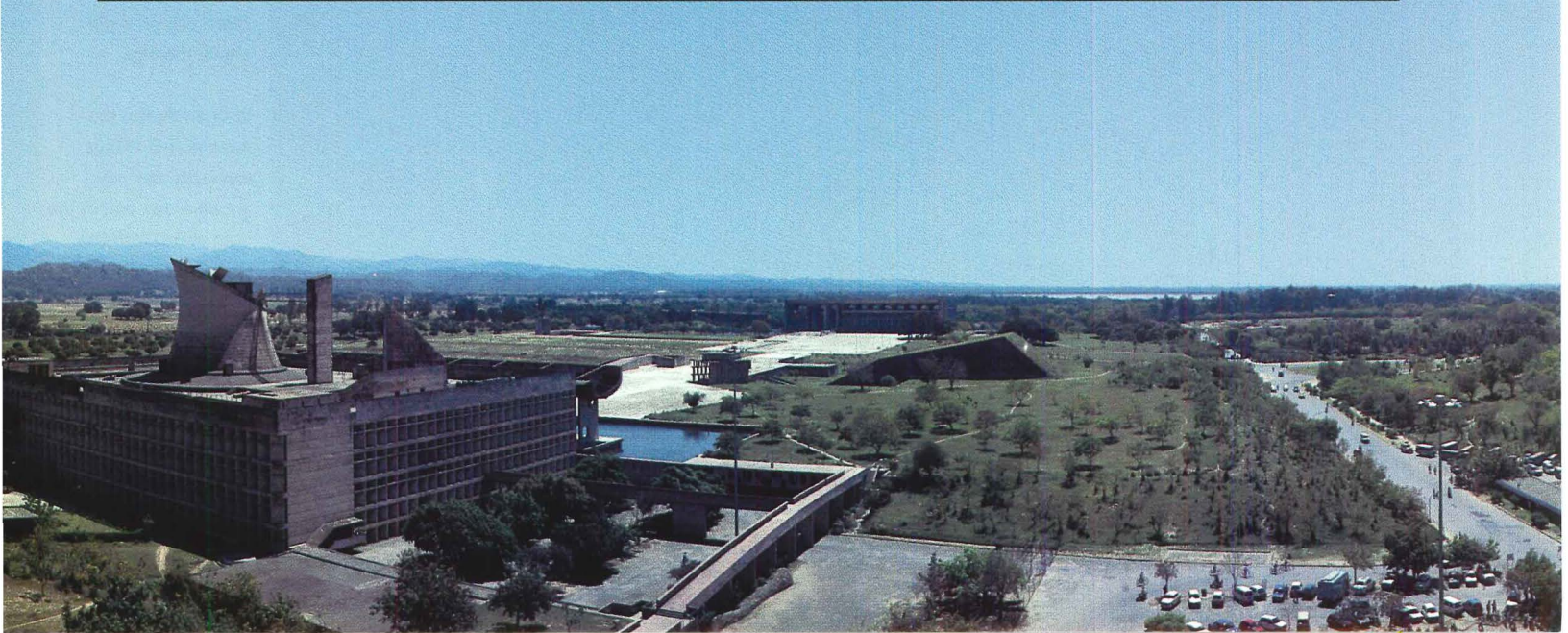
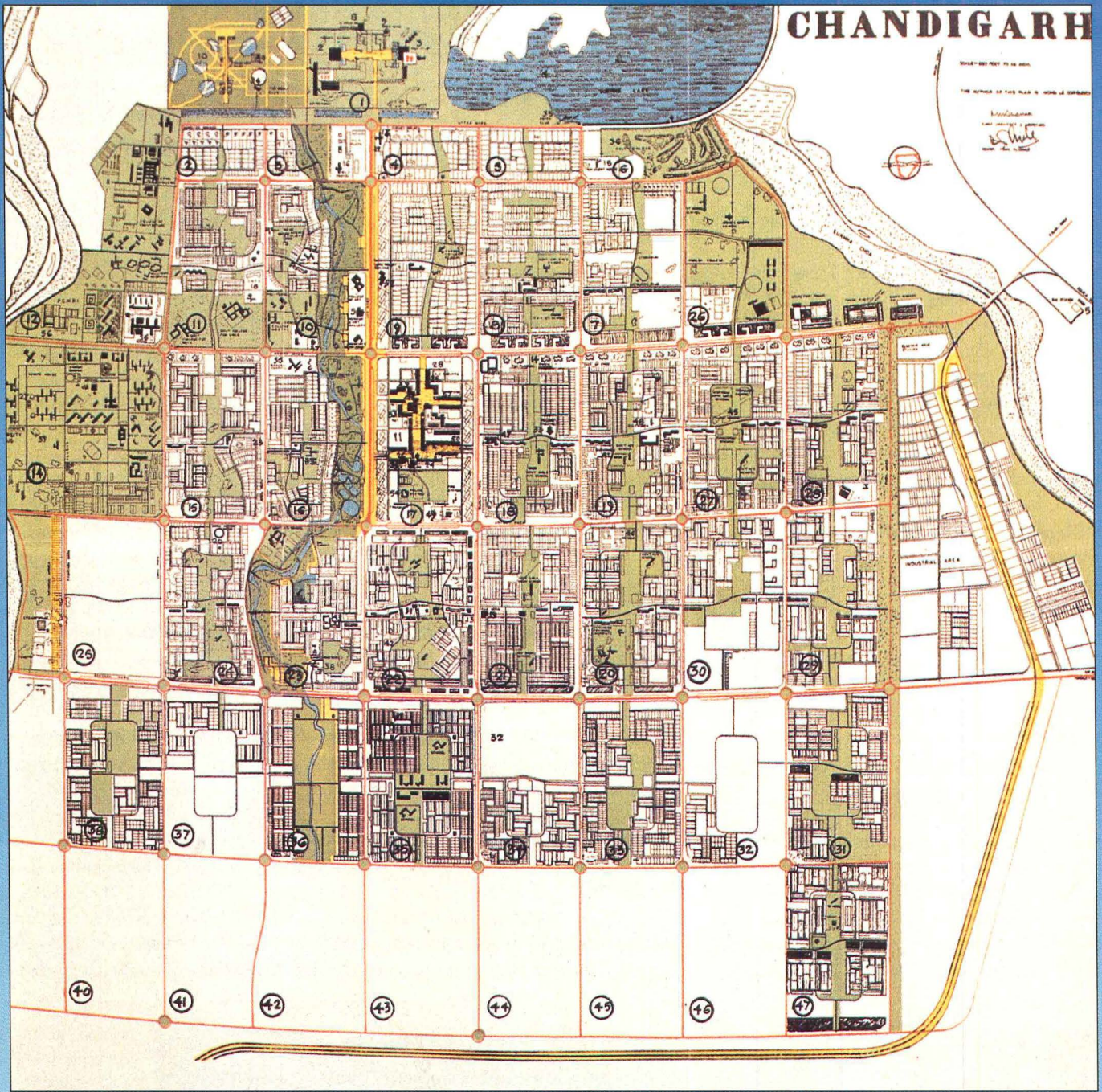
The architect who was showing me around that day was a Delhi enthusiast, partial to Edwin Lutyens and to the calm sweep of the grand, bowered avenues. And, after a couple of weeks in India, it was easy to share his appreciation for an orderly, shaded space free from the roiling maelstrom of typical Indian traffic. More problematic, though, was his tolerant position vis-à-vis the Lutyens style of grafted locality. Of course, the *tolerance* was admirable, but, interestingly, it had its limits, concealing a polemic repeatedly exposed in conversations with architects around India. While my friend loved Delhi, he was filled with contempt for Chandigarh, which he considered to be the real symbol of imaginative colonization. The next day, when I reported the apparent paradox to another Indian architect, he virtually exploded on hearing it, railing against Lutyens as the nadir of colonialism and racism and exalting Le Corbusier's city as a place that had

Contributing editor Michael Sorkin runs his own architectural practice in New York City. A monograph on his architecture, Michael Sorkin Studio: 2nd Nature, will be published by the Monacelli Press later this year.

Chandigarh's plan (inset opposite), adapted by Le Corbusier from one

by Albert Mayer and Matthew Nowicki, is seen on the city's man-

hole covers (above). A view of the government complex (opposite).



INDIAN DUALISM: ON ONE SIDE, A TRADITION OF CLARITY, OF URBAN FUNCTIONALISM; ON THE OTHER, A PATH OF SYNTHESIS, AN EMBRACE AND COLLAPSE OF CONTRADICTION.

helped to set India free, to move its architecture along a fresh and independent path.

One sees what one wants. My Delhi friend told me a story about driving Robert Venturi on a similar tour around town. After intoning his predictable enthusiasm for the helter-skelter signage encrusting the buildings of Connaught Place (and the ubiquitous layers of Indian graphic funk are amazing), he came to the Lutyens complex atop Raisina Hill. He entered in a reverie, as if to a great shrine. My colleague reported with admiration that Venturi strode through the building as if he'd been there many times, pointing out details and seeking out hidden rooms with complete familiarity. He already knew, already loved, the building.

Indian urbanism has its own rationality

The frequent reduction of the juxtaposition between Indian and European modes of urbanization and the assignment of rationality to the European side, though, is both pernicious and wrong. The rich history of Indian urbanism is filled with its own styles of rationality, which bear direct comparison with Western models. India, with its elaborately systematized spirituality and social relations, is a place in thrall of abstraction, not simply as a hedge against the awful oppressions of daily life but as a broader means of reconciliation.

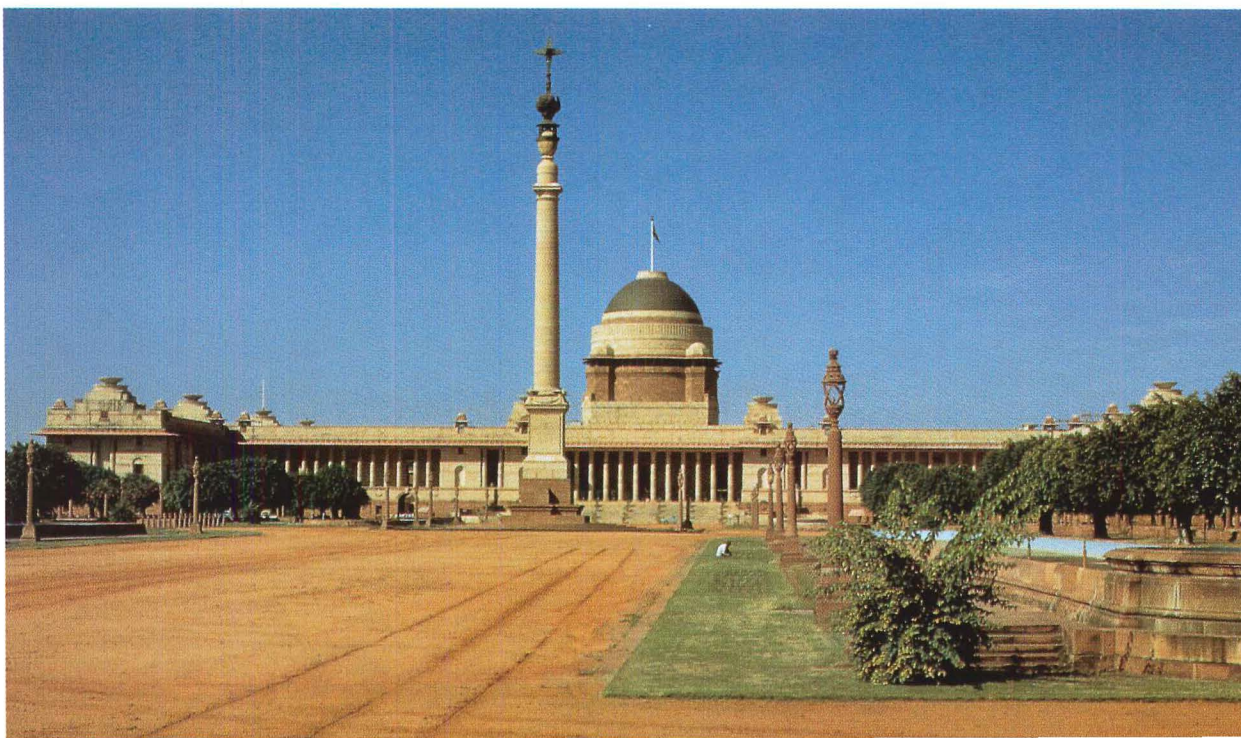
This penchant for abstraction is very Indian. The early Vedic manual of architecture, *Vastu Shilpa Shastra*, the *feng shui* of India, with its characteristic synthesis of spirituality and common sense, offers a strategy for harmonizing architecture with the basic forces of the universe by, in effect, creating structures that absorb maximum available benefits from the character and “energies” of the site—concretizations of the abstract. The premise of the text is that the originating act of architecture is the earth itself. Inherent in this theory are beautiful, implicit ideas of stewardship and continuity, which ought still to form a basis for our

thinking. Like rationalism, though, this geometricization of spirit, this rendering of one abstract system into another, works because geometry is the substance of architectural description. As with our own styles of rationality, this system is thought to aid human physical, psychological, and moral development. The urbanistic high point of its application is the 18th-century planned city of Jaipur, whose eponymous author, Jai Singh, was a virtual paragon of modernity. His city is based on a supple application of a nine-square plan, a symbol of order as much at home in a Palladian villa as the famous Navgraha mandala.

Indian streets as places of spontaneous democracy

The urban quality that struck me most forcibly on my trip to India, however, was its traffic, the apparent antithesis of harmonization. Seething circulation occupies a space from building front to building front and—at first blush—seems to defy any rationality. Streets literally teemed with people moving with and against traffic, with cars and buses and trucks, motorcycles and rickshaws, horse carts, occasional elephants, and, of course, those ubiquitous cows. And yet, somehow, it seemed to work: from the cacophony and chaos, a harmony emerges. Indian streets are a place of continuous negotiation over space, filled with a kind of spontaneous democracy, an extremely localized view of order subsisting within a larger (and largely impenetrable) pattern. Indeed, one might say it is the very chaos of the streets that makes them tractable. Unlike the uncrossable motorways, which are beginning to appear in India, it is precisely the congestion that makes it possible to cross the street.

These ruminations on the character of Indian public space were deepened by an experience of several days of juries at the excellent architecture school in Ahmedabad. While the strictly architectural aspects of the student projects were of a high standard, a curious quality seemed to pervade most of them. Outside the envelope of individual buildings, the



Lutyens's Viceroy's House (left) in New Delhi, completed in 1929, sits on a hill above the city.

In Chandigarh, the Assembly Building (opposite bottom) anchors one end of the civic plaza, with the High Court at the other end. On a cross axis to these buildings stand Le Corbusier's Open Hand sculpture (opposite top) and a large bermed monument, the House of the Winds.

sheets were largely blank, festooned at best with a tree or two. There seemed to be a resistance to elaborating the spaces of public activity, to determining the routines of encounter with public motion. As I continued to travel, I came to see this as no anomaly, and the quality of a minimally structured shared realm continued to impress me. As a medium for mixing and sorting out seemingly impossible numbers and phenomenal diversity, this lack of differentiation increasingly took on the character of a strategy rather than an accident. Certainly, this condition of density serves as subtext for the apparent force and contrast of the nominal rationality of such urban schemes as New Delhi and Chandigarh.

Chandigarh: the temple of new India?

It surely helps that Chandigarh is small. Planned for 500,000 and now grown to around a million (although it feels like less), its scale is tractable, in contrast to the impossible density and extent of cities like Bombay or Calcutta. Compared to these cities, Chandigarh is far more uniformly prosperous and extremely clean. Local industry is limited, and the city is becoming a magnet for hi-tech firms. While Bombay—home to the largest slum in Asia (a fact some locals refer to almost pridefully)—has a population of over 12 million, of which half is squatters living in appalling conditions, the utterly poor in Chandigarh number 10 to 15 percent.

The original plan for Chandigarh was drawn by Albert Mayer, joined by Matthew Nowicki, who began to work on individual buildings. Mayer had been friendly with the Indian nationalist Pandit Nehru, who recommended him for the job and who remained the project's alter ego and protector to the end. More than any other, Nehru believed in the symbolic importance and necessary modernity of this first great construction project of the new nation. At the town's 1953 inaugural, Nehru declared it "the first large expression of our creative genius, flowering on our newly earned freedom . . . unfettered by traditions of the past . . . reaching beyond existing encumbrances of old towns and old traditions . . . the temple of new India." Le Corbusier's account of this collision with modernity was somewhat more jaded: "What is the significance of Indian style in the world today if you accept machines, trousers, democracy?"

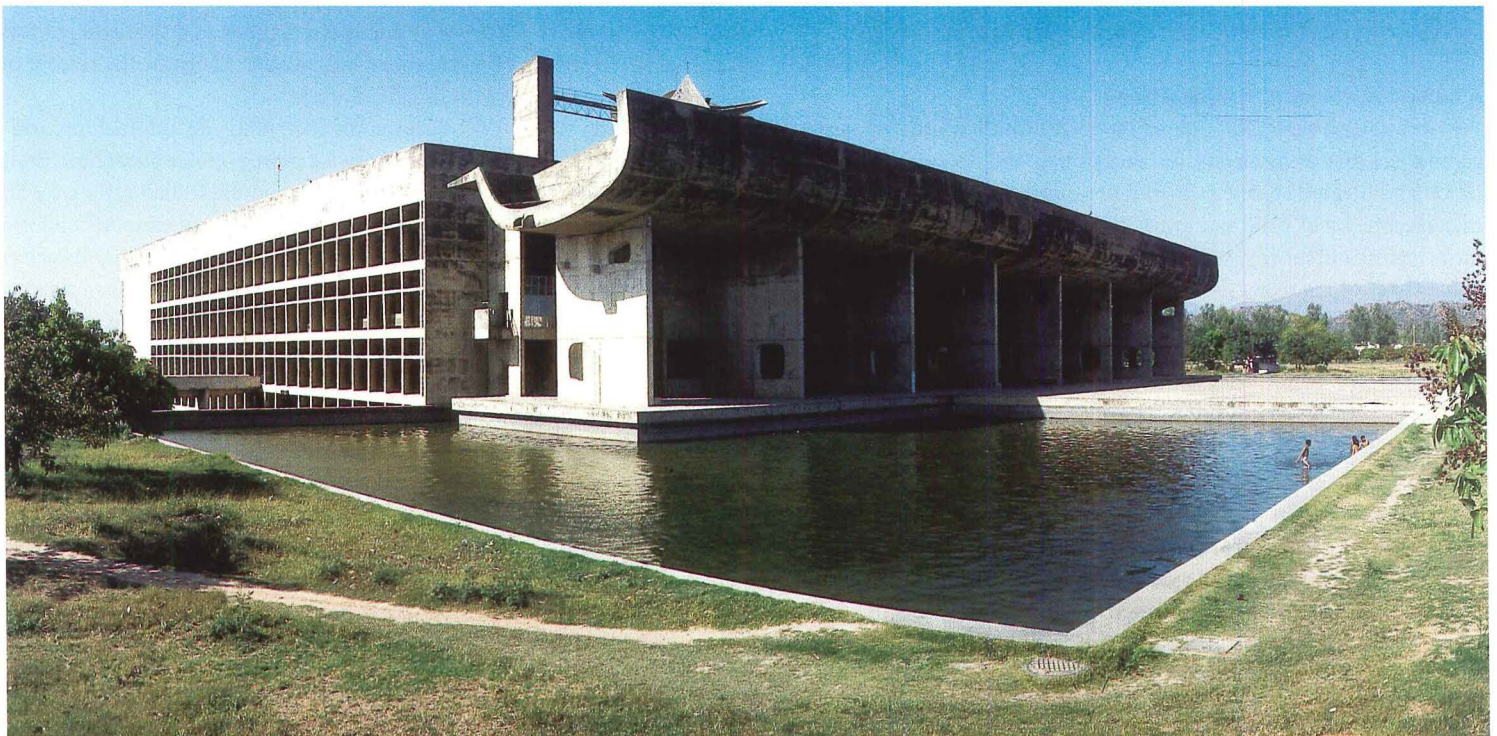
While Corb retained the essential diagram of Mayer's plan—a grid of superblocks with a commercial core and a governmental precinct as its head—he obviously found the curving, Radburn-like streets too pic-

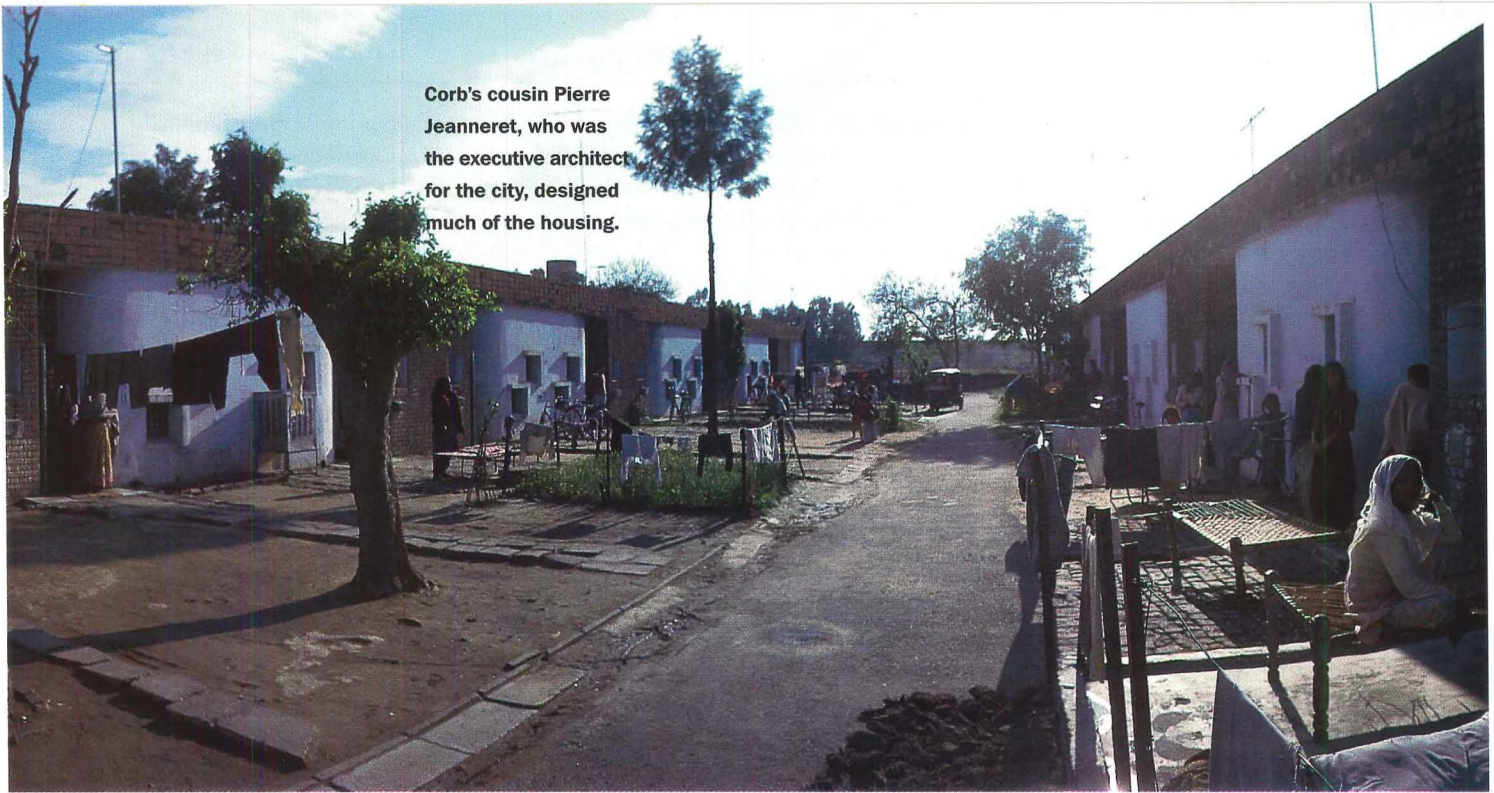
turesque and straightened them out into a more rationalist grid. Corb's understanding of the city was typically—and modernly—undergirded by a sense of circulation. For him, the new city was to be about clarity and speed ("the city that has speed has success"), about unimpeded flow.

The curved line is the line of the donkey

Famously, he had deplored the idea of a city finding its form through the meanderings of oxen but now found himself in a country in which the privileged movers were cows, who enjoy complete freedom of the road in India. In *Urbanisme*, Corb had written, "man walks in a straight line because he has a goal and knows where he is going. The straight line is the line of man, the curved line is the line of the donkey."

Donkeys notwithstanding, Chandigarh's most fundamental physio-conceptual flaw is its attempt to impose the engineer's rationality on the city universally via a strategy of separation, erecting barriers to the typical Indian means of frustrating such hierarchies. Traffic is organized by a system that imposes too many handicaps to mingling, based on the





Corb's cousin Pierre Jeanneret, who was the executive architect for the city, designed much of the housing.

modernist paradigm of smooth flow and separation of traffic—the seeming opposite of the indigenous condition. Designed from the position of the car, it inconveniences both the pedestrian and the bicycle, the logical means of transport in a city that is both flat and compact. Giving alpha status to the car does fulfill its own prophecy: the very generously dimensioned system is largely able to cope with the town's motor traffic.

The seven-fold hierarchy of street types (the famous “V” system of roadways in Chandigarh is a rationalist nightmare out of Mr. Hulot) is the medium of this strategy, but it has been partly sapped of its rigidity by an encrustation of improvisation, modification, and the makeshift, by bazaars in the parking lots and bikes on the motorway. But the surfeit of curbs and medians and the humongous street widths remain inconvenient. Likewise, the Delhi-style caste-colonial lexicon of housing types—14 categories ranked to precisely reveal status by size, elevation, and proximity to the symbolic center, the upland capitolium—is a flawed approach, certainly in a democracy. The generic architecture of the city is surely too monochromatic. The commercial center remains dry.

A coherent sense of neighborhood

But, this having been said, Chandigarh is beautiful. Insanely generous in green space for any Asian city, it stands in tremendous contrast to the pollution and turmoil typical of Indian urbanism. The city has an extremely manageable scale (I did my touring on a bike), wanting only a slightly more logical and more sustainable attitude to the mix of transport means and a series of relatively minor modifications to its streets to reverse the privilege of motor traffic in favor of walkers and bikes. And the super-block system has always had the potential to be both subtle and viable, to create a richly textured modern Mohalla, a really autonomous and coherent sense of neighborhood. What's missing is enough layers deployed in simultaneity, more of the richness of the convulsive Indian styles of compaction and the side-by-side. Chandigarh still needs to acquire the sense of both/and, a deeper patina.

For years I've heard the standard critique of Corb's government precinct in Chandigarh: inhuman in scale, lost in inarticulate space, a sun-parched monument to bureaucracy. In fact, the site is magnificent,

slightly elevated, surrounded by green, with a beautiful mountain backdrop. Clearly, the complex riffs the Lutyens acropolis at Delhi with its axial approach and formal ensemble. Like New Delhi, the grand distances are not meant to be convenient but impressive and symbolic. But if the King's Way was terminated by the palace of the Raj, Chandigarh has another iconography in mind. Approaching, the roadway leads only to emptiness, splitting in two, the court to the right and the legislature to the left. In the original plan, a governor's residence is more or less in the axis-culminating position. But compared to the other structures on the hill (or to the Palace of the Raj), the building was quite small. The servant of the state was to live well but to know his place, hemmed in by the grandeur of the courts and the legislature.

A spray of abstract iconography

The precinct is further animated by Corb's own spray of abstract iconography—the sculpture of the Open Hand and the concrete-braced berm called the House of Shadows. I visited several times, and the highlight was at dusk, as the heat of the day ebbed and the plaza became the reserve of bikers and skaters and wheeling black birds.

Next to the Corbusian acropolis stands an astonishing anti-Chandigarh, the Rock Garden, the town's most popular attraction. Built over many years by Nek Chand, an engineer on the Indian railways who continues to expand the project, the garden is an explosion of folkloric construction, Simon Rodilla meets Antonio Gaudí. Where Chandigarh is geometrical, the garden is free-form and eccentric. Where Chandigarh's materiality is limited and precise, the garden's is convulsive, odd, and eclectic, from boulders to broken porcelain electrical fittings. Where Chandigarh is flat, the garden is all cliffs and gorges. Where Chandigarh is too legible, the garden's routes meander, dead-end, and double back. It's a beautiful place and easily the most brilliant and concrete critique ever rendered of the city. And yet it fits. Much as Corb's plan opposes order and nature in a familiar European way, with overgrown parkland flowing through the city, so the city assimilates the garden as a carefully enclosed icon of otherness, the order not taken.

The garden is a kind of ghetto. Chandigarh is a monument to

CHANDIGARH IS BEAUTIFUL.... WHAT'S MISSING IS MORE OF THE RICHNESS OF THE CONVULSIVE INDIAN STYLES OF COMPACTION AND THE SIDE-BY-SIDE.

the prescriptive, the desire for everything in its place. One often reads in sympathetic accounts of Chandigarh's origins of Corb's affinity for the Indian environment, his intuitive reading of its historic architecture and spaces, emblemized by his cheery cartoons of big-horned Indian cows (although—in a familiar split—others call him superficial, his only knowledge of Indian culture coming from hobnobbing with the rich and looking out the car window). But it's also clear that Corb's rigid and antique sense of social hierarchy dovetailed precisely with an Indian mode of social division. India continues to be crippled by caste, a place in which hierarchy is hereditary and inescapable. In Chandigarh's almost insane attempts to impose a hierarchical system of classification on all dwellings, the mechanizations of European rationality conjoin with the ethos of caste to produce what is in many ways a nightmare.

Any city must answer the question of who is to live there. Naturally, a democracy prefers to answer "anyone." In a poor and stratified country like India, the consequences can be Bombay, with half the city unhoused. In Chandigarh, the initial response was to be "anyone with regular employment." The question of defining the limits of population, of course, is set at the low end of the scale. But how low to go? At the city's beginning, the entire early labor population was working on construction. The intention was for workers (often with their families) to live in self-built shacks on construction sites. These shacks were meant to be self-liquidating: when the building was completed, the workers were displaced, enacting a short-cycle episode of colonial exploitation and expropriation.

Such issues of class and mobility are truly clarified at the margins, and these margins are both social and spatial. To solve the problem of its homeless, Chandigarh has created a system meant to bring people from illegal settlements into transit camps, then self-built camps with limited services, one-room tenements, and finally into "regular housing."

Of course, most do not make it, remaining outside the system. In Chandigarh—like Brasilia—the idea of marginalization has a particularly spatial quality: the poor are literally peripheralized in squatter colonies beyond the territory of official sanction, in a parallel city, unsusceptible to the rationales of order that shape the official zone.

A degree of everyday mingling

All cities are shaped by social strategies for housing and income mobility. Caste or class systems in their pristine manifestations are formulas for total immobilization. In India, though, the upper caste/class's self-blinded, tolerating eye (the same blinkering that lets us step over our own homeless) allows a degree of everyday mingling—the ubiquity of the "informal" sector is an astonishing fact of life everywhere—which our political culture, cheering the hounding of squeegee men from our streets, would not tolerate.

All towns confront similar issues of order, but new towns throw them into special relief. Whether at Brasilia, Chandigarh, or Celebration, the degree of prescription can be seen with intense, schematic clarity because the accidental has been largely excluded and because, in their youth, these places continue to be unmodified incarnations of initiating visions. While we tend to focus on the physical aspects of these informing prescriptions, such new towns also clarify the ideological constructs that undergrid them, diagramming clearly a fantasy of social relations.

The character of a society can be judged by the way it formulates its styles of compatibility, an issue that becomes more acute the greater the degree of stratification, and all of these towns paint a precise portrait of privilege. But Chandigarh—for all its frustrations and for all its entrapment in the problems of a very poor country—is an inspiring place. Not simply as an example of willed magnificence but of that most optimistic of acts, the building of a city. The world needs more Chandigarhs. ■



Although nearly 15 percent of Chandigarh's population live in squatter settlements

at its periphery, the city has a system of 14 levels of housing. Modest homes (left) were

designed by Pierre Jeanneret in the 1960s, while red-brick ones (above) are new.

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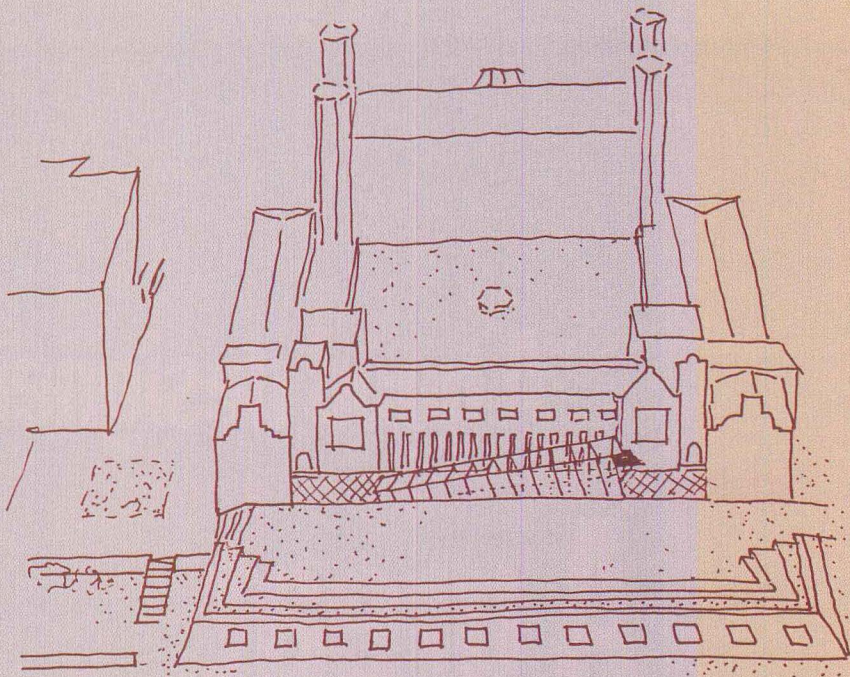
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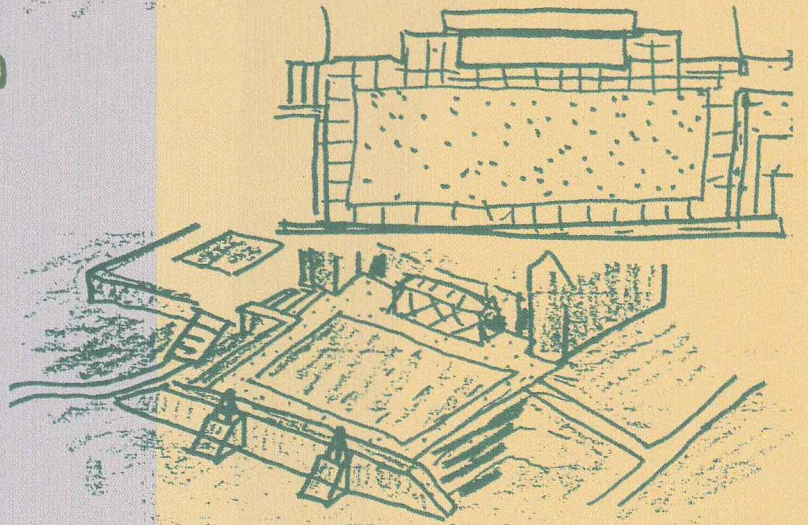
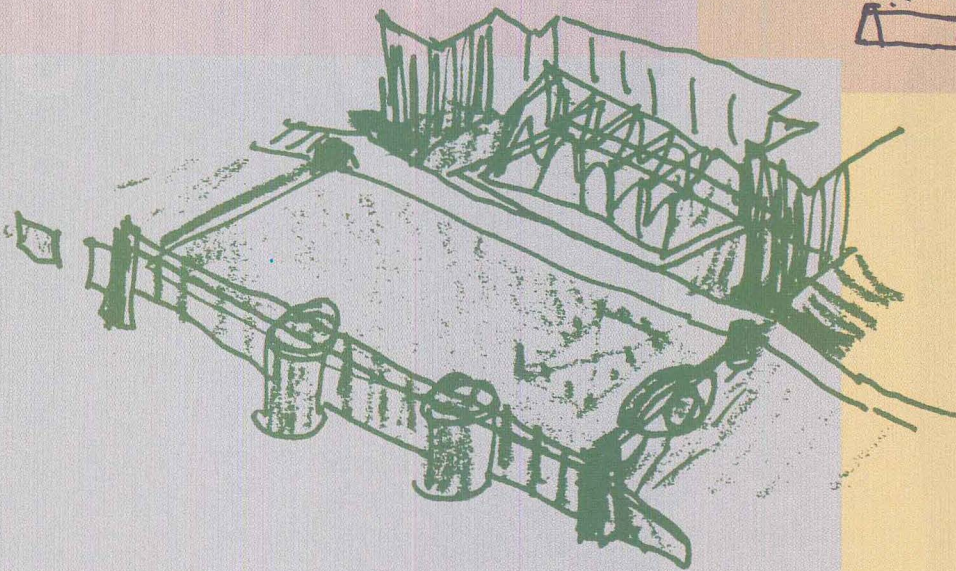
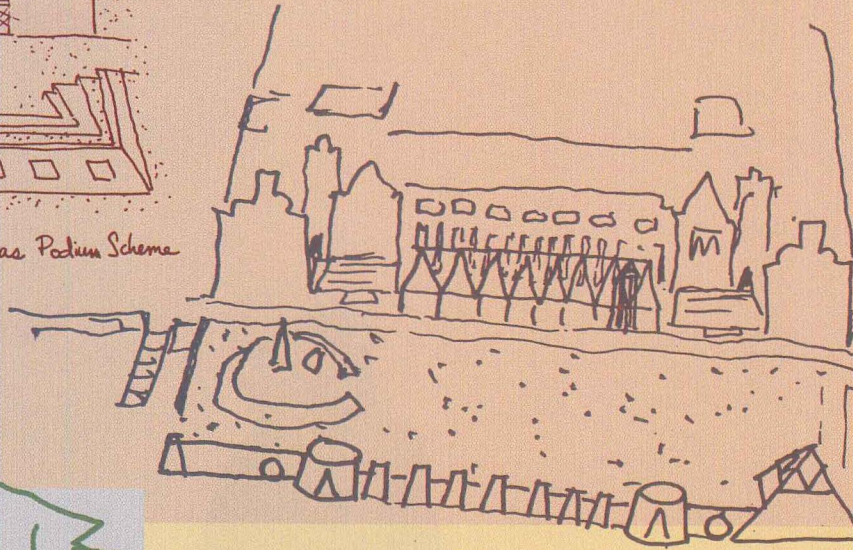


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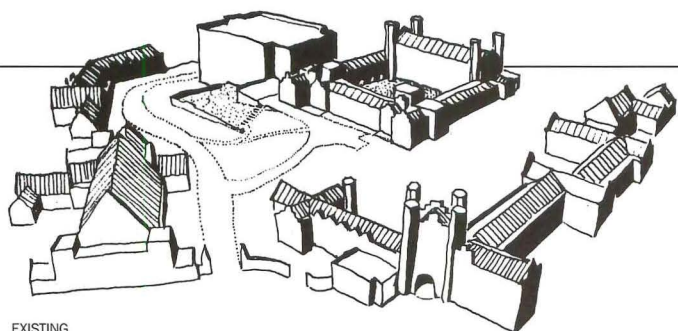


Thomas Podium Scheme



A sketch of Bryn Mawr College's historic heart shows the access roads and parking turnaround that occupy the future site of the Rhys Carpenter Library (opposite). Options for a podium scheme (above and right) locate most of the building underground.

PROJECT DIARY Henry Myerberg's first building as a solo architect, the RHYS CARPENTER LIBRARY, provides Bryn Mawr College with a popular new campus center.



EXISTING

Many young architects face the question of whether to leave an established firm and start their own practice, and Henry Myerberg was no exception. Like some of his talented and fortunate colleagues in the early 1980s, he was thriving at a successful practice, the New York City office of Edward Larrabee Barnes. After five years with the firm, he had become a trusted member of Barnes's inner circle, heading up a variety of academic and residential projects. While he enjoyed the constant challenges of a high-profile, high-powered office in the midst of a building boom, he worried about getting ensconced. Aware that in the decades of running an office, Barnes, in Myerberg's words, "had matriculated many successful independent architects" (Charles Gwathmey, Jaquelin Robertson, and Toshiko Mori, among others), he was on the lookout for the moment to make his own move.

FEBRUARY 1986 Two weeks before the birth of his first child and four months before his 31st birthday, Henry Myerberg, AIA, leaves Barnes's office to start his own firm. He already considers the move behind schedule, if only slightly. "I vowed to myself that by the time I turned 30 I would have my own company," Myerberg says.

His first solo project is a commission to design the showroom of a knitwear company located in Manhattan's garment district. And Barnes, sympathetic to the travails of a young architect, commits an act of unusual professional largesse: he hires Myerberg as an outside consultant to complete his final project for the Barnes office, the computer center at Bryn Mawr College, six months from completion. An underground facility arrayed around a central light court, the project is vintage Barnes. "He's the guru of commodious underground structures in historic collegiate settings," says his protégé Myerberg. While Barnes remains an advisor to the campus on its expansion projects, Myerberg has worked closely with campus officials and contractors on the computer center as

by Karen D. Stein

project architect and Barnes decides to retain him as a consultant to supervise its completion.

SUMMER 1988 In July 1988 Myerberg receives a call from Barnes about Bryn Mawr's interest in expanding the stack space of Thomas Hall, a historic Collegiate Gothic structure designed by Cope and Stewardson in 1904. The college's plan is to provide additional space adjacent to the existing stacks of the Art and Archaeology Library, and to place it underground. Barnes tells Myerberg he has recommended him for the job, which is technically complex but too small-scale for Barnes's practice. What's more, Myerberg has become part of the Bryn Mawr extended family, a position enhanced by the fact that his wife is an alumna of the college.

Myerberg meets with James Tanis, the director of libraries for Bryn Mawr College, to discuss the project. Tanis is responsible for the building program, which envisions 10,000 square feet of stack and study-carrel space contained in a one-level expansion behind Thomas Hall. The area designated for the project, a west-facing swath, is currently occupied by a terrace and a surrounding lawn that terminates in a service road and parking turnaround.

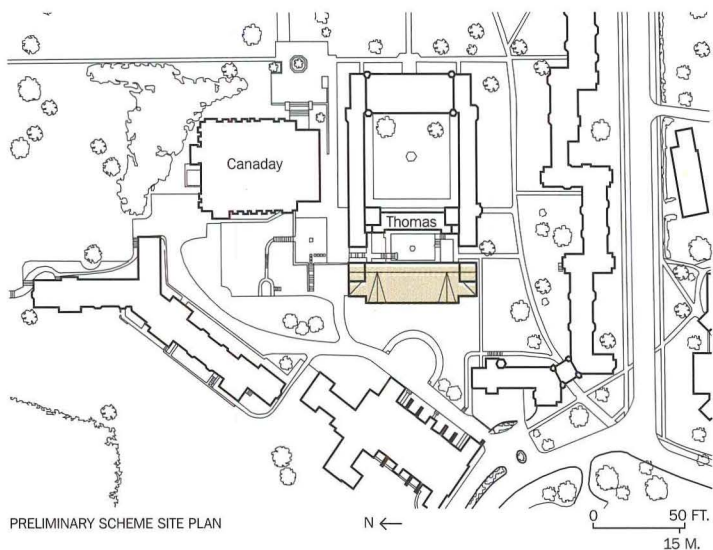
Of the state of affairs inside the library, Myerberg observes, "The stacks were built in the 1920s and they're overcrowded. The mechanical systems are inadequate, the temperature controls are ineffective. There are a lot of valuable folios, and the secure area is too small. Books are piled in seminar rooms, which is sort of charming, but all these little dens don't present the library as a singular place." Tanis, in agreement with the architect's prognosis, says campus officials first contemplated a quick, straightforward remedy. Explains Tanis: "We were so clearly in trouble

Project: Rhys Carpenter Library, Bryn Mawr College, Bryn Mawr, Pennsylvania
Architect: Henry Myerberg Architects—Henry Myerberg, AIA, principal-in-charge; Stover Jenkins, Amelie Rennolds, John Janco, Meryem Tangoren, Susan Scatoni, Sharon Portnoy, project team
Engineers: Thornton Tomasetti

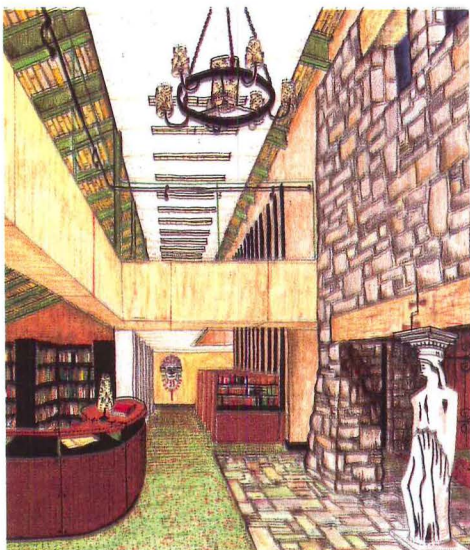
(structural); Makh Associates (mechanical, electrical, plumbing)

Consultants: Rodney Robinson (landscape); RL Design (lighting); Shen Milsom & Wilke (acoustical); Langan Engineering (geotechnical); Christopher Ostafin (interior finishes); Ani Roskam (paint colors); Wolf & Company (cost)

General Contractor: Wohlsen Construction



PRELIMINARY SCHEME SITE PLAN



Myerberg and the college considered a contextual rubble-stone structure located behind the quadrangle of Thomas Hall (site plan and drawings this page).

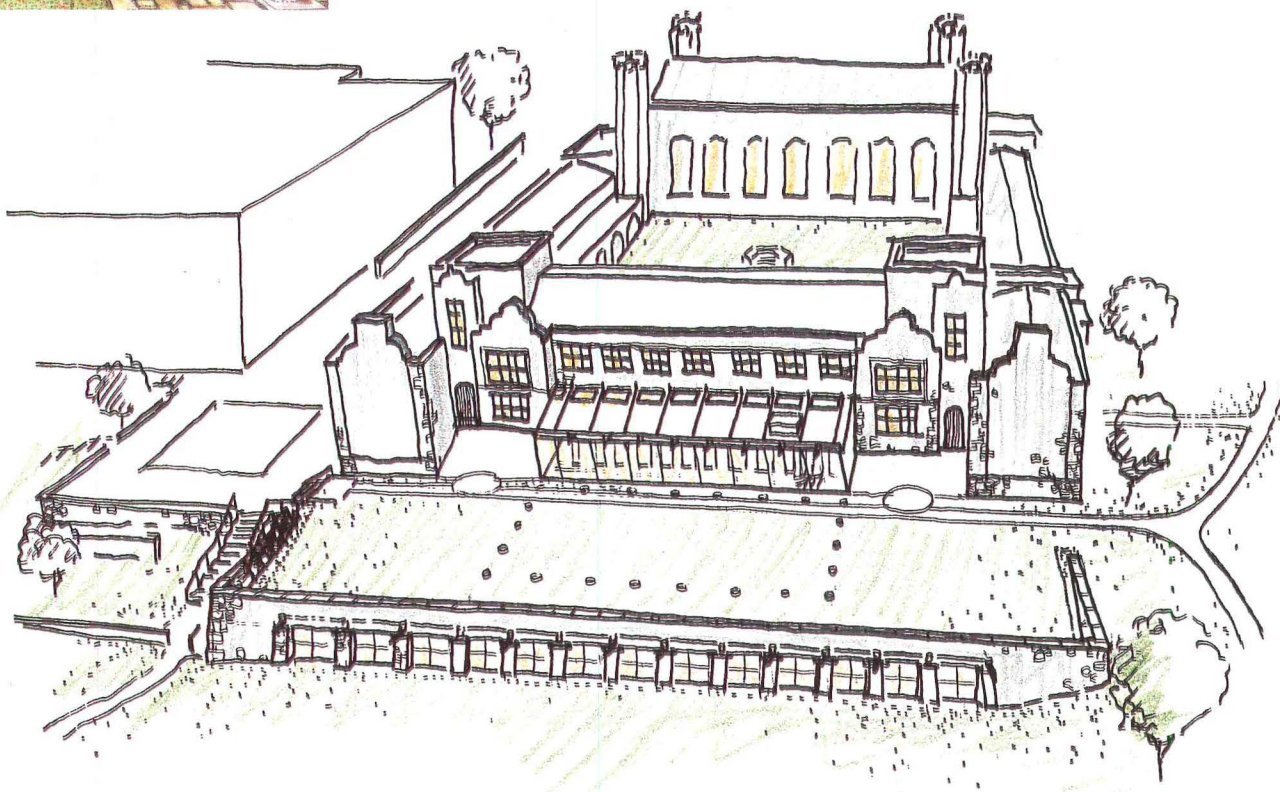
that at first we were talking about, quite simply, a hole in the ground for books.”

Myerberg spends the remaining portion of the summer and the early fall preparing his initial design scheme and assembling information to calculate potential costs. His proposal calls for an underground structure shaped like an L in plan with a grass roof and an open courtyard between the old and new buildings to bring daylight to the underground spaces. In trying to accommodate all of the needs enumerated by Tanis and Mary Patterson McPherson, president of Bryn Mawr, Myerberg discovers that 10,000 square feet of new space is inadequate. An additional cellar level of stack space is considered by the group. Anticipated cost hovers around \$2 million.

FALL 1988-FALL 1989

By November of 1988, the scheme under consideration has doubled to 20,000 square feet and two levels. The need to relocate existing utilities, which occupy the proposed site, adds to the budget. Aware that with the increased size and scope of the project they now have a full-fledged building on their hands, college officials begin to focus on the nature of the architectural expression. The college asks Myerberg to investigate the possibility of pitched roofs, which school officials consider harmonious with the surroundings: Bryn Mawr was the first Collegiate Gothic campus in America, and every building in its center is on the historic register. Also, the flat roofs on campus have a tendency to leak. As Myerberg struggles for an appropriately up-to-date interpretation of Collegiate Gothic, the size of the project increases once again, this time to 25,500 square feet.

Myerberg designs an above-ground scheme of two floors with rubble-stone walls and gabled slate roofs meant to echo the surrounding campus. The proposal includes renovating a portion of the existing library and retaining the courtyard between the new and old buildings. The cost estimate for the entire project rises to \$5.7 million.





SPRING 1991 Myerberg's office completes final construction documents for the above-ground scheme, but the college decides to put the project on hold while it completes another campus structure currently under way, a large science building.

After almost a year and a half of waiting, Bryn Mawr asks Myerberg for an updated estimate of construction costs. The new total—\$6.5 million—includes additional mechanical equipment to service other campus buildings. With the price rising for every new addition to its wish list, campus officials decide to take yet another step back and examine what other institutional needs might be fulfilled by this project. A large lecture room and accommodations for the college's vast slide library—together about 6,000 square feet—are added to the program. The project is now more than 30,000 square feet and the college wonders if another site might be less intrusive and more economical.

WINTER 1992-93 Two concepts for adding on to Thomas Hall's neighbor, Canaday Library, are explored. Bryn Mawr officials bring Barnes back to help the group evaluate the various strategies. The discussion of Canaday and the involvement of Barnes, McPherson explains, in no way reflect a lack of confidence in their young architect. "It's Henry's project," she says, but "Ed has stayed involved as a kind of welcomed kibitzer." Even though the increased complexity of the project might seem to necessitate a more established firm, Bryn Mawr officials are committed to Myerberg. "At some point we did ask ourselves if we should be looking at other architects," concedes Tanis. "But we've liked what Henry has done. He keeps coming up with viable ideas."

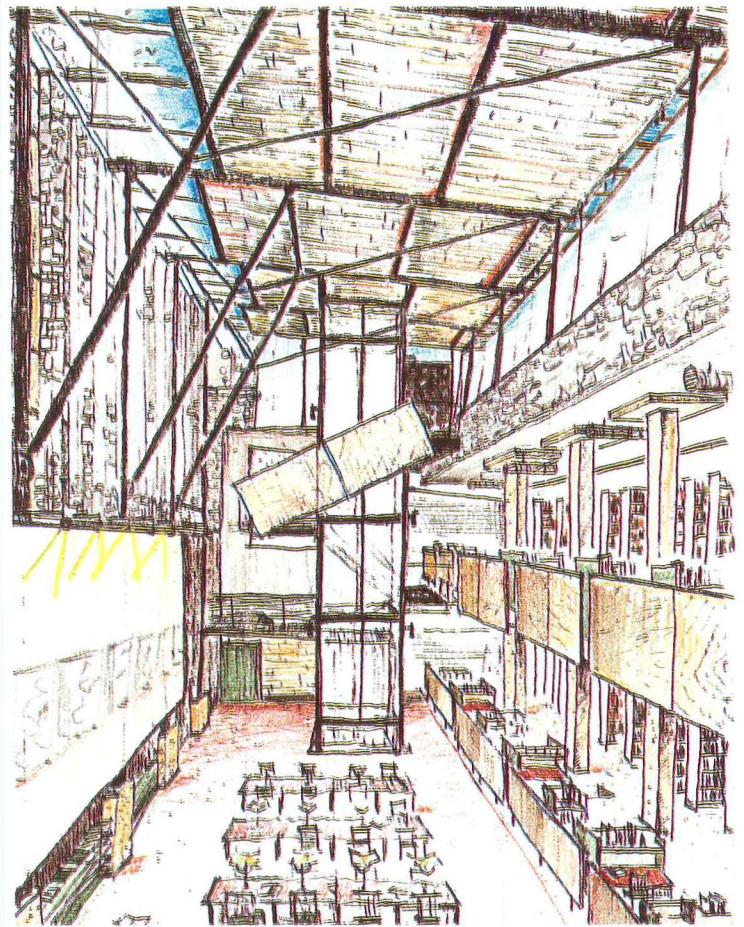
With Barnes, the group discusses the merits of proposals that

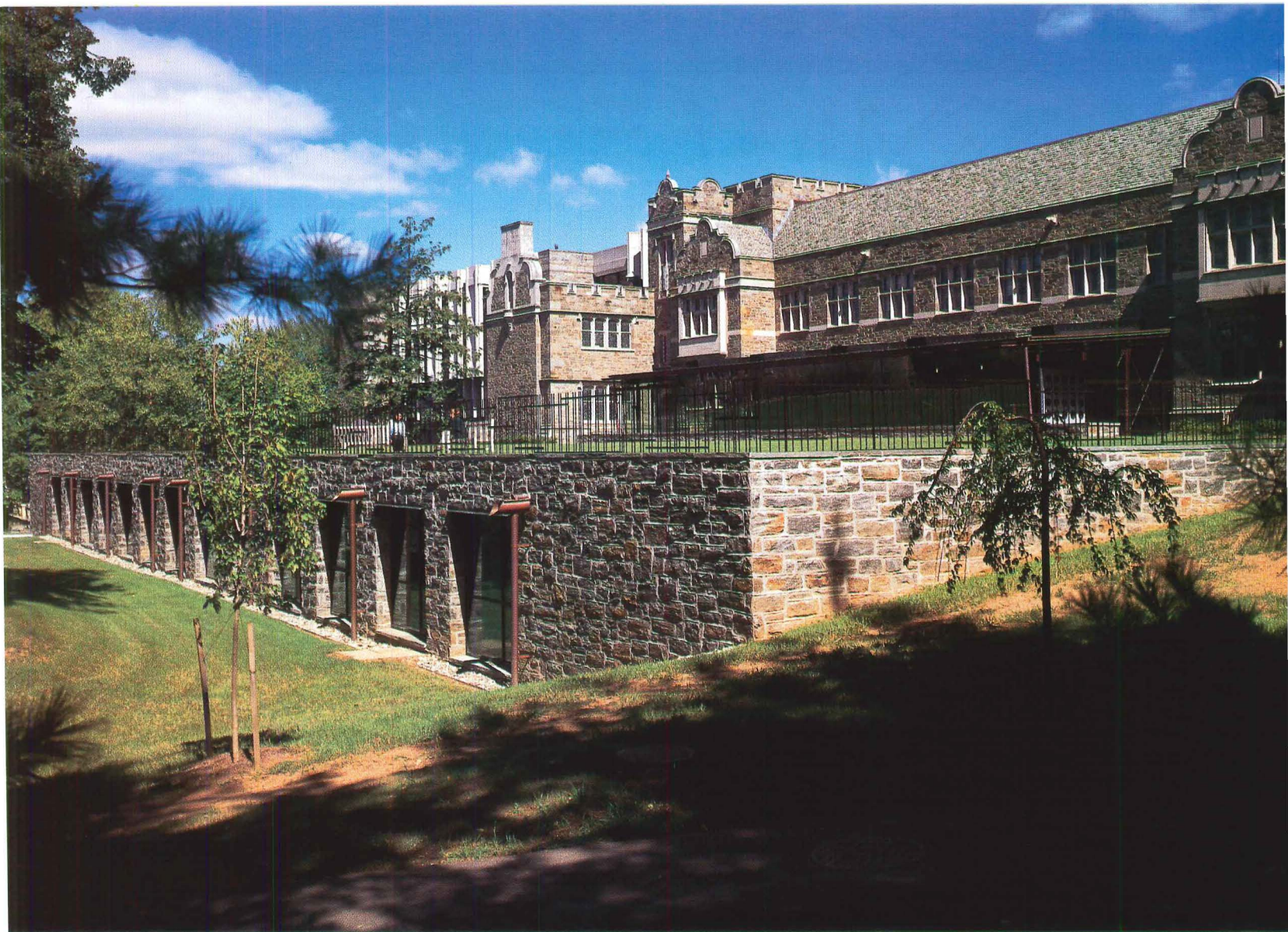
Myerberg develops for the Canaday site—one a broad podium with underground spaces and the other a five-story tower. Both were estimated to be less expensive than building next to Thomas. As members of the art and archaeology faculty get involved in the planning, they begin to express concern about the distance between their offices in Thomas Hall and the proposed addition to Canaday. The college reconsiders the Thomas Hall site.

Back on the Thomas Hall site, Myerberg prepares two alternate concepts. The first is a four-story building that screens most of the existing back side of Thomas. The second scheme, a much larger underground expansion than originally proposed, butts right up against the foundations of Thomas Hall but still incorporates a skylit atrium in between.

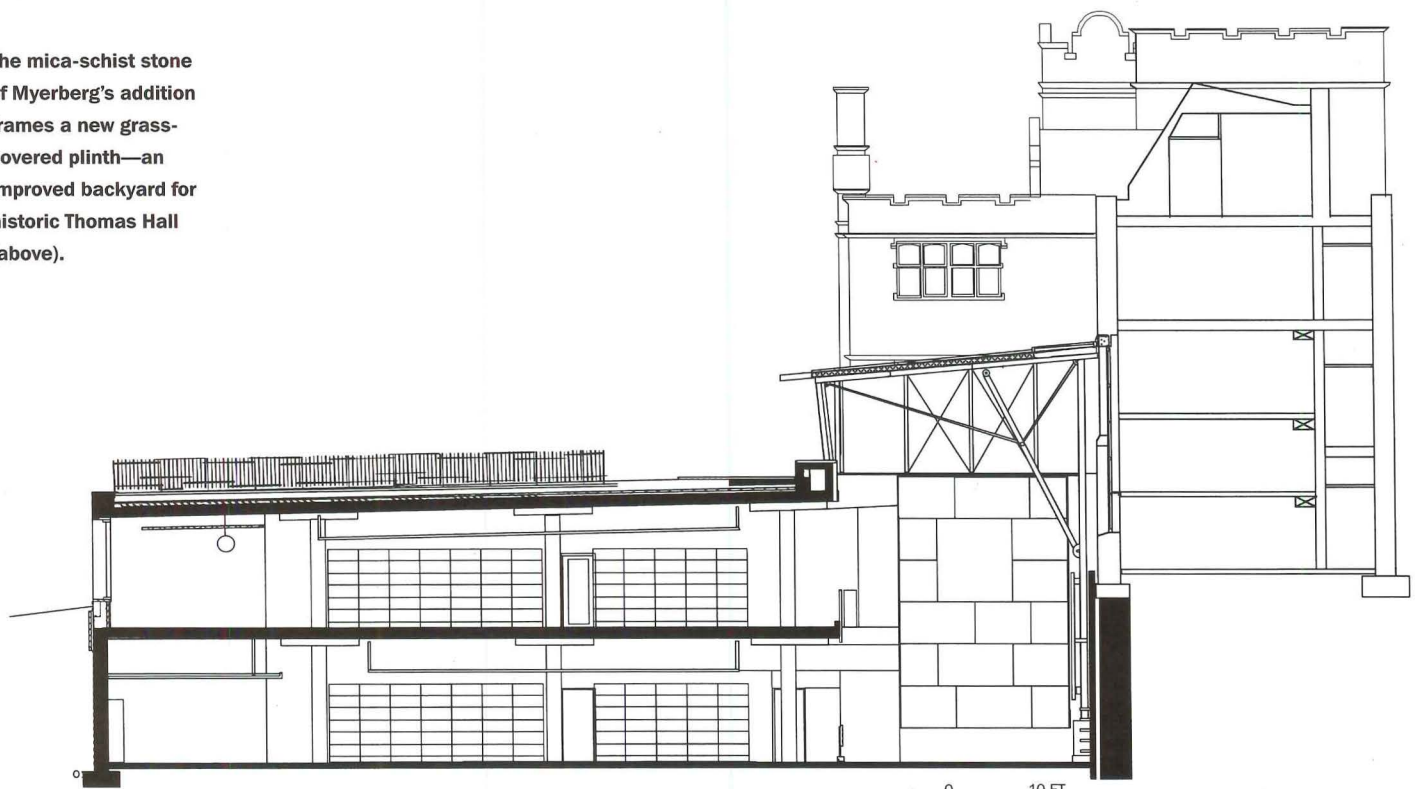
WINTER 1993 While the first scheme draws on the traditional language of the campus, the second scheme is more modern in its vocabulary of forms. For Myerberg the constant process of redesigning the project over the years has helped him develop his own architectural language for a historic site. "My designs went from Collegiate Gothic contextualism to Modernism—one that is referential but still abstract," he observes of the progression of schemes. "I got more comfortable with Modernism." Did this proposal's composition of taut, flat planes make it alien to the campus? Not entirely, for as architecture aficionados know, in addition to its beloved historic heart, Bryn Mawr has another distinct legacy: Louis Kahn's Erdman Hall Dormitories of 1965. McPherson

After the contextual above-ground scheme was abandoned, Myerberg developed several proposals for a mostly underground building (drawings this page).





The mica-schist stone of Myerberg's addition frames a new grass-covered plinth—an improved backyard for historic Thomas Hall (above).



SECTION A-A

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allows that a modern structure like Erdman can be more successful than a traditional design in knitting together historic campuses, as long as it's not too intrusive. "Often it's the very modern building that goes best," says McPherson. "If you try to match the existing too closely, it may come out as a pale imitation."

With Barnes's advice and consent, the group agrees to pursue the modern, underground scheme, which maintains the faculty offices' proximity to the proposed library and saves the Canaday site for future expansion. By the end of 1993, the project holds firm at 32,000 square feet. The cost is estimated at \$6.2 million. McPherson, who has overseen many campus renovations and additions since becoming the college's president in 1978, calls this project "the most complicated yet." There are internal issues. "It's more than just one academic department and the library system," explains McPherson. And there are the difficulties of the site itself. "When you drop a hole next to an existing building, the existing building can drop into the hole," says McPherson.

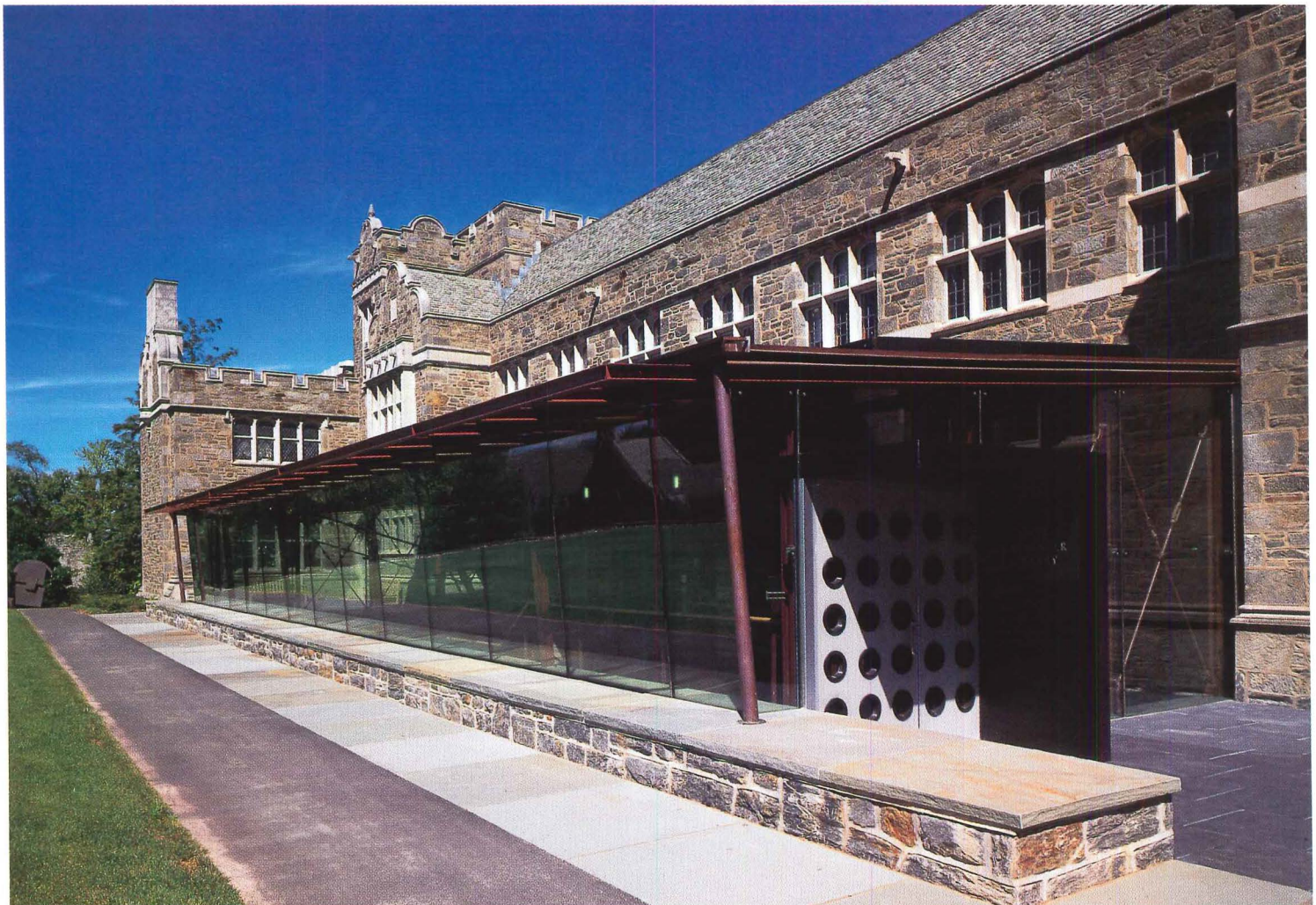
APRIL 1995 More than seven years after receiving a tip from a former employer about a small addition job, Myerberg supervises the beginning of construction on what is to be a state-of-the-art scholarly facility. Three months into the process, there is a pause in construction as the soil conditions beneath Thomas are discovered to be less stable than anticipated. Instead of a concrete underpinning to shore up the historic structure and provide foundations for the new building, metal rods are drilled at an angle



beneath Thomas Hall. These lateral tie-backs are covered with metal mesh and sprayed with gunite. An independent concrete structure, separated by a waterproofing layer, contains the centerpiece of Myerberg's design, a four-story atrium reading room.

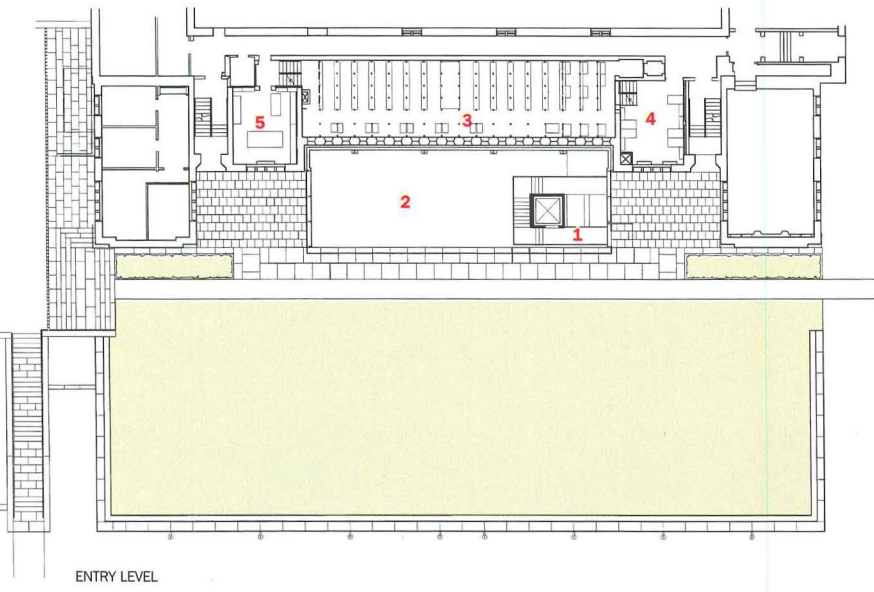
Myerberg says his glass-and-steel building with a slate roof (above and below) is "futuristic gothic."

The atrium's design, based on Myerberg's desire for a signature space that will serve as a communal focus for the various departments, was inspired by a visit to Sir John Soane's former home in London, now a museum. "When I was in the Soane house, I started to think of the project as an archaeological site and the space in between old and new as a dig. This idea suggested the structure. If it is in fact a dig, then there's a protective shed, which led me to the wood decking of the *(text continues)*

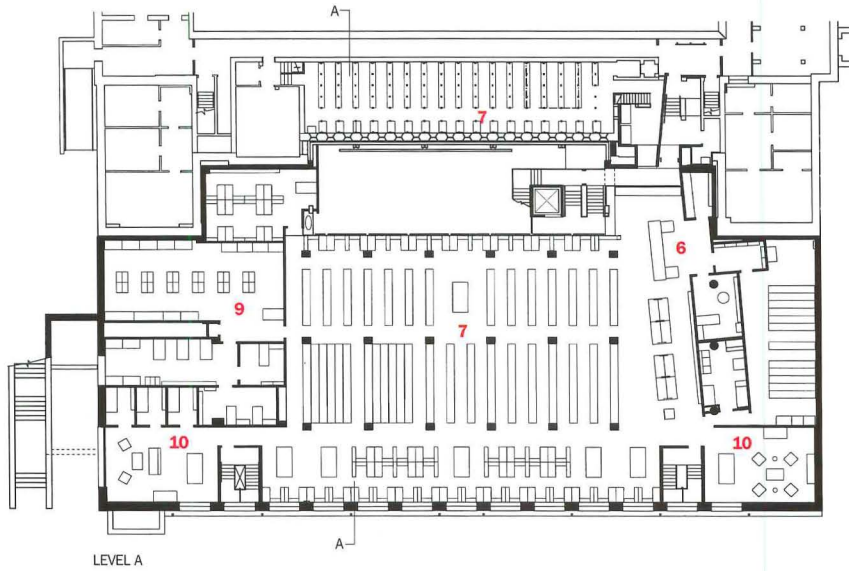




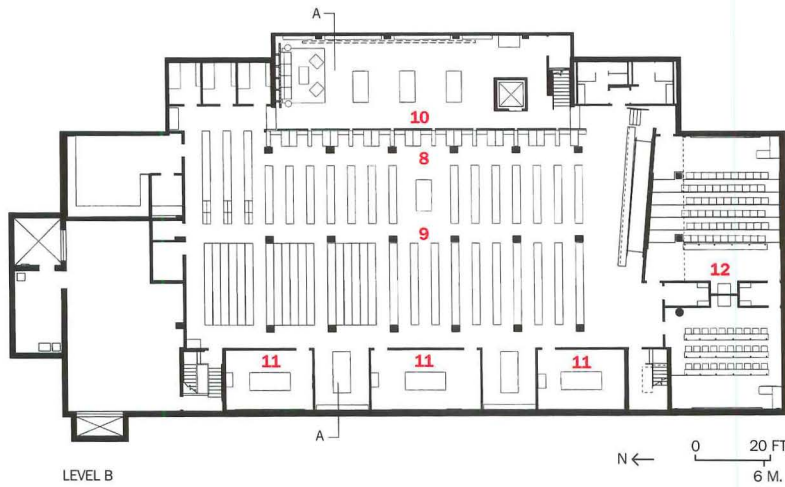
1. Entry
2. Atrium
3. Collections
4. Study room
5. Prints/drawings
6. Circulation
7. Stacks
8. Study carrels
9. Visual resources
10. Reading room
11. Seminar room
12. Lecture room



ENTRY LEVEL



LEVEL A

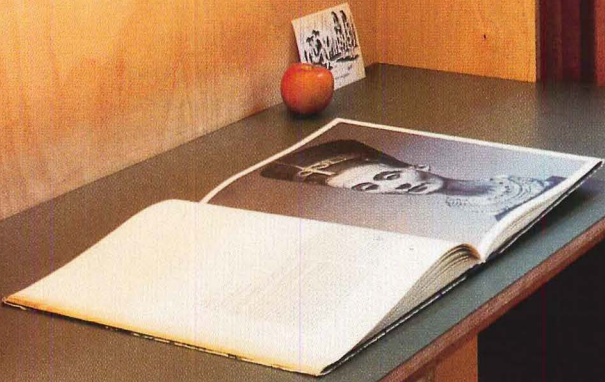
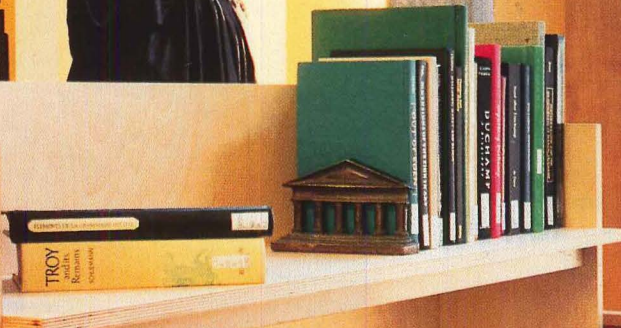
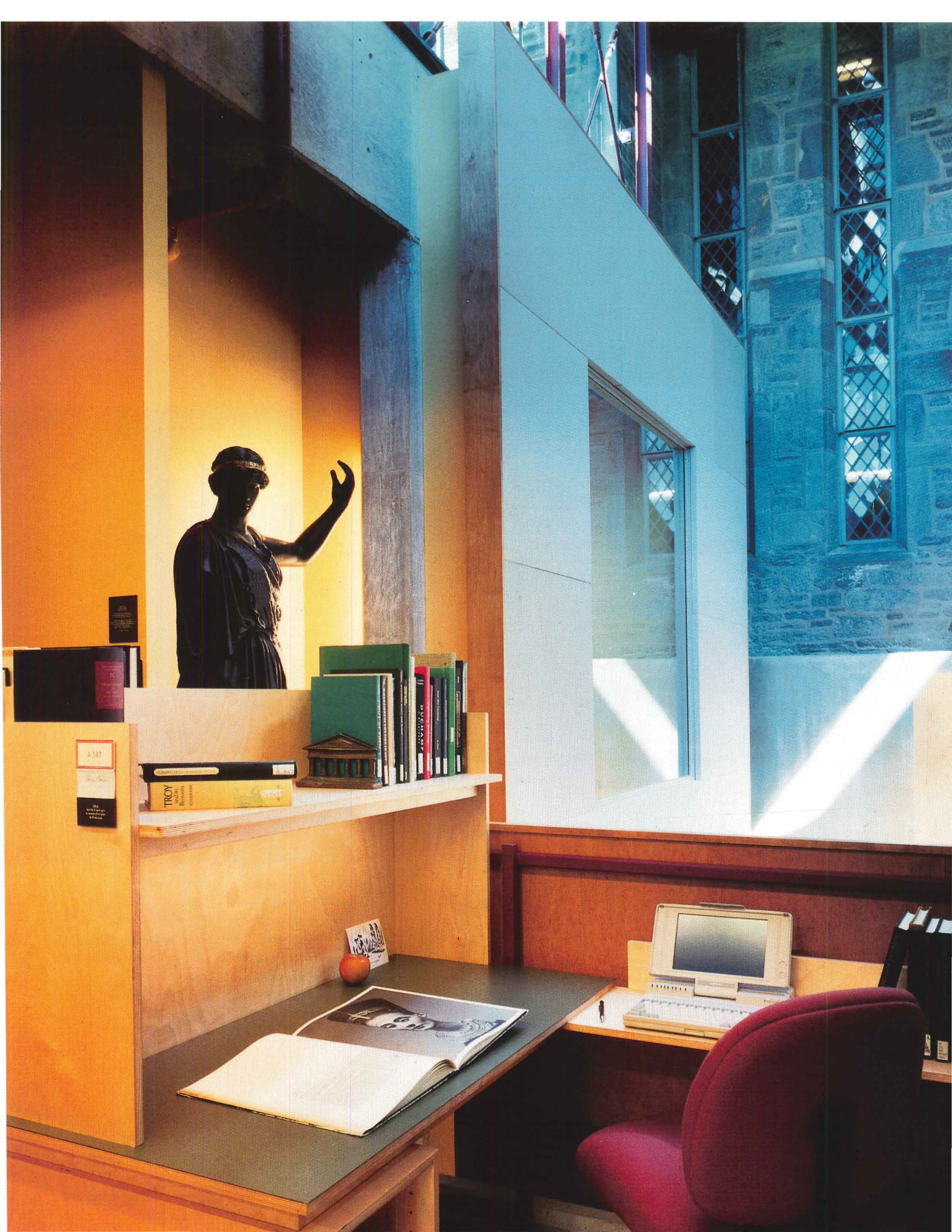


LEVEL B



The four-story high atrium reading room (above and opposite) is surrounded by study carrels, seminar rooms, and lecture halls (plans left). A

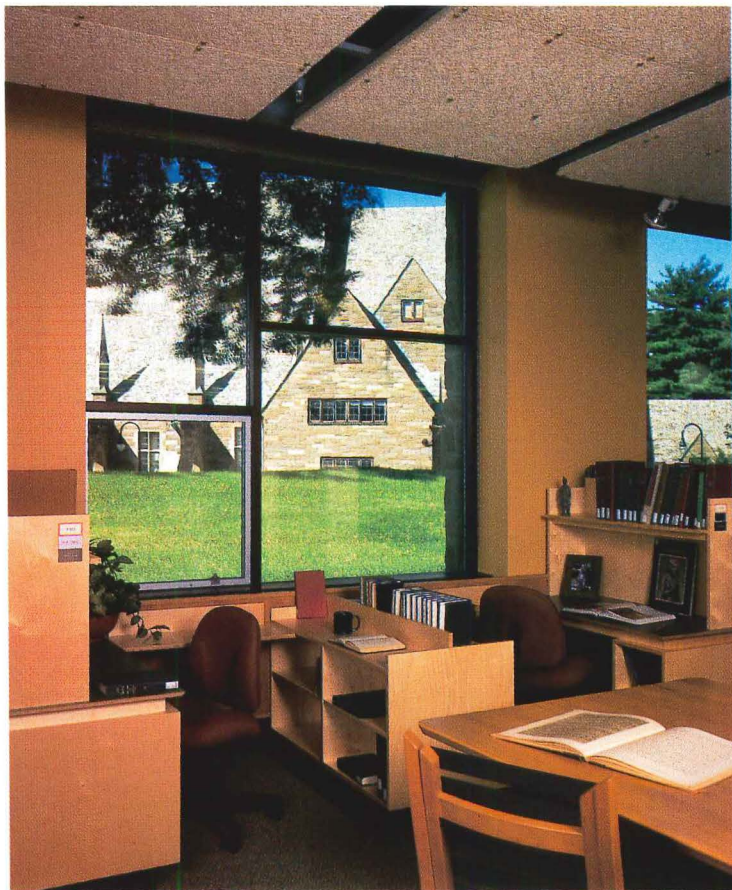
frieze of plaster casts from ancient Halicarnassus and the names of important art and archaeology faculty adorn the billboardlike new wall in front of the stone exterior of Thomas Hall.



A.147
The Troy
2002
Remains
Excavation

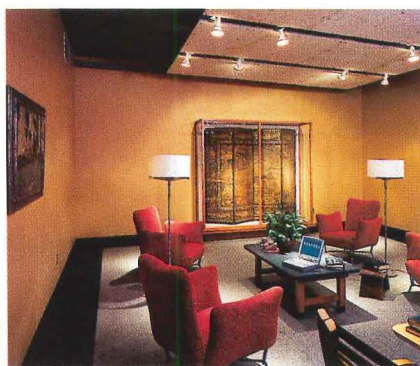
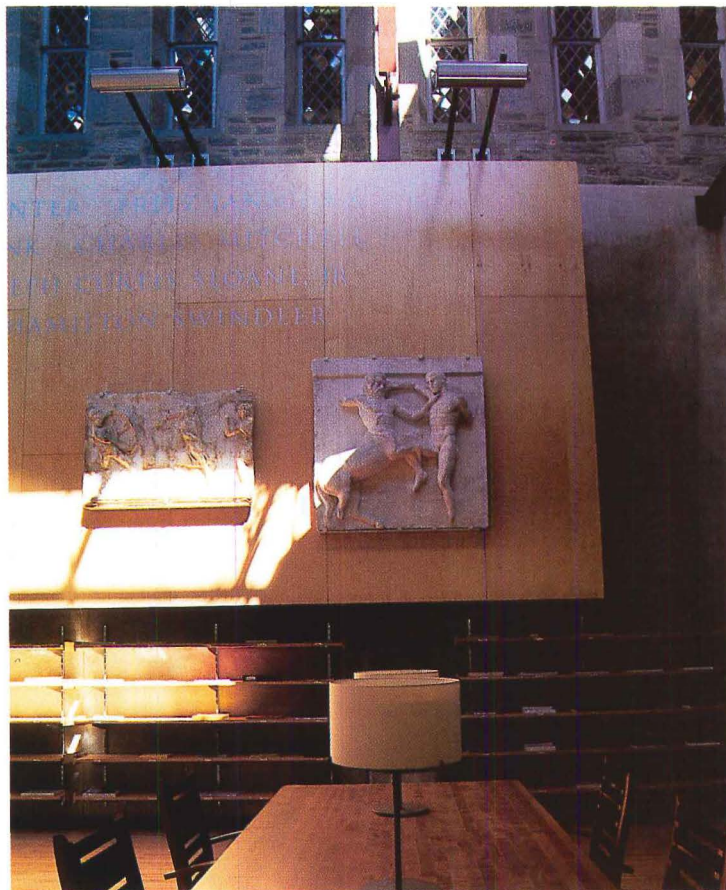
The outside back wall of Thomas Hall has been incorporated into Myerberg's multilevel atrium reading room.

The reading room features works from the college's art collection, such as a statue of Athena (opposite).



The architect's office designed study carrels (below left). Reading table chairs by Peter Danko use seat belt

fabric (below right). Tectum is suspended from the ceiling to increase acoustical privacy (bottom).



roof set atop the structural steel members. Then there's scaffolding, so the staircase wraps around the space like scaffolding. And there's a hoist, which in this case becomes the elevator enclosed in a steel cage." The steel is finished only in a red primer coat.

As the design of the atrium develops, Myerberg further imbues the space with Bryn Mawr's liberal arts mission. He surveys the college's collection of art to incorporate pieces of it into his design. Dominating the atrium, a billboardlike surface of baltic plywood is adorned with a frieze of plaster casts rescued from basement storage and repaired. A statue of Athena, once displayed in Thomas Hall, is given a central spot.

SUMMER1997 The project is 33,000 square feet of new construction and 10,000 square feet of renovation within Thomas Hall. Study space is spread among the the stacks, which, for now, hold 125,000 volumes. "There's space for the collection to grow," says Tanis.

Construction ends in August 1997. When students arrive at Bryn Mawr in September for the new school year, the library is ready for use. Within a month of opening, hours for the Rhys Carpenter Library are extended to accommodate heavy use by students, including those from other departments. "It's jammed," reports McPherson. "Henry did it right," observes Barnes, now retired. "Blockbuster buildings ruin the scale of a historic campus. His architecture is delicate glass and steel, and the rest—the bulk of the building—is part of the landscape." ■

Sources

Structural wood decking: Hoover Treated Wood Products

Mica-schist rubble stone: Media Quarries

Frameless-glass curtain wall: Pilkington

Membrane roofing: Bakor

Slate roofing: Vermont Structural Slate

Fixed aluminum awning: Kawneer

Skylights: Fisher Skylights

Insulated panel glazing: LOF

Aluminum entrance door: Special-Lite

Maple doors: Eggers

Hardware: Schlage, Hager, LCN, Von Duprin

Acoustical panels: USG, Tectum, Inc.

Paints, stains: ICI, Glidden

Plastic laminate desktops: Nevamar

Flooring: Armstrong, RCA

Carpeting: Masland Contract Agenda

Custom circulation desk, tables: Ed Kleinman

Reading table chairs: Peter Danko

Downlights: Edison Price

Display lighting: Elliptipar

Hydraulic elevator: Dover

The crematorium's porte cochere is embraced by a low brick wall that links it to the octagonal funeral hall.



ESSAY At 69 years old, Fumihiko Maki is still going strong. The recently completed **KAZE-NO-OKA CREMATORIUM** distills the themes of his rich career.

by Naomi R. Pollock, AIA

In 1956 Fumihiko Maki, a recent graduate of both Cranbrook Academy of Art and Harvard University's Graduate School of Design, began teaching at Washington University's architecture school in St. Louis. A long way from his home in Tokyo, Maki had been among the first young people from Japan to study in the United States after World War II. Like any newly minted architect, he was eager to ply his trade, and, as it turned out, he did not have to look far for an opportunity to build.

After joining the university's newly established campus planning office as a designer in 1957, Maki devised a scheme for a new campus building that would house a library, a gallery, and departmental offices under one roof. A potential donor, engaged by the architect's ideas, agreed to fund construction, provided the design was built as Maki planned. Having already accepted a traveling fellowship from the Graham Foundation, Maki had to leave his schematic design in the hands of a local architect, who saw the project through to completion. A blend of East and West, the finished Steinberg Hall impressed the editors of *Architectural Forum* so much that they hailed Maki as one of the "new generation of men and women who will shape American architecture and American building in the 1960s." Little did they know the contribution Maki would make.

Though Maki did not build in the United States again until the Center for the Arts Yerba Buena Gardens in San Francisco [RECORD, March 1994, pages 72–79], which was completed in 1993, he went on to become one of the leading practitioners of architecture in Japan and a highly respected designer, theoretician, and teacher around the world.

"He's unique," observes Hiroyuki Suzuki, professor of the history of architecture at the University of Tokyo. "He's one of the most American-oriented, and in that sense most Westernized, architects in Japan. But at the same time he shows us something Japanese in his work." A recipient of many of the profession's most prestigious prizes, Maki has designed everything from convention centers to kindergartens. He has not only built throughout the Japanese archipelago but also in Brazil, Germany, and Malaysia. Through his roles as professor, author, and jury member of architect-selection committees, Maki has extended his

Naomi R. Pollock, AIA, is RECORD's Tokyo-based correspondent. She is the guest curator of an exhibition at the Art Institute of Chicago entitled "Japan 2000: Architecture for the Japanese Public," which opens this month.

sphere of influence far beyond his portfolio. And at 69 years old, he shows no sign of slowing down.

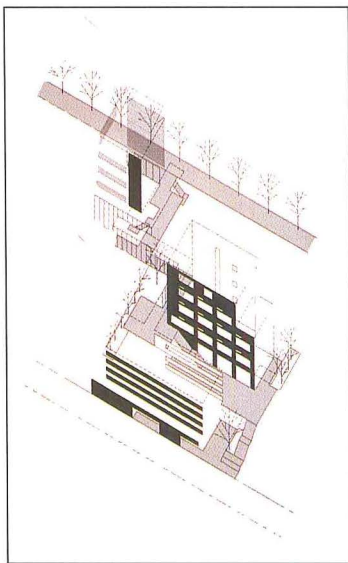
With the second phase of the already vast Makuhari Messe convention center and the Fukuoka University Student Center recently finished and a conference center in Niigata Prefecture and a library in Fukui Prefecture on the boards, Maki's office is bustling with activity. This is no small feat even for Japan's most established firms, given the country's current economic distress and consequent belt-tightening. Since work in Tokyo has recently slowed considerably for all architects, Maki, like many of his colleagues, now has more projects in regional cities than ever before. And although he has a number of repeat clients, he too is participating in competitions for public work commissions. But none of these limitations have had much impact on the quality of the firm's work. In fact, the completion of the Tokyo Church of Christ in 1995 [RECORD, October 1996, pages 88–93] and the Kaze-no-Oka Crematorium in 1997 marks the realization of two of his most elegant and powerful buildings to date.

The success of these and other Maki projects stems largely from a commitment to his own exacting standards. "The qualities of great architecture are those that provide rich spatial experiences and the provocation of images," he maintains. While Maki has been fortunate to land evocative commissions, such as the church, that lend themselves to these aims, he also has an ability to turn the practical into the poetic. "Maki always designs from the viewpoint of the user," explains architect Kengo Kuma. "For him, the overall composition is secondary."



Maki's first building, Steinberg Hall (top), is at Washington University, St. Louis. His 1995 Floating Pavilion (above), is in Groningen, Holland.

Nearly complete, Hillside West continues Maki's famed Hillside Terrace.



Although much of his work employs a Modern, abstract language, he does not shy away from expressive forms.

Maki's Floating Pavilion is a case in point. Half boat and half building—a barge of sorts—the 20-by-82-foot structure was designed for the city of Groningen in Holland as a multipurpose performance space. Neither site-specific nor program-specific, it travels up and down the canals that crisscross the city, acting as the setting for a one-act play here and a chamber music concert there. In its quiet way, the pavilion, enveloped by a steel-framed tent, alters the surrounding landscape everywhere it goes. Likened to clouds, giant snails, and alien creatures, it is

indeed hard to miss. “When ordinary people started to use nicknames, we knew the object had captured their imagination,” says Maki, who is very interested in the universal reaction to architectural forms.

While the architect is engaged in other European projects, he chooses his international work carefully. Maki rarely undertakes more than one or two projects outside Japan at the same time. Also, he is wary of huge overseas projects that might drain the resources of his 30-person office. Because it can be difficult to re-create his building process in other countries, Maki is concerned about quality control.

But once he has accepted a commission, Maki devotes himself fully from concept through construction, regardless of scale, program, or location. “I do not like to give quick comments on a project and leave the rest to others,” he says. Creating a school-like environment in his office, he invites and encourages his staff to contribute ideas and engage in free-

spirited discussion. Though he maintains the ultimate decision-making power, the open, nonhierarchical atmosphere in his atelier stimulates a steady stream of fresh ideas and new approaches.

Maki's focused thought and attention do not stop when projects go into construction. Instead, he plays an active role in the transposition of drawings and models to built form. As in the United States, comprehensive drawings and specifications are prepared ahead of time, but often they are elaborated on in the field. During frequent visits to his site offices, he meets with contractors and manufacturers to discuss the building techniques. The comparatively collaborative spirit between architect and builder even allows for design revisions during construction, provided that costs balance out in the end. Observes Maki, “In Japan we have more freedom to design further in the field office.” One particular benefit of this way of working is that it allows the designer to tailor details to each project and experiment with materials—for Maki, an essential way of giving character to space. His precise command of materials is notable, even in a country whose architects are well known for their attention to detail.

While he maintains a careful eye for the small-scale, Maki also thinks large and plans on an urban scale. Nowhere is this more evident than at Hillside Terrace. Lauded by Suzuki, among others, as one of Maki's greatest achievements, the development consists of six mixed-use parcels on either side of Old Yamate Street, a heavily trafficked four-lane artery in the heart of Tokyo. “Here he succeeded in creating a natural street scene,” explains Suzuki. Built in stages from 1969 to 1992, Hillside Terrace chronicles changes in Maki's architecture from the heavy concrete construction of the first phase to the airy transparency of the sixth. Yet all parts welcome pedestrians with open plazas and other human-scaled elements. Now Maki is working on a sequel, Hillside West, which is near the rest of the complex. The new construction will consist of three small buildings linked not by a plaza but by a small alley modeled after a traditional Japanese *roji* or exterior corridor, which will connect parallel streets. A mixture of commercial and residential, Hillside West has measured up to the master's expectations; in fact, it will become the site of his own office when the complex is completed this fall.



The Kaze-no-Oka Crematorium sits at the edge of an oval park (left). From the park, the tilted funeral hall, angled Cor-ten steel wall, and concrete crematorium appear to be sculpture (right). Maki's sketch of the project (below).





Trees screen the park from surrounding homes. The forecourt seen from the entry porch (below).

In the past, crematoriums were made to be foreboding or inconspicuous. Open to the public in every sense, Maki's Kaze-no-Oka Crematorium sets a new precedent. Located in Nakatsu, a city of 65,000 people on Japan's southern island of Kyushu, the 27,080-square-foot building derives its potency not just from its careful siting and attention to detail, but also from the architect's handling of the subject of death.

Although cremation is not strictly required by law, it is the prevalent practice in Japan because of religious beliefs as well as the shortage of open land for burying bodies. While funeral services can be conducted at any number of places, including temples, private homes, and function halls, cremations are usually held in facilities run by the local government. With their looming chimneys emitting strange odors,

Project: Kaze-no-Oka Crematorium
Nakatsu, Oita Prefecture, Japan

Architect: Maki and Associates—
Fumihiko Maki, principal-in-charge;
Yukitoshi Wakatsuki, Norio Yokota,
project team

Engineers: Hanawa Structural

Engineers (structural); Sogo
Consultants (mechanical)

Consultant: Sasaki Environmental
Design Office (landscape)

General Contractor: Tobishima
Corporation (building); Toda
Corporation (landscape)

crematoriums in the past were rarely welcome neighbors. So when Nakatsu's 30-year-old facility became antiquated and inadequate, Mayor Ichiro Suzuki invited Maki, who completed the city's Obata Memorial Library in 1993, to design an updated version and incorporate it into a new park that could mediate between the building and its surroundings. "This was precisely the kind of environment we wanted to substantiate," says Maki, who was eager to improve on the existing crematorium's inhospitable setting. Inspired by Erik Gunnar Asplund's Woodland Chapel and Crematorium in Stockholm of 1920, Maki felt the setting should allow for contact with nature. Explains the architect, "In Japan we believe that we return to nature after death."

But if this park was to be used by people without any direct connection to the crematorium, Maki knew that the building could not evoke bereavement. Instead, he decided, it should become more like a sculpture or have an abstract form. Indeed, the crematorium's three main





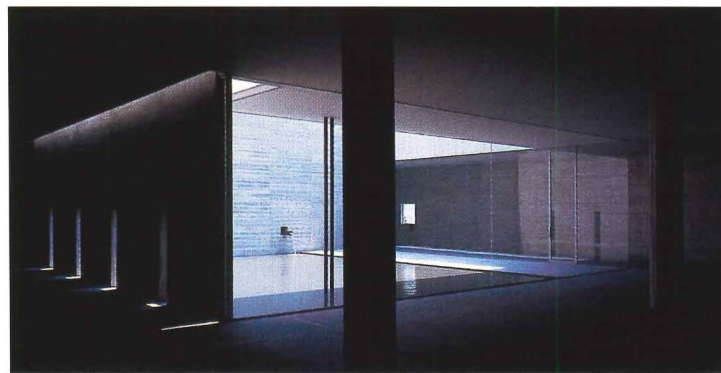
elements—the brick funeral hall, the concrete crematorium, and the waiting area concealed behind a weathering steel wall—read as the park’s backdrop. And thanks to technological advances in cremation, instead of one large chimney Maki was able to use six short chimneys, which were easily masked by the building’s parapets.

Erected on top of Kaze-no-Oka (hill of winds), the building sits at the edge of an elliptical green that unites it with an existing cemetery and historic tumuli that were discovered during early site investigations. Designed in collaboration with Toru Mitani, professor of landscape architecture at Shiga Prefectural University, the grassy basin is a world unto itself. While berms control views into the crematorium, the manipulation of the ground plane helps to edit out nearby houses. And triggered by gusts from different directions, an underground wind chime of sorts at the oval’s center adds an eerie but enchanting touch. “While the idea of being next to a crematorium is a little creepy,” says facility director Katsuhiko Oie, “people are starting to use the park more and more. When they see how nice it is, they tend to come back.”

Maki’s solution grew out of his reaction to existing crematoriums in Japan. “Many facilities built during the bubble [economy] years are very ornate. But at the other extreme are the very poor, old facilities where there is no place to prepare for cremation and final departure,” explains the architect. Rejecting these precedents, Maki started by asking what type

of place the bereaved require for taking final leave of the dead, and what sort of memories mourners should have of this primal experience.

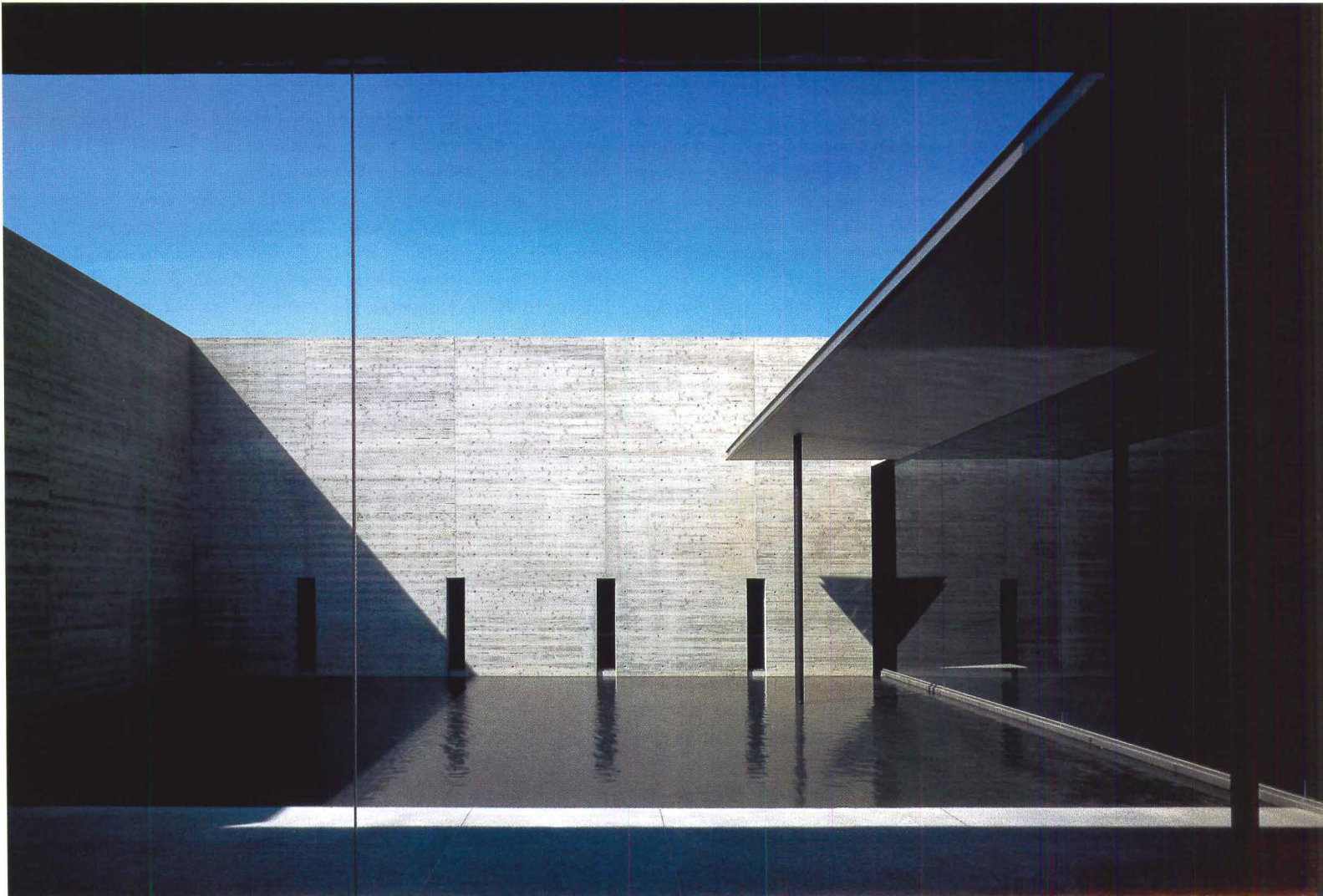
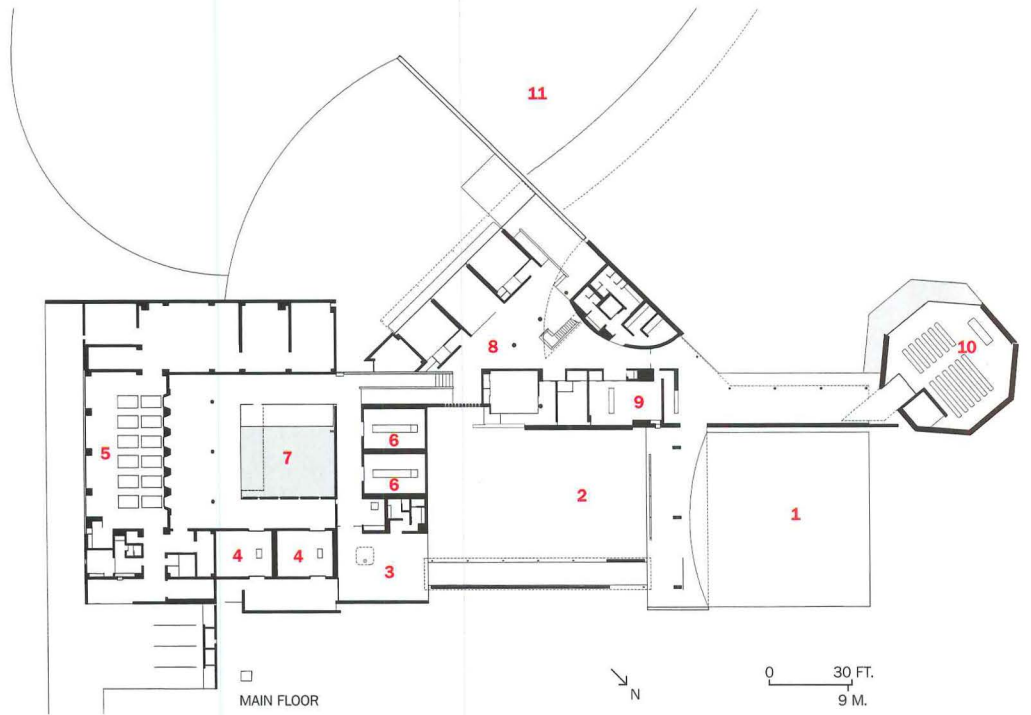
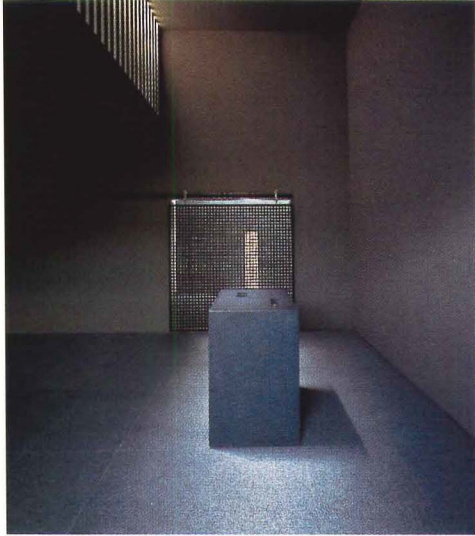
Cremations in Japan are highly ritualized ceremonies and generally follow a set course that begins with the farewell service, crescendos with the incineration, and closes with the enshrinement of the deceased’s bones and ashes. Using this sequence, Maki composed a string of discrete spaces that correlate with each consecutive stage. Unlike many Tokyo facilities, where mourners are surrounded by a constant flurry of activity, this one is well-spaced. Differentiated areas largely shield the bereaved from extraneous events and isolate them from the outside world. Equally

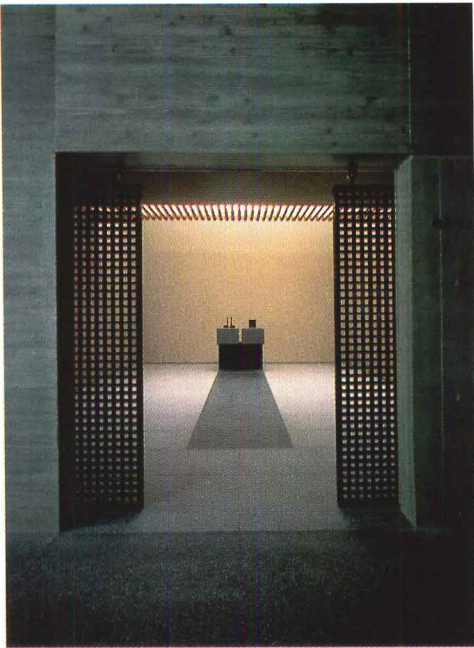


In the cloister gallery, cedar boards were used to form the concrete (opposite). Mourners proceed through a choreographed sequence of spaces (plan right) to

the oratory (below), where prayers of farewell are said. The lattice door hints at the crematory hall beyond, where a pool provides reflected illumination (below).

- | | | |
|-------------------------|-----------------------------|-------------------------|
| 1. <i>Porte cochere</i> | 5. <i>Crematory</i> | 9. <i>Office</i> |
| 2. <i>Forecourt</i> | 6. <i>Enshrinement room</i> | 10. <i>Funeral hall</i> |
| 3. <i>Entry porch</i> | 7. <i>Courtyard</i> | 11. <i>Park</i> |
| 4. <i>Oratory</i> | 8. <i>Waiting area</i> | |





From the crematory hall, mourners proceed to the airy waiting area (opposite), with a blond oak staircase and floors. The ceremony culminates in the enshrinement room (above), where the

deceased's remains are collected. The funeral hall (right), a nondenominational chapel, is shrouded in semidarkness. The simple wooden benches were designed by Maki's office.



important is the connective tissue of the reinforced-concrete and steel-frame building. Covered walkways, corridors, and well-placed walls link rooms and channel circulation but also provide places to pause, reflect, and prepare for the next stage. Circuitous but deliberate, winding but goal-directed, passage through the building recalls the approach to a traditional shrine or temple where the final destination is not revealed at the outset, says Maki.

Among the architect's most effective tools for giving specific character to each room are the multiple ways that daylight is admitted. The semidarkness of the octagonal funeral hall, where light enters through a single low window, a vertical slit, and four punched apertures overhead, contrasts sharply with the waiting rooms where mourners sip sake and pass time while the body is cremated. Here picture windows bathe seating areas with light.

Movement through the building is frequently punctuated by changes in light as visitors move from airy circulation spaces to muted ritual areas and back again. And the use of louvered clerestories, as well as the placement of windows near ceiling or floor level, enabled the designer to limit illumination and views, a design decision essential for maintaining privacy and a contemplative atmosphere. Even the expansive vistas from the waiting rooms are carefully composed to include distant mountains, following the traditional Japanese concept of borrowed scenery. However, the hall before the incinerators, where the ceremonial send-off occurs, is almost unexpectedly filled with daylight and views, albeit highly controlled ones of sky, clouds, and water. Here floor-to-ceiling glass opens onto an interior pool covered by a shimmering six-to-seven-inch layer of

water whose gentle movements are reflected on the room's ceiling. Though meditative, this space is far from gloomy. Instead, the calm presence of nature's primary elements is a soothing elixir for the grief-stricken.

Working in tandem with Maki's selective use of daylight is his rich palette of materials, whose various patterns are set off by the sun's diurnal changes. While some materials were necessary to meet functional requirements—such as the aggregate concrete floor over which coffin-bearing trolleys can smoothly glide—others were chosen for their texture or color. A clear expression of this building's link to the natural world is its predominant use of earth tones. "We decided to use colors ranging from gray to black, to express dignity, and brown, to create a feeling of gentleness," explains Maki.

Building surfaces are enhanced by the striations of stone, the pronounced grain of cedar planks, and the sheen of polished concrete. And the juncture of wood and steel, or glass and concrete, inspired numerous details. As is common practice in Japan, Maki worked closely with his on-site staff to design many details during construction. This was essential for the proper assembly of elements such as the sashless windows, whose simplicity belies the effort that went into their making, as well as highly articulated pieces like the doors of the oratory. Made of dark wood lattice, the doors operate like traditional sliding partitions but are suspended by industrial-grade stainless-steel hardware left exposed for all to admire.

And admire they do. While the crematorium is in use almost daily, the building is a frequent destination for architects and others interested in Maki's work. ■



PORTFOLIO Eight uncommon projects illustrate how small size or limited scope can foster creative design solutions.

TAMS's Ventilation Building No. 7, which functions as a huge fan room for a tunnel in Boston, is a clear

expression of "the building as machine," yet its detailing provides an almost decorative quality.



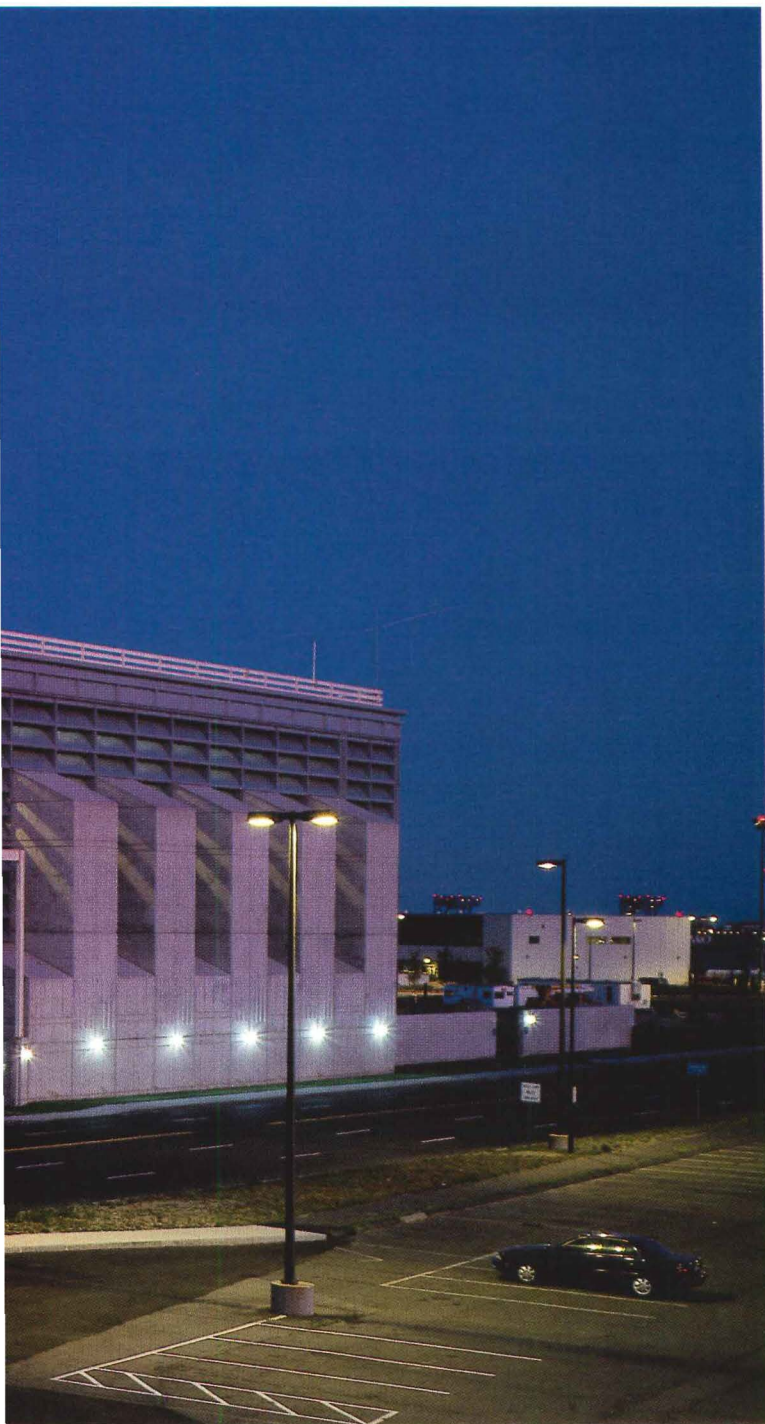
Most architects will never get to do a high-profile project with a huge budget. There are just so many Gehrys and Guggenheims, Meiers and Gettys. But emulating the considerable achievements of these men is not necessarily the goal of many professionals. Instead, the most satisfying moments in their careers may come when they have the opportunity to discover a new approach to something that has been overlooked by everyone else. The buildings on the following pages fit into this category.

Originally, the in-house moniker for the buildings featured here was “small projects”; but some of the projects we chose, such as Boston’s Ventilation Building No. 7 (this page), are far from small. What distinguishes these buildings, we found, was that although the architectural demands on them may be quite limited compared to, say, those of a commercial office building, they are treated in an uncommon way. In the case of the vent building, the architects seized as their palette what some might have

left as blank walls, using them to express what the building is: the skin of a great machine.

Sometimes architects make opportunities for creative expression by finding ingenious new uses for things—such as employing a prefabricated salt dome usually found on a roadside for a school’s library. While the dome, which is at the center of the building, houses books and work spaces for students, it also makes a tongue-in-cheek reference to Thomas Jefferson’s library at the University of Virginia. Architects might also handle small details in a more Proustian manner, either to invoke a grown-up’s memories of a picnic shelter at a summer camp long ago or to impress brand-new memories on the children who will eat peanut butter sandwiches there next summer.

These works may not be small, but they are uncommon. And they demonstrate one of the greatest pleasures of being an architect: exploring the unlimited number of ways we can find to create beauty out of what might seem to be nothing at all.—Charles Linn, AIA



MACHINE FOR AIR-HANDLING CELEBRATES ITS MECHANICAL NATURE

Ventilation Building No. 7 functions as a huge fan room, pumping fresh air into the new Ted Williams Tunnel, which links the city of Boston to Logan Airport, and sucking fume-filled air out. It is also an important icon for Boston’s newly improved highway system, known as the “big dig” because much of it is underground.

Three firms collaborated on the building: TAMS Architects, Engineers & Planners; Wallace, Floyd, Associates Inc.; and Stull & Lee Inc. A project team from Wallace, Floyd and Stull & Lee provided conceptual design and a description of criteria. TAMS was given a set plan, determined by function.

The architects decided that the best way to celebrate the highway system was not to mask the mechanical nature of the vent building but to express it with as much clarity as possible.

The building is divided into two sections. The intake section is made up of horizontal gray aluminum louvers and vertical concrete risers. The exhaust section consists of aluminum panels surmounted by 14 towers of concrete and stainless steel. Gray aluminum channels divide the facade into rectangles, behind which are the huge fan rooms. The facade’s deep, overscale divisions indicate the size of the

elements behind it: “squirrel-cage” fans that are big enough for polar bears.

Although the location of every one of the 14 vent stacks was pre-assigned, the slope of the stacks and other details—such as the black bolt heads that punctuate the stainless-steel caps of the exhaust vents—were left to Deborah Fennick, AIA, and Chris Iwerks, AIA, of TAMS.

The aluminum sheathing that covers the intake section of the building is a “rain screen” pressure-equalization system. Wind blowing against a conventional wall system tends to create a pressure differential—positive on the exterior, negative on the interior—and moisture tends to be drawn into cracks or openings toward the negative pressure. A rain screen is an open-jointed cladding system with a cavity behind it and a weatherproof wall behind that. The open joints prevent pressure differential, so that wind-driven water is not drawn into the building. With no sealants to deteriorate, the system has an estimated life of 75 years.

The vent building’s exposed structural steel and cross-bracing are painted a cream color that contrasts with the warm dark gray of the skin, and the steel system is separated by more than a foot from the panel faces. TAMS’s precise

expression of material and function was deliberately Miesian, according to the architects; but details such as doubled vertical aluminum channels and horizontal channels mitered to go around corners belong more to the decorative 1990s than to the purist 1940s. The exposed concrete of the five supply shafts and 14 rooftop exhaust vents is meant to recall the concrete highway that runs directly beneath the building.

Ventilation Building No. 7 cost approximately \$15 million, on a par with buildings of similar scope.
Jonathan Hale

Jonathan Hale is a Boston architect, critic, and the author of The Old Way of Seeing.

Project: *Ventilation Building No. 7, Ted Williams Tunnel, Boston*

Owner: *Massachusetts Turnpike Authority*

Architects: *TAMS Architects, Engineers & Planners—Deborah Fennick, AIA, and Chris Iwerks, AIA (design development and final design)*

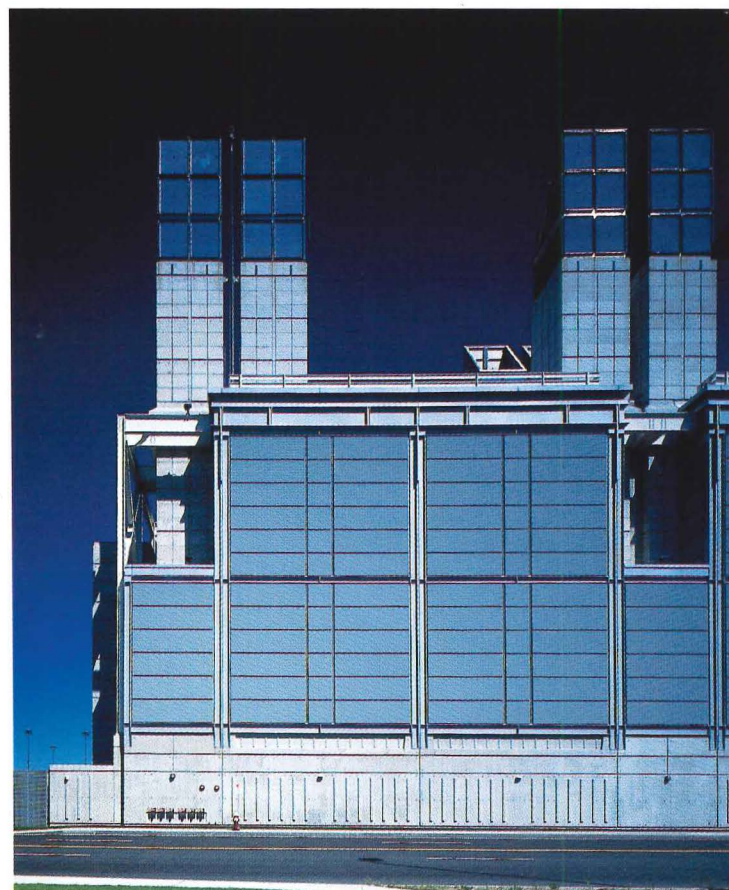
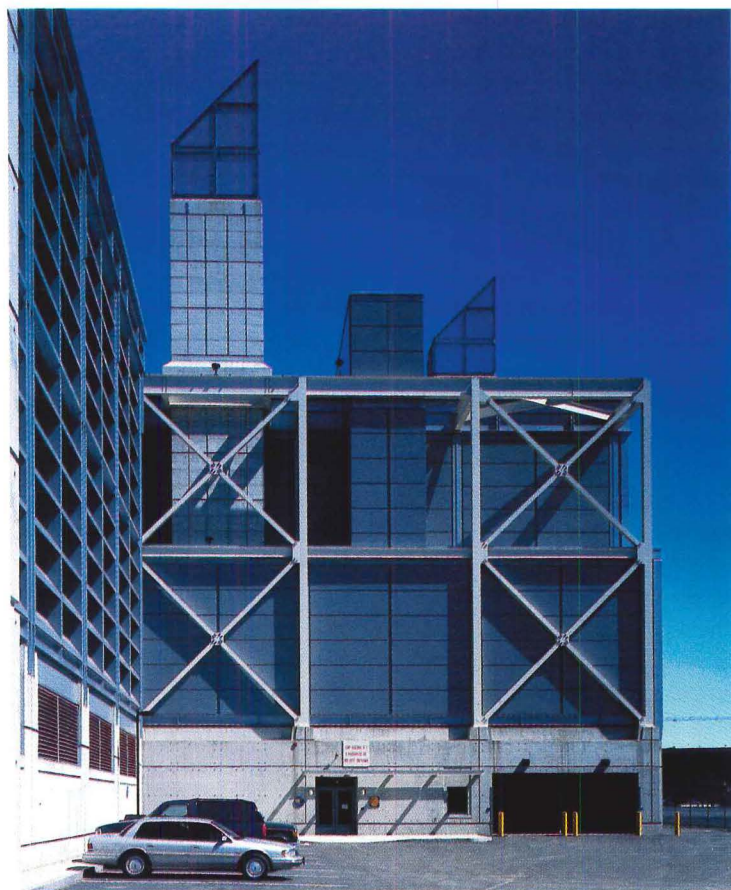
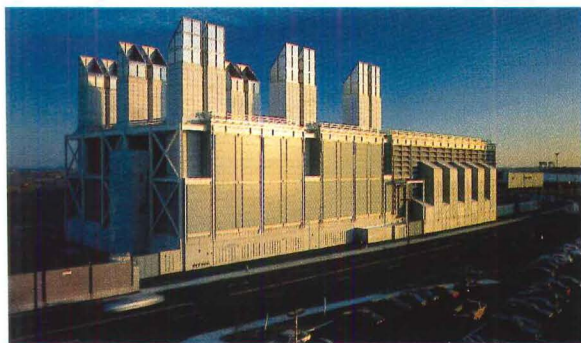
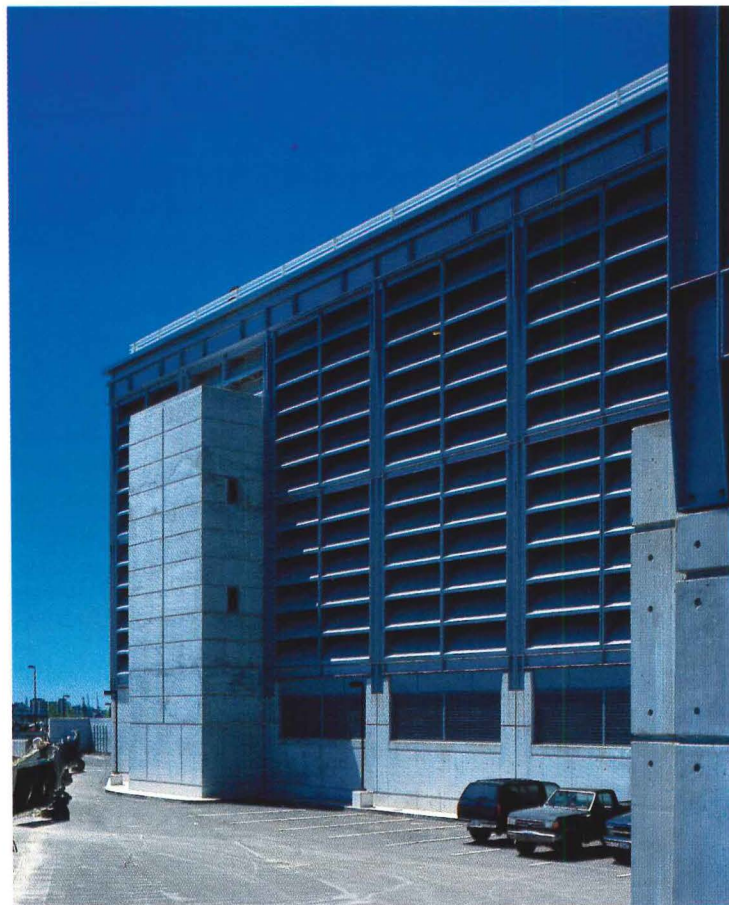
Wallace, Floyd, Associates Inc. and Stull & Lee Inc.—Doug McCallum, AIA, lead designer; Herbert Murray, AIA, chief architect (systemwide design)

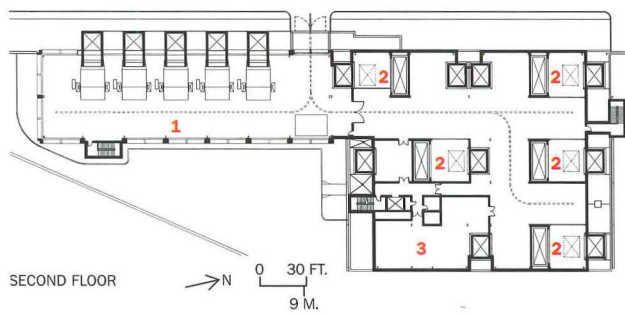
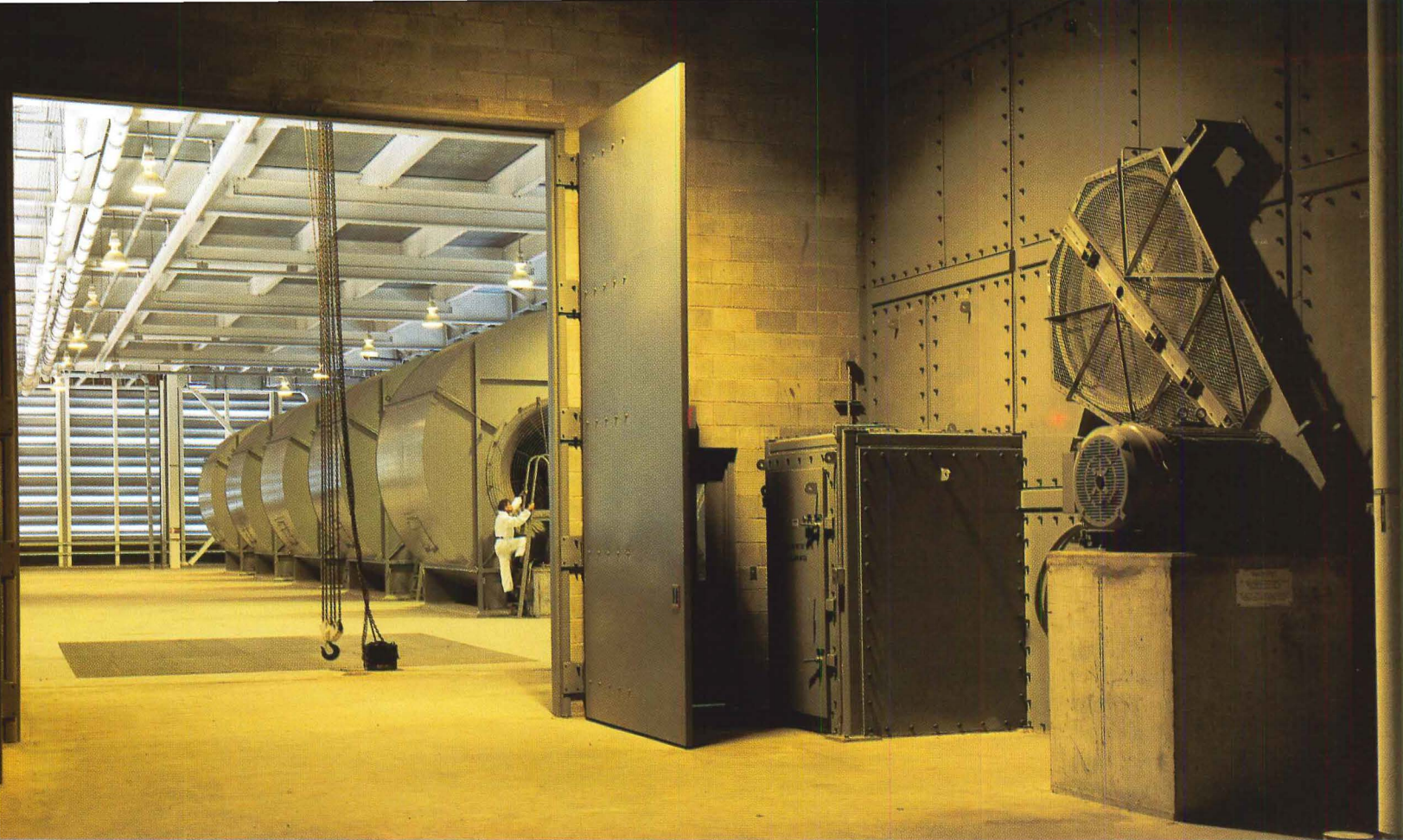
Engineers: *TAMS (structural); URS (civil); Gannett Fleming (project management); SAR Engineering (mechanical/electrical)*

Consultants: *Carol Johnson Associates—Pat Loheed (landscape)*

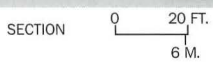
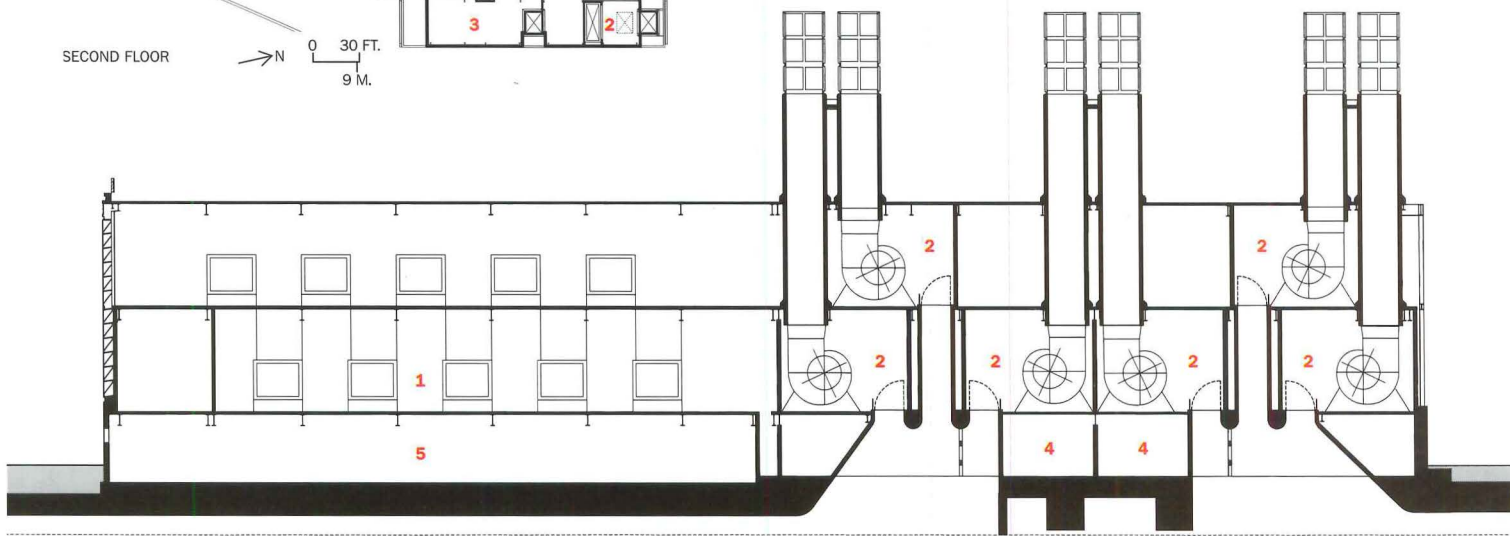
General Contractor: *De Matteo Construction*

The meticulously detailed building has a Miesian, machinelike appearance that makes no attempt to hide its function. A pressure-equalizing rain screen (below) covers the massive “squirrel-cage” fans.





- 1. Air-supply room
- 2. Fan plenum
- 3. Fan control room
- 4. Fan and radio equipment
- 5. Electrical equipment
- 6. Harbor tunnel



A CHILD-CARE CENTER ENTICES ITS CHARGES USING SIMPLE MEANS

A commission for a low-budget 3,000-square-foot child-care center several hundred miles away might not seem sensible for many architecture firms. But Peter Q. Bohlin, FAIA, and his staff trekked from Pennsylvania to the Silver Bay Association, in New York's Adirondack region, because Bohlin Cywinski Jackson have always prided themselves on the diversity of their work.

Located at the southern end of Lake George, the Silver Bay Association is a YMCA conference center that offers programs for Christian spiritual growth and renewal in landmark structures on 600 acres amid the tumbled green mountains. Because entire families are encouraged to participate, the association needed a child-care facility to give adults time for their own activities.

To keep the project light-hearted (but not cloying) and to meet a limited budget, design partner Bohlin enclosed the child-care center in a simple rectangle. Residential shed-roof trusses were united to form a gable roof—a child's image of home—on the entrance side (top right). The short end walls are bearing walls, framed in two-by-sixes. The designers spaced intermediate support columns where they were needed, but there are no internal bearing

walls, permitting a free plan, within which partitions can be adjusted as needs change. A reading area, roofed with skewed sheds and supported by angled pipe columns, bursts out of the facade on the water side (middle right).

To keep design costs low, explains Lee Clark, project manager, "we gave the contractor pretty developed design development drawings" rather than a full set of documents. She also made monthly site visits during construction. "We didn't have a lot of details at first but provided them along the way. Not all contractors would work with that."

"One of the great pleasures here," comments Bohlin, "is that we were able to develop a connection between the 'bones' of the building and the spatial path [opposite bottom right] you use to move through it." *James S. Russell, AIA*

Project: Marjorie Hilliard Hodges Children's Pavilion, Silver Bay, New York

Owner: Silver Bay Association

Architect: Bohlin Cywinski Jackson—Peter Q. Bohlin, FAIA, principal-in-charge; Lee Allison Clark, project manager

Engineers: E. D. Pons & Associates (structural)

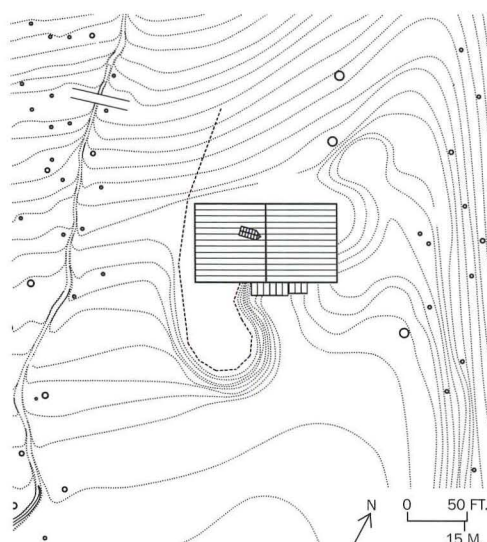
General Contractor: Mill Bridge Construction



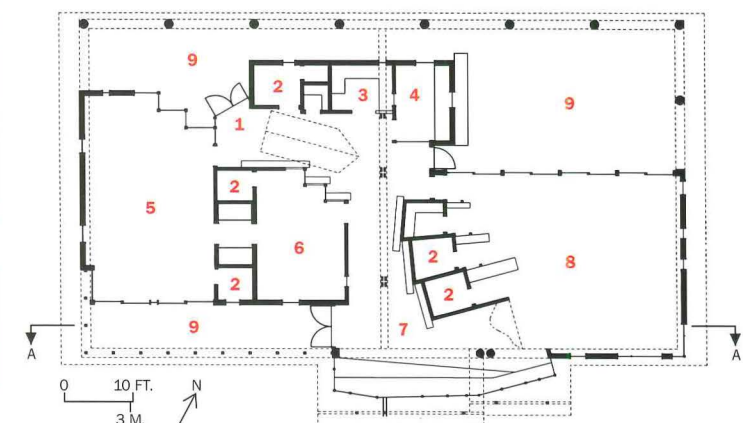
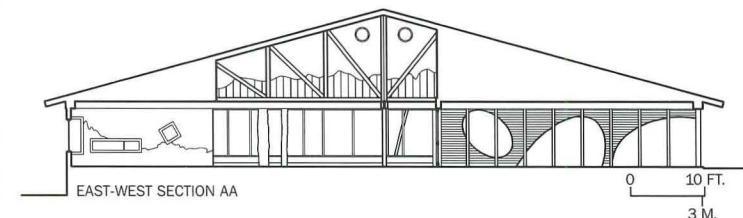
Ample porches allow programs to take place outside in the busy summer months. A play area was made from soil cut from the uphill

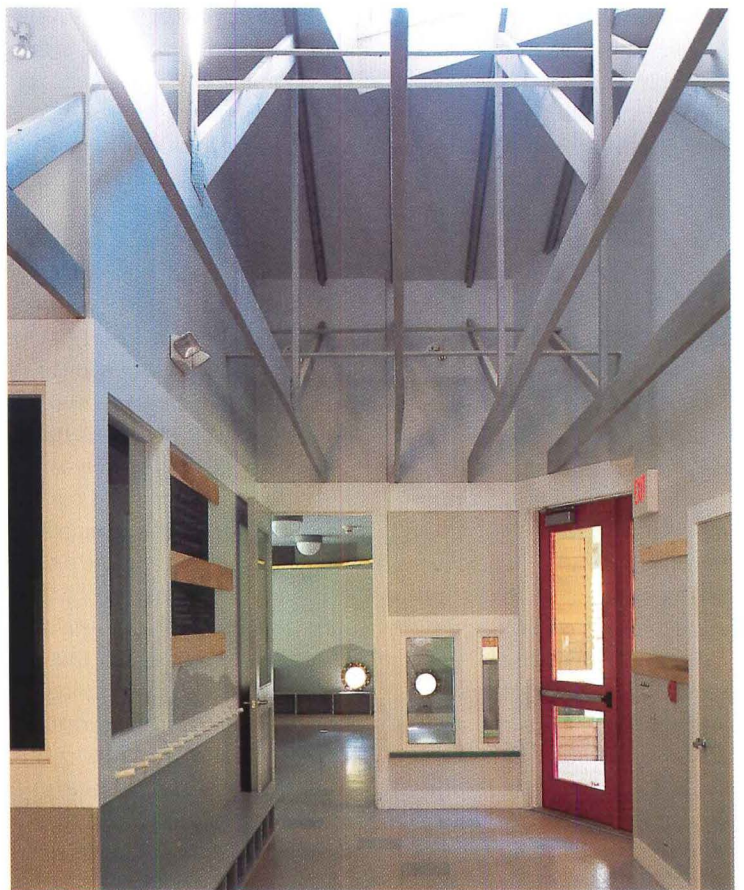
side (site plan). A wood fretwork (opposite bottom left) and broad overhangs add sun protection in the reading area (opposite top).

"You can see how the building works and how it's constructed," says center director Helen Barton. "It stimulates children's imaginations."



1. Entrance
2. Toilet
3. Kitchen
4. Office
5. Toddlers
6. Infants
7. Reading
8. Preschool
9. Porch





A SCHOOL BUILDING THAT IS MORE THAN THE SUM OF ITS PREFABRICATED PARTS

Toward the end of 1995 an anonymous donor approached the trustees of the Salisbury School, in Salisbury, Maryland, with an intriguing offer. For years the committee had been dreaming of adding an upper school to the private elementary school that has been operating since 1972 in an early, much-acclaimed open-plan building by Hardy Holzman Pfeiffer Associates. The donor promised 26 acres of land adjacent to the existing school and \$2.8 million.

There were, however, some strict conditions: another \$1 million had to be raised to match the grant within 90 days. And the school had to be built and operating by September 1997—a little more than 18 months from the date of the offer.

What made the challenge even more daunting was that the new building couldn't be just a typical secondary school. The institution's character—its openness combined with what headmaster Stephen K. Barker calls "a carefully structured way of operating, a formal informality"—is embodied in its original building. If the upper school couldn't be equally extraordinary, there was scarcely any reason to build it. Although the school had hired local architects to build several additions to the original structure, the building committee returned to Hardy Holzman Pfeiffer with this new challenge. And despite the shoestring budget—\$95 a square foot—and a close-to-impossible schedule, Malcolm Holzman, FAIA, partner-in-charge, said the architects were delighted to return to Salisbury.

In describing the rapport between architect and client, both Holzman and Barker pointed to the same expanse of garish red carpeting at the heart of the original building. It's a period piece, like something that might have been found in the Minneapolis apartment of Rhoda from "The Mary Tyler Moore Show." At the time even RECORD [October 1974] noted its cheerful defiance of conventional

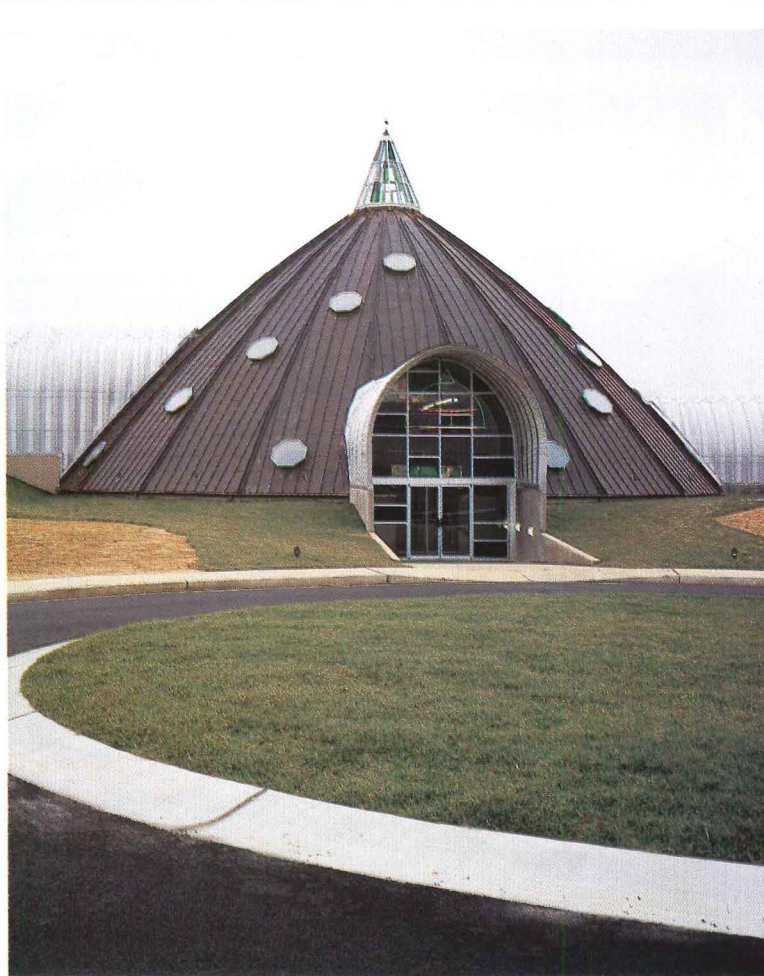
taste. For Holzman, the survival of this carpet in very good condition epitomizes the school community's respect for the building. For Barker, it's an indication that, despite appearances and limited budgets, the architects knew what they were doing and built with integrity.

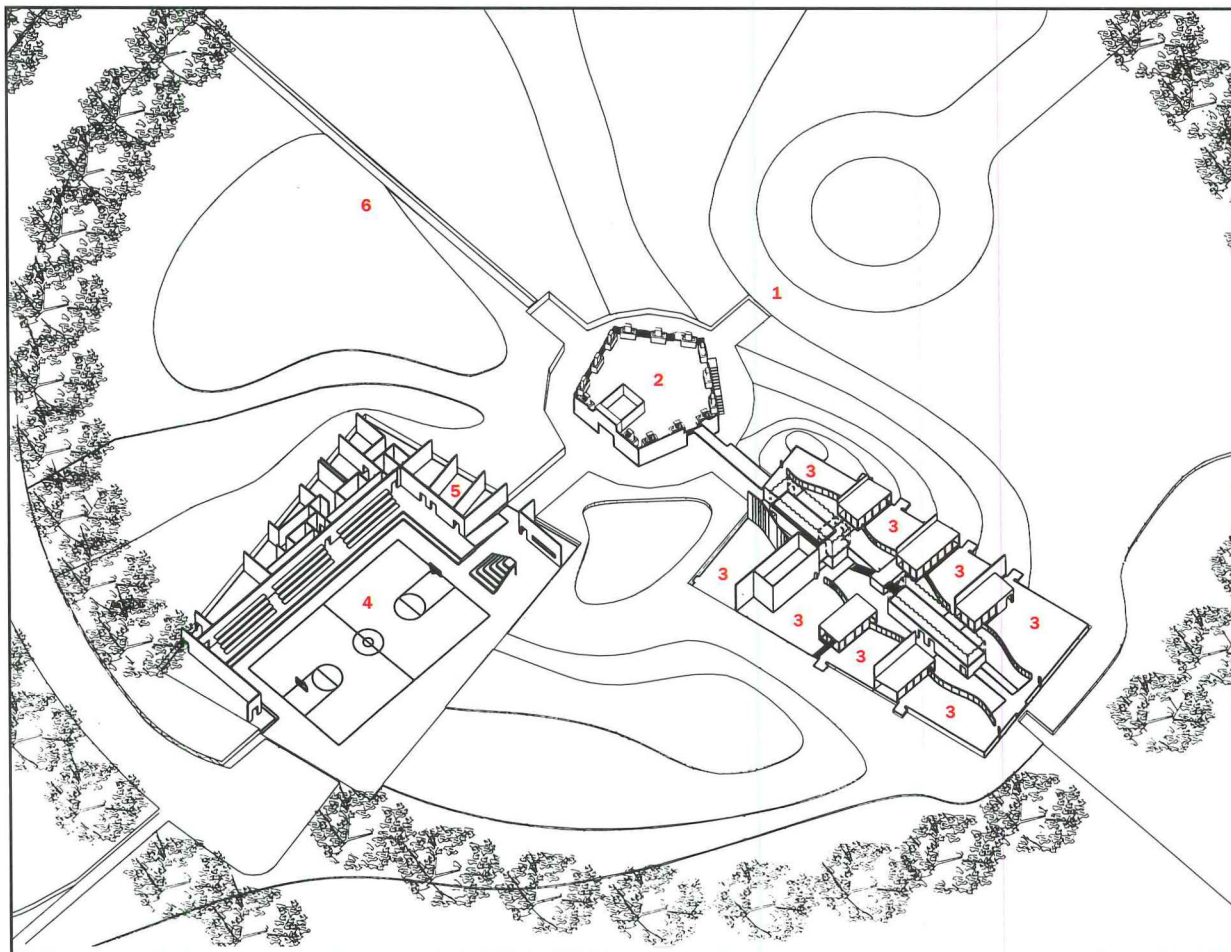
Like the carpet, the open classroom is seriously out of style. At Salisbury, though, what was in many places a pedagogical fad has become a tradition. The school serves a largely agricultural region and is located in a Delmarva Peninsula town best known as the headquarters of the Perdue Chicken empire. Its playful, optimistic, Earth-shoe-era building has been viewed in pragmatic farm-country terms: it's a little weird but it works.

Thus, when the architects made a number of suggestions for the Upper School that most building committees might find strange—such as housing the library and administrative core of the school in a prefabricated salt-storage dome—the trustees were willing to listen.

"The dome cost \$30 a square foot," says Ann Coates, head of the building committee. "That freed up money to spend on finishes we couldn't have afforded if we had done stick construction." The structure's roadside roots are still evident, but especially inside, the dome—not unlike Thomas Jefferson's at Charlottesville—represents the library as both the heart and the mind of an educational institution.

The Upper School was designed as three separate structures: the central dome, the classroom wing to its left, and the gymnasium behind. This plan created an obvious site for expansion to the west of the dome, and it also allowed each of the three wings to be considered a separate building for code purposes. Thus, any approval delay for one part of the school wouldn't delay progress on the others. Also, if the school had been reviewed as a single entity, fire sprinklers would have been required, which Coates says the





To enhance the inherent spatial qualities of the 20-faceted dome (opposite), a spire of green art glass, octagonal windows in a spiral arrangement, and a copper roof were added.

1. Entry
2. Library/offices
3. Classroom
4. Gymnasium
5. Change rooms
6. Future addition

building committee decided not to spend its limited budget on. It was a design-build process, in which key decisions were made on site at the last minute.

From the outside, the school appears to be an assemblage of prefabricated parts: the dome, the corrugated-steel arches that connect the domes to the vinyl-sided wings, the aluminum antennae that serve as trellises. Yet components that most schools would buy off the shelf, such as student lockers, were built on site. Indeed, the building has been carefully crafted, albeit from humble materials like oriented-strand board and structural tile that are rarely accorded such loving attention.

Classrooms are usually the most repetitive element of a school building, but here each one is unique in size, shape, and character. Each classroom is literally at its own level, but because of the high ceilings and sight lines up and down, pupils get the sense of being in a larger space. Even the teachers'

Thomas Hine was architecture critic of the Philadelphia Inquirer from 1973 to 1996 and is the author of a forthcoming history of the American teenager.

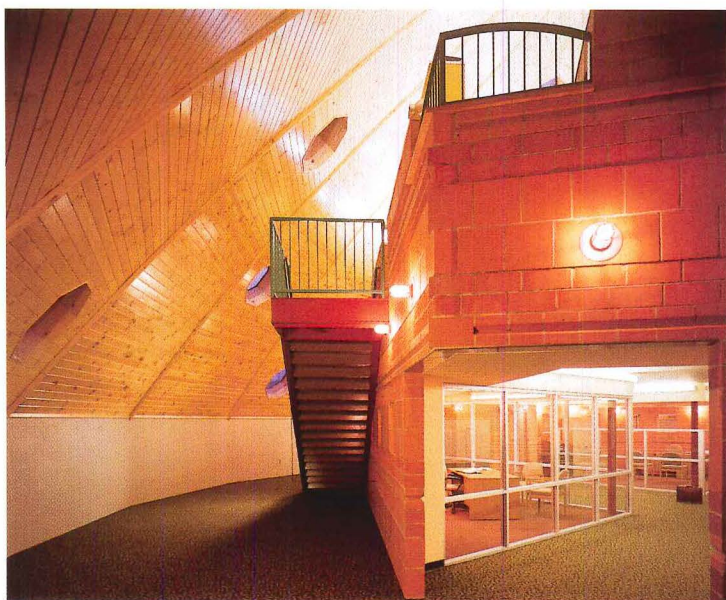
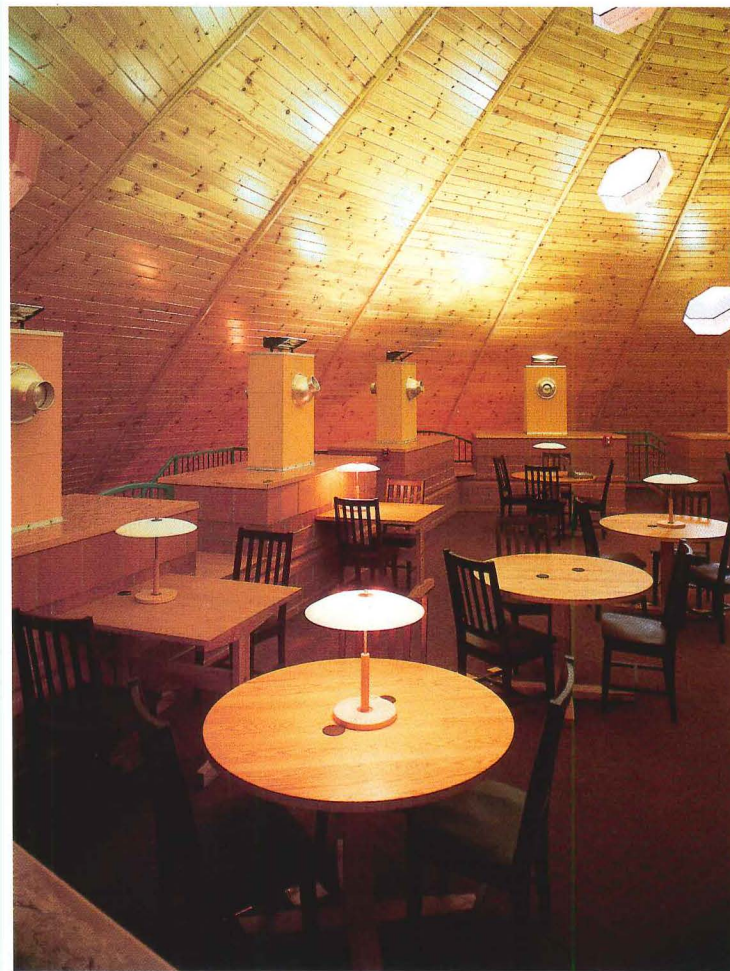
offices have glass windows that are visible from the classrooms. Though the lack of privacy can sometimes be quite demanding, Barker says the school's openness is essential to its sense of togetherness. "The architecture assists us in building a sense of community," Barker says. "Everybody has to work together."

Thomas Hine

Project: *Salisbury Upper School, Salisbury, Maryland*
Architect: *Hardy Holzman Pfeiffer Associates (design architects)—Malcolm Holzman, FAIA, partner-in-charge; Robert Almodovar, project manager; Jeeyoon Lim, project architect; Hakee Chang, Joyce Louie, design team*
Associate Architect: *Becker Morgan Moore Olds & Richter*
Engineers: *Davis, Bowen & Friedel (structural); Philip Parker Associates (civil)*
General Contractor: *Gillis Gilkerson*

Sources

Prefabricated plywood dome structure: *Domar Bulk Storage System*
Connectors: *Artec Steel Buildings*
Aluminum doors: *Kawneer*
Acoustical ceilings: *Armstrong*
Paints and stains: *Sherwin-Williams*
Vinyl composition tile: *Congoleum*

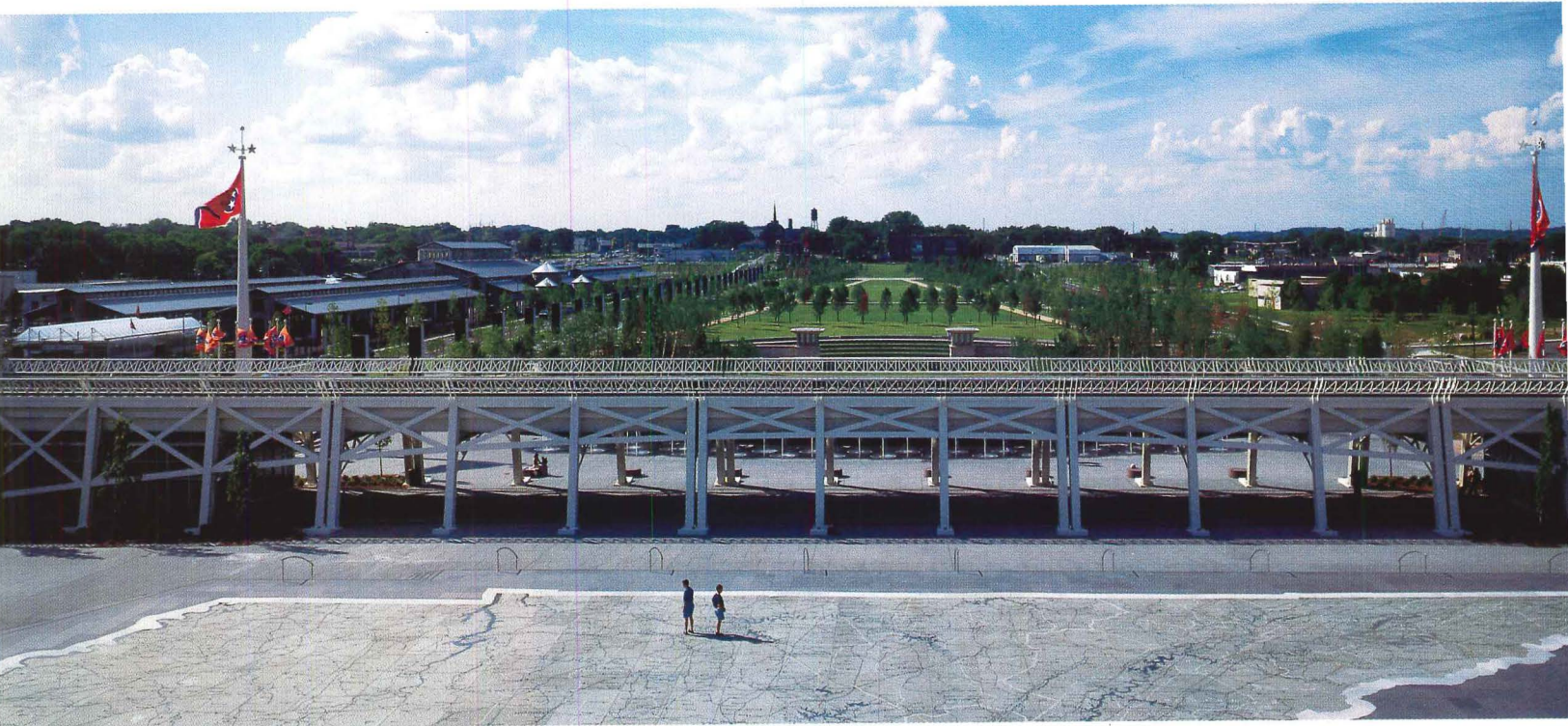


Salisbury Upper School's prefabricated components, such as the salt-storage dome (above and top right)

and a corrugated-metal passage that links two portions of the building (right), stretched the budget, allowing for

extras like skylights, neon sculpture, and shelves handcrafted of oriented-strand board (opposite).





NEW RAILROAD BRIDGE FOCUSES VIEWS AND CHANGES PERCEPTIONS

The Tennessee Bicentennial Capitol Mall Railroad Trestle opens the southern boundary of Nashville's mall and preserves the last remaining views of the historic state capitol grounds. Prior to creation of the mall, a new 19-acre park north of the Tennessee Capitol, the railway lines ran on the earth berm that divided the city and discouraged development to the north. At the same time, this lack of development helped protect the view of the capitol.

While earlier proposals for the area had dealt with the tracks, still used by freight trains, as an eyesore, Tuck Hinton Architects' bridge concept was based on the importance of railroads to Tennessee history. To open up the mall without a major track rerouting, the open steel bridge was positioned about 50 feet north of the existing earth-berm railroad tracks. The 500-foot-

Linda Hallam edits shelter books for Meredith Corp., Des Moines, Iowa. She was formerly the editor of the homes section of Southern Living magazine.

long trestle spans the width of the mall between the two limestone-clad street bridges, which serve as underpasses for automobile traffic. Under the bridges are restrooms and a visitors' center.

The resulting trestle not only encourages pedestrian traffic underneath the gentle arch but focuses views through the mall. "It has also helped change perceptions about this area of the city," Hinton explains. "Now there is a different attitude about the way the downtown might expand."

Linda Hallam

Project: *Tennessee Bicentennial Capitol Mall Railroad Trestle, Nashville*

Owner: *Tennessee Building Commission*

Architects: *Tuck Hinton Architects (schematic design); Jon Coddington, David Johnson, Charles Watterfield, SSOE Inc. (design advisors); Nathan Evans Taylor Coleman Foster Architects (design development and construction administration)*

Structural Engineers: *Stanley D. Lindsey and Associates*



A new steel railroad trestle anchors one end of the capitol mall. While other proposals

dealt with the existing railroad tracks as an eyesore, Tuck•Hinton used them to celebrate the role of trains in the state's history.

A "SAILING SHIP" CONNECTS CAMPUS PEDESTRIANS TO PACIFIC OCEAN

The Scripps Crossing Pedestrian Bridge in La Jolla, California, floats like a rigged sailing ship above La Jolla Shores, one of the city's most scenic streets. A key link in the master plan for the University of California, San Diego, the 140-foot-long bridge provides a pedestrian and wheelchair connection between the upper campus and the Pacific Ocean research pier of the Scripps Institute of Oceanography.

Engineer Frieder Seible of SEQAD Consulting Engineers did the initial concept for the bridge. He worked with the architects, Taal Safdie and Ricardo Rabines, to hang the bridge from cables encased in stainless-steel tubes from a 60-foot-tall concrete pylon. The slender cross-section of the walkway and

the thin reflective cables create a transparent design that doesn't hinder the view from either the street or the bridge.

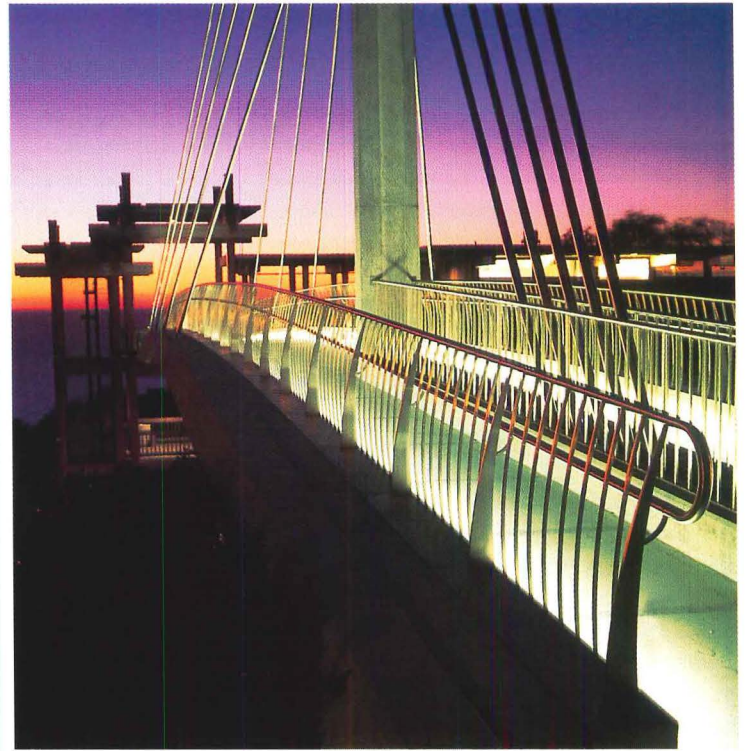
Fluorescent lighting recessed beneath the handrails washes light onto the concrete walkway. At night, when the light bounces up to illuminate cables and pylon, all visual supports seem to disappear. *L.H.*

Project: *Scripps Crossing Pedestrian Bridge, La Jolla, California*

Architect: *Safdie Rabines Architects—Taal Safdie, Ricardo Rabines, partner-in-charge*

Design Engineer: *SEQAD Consulting Engineers—Frieder Seible*

Engineers: *Burkett and Wong Engineers (structural); DLSK Professional Engineers (electrical)*



PEDESTRIAN BRIDGE'S ARBORLIKE GRID IS INSPIRED BY NEARBY GARDEN

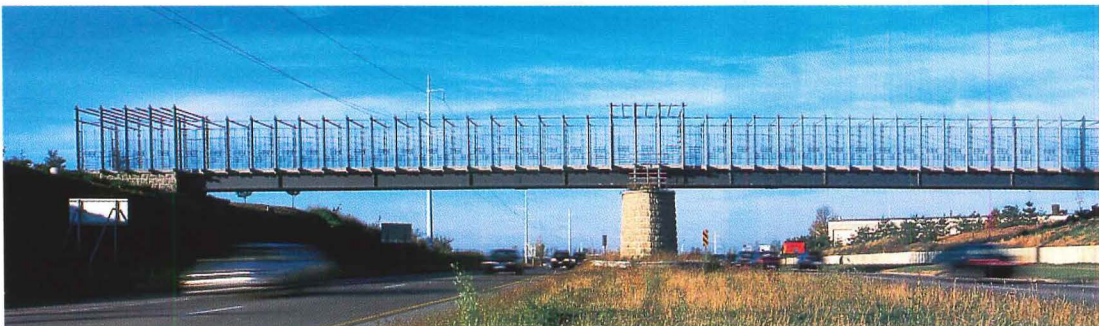
The 245-foot-long Chanhassen Pedestrian Bridge spans a busy four-lane highway and links a residential development with downtown Chanhassen, Minnesota, where the city hall, library, and schools are located. It also serves as a visual gateway to the Landscape Arboretum, one of the Twin Cities' most visited sites.

The arboretum, about five miles west of the bridge, inspired architects Meyer, Scherer, and Rockcastle to incorporate an arborlike structure of galvanized-steel tubes, angles, and bars into the composite, poured-concrete deck and flange-steel-beam structure. The trellis structure, at 10 and 12 feet above the walkway, alters in appearance from the highway as

the light and shadows change from hour to hour and from season to season. The pedestrian experience combines sculptural openness at the approach with a secure sense of enclosure inside the structure, encouraged by the steel handrails and vertical ribs.

In keeping with the intention that the bridge should be a landmark for highway and community, the landscape architects suggested planting red-flowering Dropmore honeysuckle at the base of both abutments and in the central pier, which serves as a large planter. As the perennial vine matures, the steel trellis will be intertwined with the bright blooms. *L.H.*

Project: *Chanhassen Pedestrian Bridge, Chanhassen, Minnesota*
Architects: *Meyer, Scherer, and Rockcastle—Tom Meyer, partner-in-charge; Mark Burgess, project architect*
Engineers: *Strgar-Roscoe-Fausch (structural and construction administration); Ericksen Ellison and Associates (electrical)*
Consultants: *Hoisington Koegler Group (landscape architect); Schuler and Shook (lighting)*



STUDENTS STARE DOWN THE STARS AT VASSAR'S NEW OBSERVATORY

Because light pollution in most populated areas makes stargazing impossible, few observatories are being built today. One exception is Vassar College's Class of 1951 Observatory in Poughkeepsie, New York, named for the alumni group that raised the funds to build it.

Vassar's 1860 brick observatory, built by Mariah Mitchell, the first prominent female astronomer in America, still stands on the main campus. Its view of the galaxies has been blocked by ambient light and nearby buildings. Furthermore, heat stored in the building's masonry walls is released into the atmosphere around the building, and this rising air refracts the light from the stars, making them shimmer slightly. To the naked eye the interference is negligible, and it did not affect the telescopes in use when the observatory was built. But the effect on today's high-powered telescopes would be so extreme that they could not be placed in the old observatory.

"We really enjoyed learning about observatories," says architect Harold Roth, FAIA, of Roth and Moore Architects, "and getting into nuances of detailing having to do with angles of the telescope and exactly how to place it on the site." The new observatory is located next to the Vassar golf course, at the highest point on campus, where there is little light or thermal pollution to interfere with observation of the galaxies.

The 22-foot-diameter domes, each housing a reflecting telescope,

were manufactured by a firm that specializes in observatory structures. Their scale and proportions influence the rest of the design, as does their aluminum-on-steel skin, chosen for its heat-reflecting quality. To further ensure that warm air inside the domes is minimized, they have been left unheated.

The position of the telescopes, the exterior viewing doors—known as shutters—and the direction the domes face are set by computers in the control building. Spanning between the two short passages that lead to the domes, the control building also contains a classroom and work space for faculty members. Its half-round roof is supported by laminated wood arches. As with the domes, the roof is aluminum-finished to reflect heat, and it is superinsulated to keep heat loss from disturbing the view.

Charles Linn, AIA

Project: *Class of 1951 Observatory, Vassar College, Poughkeepsie, New York*

Architect: *Roth and Moore Architects—Harold Roth, FAIA, and William F. Moore, AIA, partners-in-charge; David Thompson, AIA, project architect*

Engineers: *Spiegel Zamecnik & Shah (structural); BVH Engineers (mechanical/electrical); Hayward and Pagan Associates (civil)*

Sources

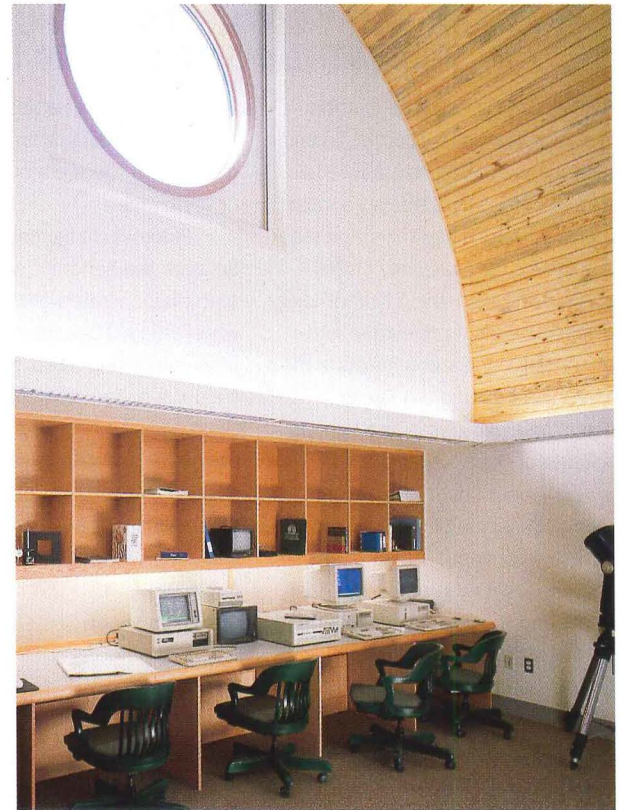
Domes and dome controls:

Ash-Dome

Metal siding: *Reynolds Metals*

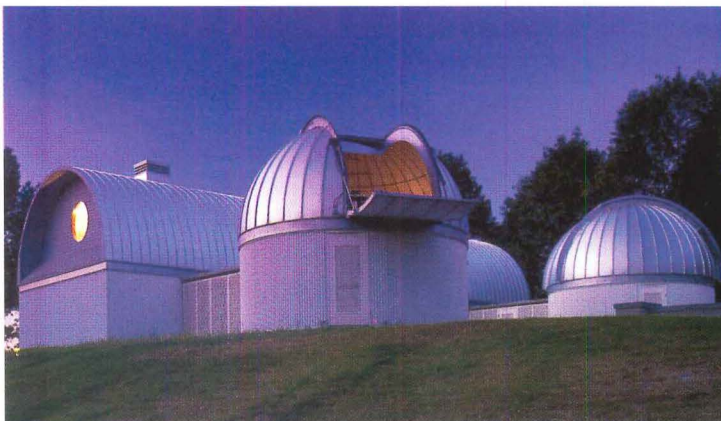
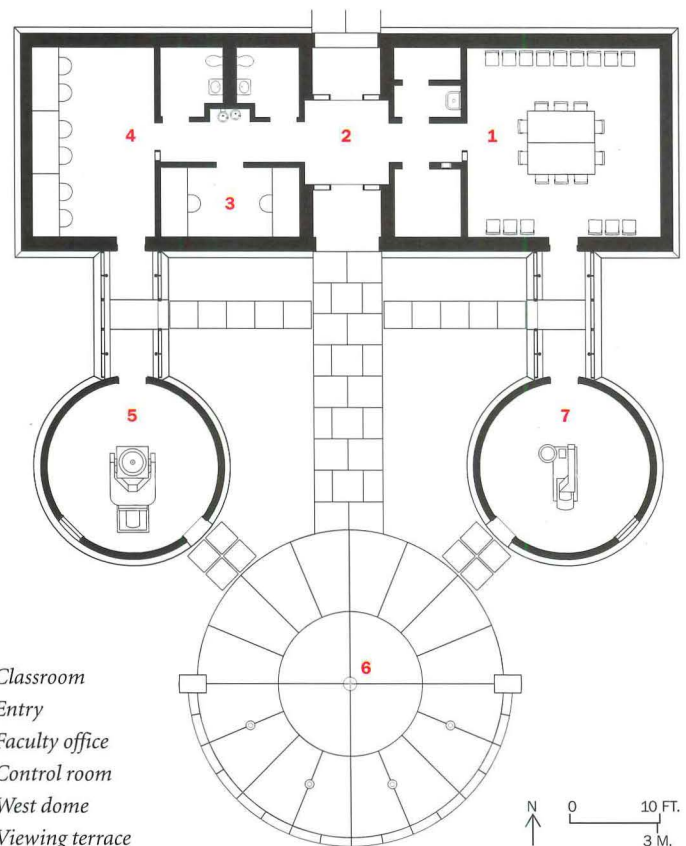
Metal roofing: *Berridge*

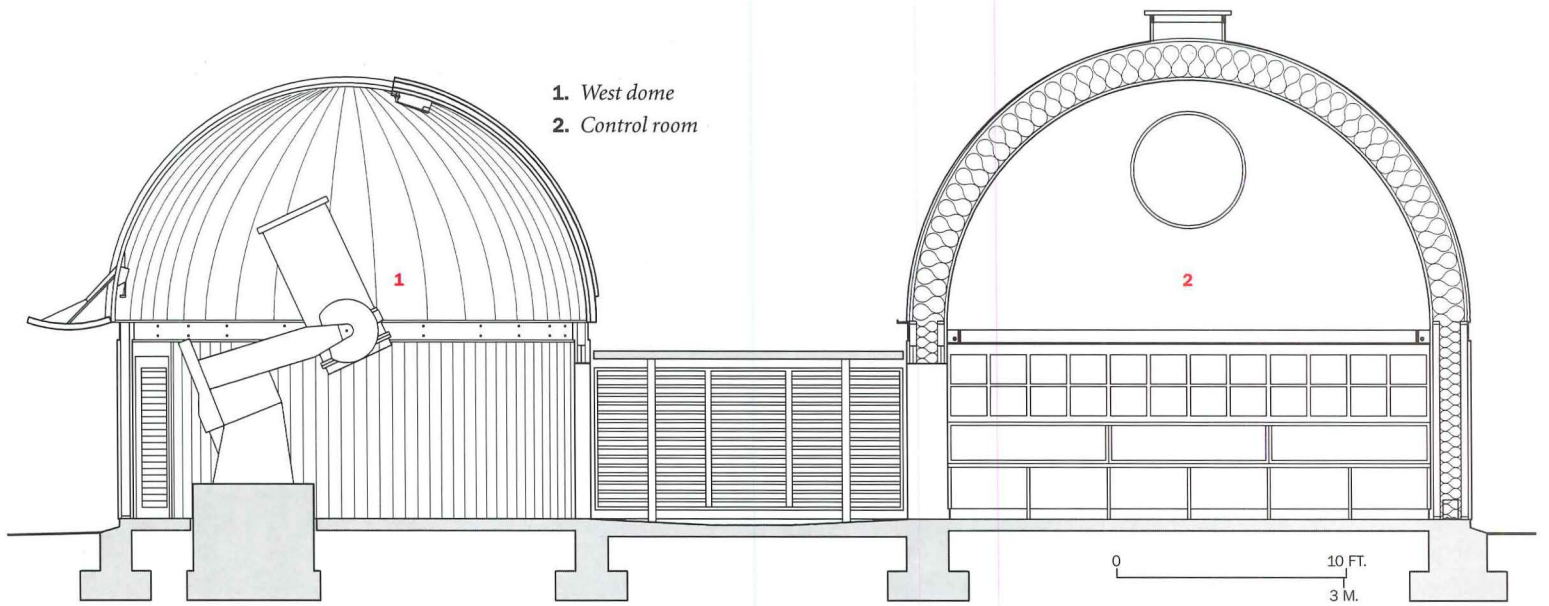
Laminated arches: *Gaylon Lumber*



The position of the two telescopes is controlled by computers located in the observatory's control room

(above). The roof and ceiling of the control building are supported by laminated wood arches.





The domes rotate to give the telescopes access to most of the sky. They are unheated and uninsulated to avoid radiating warm air that would disturb the view of the stars.



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Shown to the right is Lenox Plaza in Atlanta. The objective was to bring a 20-year old building up to Class A status with the look of granite. So, the panels were finished with Dryvit Ameristone. Being lightweight, they were easily trucked to the site as needed. The most compelling statement came from the architect, Jerry Clark, who said, "Anyone who went by the building would think we built a brand new building there. It is totally transformed."

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ADAPTIVE REUSE

Tackling the Really Big Ones

PROJECTS SUCH AS MILITARY-BASE CONVERSIONS, NATIONAL HERITAGE AREAS, AND REDEVELOPING OLD DOWNTOWNS ARE LEADING ARCHITECTS TO WORK AT A HEROIC SCALE.

by Clifford Pearson



1

Los Angeles

Bobrow/Thomas and Associates tore down the walls to turn offices from the 1960s into art studios at the Otis College of Art and Design.



2

Salt Lake City

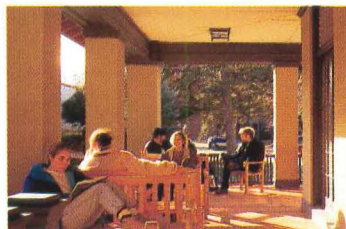
Large floor plates and a heavy-timber interior frame give an old hardware warehouse new cachet as a speculative office building.



3

Lexington, Kentucky

By saving an International Style department store, the James N. Gray Company was able to create a new home for itself.



4

Poughkeepsie, New York

Detective work into old drawings and a sensitivity to the Arts and Crafts style helped Linda Yowell design an admissions center for Vassar College.

What do you do with an old mining town once the silver or coal runs out and the major employer calls it quits? How do you handle the closing of a military base and its conversion to civilian use? How do you revitalize an entire region where the dominant industry has withered away but left a physical and historical legacy that continues to resonate with the people who live there? These are just a few of the challenges facing architects and planners involved in historic preservation today. More than just individual buildings, adaptive-reuse projects are increasingly encompassing great swathes of territory: historic districts, city centers, cultural landscapes, and industrial heritage areas.

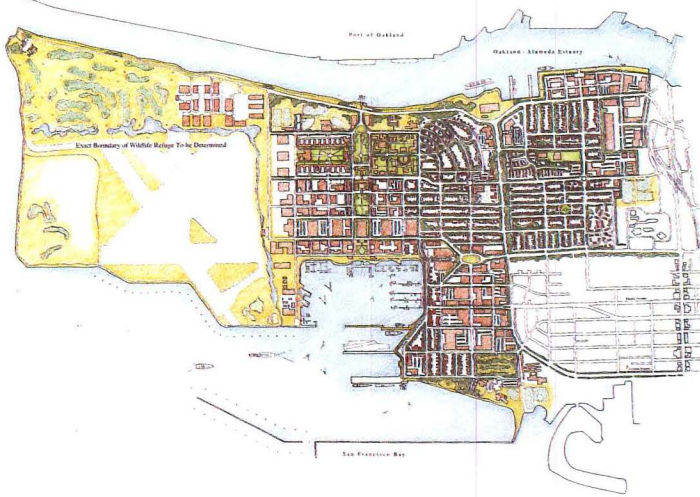
“The scale of intervention has changed over the last 20 years,” states John Stubbs, vice president for programs for the World Monuments Fund (WMF). “This comes with the maturing of the field of historic preservation,” explains Stubbs. The WMF’s latest list of the world’s 100 most endangered sites, for example, includes four historic city centers and three cultural landscapes (such as Lancaster County, Pennsylvania, where the Amish have built and farmed for three centuries).

The expanding scope of adaptive-reuse projects comes at a time when renovation is accounting for a growing percentage of total construction. In 1980 additions and alterations represented 25 percent of all private, nonresidential construction in the country, according to the U.S. Department of Commerce. By 1997 more than \$32 billion, or 39 percent, out of a total of \$83.1 billion spent on private, nonresidential construction was for these renovation projects. Looking at the future, *U.S. Industrial Outlook, 1998*, produced by the Department of Commerce and McGraw-Hill/DRI, forecasts that “the repair and renovation market should grow slightly faster and should be less cyclical than the new construction market over the next five years.”

Reasons to renovate: the recycling ethic and tax credits

There are a number of explanations for these growing numbers. “Buildings today are seen as material resources that shouldn’t be just thrown away,” says WMF’s Stubbs. In this regard, the “green” movement and a general sentiment in favor of recycling all kinds of resources has paved the way for adapting old buildings to new uses, he explains.

In addition, federal tax credits for restoring historic buildings have made many projects financially possible. Although the number of projects taking advantage of federal tax incentives for rehabilitating



A reuse plan for the Alameda Naval Air Station near San Francisco is being prepared by EDAW. It envisions a 20-to-30-year process through which a mix of civilian uses will be developed in phases.

historic buildings dropped radically after changes in the law in 1986, the number of applications for the credits has been rising since then. In the 19-year history of the tax credits up to 1996, more than 27,000 historic rehabilitation projects have been certified and nearly \$18 billion of private investment has been leveraged.

Reinventing old downtowns

Americans are also rediscovering whole sections of their cities, often the older parts. “People are moving back downtown,” states Peter Brink, vice president for programs at the National Trust for Historic Preservation. “Young people want to live there before they start families and older people are coming back after raising kids in the suburbs,” he says. Not only are people moving downtown, but they are changing the ways in which these areas work—converting office and industrial buildings to residential use and bringing 24-hour activity to places that once shut down after 5 pm. “There’s a proliferation of conversions of industrial buildings into residential lofts all over the country. I see it happening in Denver, Omaha, even Lincoln, Nebraska,” says Brink.

In cities such as New York and Boston, where residential lofts are old hat, a new wrinkle has started to emerge: the conversion of office towers into residential buildings. In the process, more than just individual buildings are changing; entire downtown districts are adapting to new uses as well. For example, in New York, the city is in the process of changing zoning laws and providing incentives for developers to convert office towers in the Wall Street area to apartment buildings. The personality of Wall Street is set to change in a dramatic way.

In Boston, Jung/Brannen Associates recently converted the 30-story Beaux Arts office tower built on top of the city’s Greek Revival-style

Custom House into a time-share apartment hotel. The building had lost its major tenant, the General Services Administration, in 1985 and a string of developers had tried a variety of approaches over the years to renovate it—everything from combining it with a nearby building to turning it into a full-service hotel. Jung/Brannen’s new Marriott’s Custom House (opposite top) is part of the changing face of Boston’s older downtown areas.

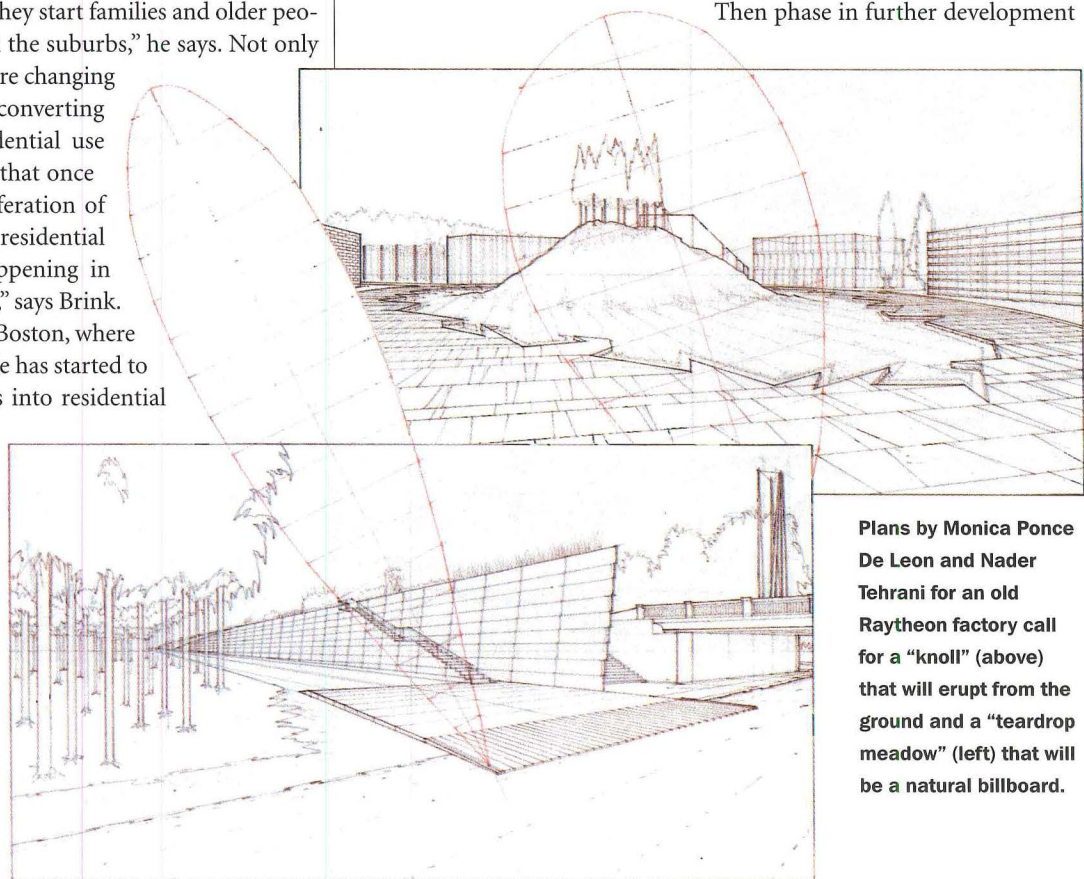
From swords into plowshares

A similar kind of scale (though a very different set of challenges) faces architects and planners figuring out what to do with the sprawling military bases that the Pentagon has decided to close. Nearly 200 bases have been earmarked for decommissioning in four rounds of closings (1988, 1991, 1993, and 1995), and some are gigantic in size. In Orange County, California, for example, El Toro Marine Corps Air Station encompasses 4,738 acres. Because of their size and the mix of uses found on them (usually housing, retail, and industrial buildings, in addition to military facilities), these bases are like entire cities looking for new reasons to exist.

“There’s no owner’s manual for military bases,” says Allen Folks, a senior associate with EDAW, a large landscape architecture and planning firm based in San Francisco that has worked on about 15 military-base conversions since 1988. EDAW is currently doing planning work on the Alameda Naval Air Station, across the bay from San Francisco, as well as several other bases. EDAW’s approach to adapting Alameda to civilian use is to divide the 1,522-acre site into seven discrete areas, each with its own character and mix of uses, and to progress in phases.

Folks’s advice to communities wrestling with military-base reuse projects is, “Don’t feel like you need to use all of the land all at once. You can land-bank part of the site. Start small and move incrementally, perhaps beginning with the old or historic part of the base.

Then phase in further development



Plans by Monica Ponce De Leon and Nader Tehrani for an old Raytheon factory call for a “knoll” (above) that will erupt from the ground and a “teardrop meadow” (left) that will be a natural billboard.

in conjunction with upgraded infrastructure.” One of the most difficult challenges is dealing with the environmental cleanup needs that most bases have. Oil and fuel seepage into the soil and chemical spills are not unusual problems. Folks recommends that after assessing the degree of environmental contamination and taking inventory of the site’s assets, redevelopment authorities “need to go to market immediately. Get the word out to the development community about what you have. Hire a brokerage firm and a marketing consultant and promote the assets you have.” As for developing successful plans, Folks says, “The key is creating activity and a mix of uses. Looking for a single-use savior” such as a new airport or college campus “can be a big problem if it doesn’t work out.”

Finding new uses for towns and old factories

Military bases aren’t the only megaprojects in the adaptive-reuse realm. Old mining towns such as Aspen and Vail, Colorado, have been reinvented successfully as resort destinations, and cities such as Savannah, Georgia, have used their stock of historic buildings to attract tourists and accommodate related businesses such as restaurants, hotels, and stores.

Shifts in industrial production in the U.S. have also left some large tracts of land available for adaptive reuse. One such site is a former manufacturing facility in Wayland, Massachusetts, owned by Raytheon, the military contractor that makes the Patriot missiles. While the closing of the 400,000-square-foot factory was a blow to the local economy, the town of Wayland, a suburb of Boston, sees it also as an opportunity to create a new town center to complement its existing commercial center. To their credit, both the local government and Raytheon have decided to be innovative in their approach—hiring the young team of Monica Ponce De Leon and Nader Tehrani, whose firm Office dA is based in Boston.

Ponce De Leon and Tehrani’s plans call for “reframing the suburban landscape” by creating public spaces that highlight various natural features or play off of existing building forms (opposite bottom). While their plans include a mix of uses (offices, stores, housing, and civic buildings) and are intended to progress in phases—just as more conventional proposals elsewhere do—the architects have designed some unusual out-

“THE SCALE OF INTERVENTION HAS CHANGED OVER THE LAST 20 YEARS,” SAYS WMF’S JOHN STUBBS.

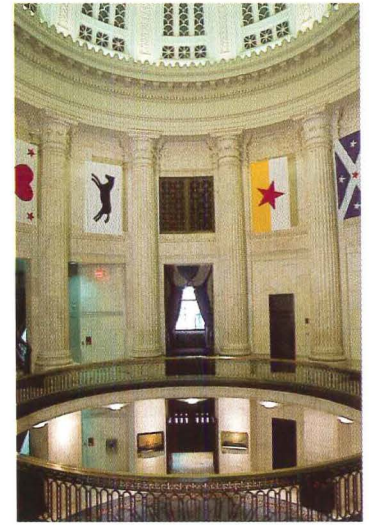
door areas where the existing landscape is “reframed and reconfigured for [its] surreal potential.” These include the Wayland Knoll, a large hill that seems to erupt from the earth and serves as a focal point for development such as a new public safety building; the Teardrop Meadow, an elongated landform that rises up and tilts so it acts almost like a natural billboard for the town; and the Parking Grove, where cars park within a grid of evergreen trees.

“We use infrastructure and public spaces as the glue holding everything together,” explains Tehrani. “The idea was to manipulate the landscape to give a strong identity to the site,” says Ponce De Leon. Although radical in design, the outdoor areas respond to the needs of Wayland residents who said they wanted places where public events and celebrations could occur.

A relatively new (and sometimes controversial) kind of adaptive-reuse project is the cultural or industrial heritage area, which may encompass hundreds of square miles in more than one state. Focused on particular themes—often having to do with an important but dying industry such as coal mining or steel—such projects attempt to package and market whole regions to businesses and tourists.



A Beaux Arts office tower in Boston has been converted by architects Jung/Brannen into Marriott’s Custom



House, a time-share apartment building, and its historic rotunda (above) has been preserved.

The first national heritage area was the Illinois and Michigan Canal National Heritage Corridor, designated by Congress in 1984. Designation usually includes federal funding and can encourage municipalities, counties, and states in the area to work together to revitalize historic town centers, provide interpretive programs at various sites, preserve historic resources, create unified signage to help tourists find their way through the area, and establish a shared identity. Unlike national parks, which are clearly defined geographically and publicly owned, heritage areas may include isolated sites surrounded by great stretches of private property. Today there are 15 national heritage areas, of which nine were designated in 1996.

Controversy follows a few projects

Established by separate acts of Congress, usually with funding of less than \$8 million, heritage areas are popular projects. A few, though, have been accused of being porkbarrel projects that powerful Congressmen use to curry favor with voters. The Steamtown National Historic Site around Scranton, Pennsylvania, for example, has been attacked for its loosely defined mission and its dearth of results in comparison to the amount of money allocated. (Though it follows many of the same principles as heritage areas, Steamtown has a different designation—as a national historic site.) Another criticism is the program’s lack of teeth; designation doesn’t bring any legal protection to buildings or sites in the area.

As a tool for focusing preservation and revitalization efforts, though, the heritage-area program can make an important contribution to some economically depressed parts of the country. “We have lots of anecdotal evidence from businesses showing that designation has been a help in attracting economic development,” reports Samuel Stokes, the acting manager of the program at the National Park Service.

“The jury is still out” on the success of heritage areas, says the National Trust for Historic Preservation vice president Brink. The best heritage areas, he says, have “a strong organizing thread, whether it’s a canal or theme, and tell a story that’s historically important.”

The role of architects in megaprojects like heritage areas, military-base conversions, and the transformation of downtown districts is not always clear, but it often involves giving form to a common vision or direction that others can rally around and take forward. ■

1

Otis College of Art and Design, Los Angeles

STRIPPING AWAY AN OFFICE BUILDING'S BUSINESS CLOTHES, BOBROW/THOMAS REVEALS THE ART SCHOOL HIDDEN INSIDE.

by Clifford Pearson

Project: Otis College of Art and Design, Los Angeles

Architect: Bobrow/Thomas and Associates—Michael Bobrow, FAIA, Julia Thomas, design principals; Greg Doench, senior designer; Bob Cull, project manager; Hillary Jaye, signage designer; Jacky Yung, Michael Olshefski, project team

Engineers: KPFF Consulting Engineers (structural); Syska & Hennessy (mechanical and plumbing); Norman A. Cohen Associates (electrical)

Consultants: Integrated Lighting Design (lighting); Martin Newsom Associates (acoustical)

General Contractor: Cannon Constructors

Adaptive use: Office building to art college

Size: 115,000 square feet; seven stories, plus basement

Cost: \$28 per square foot, plus \$7 per square foot for fire stair

Call it conversion by subtraction. To turn a tired office building from the 1960s into a hip college of art and design, Bobrow/Thomas and Associates (BTA) tore down most interior partitions, stripped off colored paint from precast walls, and removed tinted film from glazing. Ironically, by taking away much of the old design and opening up interior spaces, BTA increased the visual impact of one of the original building's most characteristic features: its bands of punch-card windows.

Designed for IBM by Eliot Noyes in conjunction with Quincy Jones, the building was a conventional office tower on the inside with private offices wrapped around a service core. Floor plates considered small by today's megastandards (they're under 15,000 square feet), a less-than-prime location in the Westchester area of Los Angeles, and the need for seismic upgrading prompted IBM to move out of the building and find office space elsewhere, leaving the building vacant.

Finding a new home

Meanwhile, Michael Bobrow and his partner, Julia Thomas, were helping the Otis College of Art and Design find a new home. Drug wars in MacArthur Park, where the school was located, had convinced Otis's board of trustees to leave the neighborhood. For several months the

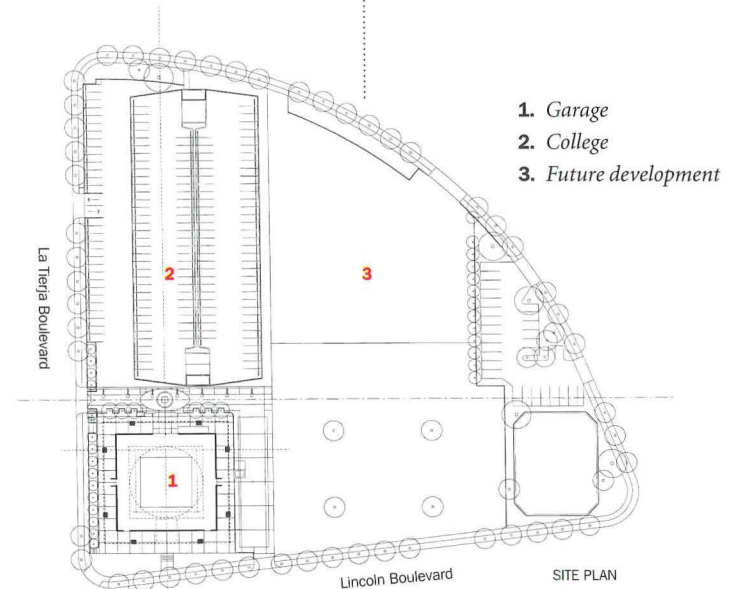
college explored the possibility of moving into an old department store that the Los Angeles County Museum of Art had acquired next to its buildings, but negotiations ended without a deal.

Under intense time constraints and with a very limited budget, Otis bought the empty IBM building and its 4.5-acre site (including a parking garage) for just \$5 million at the end of 1995. In January 1997, with design and construction having been completed in less than 14 months, the college moved in. The cost of construction was a remarkable \$35 per square foot.

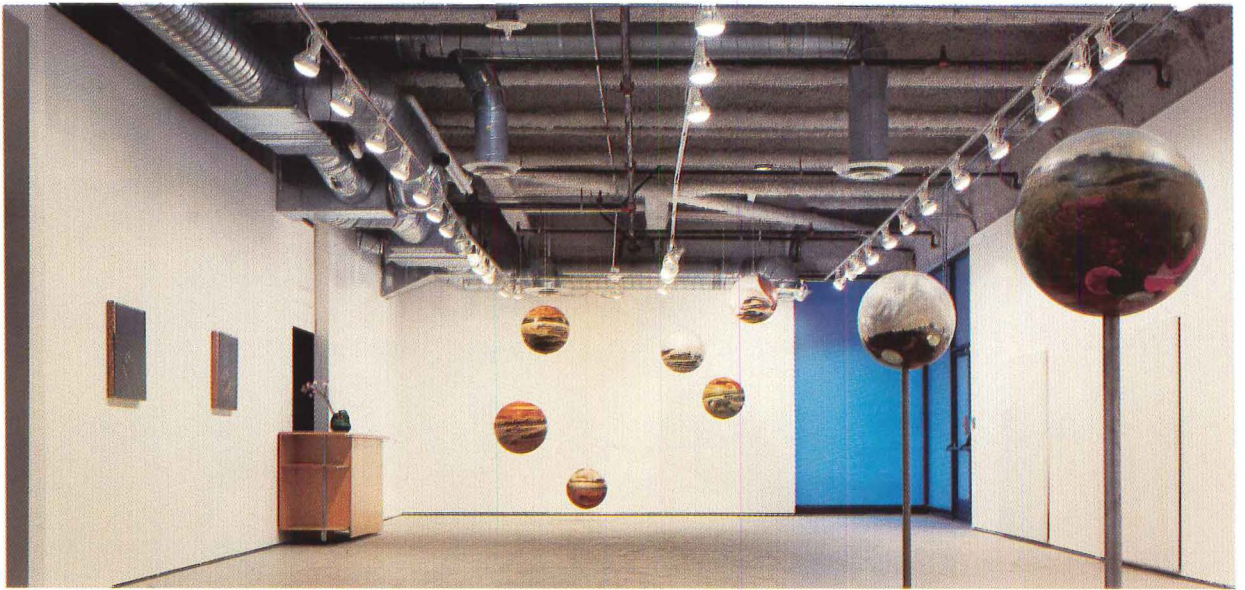
"Our approach was to create a work-in-progress, to design unfin-

ished art lofts rather than traditional spaces," explains Michael Bobrow, FAIA. "We also wanted to create a sense of community" among the various departments, says Julia Thomas. Taking down partitions, removing hung ceilings, and opening up interior spaces were ways of merging the firm's two tasks—resulting in flowing studio spaces that encourage people to walk around and see what's being done in other departments.

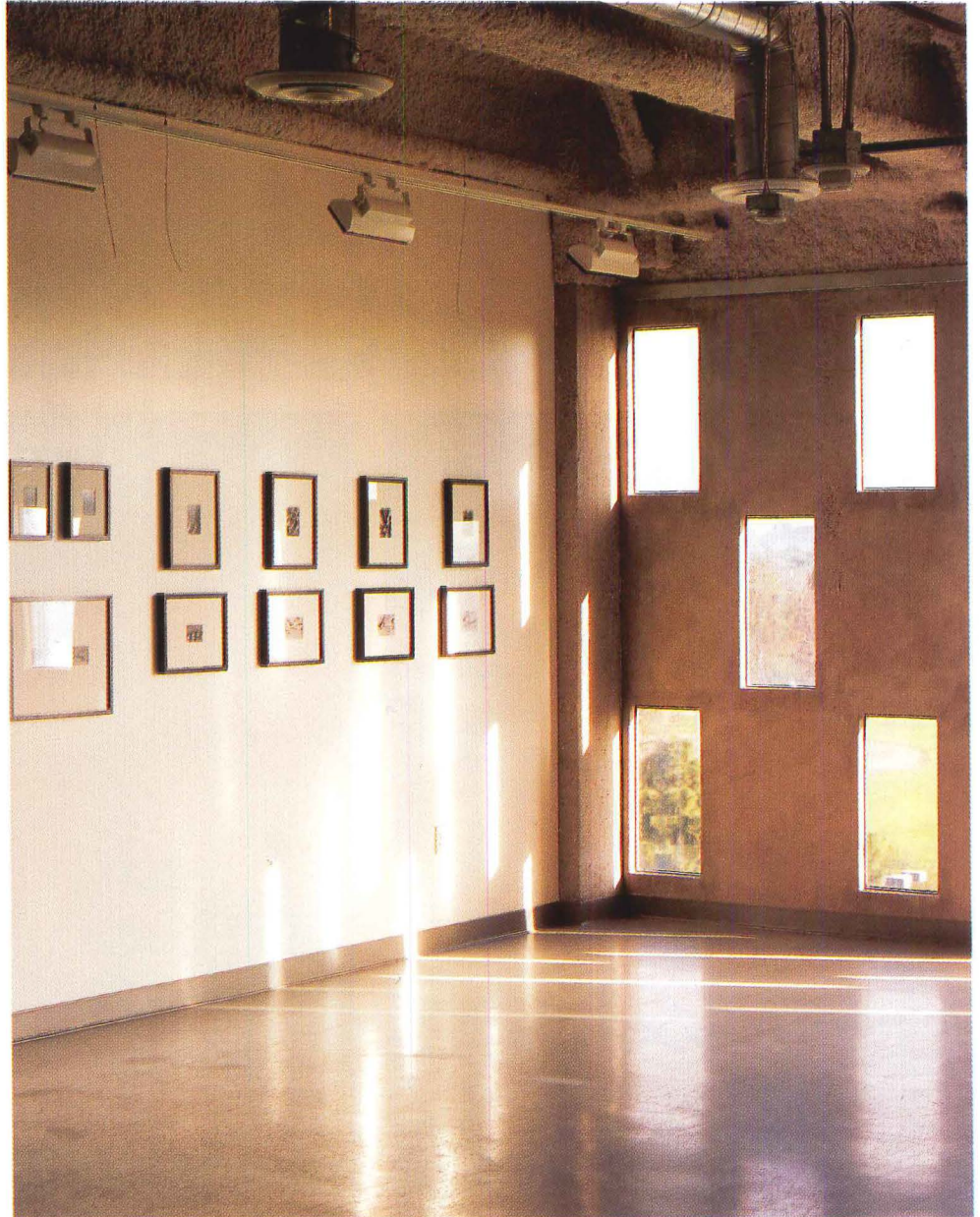
"We wanted a more integrated approach to learning," states Neil Hoffman, the president of Otis. "At most art schools, each department has its own turf. Here we wanted to encourage interaction."

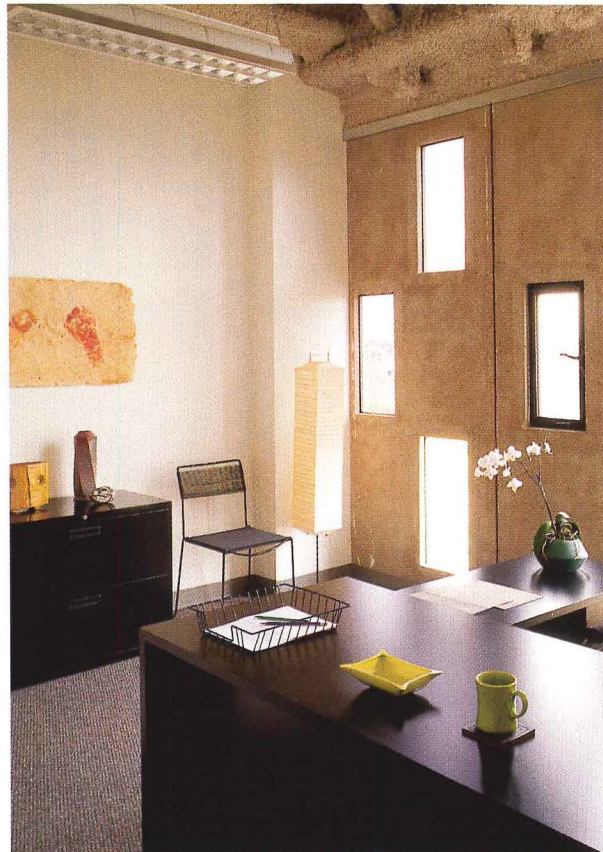


The architects took advantage of 14½-foot-high ceilings on the ground floor to create an art gallery for the entire school to share (right). Other common facilities such as a café and a lounge are also on this floor.

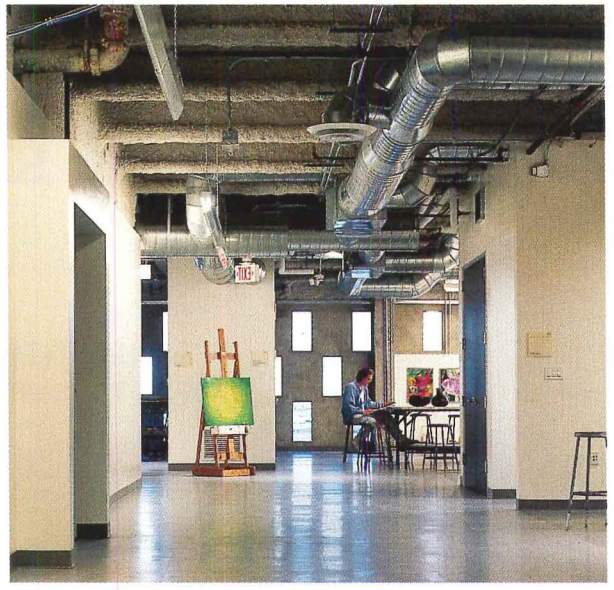


The building's exterior was restored (above), while 200 of its punch-card windows were made operable. On the inside, precast-concrete panels were sandblasted to remove paint and hung ceilings were eliminated to add height to spaces such as a gallery on an upper floor (right).

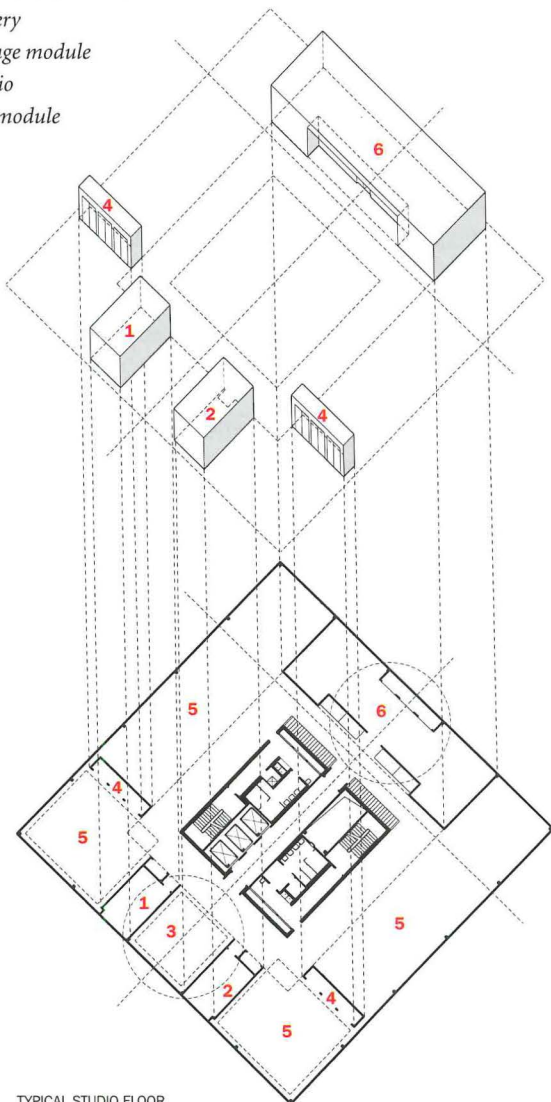




By removing most of the interior walls, BTA opened up views of the checkerboard fenestration in work areas (above) and offices (left). In studio spaces, gypsum board is pushed up against the building envelope to create a sense of layering and provide tackable surfaces (far left). A library (opposite left) is housed on the third floor. A 12-foot-wide circulation zone flows directly into studio space and a gallery (opposite right), eliminating the need for an enclosed corridor.



1. Office module
2. Conference module
3. Gallery
4. Storage module
5. Studio
6. Lab module



TYPICAL STUDIO FLOOR

Before any work could begin on the inside, the architects had to upgrade the building to meet new seismic codes. This involved reattaching precast-concrete panels to the building's structure using flexible connections and silicon sealant, and adding shear walls to the concrete parking structure. BTA also added steel to the main building's third floor to support the weight of the books in the school's library.

Although the architects thought about reclassing the building, the budget wouldn't allow it. In the end, they replaced about 200 of the building's 1,000 punch-card windows with operable versions of the same dimensions.

Opening up the floor plans

On the inside, the most important move made by BTA was to eliminate the original egress corridor surrounding the building's central core, allowing the studio spaces on each floor to flow uninterrupted from an open circulation area in the center. With the help of a code consultant, the architects were able to persuade the city's building department to allow this unusual arrangement, as long as the 12-foot-wide circulation zone was free of permanent obstructions over 5 feet 9 inches high.

Within the open loftlike spaces of each floor, BTA inserted enclosed areas, or modules, for laboratories,

offices, conference rooms, and storage. These modules help break up the open work area into discrete studios and define a gallery area on the east side of each floor.

With shared facilities (such as computer lab, wood shop, and metal shop) located on each of the four studio floors, the design encourages students and faculty to move throughout the building and encounter people from other departments. Each of the studio floors also has an area reserved for first-year core studies, so freshmen are exposed to the work of students ahead of them.

Throughout the eight floors of the building (seven of which are above ground), an industrial aesthetic was employed. New air ducts and mechanical systems were left exposed, tough materials like sealed concrete and vinyl tiles were specified for flooring, and cut edges of plywood cabinetry were revealed. Five-foot-eight-inch-high gypsum-board walls push right up against the building's envelope, covering some windows and creating a sense of layering that is an important part of BTA's design approach. ■

Sources

Apple-ply and birch cabinetwork: Jeffrey Trott Industries
VCT flooring: Armstrong, Stone Tex
Acoustical spray: International Cellulose Corp.

2

Salt Lake Hardware Salt Lake City

FFKR ARCHITECTURE CONVERTS AN OLD WAREHOUSE INTO OFFICES AND HOPES TO JUMP-START REDEVELOPMENT IN AN INDUSTRIAL PART OF TOWN.

by Clifford Pearson

Project: Salt Lake Hardware, Salt Lake City

Owner: SLHNET Investment

Architect: FFKR Architecture/ Planning/Interior Design—M. Louis Ulrich, AIA, partner-in-charge; Russ Bachmeier, Kathryn Anderson, AIA, Hans Fagerlund, Oktai Parvaz, AIA, David Winchester, AIA, design team

Engineers: Bush & Gudgel (civil); Colvin Engineering Associates (mechanical); D. George Hansen (structural); BNA Consulting Engineers (electrical)

General Contractor: Duane Marsala

Adaptive use: Warehouse to office building

Size: 225,000 square feet; five stories

Construction budget: \$10 million

When it was erected in 1909, the Salt Lake Hardware building was the largest warehouse between the Missouri River and California. Today the five-story, 225,000-square-foot building houses mostly office workers, and the only hardware in sight is the computer on every desk.

Converted into a speculative office building and fully leased within six months of its opening in March 1996, Salt Lake Hardware (the old name has been preserved along with the bricks) is reviving interest in an industrial part of town that was on the skids. As the first large-scale project in what is now being called Salt Lake City's Gateway district, the building may be a catalyst for future development and a model for adapting old structures to new uses.

The developer of Salt Lake Hardware, John Williams, has been saving old buildings in the city for a couple of decades, successfully turning them into restaurants, shops, and offices. He has teamed up with M. Louis Ulrich, AIA, of FFKR Architecture on several projects, including the conversion of an automotive repair shop into the upscale Metropolitan Restaurant. The developer and the architect are now working on saving a Ford Motor Company assembly plant designed by Albert Kahn and turning it into offices.

At Salt Lake Hardware,

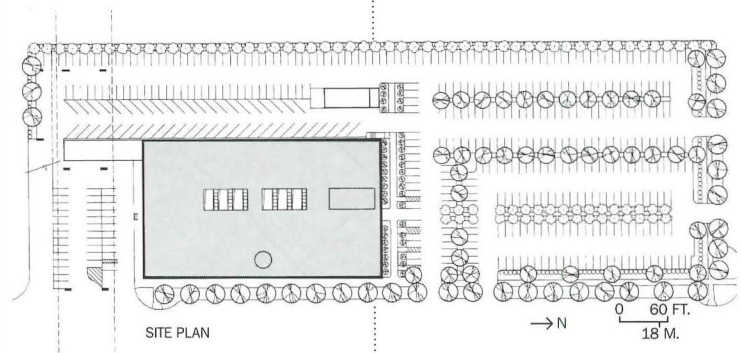
Williams and Ulrich approached most of the building's exterior as a preservation effort. They restored the main (east) facade to its original glory—cleaning bricks with water, repainting them, and restoring old fire escapes, fire bells, and a large rooftop water tower. All the windows on this elevation are original stock, some of them salvaged from other elevations of the building. While some of the windows on the other sides are new, all are wood and share the original profiles.

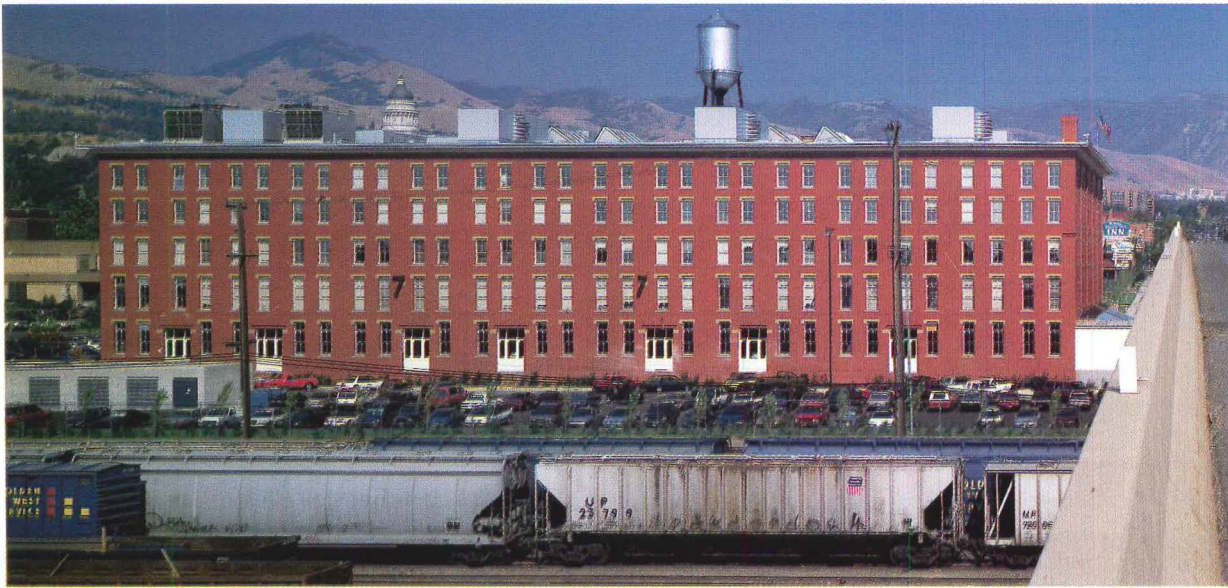
A new entry of glass and steel

On the north facade, a new main entrance was inserted in what had originally been a solid brick wall. The new entry and a rectangular window above it are crisp modern designs of dark steel and glass. Old bricks taken from other parts of the building were used to fill in around the glass and steel, but the joint line between old and new was left for all to see.

A considerable amount of effort went into keeping Salt Lake Hardware looking as good as old. Because of uneven settling over the years, 48-inch-deep steel beams were inserted at a diagonal underneath the corners of the building to provide new support. And a major seismic retrofit was needed to bring the building up to code; this involved adding steel reinforcing bars to create a diaphragm that transfers loads to thick masonry walls and applying plastic-polymer webbing to the interior surface of brick walls as a method of bracing.

All the mechanical systems in the building are new. A chiller on the fifth floor provides cool air that comes down existing vertical shafts and is distributed horizontally through new exposed vents. Separate air-handling units service each of the eight zones of the building, allowing individual control. Three backup power generators are available, since several of the tenants





Located next to the railroad, the building (left) was once a regional distribution center. Today it anchors a warehouse district that's undergoing a revival. An old parts chute has been retained in the building's new atrium (foreground below).

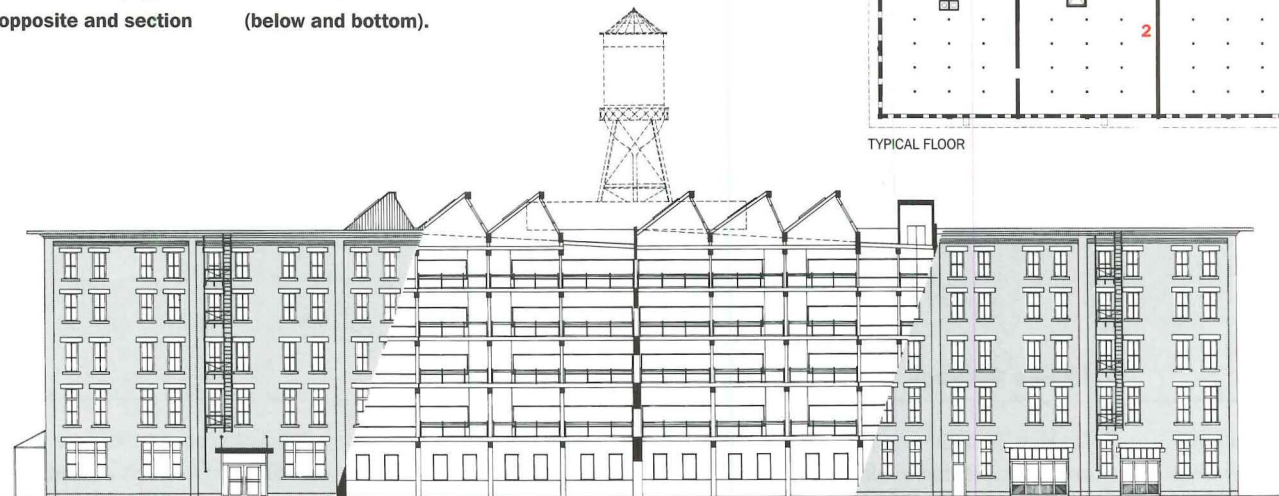
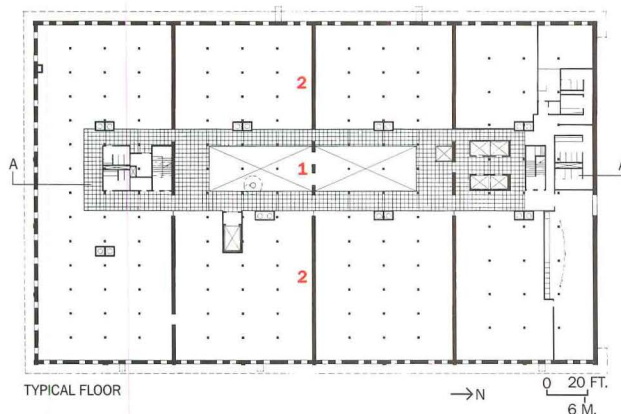




To bring daylight into the 50,000-square-foot floors, the architects inserted a five-story-high atrium into the center of the building and rebuilt skylights (opposite and section

below). In the process, 2 million board feet of timbers were preserved. FFKR also designed showrooms and offices for a furniture supply company (below and bottom).

1. Atrium
2. Offices



EAST ELEVATION/SECTION A-A

have large computer-dependent operations.

On the inside, the architects preserved the impressive fir timbers that work as a structural frame for the building as well as the load-bearing fire walls, which are two feet thick at their base and divide the interior into four giant bays. But to bring more daylight into the 50,000-square-foot floors, Ulrich cut a 96-foot-long, 22-foot-wide atrium out of the center of the building and topped it with rebuilt skylights (made in part from timbers salvaged during the construction of the atrium).

Cutting new openings

In a building as heavy and enclosed as this one, "a sense of transparency is needed," says Ulrich. So the architect cut arched openings into the masonry wall dividing the atrium in half, allowing views and light to run through most of the interior. The shallow arches were modeled on ones found in another part of the building, so they seem to be a natural fit.

The major circulation route wraps around the atrium, providing a great deal of flexibility in subdividing office space on each floor. To

maintain an industrial feeling in the interior and stay within a tight \$10 million budget, Ulrich searched hard for the right railings and balusters to overlook the atrium. His solution was to stand industrial steel floor grates on their sides. Another intriguing decision was to keep in place the spiraling metal hardware-delivery chute. Today the chute serves as a sculptural element, rising up through the atrium and recalling the building's previous function.

In addition to all the public spaces, FFKR designed the interiors for a furniture showroom on the ground floor. The architects exposed the building's brick walls, restored the original pressed-tin ceiling, and inserted some gently curving walls to enclose a few freestanding rooms. ■

Sources

- Wood windows:** Pozzi
- Insulated-glass skylights:** Aladdin Industries
- Hickory-trim woodwork and framing:** Boswell-Olsen
- Atrium floor tiles:** American Olean
- Surface-mounted downlights:** ESCO
- Custom metal guardrails and reception desk:** Elwood/Sieg Design



3

James N. Gray Company Lexington, Kentucky

A DESIGN-BUILD COMPANY SAVES A BELOVED MODERNIST DEPARTMENT STORE BY CONVERTING IT INTO THEIR OWN HOME OFFICE.

by Lisa Germany

Project: James N. Gray Company Home Office, Lexington, Kentucky
Architect: Franklin N. Gray Design Services—Sharon Blandford, AIA, John Thorne, AIA, Stephanie Gilbert, design team

Architect of Record: Lucas/Schwering Architects

Associate Architect: Pentagram Architectural Services

Interior Designer: Carol Carol & Company Interior Designers

Engineers: Freeland Harris Consulting Engineers (structural); Technical Horizons (mechanical); Engineering Resources, Inc. (electrical, lighting)

Landscape Designer: John L. Carman & Associates

Design-BUILDER: James N. Gray Company—Stephen Gray, project manager; Doug Aebersold, site manager

Adaptive use: Department store to offices for design-build company

Size: 74,000 square feet; four stories, plus basement

Construction cost: \$5 million

On May 25, 1995, in the suburbs of Lexington, Kentucky, more than 150 people broke ground at the site of the new home office of the James N. Gray Company, a growing design-build company. The sunny day was full of speeches and tributes to employees from the Gray family. So bright were the expectations for the facility that no one could have guessed that within a month the company would scrap it in favor of a downtown building vacated by a department store.

The Wolf Wile Department Store, on East Main Street, had been a beloved icon in Lexington and the city's Modernist gem. But like many grand department stores in downtowns around the country, it had closed its doors in the 1990s and the building was up for sale. Civic leaders concerned about a downtown losing its vitality tried to interest several companies in the Wolf Wile store. Unfortunately, it presented the Grays with some of the same shortcomings as their existing offices—four separate floors and not enough parking. Besides, at \$2 million, it was too expensive to buy and remodel.

Enter David Mohny, the dean of the University of Kentucky School of Architecture, who says he

Lisa Germany is the author of Harwell Hamilton Harris, a biography of the early Modern architect.

“nudged” Franklin Gray, son of the company's founder, to think again about the store even after breaking ground for the suburban building. Mohny felt keeping the firm downtown would provide the city with a shot in the arm, so he asked the mayor to help work out a deal.

He also enlisted a friend, former University of Kentucky dean (and Gray Company consultant) Charles Graves, to talk to owner Joseph Wile about reducing the price of the store. Their efforts paid off when the city made parking available and Wile lowered his price to \$550,000.

Designed for Wile by New York architect James Pickering (in association with the local firm Frankel and Curtis), the 1950 International Style building was an elegant place to shop. The challenge the Grays faced

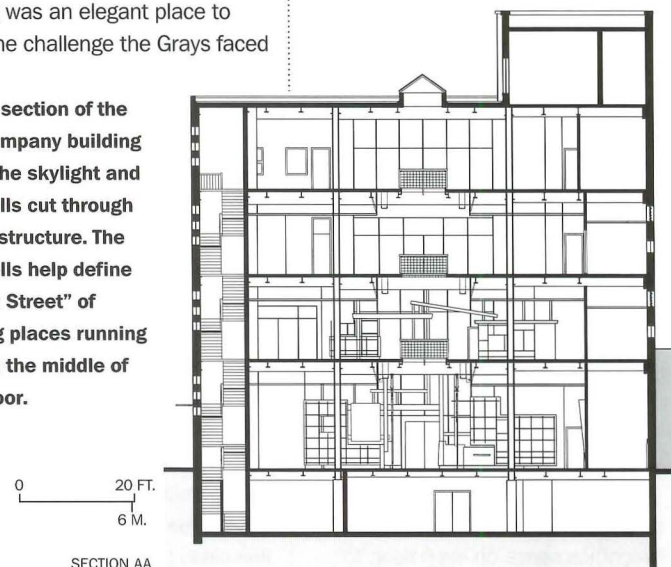
was how to convert the store to a very different function without compromising its unique personality.

Preserving an old front

Respecting the store's role as a presence on East Main Street, the Grays cleaned and restored its front facade of recessed-glass display windows surmounted by three levels of square granite panels and kept the stainless-steel columns and limestone pylon bearing the Wolf Wile name. The restoration of the front and the eastern face of the building qualified the structure for a spot on the National Register of Historic Places and a 20 percent historic buildings tax credit.

The restored department-store

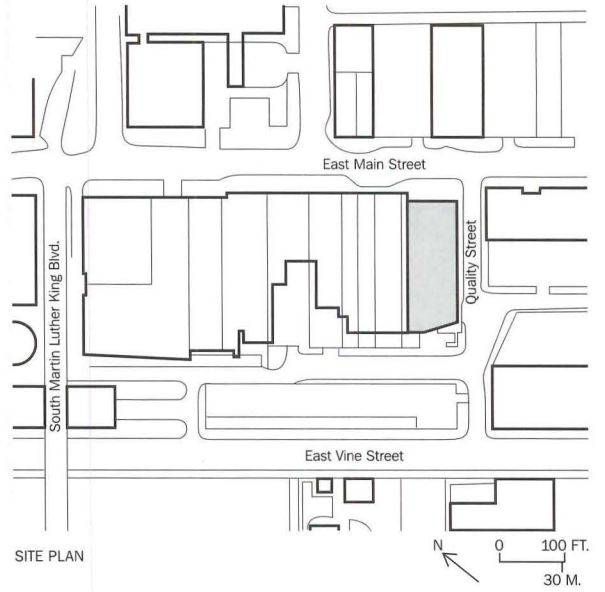
A cross section of the Gray Company building shows the skylight and light wells cut through the old structure. The light wells help define a “Main Street” of meeting places running through the middle of each floor.



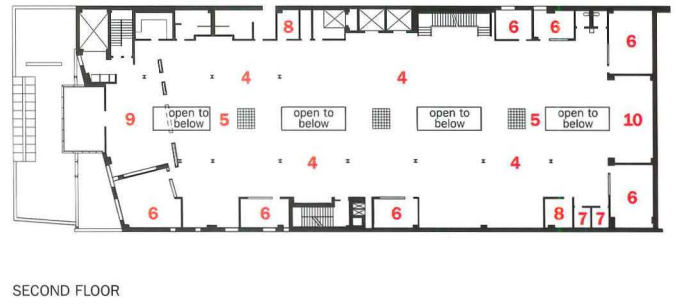
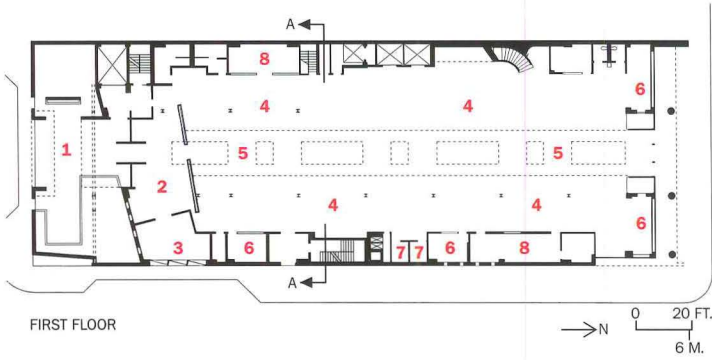
SECTION AA



The Main Street front of the Wolf Wile store was restored (left) and a new entry for Gray was created with painted I-beams “completing” the sliced-off end of the building’s envelope (below).



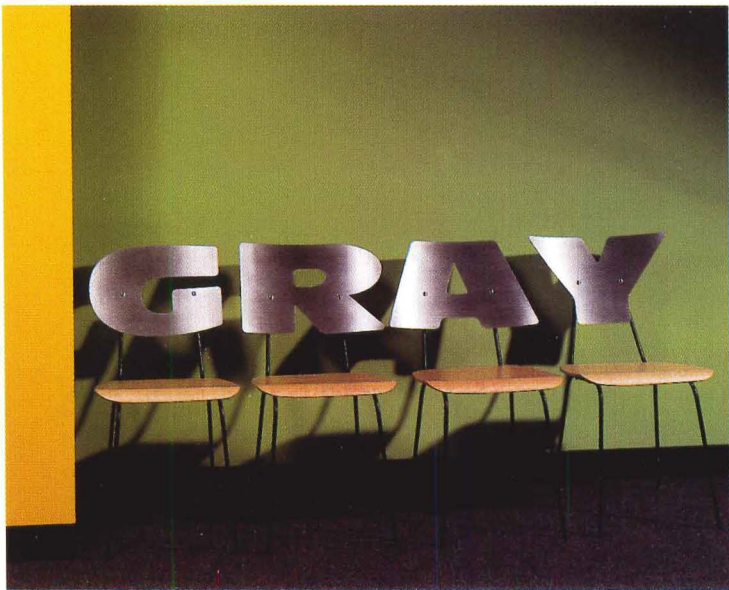
- 1. Entry court
- 2. Reception
- 3. Greeting room
- 4. Office
- 5. "Main Street"
- 6. Conference
- 7. Quiet room
- 8. Support
- 9. Coffee shop
- 10. Library



The open interiors provide plenty of places for Gray employees to meet and relax. The "Main Street" area under the 100-foot-long central skylight is furnished with work tables and comfortable chairs (right). A curving

stair from the original store has been incorporated into the new facility (opposite top right). Timber and untreated materials used in the interiors refer to the company's business: construction (opposite bottom).





front, though, wasn't convenient to parking and offered little chance for Gray to project its own identity. So the back of the building became the main entrance for Gray Company employees and clients. The building's new orientation has also added architectural interest to Vine Street, a road motorists once used only for speeding across town.

The new facade takes its cue from the angular cutaway of the store's backside, which keeps the building from being the Modernist box it otherwise would be. "You immediately wanted to complete the grid," says Franklin Gray of the old store's angled rear elevation. In effect, that's what the designers did when they added colorful I-beams, braced by a catwalk off the fourth floor, to the Water and Vine Street facade. The composition frankly communicates the business that goes on inside: construction.

The designers of the new Gray home office let the old building lead the way. "It is so clean and so forceful that it was easy to give it form," says Franklin Gray, who collaborated on the building with his own staff at the Gray Company and, until there was a parting of the ways, with Jim Biber of New York's Pentagram Architectural Services. To introduce natural light into more of the structure, an expansive 100-foot-long by 8-foot-wide skylight was cut into the roof. Beneath it,

four cutouts on each floor distribute daylight and serve as unifying central elements. (The cutouts are staggered vertically, so they don't line up.) On each floor, the space below the skylight is called Main Street, an area where employees can meet colleagues and relax.

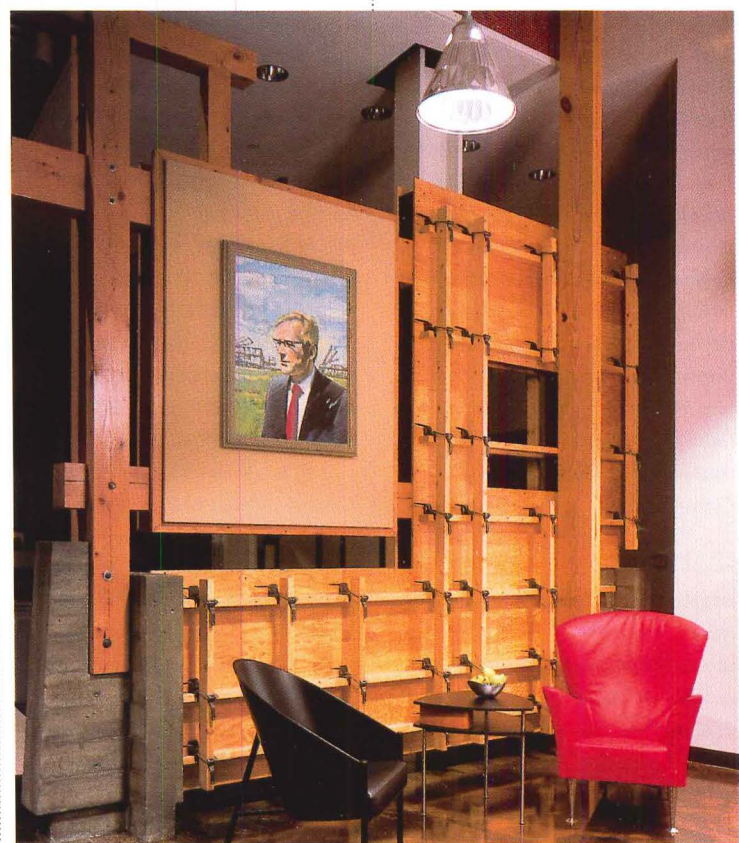
Open office areas allow people to work in teams and encourage flexibility when new teams are formed. Executives work in the same open areas and meet clients in conference rooms. Small "quiet rooms" provide privacy when needed.

Designing for collaboration

The Grays credit Biber with understanding their desire to use the building as a way of expressing their philosophy of collaborative work, helping them create a structure that establishes the corporation's particular brand identity. They were also inspired when he created what he called a precedence book, which illustrated Classical prototypes (such as the Piazza Navona in Rome and the Uffizi in Florence) for the forms created by the building's light wells.

The interiors, designed by Carol Gullett of Carol Carol & Company of Lexington, are awash with strong color, which vibrates through the 74,000 square feet of floor space and down the various levels of the building.

Except for the meeting rooms



that line the perimeter of every floor, the interiors have an organic flow, intended—as so many other features of the building are—to bring people together.

The Grays are happy to have invested the same amount of money in converting the Wolf Wile store—\$5 million—that they had planned to spend on building a new headquarters and to have ended up with 80 percent more space. ■

Sources

Curtain wall: Kawneer

Continuous-ridge skylights: Naturalite, EPI

Acoustical ceilings: USG

Cabinetwork: Prajna, Lexington Laminates

Carpeting: Collins & Aikman, Eurotex

Office furniture: Herman Miller (Relay Group)

Upholstery: Kravet; Knoll, Stroheim & Rhomann

4

Admission House Vassar College Poughkeepsie, New York

RESTORING SOME OF THE ORIGINAL ARCHITECTS' IDEAS AND INJECTING SOME OF HER OWN, LINDA YOWELL GIVES NEW LIFE TO A 1908 BUILDING.

by Clifford Pearson

Project: Carol and James Kautz
Admission House, Vassar College,
Poughkeepsie, New York

Architect: Linda M. Yowell, Architect—
Linda Yowell, AIA, principal-in-charge;
Joaquín Ham, Nick Raschella, AIA,
Alfred Wen, Anne Derry Whidden,
project team

Engineers: Robert Silman Associates
(structural); Atkinson Koven Feinberg
Engineers (mechanical/electrical)

Consultants: Judith Stockman (furni-
ture specification); Sasaki Associates
(landscape design)

General Contractor: Kirschhoff
Construction

Adaptive use: Clubhouse to admissions
office

Size: 5,000 square feet, including 800-
square-foot addition

Construction cost: withheld

If you didn't know the building before it was converted to Vassar's Admission House, you would think it had always been this way. Built in 1908 as a clubhouse for maids who worked at the college, then used as offices for the employees' union, this Arts and Crafts structure has now assumed its third identity. Although she redesigned nearly all the interiors and made changes to the exterior, architect Linda Yowell, AIA, was able to capture the spirit of the original architecture.

The new admissions building is the last piece of a program started by Vassar president Frances Fergusson to convert old service buildings in the area behind the school's Main Building. Earlier projects included turning a power plant and a coal bin into two theaters. Fergusson, who is an architectural historian, is continuing to build on campus and has commissioned Hugh Hardy to design a library addition.

Before working on the Carol and James Kautz Admission House, Yowell (a Vassar graduate herself) checked the drawings of the original building by Pilcher and Tachau. She discovered that a series of ceramic tiles specified for the upper portion of the main elevation had never been installed and that a set of cascading front stairs had actually been built as a straight set. So Yowell incorporated the original

architects' ideas into her design, while repairing the building's cracked stucco and wooden eaves and rebuilding the front porch to accommodate a new wheelchair-accessible ramp. To make the new ramp compatible with the Arts and Crafts building, Yowell detailed its railing to match the old porch railing. She also raised the level of the front yard by a foot to reduce the length of the ramp.

On the back of the building, the architect added an 800-square-foot, two-story addition, necessary for the building's new function. By keeping the addition's roof low, Yowell ensured that it didn't obscure the upper band of small windows on the top floor of the existing building.

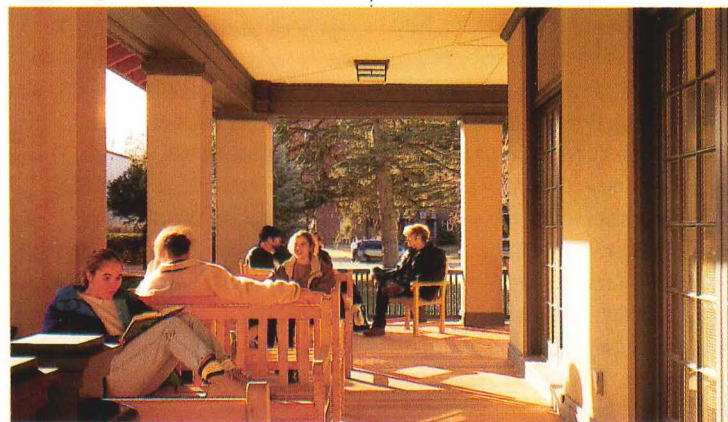
Reworking the interiors

Because the needs of the admissions department differ from those of a clubhouse, most of the build-

ing's interior spaces have been changed. The basement, which had housed a laundry and boiler, now has offices. And the second floor has been redesigned so it can work as a series of offices around a combined conference and waiting room.

On the main floor, Yowell moved interior partitions to accommodate offices and a secretary's area. Meanwhile, the old lounge was totally refurbished to serve as the waiting room for prospective students and their families. Layers of aging white paint were stripped off the inglenook fireplace to reveal a set of Henry Mercer tiles the same size and shape as the tiles Yowell restored to the building's exterior. Slender wicker furniture was replaced by more solid and comfortable Stickley pieces.

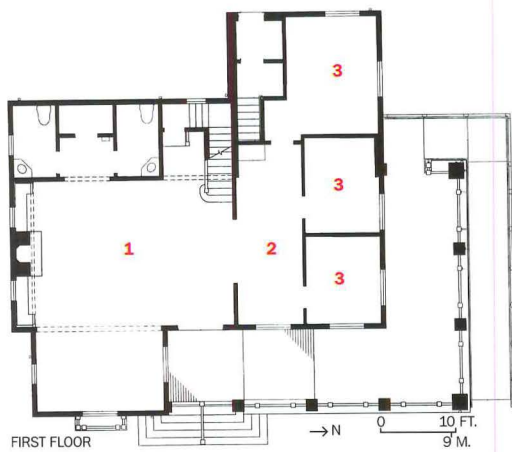
While new interior partitions are gypsum board, the architect restored the old plaster perimeter



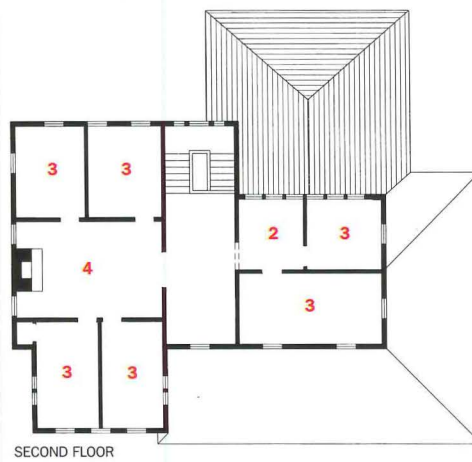


The building's porch (opposite) was rebuilt to include an accessible ramp (far left). Ceramic tiles like those envisioned by the original architects were added under the eaves (left). In the waiting room, paint was removed from wood brackets and the fireplace (below).

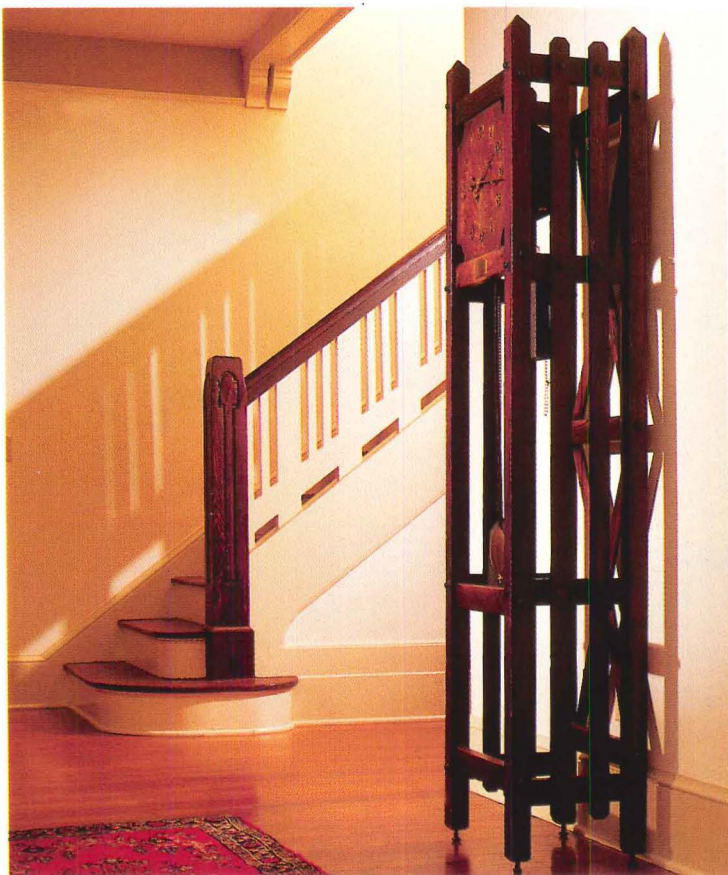




- 1. Waiting
- 2. Secretary
- 3. Office
- 4. Conference/waiting



The original stairs and plaster walls were restored (below left). Floor plans were totally reworked to accommodate new offices (below right) and waiting rooms on the first and second floors.

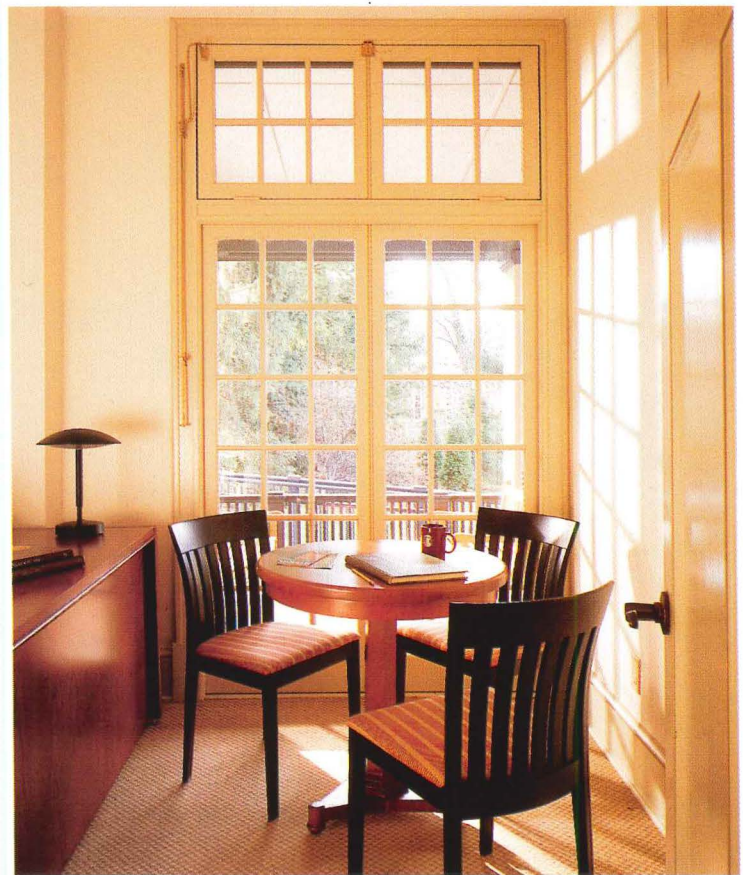


walls. "The feeling and sounds you get from plaster walls are completely different," says Yowell. "I wanted to keep that feeling."

For the Admission House project, Yowell tried to understand the intellectual world within which the original architects worked, not just the specific building in question. "I wanted to know what they were thinking and what other architects

were doing at that time," explains Yowell. In so doing, she could then make decisions in the spirit of the old architecture, almost as if she were a turn-of-the-century architect herself.

For example, she added a stenciled border around the top of the walls in the reception room, which she adapted from student artwork on the cover of the 1905



Vassar yearbook. She also selected colors for the exterior of the building that were true to the work of Arts and Crafts architects such as Bernard Maybeck rather than limiting herself to what was on this building.

The building seems to be impressing prospective students and their parents, affecting their views of Vassar. In the first year

after it was completed, admissions applications jumped 18 percent. ■

Sources

- Exterior pottery tiles:** *Pewabic Pottery*
- Fiberglass shingles:** *GAF*
- Wood windows:** *The Woodstone Co.*
- Area rugs in waiting room:** *Stark Carpet*
- Reception furniture:** *Stickley (Audi)*
- Chandelier:** *Brass Light Gallery*

Lowering the Risks of Reroofing

SUCCESS IN REDOING ROOFS OFTEN MEANS CONTENDING WITH RUSTING FANS, ABANDONED CONDUITS, CLOGGED DRAINS, AND MISTAKES MADE BY OTHERS.

by Barbara A. Nadel, AIA

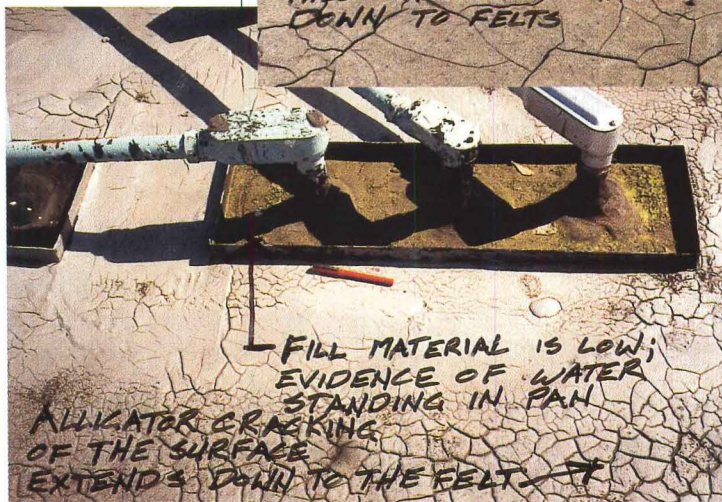
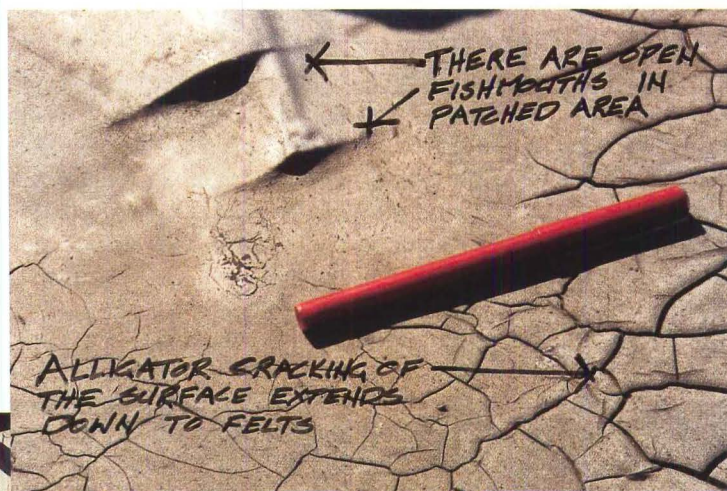
Much of the time, reroofing is a contractor's job. But an architect may be called in when a roof presents persistent problems or when reroofing becomes part of a larger renovation project. After a flurry of new membrane types were introduced in the 1980s, technological change has settled down, and most roofing technologies in common use now have a track record. This does not mean roofs are problem-free. They remain vulnerable to poor design, poor installation practice, and poor maintenance. More claims are filed each year regarding roof and wall systems than any other part of a building, according to a recent survey by liability insurer DPIC (page 143).

Retrofit roofs are not the same as roofs designed for new buildings. Undocumented existing conditions (such as a rooftop addition) may have been in place for a while and may be contributing to deterioration. Unforeseen environmental factors (perhaps grease from an added fan) and lack of maintenance may also shorten roof life.

Why did the old roof fail?

Most of the time, however, an architect is called in when the old roof leaks. A split or hole in the membrane may be an obvious cause, but for many roofs, finding the source of leakage is a tricky yet essential step toward getting the designed performance out of the new roof.

When faced with a roofing retrofit project, the two most important reroofing questions an architect should ask are why the original roof failed and why the building leaked. "Roofing professionals recognize that most failures occur at penetrations, substrate and material transitions, base flashings, and ter-



A roof at the end of its life: cracking ("alligatoring") in the built-up roof shown above extends through the tar covering and into the felts. Roofing experts generally frown on leak-prone "pitch pocket" details (left).

mination details," says Ken Bensimon, AIA, principal of KMB Architects in Olympia, Washington. "Incompatible materials may cause a reaction adversely affecting waterproof capabilities," he continues, such as a metal flashing to which a thermoplastic membrane won't adhere. He also explains that roofing commonly fails where penetrations are not detailed to account for building movement. A building may expand and contract or even permanently "grow" due to changing temperatures and positive air pressure.

Jan Kalas, AIA, an associate at LZA Technology in New York City, frequently examines defective roofing systems for the forensic-investigations arm of LZA, a large engineering firm, to determine whether to restore, repair, or replace them. An existing-conditions assessment

Barbara A. Nadel, AIA, is principal of Barbara Nadel Architect in New York City, specializing in health, correctional, and institutional planning and design. She is New York State Regional Director on the national AIA Board of Directors.

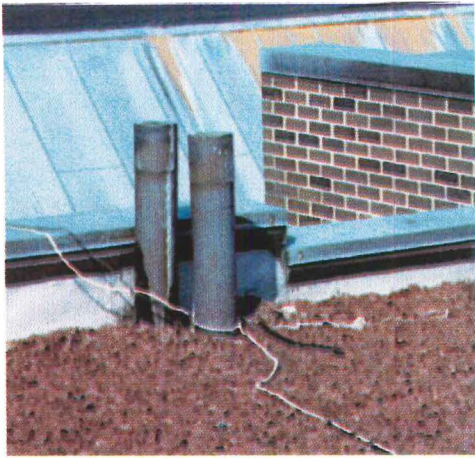


Continuing Education This month's installment of the ARCHITECTURAL RECORD/AIA Continuing Education series focuses on the problem-laden area of reroofing. After reading the article, complete the questions (page 246) and check your answers (page 248). AIA members may fill out the self-report form (page 248) and send it in for two AIA Learning Units. —Mark Scher, AIA Director Professional Education Products and Services

Learning Objectives

After reading this article, you will be able to:

1. Identify at least 15 factors in structure analysis, owner requirements, and building use to consider in programming, designing, and specifying reroofing projects.
2. Cite authoritative sources and references for roofing information and research.
3. Write specification solutions for environmental problems that affect roofs and offer detailing/specification tips to avoid preinstallation communication problems.



Pipe penetrations at curbs (left) are a reroofer's nightmare, only made worse by the wiring. An independent roof inspector can call attention to such contrary-to-specs conditions as new roof materials stored where they can get wet (right).



should not only evaluate the condition of the membrane but also identify any trapped wet materials and the source of leaks. Signs to look for include blistering and delamination of the roofing membrane, leaks, moisture and stains in spaces below the roof (such as on ceiling tiles), rips and holes in roofing or flashing, ponding water, and moss or other plant growth. If a spongy, uneven surface or water bubbling out of the membrane is encountered while walking on the roof, more detailed analysis is needed.

“Roofing is only as good as what’s underneath it—the deck, substrate, and attachments between the roofing and the structural system,” says Kalas. “Roofing leaks can damage the substrate and structure. Moisture infiltration can lead to indoor air quality problems caused by mold, bacteria, stagnant air, and standing water.”

Kalas usually follows visual observation with testing. Non-destructive testing includes infrared photography or nuclear scanning for moisture content. If such testing or observation suggests that roofing or substrate materials are wet, destructive testing may be needed. Destructive testing requires cutting into the roof and taking a piece out for analysis. This core sampling indicates the condition of the roofing, insulation, and subsurface deck.

For example, if a roof with a steel deck, perlite insulation, and a membrane over it has leaked and the insulation is wet, the insulation

A reroofing may involve improving earlier, unfortunate design decisions. When dealing with retrofits, says Kevin Cash, associate at Simpson Gumpertz & Heger, Inc., in Arlington, Massachusetts, a consulting firm that specializes in building-envelope design, check the existing roof-drain system, especially in buildings more than 15 years old that may not have been sized to modern standards. If the existing system and roof drains are undersize, it may be necessary to substantially upgrade or replace the entire drainage system to current codes. In such instances, coordination with local building officials may be required. Drains may also have been placed too close to walls and parapets, where water can be trapped or where there is insufficient space for the roofer to flash them properly.

“Skylights are often placed over the interior construction and not where the roof wants them,” Cash explains. Skylights and other interruptions in roof slope require crickets on the up-slope side to divert runoff. An older building may have accumulated a junkyard of conduits, pipes, and mechanical equipment, all of which can cause leaks and make reroofing nightmarish. Part of the reroofing analysis includes considering which of these items can be removed or relocated.

Recently, roof-mounted antennae for cellular phones have proliferated. Although cellular antennae are said to generate harmful microwaves and extensive exposure may pose a health risk, more owners are

TOO MANY OWNERS GO ON THE ROOF ONLY WHEN A PROBLEM ARISES, BUT PREVENTIVE MAINTENANCE IS THE KEY TO ROOFING LONGEVITY.

must be removed. This is critical because the deck will continue to rust, the metal fasteners for the replacement roof will corrode, and the new membrane will probably blister. The roof may not rest on a firm substrate, making it subject to premature wear or puncture.

One of the key decisions the designer must make is whether a new roof can be applied over the old roof or whether conditions warrant a “tear-off.” The structural condition of the underlying roof deck to a great extent determines the answer, says Jack Robinson, the technical services deputy director of the National Roofing Contractors Association in Rosemont, Illinois. New roofs add weight that might not have been anticipated in design, for example. “Inspect the underside of the roof deck to see if the existing structure is damaged,” says Robinson. “Look for signs of rust in steel decks, rot in wood, or spalling in concrete. If there is damage, you need to repair or replace the decking first, which can mean a tear-off rather than a re-cover.” He also advises making sure no conduit runs above or below the roof deck in channels to avoid penetrating the conduit with new roofing fasteners.

adding them to roofs and facades because they generate income. “These antennae must be placed at a roof high point, where water is unlikely to collect, not at a low point, where water will inevitably find its way into the building,” cautions Peter Blaufeux, AIA, principal of Peter Blaufeux AIA Architects in New York City, who specializes in building exteriors and institutional work. Installing any rooftop items after roof completion and inspection may also void a warranty.

The National Roofing Contractors Association (NRCA) offers a great deal of guidance on various commercial roofing systems (the association can be reached at 847/299-9070). The NRCA fields more than 4,000 calls annually from architects, engineers, attorneys, contractors, and homeowners asking for roofing advice and contractor referrals. It publishes a roofing manual, roofing-material guides, and the *Handbook of Accepted Roofing Knowledge (HARK)*. The NRCA also publishes more than 300 detail drawings on low-slope roofing on CD-ROM and for CAD systems, and maintains Project Pinpoint, a program identifying roofing problems and solutions using new technology.

Selecting a reroofing system

Kalas decides on a reroofing approach by balancing installation and life-cycle costs, energy-conservation performance, and the degree of protection the owner wants to maintain. He develops strategies with options for roofing systems and cost estimates for each alternative.

When choosing roofing systems, architects should consider the building use and the client's financial circumstances. [See "Simplifying Single-Ply Roofs," RECORD, February 1995, pages 38–29, for an overview of standard roofing types.] Developers generally want low first cost, even if maintenance levels may be higher or replacement will loom sooner. Institutional clients can often pay incrementally more for a roof if there is a return in longevity and lower maintenance. (Metal-roofing manufacturers have successfully made a low-maintenance case for retrofitting metal roofs on a sloped purlin system over older roof systems with nearly flat built-up or single-ply roofs.) Many large owners choose a roof system because it has a proven track record for them and because it is easier to maintain a great number of buildings that have the same roof.

A competent roof designer will design a system suited to environmental and site-specific conditions—such as rooftop exposure to chemicals, falling debris, interior exposure to fumes, extreme winds, or a marine climate—and will evaluate potential or existing roof problems that may go beyond the scope of roofing itself. These might include structural modifications, thermal-insulation improvements, improved thermal-movement or seismic-movement control, and better handling of roof or attic ventilation, as well as upgrades to bring the structure up to code and design to reduce needed maintenance.

Building use also affects roof selection. "Buildings housing electronics, computers, and telephone equipment are highly susceptible to water damage," advises Roland Frerking, AIA, vice president at HNTB Corp. Facilities Consulting in Kansas City, Missouri, who specializes in roofing design. In such cases, the roof must offer absolute protection. A less expensive, low-maintenance roof might be fine for a warehouse storing farm implements, however.

Some building types present unexpected issues. Dormitory roofs covered in synthetic-rubber membranes can suffer deterioration due to kitchen-exhaust grease or oils used by sunbathing students. Buildings under an airport landing path may be subjected to soot and exhaust fumes that can interact chemically with some membrane types. Loose-laid membrane systems and poorly detailed metal roofs have proven particularly susceptible to gales, and slates or tiles torn off in high winds have become dangerous projectiles. In waterfront areas, seagulls may be attracted to polyurethane-foam roofing and have been known to peck at and build nests on sprayed-urethane decks. Preventive coatings are available.

Many products appear on the market for new and retrofit applications. Using new technology can pose a risk, because problematic field conditions may not appear immediately. "A roof is no place to experiment," advises Blaubeuf. "I'll wait for the glitches to be worked out. I want a proven track record."

Design and detailing issues

Reroofings should be designed, not merely specified, Bensimon asserts. "A roofing contractor may recommend a system they are authorized to install, rather than one that may be more cost-efficient, such as a system with the proper material and wind-uplift requirements," he says. Details are a sore point for many contractors, NRCA's Robinson says. "Most contractors see drawings that are inadequately detailed and contain too many 'RFOs' (roofer figure out) and such blanket responsibility-shifting phrases as 'Shall conform to the recommendations of the NRCA Roofing and Waterproofing Manual.'" The manual is 1,900 pages, Robinson explains. "Can't they narrow it down to one chapter?"

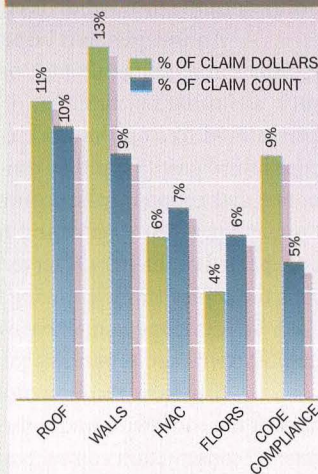
"It's refreshing to get a call from an architect asking about a detail for an expansion joint running into a wall. That's a classic RFO," Robinson adds. "Architects basically tell contractors, 'Don't do it right' or 'Do it over at your cost.' We'll comment and mark up an architect's sketch and provide related information."

"Manufacturers' details are good but generic," LZA's Kalas adds. "Standard details should be made project-specific. Roofing design errors also occur when the designer fails to understand the roof as an entire system consisting of membrane, flashing and terminations, insulation, vapor barrier (if needed), decking, and the roof-support structure."

Contractor selection

Since improper installations are much more common than material failures, the selection of the roofing installer is a critical decision. The contractor's roofing experience should be verified and the company should be a member of the NRCA. "The NRCA list is a good place to start," says Simpson Gumpertz & Heger's Cash. He also advises, "Choose roofers from among those certified by the roofing manufacturer for installation, not just the ones who buy the materials." As you narrow the list, ask for references and check them, says Cash, and

ELEMENT MOST OFTEN INVOLVED IN ARCHITECT CLAIM



ROOFS ARE HIGHEST LIABILITY RISK

Roofs are both exposed and relatively fragile building technologies. It's not surprising, then, that "most insurers won't touch roofers," says Arlene Petty, of Petty Burton Maloney Associates in Rochelle Park, New Jersey, whose firm insures design professionals. In late 1997 her office had three pending roofing claims relating to worker injuries.

A recent study by the DPIC Companies, an insurance carrier based in Monterey, California, found roofs to be the element most often involved in architects' claims. Ten percent of the 3,700 closed archi-

tectural claims between 1989 and 1995 involved roof problems (see chart). Claims most often concerned venting, flashing, and gutters (cited in 50 percent of claims), though Installation—not detailing—was the major culprit.

Inadequate field observation, material degradation, and use of new, unproven materials and technology were also frequently cited.

Design errors figured in 21 percent of claims. Half of these were due to a consultant's error and a third were due to inadequate documentation. B.A.N.

check the roofer's financial state (its Dun & Bradstreet rating) and its safety programs. Then call the contractor and make sure they can handle your specific installation. "Ask who their best competitors are," says Cash. "Put them on the bid list." Cash continues, "It's good to know a contractor's specialty. Certain roofing systems are more common in some parts of the country and will be more competitively priced by the contractor."



Reroofing a historic structure may call for laying old technology (copper) over new (an elastomeric membrane), as at the 1907 Guardian Life Insurance Company Building, New York City (left). Michael Devonshire, conservator at Jan Hird Pokorny Associates, the architect, also oversaw remodeling of historical terra-cotta trim.

Solving problems before construction

Blafeux is among those who stress the value of a preconstruction conference. "Drawings are no guarantee you'll get what you designed," he explains. Meeting attendees should include at least representatives from the owner, architect, roofing contractor, and roofing-system manufacturer. Other affected subcontractors or consultants (environmental and structural, for example) should be included. The meeting gives parties a

Because quality control and workmanship are so important to modern roof systems, Frerking recommends that his clients retain an on-site observer during roofing installation. It's an expense many clients don't want to bear and an inconvenience for contractors, but the consequences of premature roof failure may be worse. Manufacturers are supposed to inspect the work of their certified installers before signing off on a warranty, but Blafeux contends that the inspection often doesn't

WET MATERIALS FOUND IN AN EXISTING ROOF ASSESSMENT MUST BE REMOVED, OR FASTENERS MAY RUST AND THE NEW ROOF BLISTER.

chance to resolve questions about documents and existing conditions rather than having to solve them on the roof while bitumen kettles are bubbling, rain is threatening, or seams are curing.

Assuring installation quality

Much can go wrong with a roofing installation, and experts identify some common problem areas.

Existing conditions. Before new materials go on, it is important to inspect areas that will be hidden when roofing is complete, says Blafeux. "Architects should discuss the possibilities with their clients in advance of construction. Let them know that some conditions needing further attention can't be determined in advance, such as clogged drains."

Materials storage. "A wet blanket doesn't insulate very well," Blafeux observes. "Roofing materials must be stored dry."

Timing and crew changes. How the partially completed roof is protected at the end of the day or when a sudden storm threatens is key to performance. Protection not only has to enclose the new material, it has to keep water out of the exposed or unrepaired old roof. A crew change can result in a lapse of quality control, Frerking says, if the contractor is not paying close attention or a designer or inspector is not present.

Craftsmanship. Single-ply roofing materials, including EPDM, PVC and PVC blends, CSPE, and TPO, depend on essentially perfect field seams, which are lapped and glued or solvent-welded. The multiple plies of built-up roofs offer some redundancy if craftsmanship is not up to par.

occur until the installation is completed, when it is too late.

An independent inspector is most important in observing the installation of materials and components that will ultimately be hidden, such as insulation, flashing, or vapor barriers. Inspectors may not be empowered to stop the work (it's a job often outsourced to an experienced third party), but they can put the roofer and general contractor on notice that apparently nonconforming procedures may compromise the roof, and get the designer and roofer together in a timely way to resolve unexpected problems. Observers pay for themselves when they help prevent the roofer from removing improper work and doing it over again. Cash has developed an extensive checklist, used for training, with more than 24 items and reminders for roofing installation and quality control.

Blafeux recommends requiring the roofing contractor to inspect the roof twice under the one-year guarantee usually called for in general-construction contracts and to issue a written report documenting observed conditions. The architect should inspect the roof a few months prior to expiration of the contractor's agreement to determine if any defective work needs to be corrected under the guarantee. Documentation should include written records and dated photos of flashing, seams, and other key areas.

Are warranties worth it?

As manufacturers have offered longer and longer warranties, owners have come to think of them as taking care of any (*continued on page 250*)

Taking Care of Business

DOES YOUR BILLING AND PAYROLL SYSTEM MESH WITH OTHER PARTS OF THE BUSINESS TO HELP YOU MANAGE, MARKET, AND FINE-TUNE PROJECTS?

by Steven S. Ross

There's more to bookkeeping than keeping the books. What if you could arrange your payables and payroll expenses by project and could match them against receivables to determine which projects make a profit and which ones are marginal? What if the software itself could help guard against error and fraud by keeping a careful history of bills, hours worked, and payments received?

That kind of capability is widely available now. It's just one step up from commonly used software such as Intuit's QuickBooks or Sage's DacEasy. Now, thanks to powerful software that takes advantage of Windows 95 and Windows NT, standardization in database structures, and growth of the World Wide Web as a cheap network that can tie together diverse functions in diverse locations, a new set of capabilities is emerging: the ability to combine and analyze every piece of data about your operations, your personnel and affiliates' personnel, your clients, and the projects you work on. You may not want to computerize every aspect of your business right away, but you should be thinking about upgrades with such tasks in mind.

Many vendors are offering software to perform these tasks, and the merits of several programs are outlined here. Also discussed is Web-based networking, so that you can consider management software that can be used in networked environments in the future—a future that appears to be coming faster than most architects might believe.

Linking your data

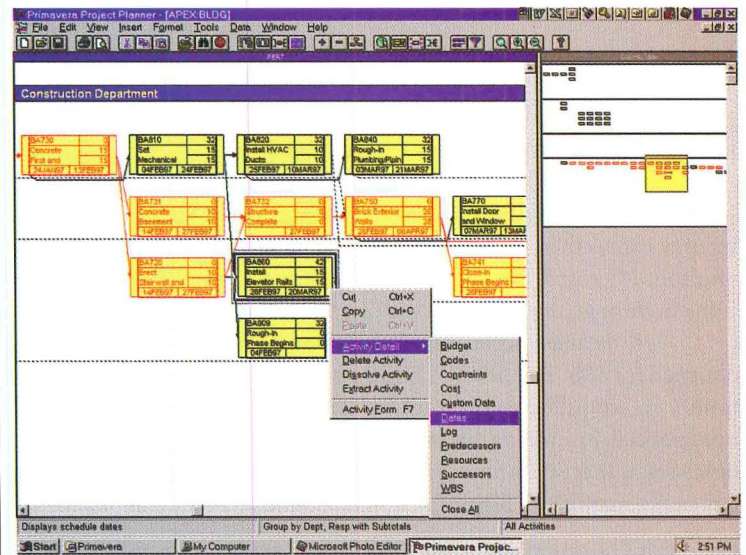
Two years ago databases did not easily accommodate connectivity. Now the term to look for is Open Database Connectivity (ODBC). Most data

ALL YOUR FIRM'S INFORMATION IN ONE DATABASE CAN HELP YOU DETECT CASH COWS AND CASH DRAINS.

produced by modern Windows software is ODBC compatible and thus easily linked together. If you think of data in terms of piles of information to draw from, yours might include the following:

Internal finances. Normal salaries, benefits, taxes, and overheads such as rent and utilities. To get a handle on these issues, you need an income (profit and loss) statement that is updated monthly or even weekly as you enter data. A balance sheet (balancing assets and liabilities) performs a different function. It is essentially a snapshot of your finances, taken every three to six months, or even annually. A balance sheet helps

Steven S. Ross has been reviewing software and hardware for this magazine for more than 11 years. Unlike many other journalists, he has run a company (developing educational software) and met a payroll.



you track long-term changes in the worth of your enterprise. Most "general ledger" accounting packages can do the calculations for you.

Human resources. An inventory of staff members, consultants, affiliated firms, and other personnel, all of which can be brought to bear on new projects.

Previous projects. The need to showcase your best work is obvious. But what about learning from mistakes, or making sure that special expertise rests with the firm and not with a specific individual? And what about putting the project database into a form that can easily be mined for promotional activities?

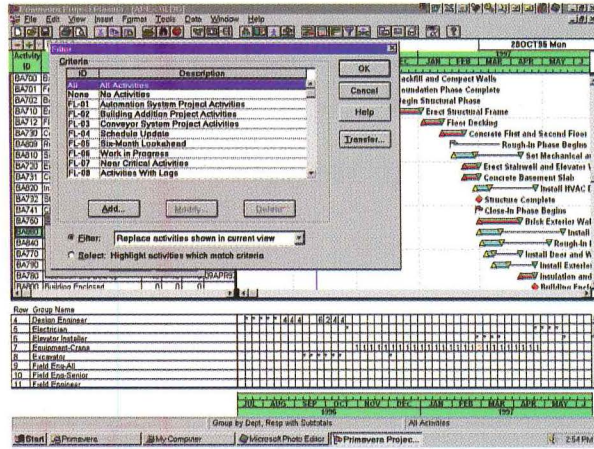
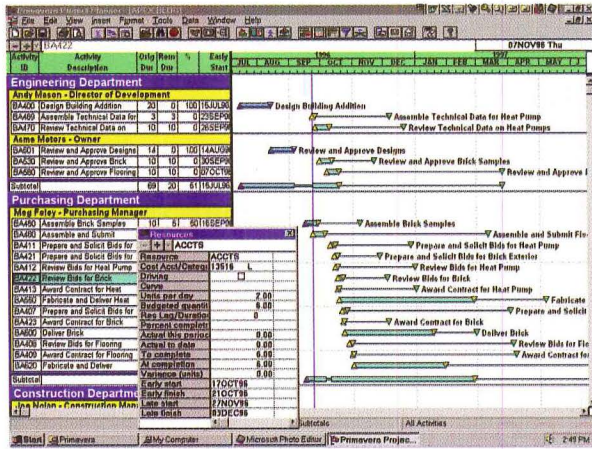
Knowledge base. Everything you need to produce a project—details, costs, code issues, and an expanding array of data ranging from geographical information systems to federal or state health regulations.

What's really new is that all of these piles can be combined into one large database to help you manage your firm's resources more effectively and detect areas that are particularly cost-effective or are cash drains. Almost all of the new class of management software requires Windows 95 or NT 4.0 or higher and plenty of disk space and RAM. Most vendors recommend 32 MB minimum for Windows NT and 16 MB for Windows 95, but it's a good idea to double both minimums for speed and reliability.

Handling your firm's finances

Bookkeeping software, of course, has been around for years. But over the past year or so, more and more inexpensive packages have been set up to run in conjunction with the Microsoft Small Business Server as well. This allows functions to be coordinated among different packages. The SBS

P3's charting technique makes it easy to see how a project's activities are interrelated.



Primavera Project Planner provides a graphic view of a project's progress with a time line. You can view the entire project at once or highlight a particular area of interest.

operating system is Windows NT Server 4.0; computers connected to the network can run on Windows NT or Windows 95.

SBS includes Microsoft Exchange, Microsoft Outlook, and Internet Information Server (the current version is 3.0) for fairly easy Internet connectivity through the network rather than through individual modems. Microsoft Fax Server does the same for faxes; they go out and come in through the central server's connection to the outside world.

A database server can be accessed by almost any application designed for SBS. This allows a fairly easy pathway for systems administrators or consultants to combine diverse packages, financial and nonfinancial, in a reasonably error- and fraud-resistant way. The biggest limitation is that SBS is for companies with 25 connections or fewer; additions can be expensive. (Bigger firms, and those with needs that SBS would

DISTINCTIONS ARE KEY FOR SPECIFIC TASKS, BUT YOU NO LONGER HAVE TO COMPROMISE TO GET A GOOD PROGRAM AT A GOOD PRICE.

be hard-pressed to meet—such as Web publishing of drawings—should investigate Bentley Systems Engineering Back Office or another product, discussed below.)

There are so many bookkeeping packages designed to run with SBS that it would be impossible to list them all here. But one of the most popular among architects has been Wind2. Semaphore has been popular among engineering firms, and this program seems to be gaining favor among architects as well.

The distinctions can be important for specific tasks, but the key point is that you no longer have to compromise to get a system at a good price. In the days of DOS software—each package with its own interface and quirks—you often picked software your data-entry staff or bookkeeper knew how to use, even if it wasn't ideal for your business. Now, all the Windows-based packages look quite similar and are easy to learn. So you can pick what's best, with little regard as to whether you can find someone to make it work. Simple stand-alone accounting packages such as QuickBooks and DacEasy can be purchased for a few hundred dollars. Moving up to a more comprehensive system can cost \$1,000 to \$10,000 or more, however.

Wind2, designed to work right out of the box, is a good example of what architects should be aiming for. It is divided into six modules. A System Manager module sets up basic company information such as employee lists. Business Management tracks employee time records, receipts, project expenses, and even employee evaluations. From expenses and receipts, it can calculate projected profits. There is also a General

Ledger module for routine bookkeeping chores and an Accounts Payable module that distributes expenses and handles checks and 1099 forms. The Cash Management module and Payroll module base their calculations on the activities recorded in other modules.

Crystal Reports, an industry-standard "report writer" program from Seagate Software, can tie together the data in the separate Wind2 modules and present it in ways useful to managers. It works with the databases in almost all Windows-compatible programs, but if you try to mix and match many software vendors' files, you will need a systems-savvy manager programming Crystal Reports to set things up for you.

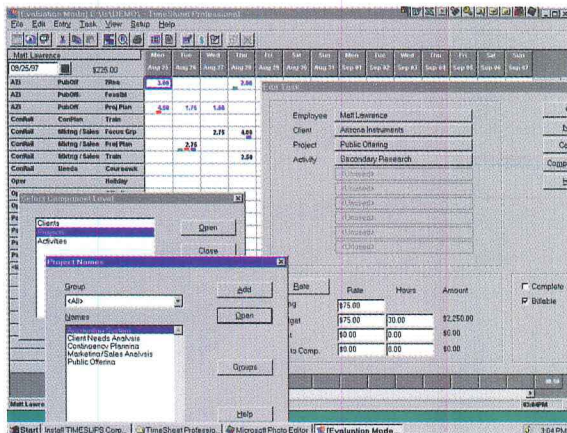
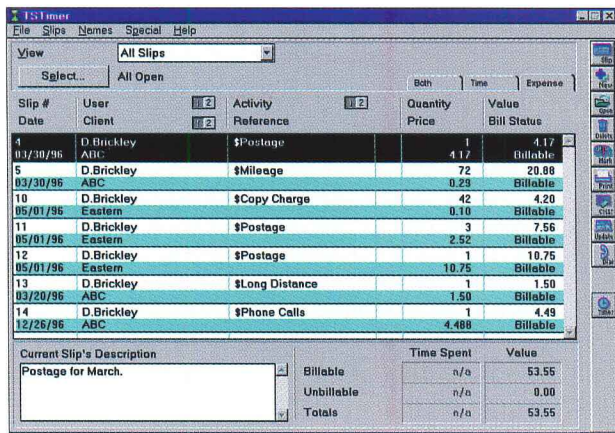
A good example of a set of general accounting packages that can be adapted to architects' use is offered by Sage U.S. This is a newly formed subsidiary of The Sage Group in England. It combines the publishers of

popular accounting and time management packages that, unlike Wind2, are not specific to architects. DacEasy, the accounting program, has been around since 1984. It's aimed at small and medium-size businesses. Version 4, a Windows 95/NT program, started shipping in October 1997. Sage also publishes TimeSheet Professional 5.5, through its TimeSlips division. It offers more flexibility than previous releases and TimeSlips itself in recording costs such as overheads, and is compatible with Crystal Reports and with remote access through Web browsers.

Project planning software

Primavera Project Planner (often called P3) has been the industry leader for more than a decade, although it provides more power than necessary for projects in the "under \$5 million" range. Version 2.0 includes a charting technique that gives you a good view of the relationships of various project activities, better ways to "level" or reschedule resources, and strong Internet links. There's even a fairly functional "Web publishing wizard" to guide you through building and maintaining a project Web site. You can even set hyperlinks inside activity logs for viewing over a network. The old E-mail functions have been expanded as well. The price is \$4,000.

If you don't have to link multiple projects and multiple users with the sophistication of P3, Primavera sells SureTrak Project Manager 2.0 (which allows for some linking of projects). Even this cut-rate project planner can publish projects to the World Wide Web for viewing by others. And you can graduate to P3 if you ever need it—SureTrak reads and writes P3 files. Estimated street price is less than \$400. If you are



TimeSheet Professional is a general accounting program that lends itself well to the business of architecture. It can log each employee's billable expenses for a number of projects (far left) as well as keep track of hours worked.

absolutely a novice at project planning, try SureTrak first. In between P3 and SureTrak is Scitor Project Scheduler 7, with a street price well under \$600. It also has excellent E-mail and Web publishing and can allocate a firm's resources across multiple projects. A five-user license is \$2,900.

At the low end, try QuickGantt from Ballantine & Company. It's not for total novices, but it does come with a library of project worksheets. A basic version is \$99.95, and Version 2.0 for Windows is \$199. But spring for 2.0 Plus, at \$249 (multiuser versions start as low as \$349). It lets you link various tasks automatically and import data from spreadsheets. Linking, standard in the bigger commercial packages, updates subsequent activities automatically when you change an action early in the process.

Project tracking and contract control software

This category allows you to see every phase of a project, and how costs and time lines might be affected as a change ripples through. The problem is that your record keeping must be in pretty good order to use this type of package. If you are manually paying bills to contractors, for instance, you will have to manually copy the bills and payments to a file the contract control software can read—a fraud-prone idea.

Primavera's Expedition 6.0 has been demonstrated at shows for the past three or four months. One elegant new feature of this \$2,500 package (substantial multiple-seat discounts are available) is a "project dashboard" that displays a graphic view of budgeted and committed changes and submittals that might be critical to the project's completion.

PROGRAMS CAN HANDLE EVERYTHING FROM WORK ORDERS TO BILLING.

Expedition also allows you to customize how changes are processed in a project—to focus, for instance, on contractor costs or on internal resources. Expedition can import files from P3 and SureTrak as well.

The delivery systems: management and the Web

As with almost everything else in the software business, vendors have been grooming their packages for Internet access. Their idea is to use the World Wide Web to publish and update information (RECORD, September 1997, pages 131–37). Microsoft's Small Business Server and Bentley's Engineering Back Office have already been mentioned. In addition, Primavera offers Webster, for access to information created in Project Planner or SureTrak Project Manager. Framework Technologies is pushing Aspects SiteBuilder for project-specific Web sites and Aspects ProjectServer to manage transactions concerning projects on line.

On the facilities management side, Harper and Shuman introduced Windows-compatible software in 1996. Drawbase Software, which has repositioned its Drawbase drafting software as a facilities management tool, has also packaged it with DP Solutions' PMC for Windows, computerized maintenance management software. These programs can handle everything from work orders to purchasing, inventory, labor and materials tracking, and, of course, billing and payables. ■

Contact information for the vendors mentioned in the text are listed here. In addition, many of the vendors' Web sites include directories of consultants who can help you choose and implement management software systems.

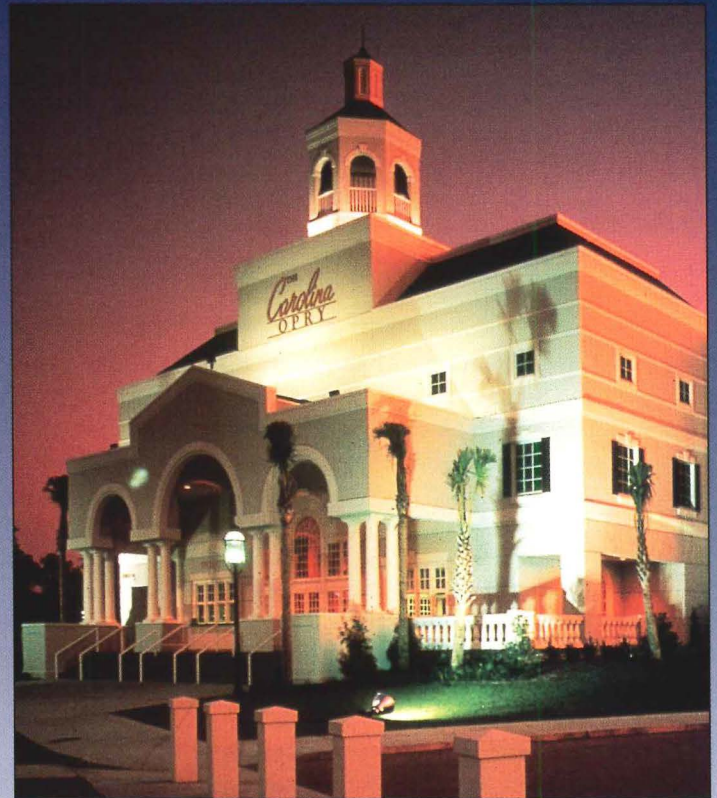
- Ballantine & Co.: QuickGantt
One River Rd., P.O. Box 805, Carlisle, MA 01741-9950; 800/536-6677
- Bentley Systems: Bentley's Engineering Back Office
690 Pennsylvania Dr., Exton, PA 19341; <http://www.bentley.com>; 800/BENTLEY
- Drawbase Software: Drawbase
222 Third Ave., Suite 2300, Cambridge, MA 02142; <http://www.drawbase.com>; 800/545-4223
- Harper and Shuman: CMFS/Advantage
68 Moulton St., Cambridge, MA 02138; <http://www.harperandshuman.com>; 617/492-4110
- Intuit: QuickBooks
2535 Garcia Ave., Mountain View, CA 94043; <http://www.intuit.com>; 800/446-8848
- Microsoft: Microsoft Small Business Server
One Microsoft Way, Redmond, WA 98052; <http://www.microsoft.com/smallbiz> or <http://www.microsoft.com/backofficessmallbiz>; 800/60-SOURCE
- Primavera: Primavera Project Planner and SureTrak
Two Bala Plaza, Bala Cynwyd, PA 19004; <http://www.primavera.com>; 800/423-0425
- Sage U.S.: DacEasy, TimeSheet Professional, and so forth
17950 Preston Rd., Suite 800, Dallas, TX 75252; <http://www.sageus.com>; 972/818-3900
- Scitor Corp.: Project Scheduler 7
333 Middlefield Rd., Menlo Park, CA 94025; <http://www.scitor.com>; 800/533-9876
- Seagate Software: Crystal Reports, Seagate Software
920 Disc Dr., Scotts Valley, CA 95067; <http://www.seagatesoftware.com>; 408/438-6550
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3 East 28th St., New York, NY 10016; <http://www.sema4.com>; 800/545-7484



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IN ASSOCIATION WITH
THE METAL BUILDING MANUFACTURERS ASSOCIATION PRESENTS...



AN INTEGRATED DESIGN APPROACH OFFERS FLEXIBILITY, ECONOMY, DURABILITY

An Evaluation of Metal Building Systems

Metal building systems provide an integrated set of interdependent elements and assemblies. Yet, each system is unique—custom-designed and engineered, produced by the manufacturer, and then erected on the construction site. Interface with CAD, along with the ability to clad the buildings in brick, precast concrete, stone, wood, architectural metal, or glass, allows great flexibility in design aesthetics.

The process of creating a successful structure begins with a basic understanding of the various elements and options available on the market today, as well as energy efficiency and acoustical considerations. Once these are assimilated, design creativity can begin. With this in mind, the Metal Building Manufacturers Association (MBMA) offers this compendium, in association with the AIA/ARCHITECTURAL RECORD Continuing Education Series. Architects can earn two continuing education credits by reading the section,

studying the learning objectives, and answering the questions on page 164.

Metal building systems comprise nearly 70 percent of the one- and two-story, nonresidential building market in the U.S. The MBMA was founded in 1956 to address issues relating to structural design, fire insurance, building codes, transportation, and safety in such buildings. MBMA member companies provide engineering design, structural steel framing systems, metal wall and roofing systems, and accessory equipment for low-rise nonresidential construction. MBMA works closely with the American Institute of Steel Construction, American Iron and Steel Institute, American Society of Civil Engineers, and the model building code organizations in maintaining and improving national design standards. For more information contact: MBMA, 1300 Sumner Ave., Cleveland, Ohio 44115-2851. (216) 241-7333. Or visit MBMA's website at <http://www.taol.com/mbma>.

LEARNING OBJECTIVES

After reading *An Integrated Design Approach Offers Flexibility, Durability, Economy* and completing the following exercise, you will be able to:

1. Identify how today's metal buildings differ from the metal building systems of the past with regard to design options and process.
2. Explain nine advantages of metal building systems design and fabrication.

3. Identify the benefits of a metal building systems industry certification program offered by the American Institute of Steel Construction.
4. Identify one or more building component types with their corresponding applications.
5. List at least four steps for preventing condensation degradation of insulation.

METAL BUILDING SYSTEMS

The metal building systems industry was born to fulfill an urgent need—to house troops during World War II. The most famous example, the Quonset Hut, was a half-round structure that could be easily constructed by unskilled labor using only hand tools and then disassembled and transported to a new location. After the war, the first standard metal building kits were mostly utilized for industrial and agricultural purposes. By the late 1960s, the industry had gained a reputation for its economy and speed of production and delivery and was used for wider applications. The systems, however, lacked any flexibility in design. So as demand grew from architects, engineers, and building owners for greater systems flexibility, manufacturers of metal building systems retooled their factories offering more systems options. Today, metal building systems dominate the one- to two-story nonresidential building market, comprising nearly 70 percent of the market.



The great opportunity for change, growth, and development paralleled the rise of computer technology and the use of CAD systems in architecture and engineering. In effect, the term "pre-engineered metal buildings" has become a misnomer. The standardization inherent in systems-based buildings make it a natural application for computer-aided design and engineering. There are, in fact, no standard buildings anymore. Each is custom designed as a unique project.

Greater flexibility than ever before is now possible. Designers can select straight or tapered columns, variable or odd-sized bays or modules, single-slope or double-slope buildings, with centered or off-center ridges. These systems can be integrated with a wide variety of wall materials, such as block, brick, tilt-up concrete, curtain wall, or metal. Flat, conventional roof design has given way in popularity to a water-shedding design, in which a sloped roof element is a key part of the overall image of the structure. Size can vary tremendously: the average is 10,000 to 20,000 square feet, but can range to more than one million square feet.

Critical to the engineering/design process is determining the safe loads which the structure must be able to support—such as dead load, roof live load, roof snow load, wind load, seismic load, and auxiliary load. The architect should consult

local building code requirements. The MBMA publishes the Low-Rise Building Systems Manual that defines and recommends minimum design loads for metal building systems. In addition, formulas for calculating wind pressure and suction for various building geometries are given. Values of lateral, tractive, and impact loads for overhead cranes are also listed.

While computer technology has streamlined the design and engineering process, real economies still come through the fabrication of structural elements.

Completion of a metal building systems structure is possible in roughly two-thirds the time of a conventional building. Since all elements are factory fabricated, pre-cut and prepunched under controlled factory conditions, where efficiency and quality can be exercised to a much greater degree than in the field, waste material is minimized. And it is generally easier to predict erection costs and erection time than with conventional construction. Typically, the buildings are shipped within six to eight weeks from the date an order is received.

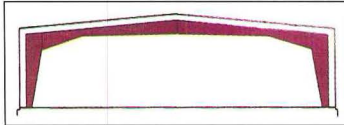
The design professional reaps the benefits of single source responsibility, since the metal building systems company takes responsibility not only for engineering and fabrication, but also the performance of the entire building shell. It is important for the design professional to ensure that the design criteria, particularly lateral drift and deflection of the primary frame and/or secondary supports, are consistent with the chosen wall materials. Manufacturers can provide a "letter of certification" with each building that assures the metal building system has been designed in accordance to specified state and local codes and/or specified project design requirements. A variety of warranties are offered on metal building systems. These may include finish warranties on roof and wall systems and weathertight warranties on roof systems.

METAL BUILDING SYSTEMS ELEMENTS

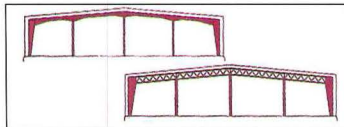
Metal building systems offer a completely integrated set of interdependent elements and assemblies, which, taken together, form the total building. Included are primary and secondary framing elements, covering components, and accessories. These building block parts come in many different configurations, as illustrated below.

Framing Systems

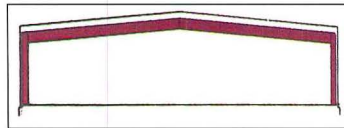
Rigid frame clear span: Provides a column-free interior space 20 feet to 160 feet and wider. Recommended applications include auditoriums, gymnasiums, warehouses and aircraft hangars.



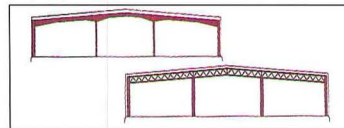
Ridge frame multi-span (solid web rafter) and modular open web (open web rafter) — 50 feet to 500 feet and wider. Used where interior columns do not impair the function of the building. Interior columns shorten the spans of the rafter beam, thereby often reducing the frame cost. Recommended applications include manufacturing facilities and warehouses.



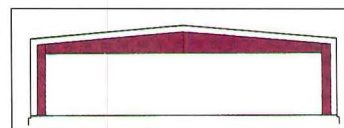
Flush wall clear span—20 feet to 70 feet and wider. Offers not only column-free interior floor space but also uniform depth columns. The secondary wall structural systems (girts) are totally flush with the interior flanges of the columns. This allows interior sidewalls to be finished without the frame columns protruding into the interior wall line. Recommended applications include retail stores, branch banks, and office facilities.



Flush wall multi-span—50 feet to 250 feet and wider. Available with solid or open web rafters. Uniform depth exterior columns with girts are totally flush with the inside column flange. Interior columns reduce span lengths, thereby reducing costs. Recommended applications are buildings where interior sidewalls are to be finished for office areas or for warehouses and distribution centers where "close to wall" palletizing is required.

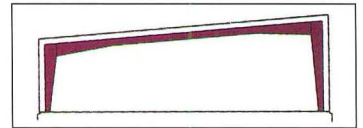


Tapered beam straight columns—15 feet to 70 feet and wider. Clear span with uniform depth columns. Greater vertical and horizontal clearance at column/rafter connection than rigid frame clear span. This system is economical for narrow widths. Recommended applications include offices, retail stores, and buildings with bridge crane systems.

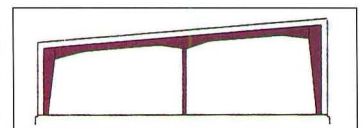


Single slope clear span—20 feet to 160 feet and wider. Available with solid or open web rafters. This system provides single direction roof slope for rainwater runoff control. It is

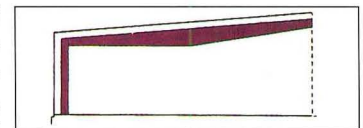
often used for shopping centers and office complexes where rainwater must be directed away from parking areas.



Single slope multi-span—50 feet to 200 feet and wider. Available with solid or open web rafters. The single slope design facilitates rainwater runoff control. This system is used in facilities where interior columns do not impair building function. Recommended applications—manufacturing, warehousing, and distribution centers, retail shopping centers, and office complexes.



Lean-to—10 feet to 60 feet and wider. Used primarily for wing units and additions to existing facilities. A lean-to can be used with any of the above framing types.



Wall Systems

Wall systems typically consist of a wall panel and girt. Girts are cold-formed "C" or "Z" sections and are attached to the columns of the primary frame to support the wall panel against lateral loads. They may frame into the column webs, or be attached to the outer flange. Flush framing provides more usable building floor area. The panel and girt act in concert to resist pressure and suction placed on the system by heavy winds.

Panels are available in a variety of textures, with embossed and sand-finished metal available. Manufacturers stock standard colors and can obtain special colors from their suppliers to match architectural requests. Often, the exteriors of the panels are integrated with another material—brick, precast concrete, glass, stone, or wood.

Two types of wall assembly methods are available, field assembly or factory assembly.

Field Assembled Systems. The system consists of optional interior liner panels, exterior metal panels, and insulation, usually blanket fiberglass insulation. Advantages include rapid erection of panels, cost competitiveness and quick and easy replacement. Openings for doors and windows can be created quickly. In addition, the panels are lightweight, so heavy equipment is not required—nor are large foundations or heavy spandrels. Acoustic surface treatments can be easily added to interior panel walls at reasonable cost.

Factory Assembled Panels. This system consists of an outer panel and an interior face formed over an insulating core, usually a foam material. It is normally fastened outside

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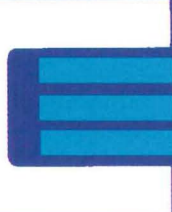
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SEE PAGE 39 ON INQUIRY CARD



Robert J. ...



Larry N. ...



Thomas C. ...



METAL BUILDING SYSTEMS ELEMENTS continued...

the girt. Panels providing insulating values are available from several manufacturers. This system has a lightweight, hard surface interior liner connected to the panels by side lap fasteners that are normally concealed to produce a clean appearance.

Two types of fastener systems are available, exposed fastener or concealed fastener systems.

Exposed fastener systems. Panels vary in depth and are available in widths of two feet to four feet and thickness ranges from 26 gauge to 20 gauge steel. The most common wall panel thickness is 26 gauge. Wall panels are attached to "C" or "Z" girts with self-tapping screws, self-drilling screws, or expanded fasteners, and joined to each other at their sides and ends in lap joints. Profile panels range in depth from 1 inch to 2 inches and are available in widths from 28 inches to 40 inches with varied patterns and colors.

Concealed fastener systems. Designed with edge joints that conceal the fasteners, the panels are available in many different profiles and finishes. These panels usually have deeper cross sections and can allow longer spans between girts.

Roof Systems

Roof systems are made up of two components: purlins and roof panels.

Purlins. Two types of purlins support the weight of the roof and any applied loads—cold-formed steel (either "Z" or "C" sections) and open web joist. The purlins work to transfer these loads to the primary structural system. The "Z" or "C" sections can either be simple spans, or more commonly used as continuous beams between frames. They can be used on spans of up to 30 feet. For spans greater than 30 feet, open web joists or deep "Z" sections may be used for purlins. Open web joists are utilized as simple spans.

Roof panels. Panels are fabricated from light gauge steel as a lap seam roof or a standing seam roof system. The panel of a lap seam roof is typically 1 inch to 1-1/2 inches deep, 26 or 24 gauge thick, and connected together by lapping. A sealant is installed between the panels at the sidelaps and end laps and fasteners are used to secure them. The selection of panel depth and thickness is affected by the roof load, purlin spacing, and insurance considerations.

Standing seam panels. The seam between two panels is made in the field with a device that produces a cold formed weathertight joint at the sidelap of each panel. The panel is attached to the purlins with a clip concealed inside the seam, which allows a secure attachment while permitting thermal expansion or contraction. Since a majority of the through-the-roof fasteners have been eliminated, a continuous single skin membrane results. Thermal spacer blocks can be placed between the panels and purlins in order to provide a consistent thermal barrier. The metal standing seam roof can be used to renovate and restore old, leaking flat roofs to better than original condition by adding a slope—in other words,

turn a flat roof into a water-shedding one. Various finishes and colors are available. The products can be used in either a structural, low slope application or a highly visible architectural metal roof situation.

Bracing Requirements. To complete the roof system, metal building manufacturers typically provide bracing for the purlins. Depending on the design assumption used, different types and arrangements of bracing may be utilized. Bracing systems include "straps," channels, or sag angles. All of these systems span from purlin to purlin. For a standing seam roof system, the amount of lateral support provided by the panels to the purlins has to be determined through testing, if it is to be included in the design. That is why a standing seam roof system from one manufacturer may have more visible bracing than another.



Special Design Considerations

Frame shape and peak location. Both can be important components of the design. The majority of buildings supplied today are the traditional rectangular shape, yet many other shapes are possible—L's, T's, U's, and octagons. The majority of metal buildings supplied are single slopes or gable buildings with the ridge on center of the frame. The peak can be moved off center, however, to almost any location on the frame. A single slope building can be positioned with the high or low side facing the front, depending upon drainage or architectural requirements. When frames with multiple ridges or with a valley instead of a ridge are specified, an interior drainage system will be designed by the metal building manufacturer.

Bay sizes. While in the past only two or three bay sizes were commonly offered, any bay size is now possible. When the building has interior columns, the interior columns can be of different spacing patterns.

Column shapes. Tapered perimeter columns are often the most economical choice, but straight columns can be used at the perimeters. The perimeter columns are normally fabricated H-shape and can be parallel or tapered. Interior columns can be supplied in many different shapes, including hollow structural shapes, hot rolled H-shapes, and fabricated H-shapes.

Column heights. Heights can vary to provide a step in roof elevation or in floor elevation.

Accessories. A variety of structural and nonstructural accessories can be included: insulation, gutters, downspouts, roof ventilators, roof openings, interior liner panels, wall vents, wall openings, windows, pedestrian doors, overhead doors, canopies, skylights, fascia, and trim. These elements can add aesthetic variety.

Expandability. Metal building systems are easily expanded. This usually involves the removal of an end or sidewall, the erection of additional structural frames, and the addition of matching wall and roof coverings. Manufacturers routinely perform assessments of adding on to a metal building system, including structural and roof drainage analysis.

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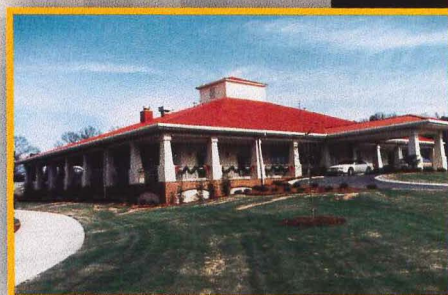
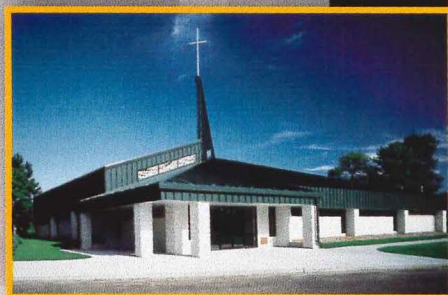
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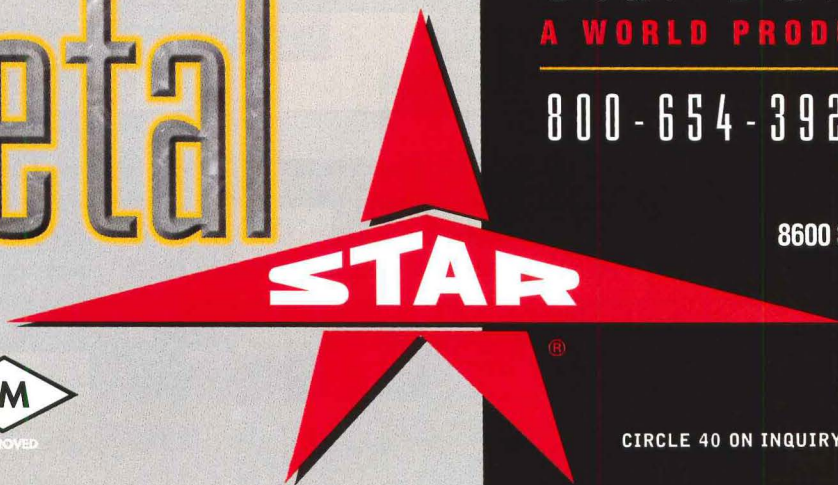
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ENERGY EFFICIENCY & ACOUSTICAL CONSIDERATIONS

Energy considerations and controlling condensation is an important part of providing an energy efficient building. Condensation can lead to long-term detrimental effects including corrosion and degradation of insulation. Condensation occurs when warmer moist air comes in contact with cold surfaces such as framing members, windows and other colder regions within the insulation envelope. Warm air, having the ability to contain more moisture than cold, loses that ability when it comes in contact with cold surfaces or regions. When this happens, excessive moisture in the air is released in the form of condensation. If this moisture collects in the insulation, the insulating value is decreased since wet insulation has about the same heat conductance value as water. Condensation problems are most likely to occur in climates where temperatures frequently dip below 35° F over an extended period of time.

A practical guide to providing energy efficiency and protection against condensation within a wall or roof assembly includes:

- Knowledge and control of the air temperature and relative humidity inside the building and knowledge of outdoor temperatures.
- Installation of an integral vapor retarder on the warm side of the assembly (under winter conditions). The main function of the vapor retarder is to slow down the flow of moisture through a roof or wall assembly. Permeability is measured in perms. The lower the permeance, the more effective the vapor retarder is. A 0.02 perm is recommended.
- Installation of sufficient insulation thickness (between the outside skin and the vapor retarder) to keep the temperature of the vapor retarder above the dew point temperature of the environmental air inside the building.
- Whenever possible, vent the insulated spaces to the outdoors to provide an escape path for moisture that gets past the vapor retarder.

Acoustics. Another important consideration in selecting insulation is acoustics, often viewed as a problem with metal building systems. Both the

level of interior and exterior noise can be greatly reduced by several types of thermal insulation. The insulation's noise absorption properties help prevent the transmission of exterior noises, such as rain, hail, aircraft, and traffic. In addition insulation helps to quiet noise within the building by absorbing reverberating sound. This is especially important in manufacturing buildings where there may be high noise levels.

Types and thickness of insulation have the largest influence on thermal efficiency of a building as insulation traps still air and slows down conductive heat transfer. Two basic types of insulation are most commonly used for metal building systems: fiberglass, and rigid board.

Fiberglass blankets are the most common types of insulation used in roof and walls of metal buildings because of their low cost, fire and sound resistance, and ease of installation. The insulation is placed on the outside of the purlins and girts and the panels are applied over them. In the case of the standing seam roof, an "insulation block" may be placed over the purlins to eliminate any heat loss due to the compressing of the blanket insulation.

A second form of roof insulation is rigid board, usually made out of polyisocyanate material. Most often a metal liner panel is installed over the purlins, the rigid board is laid in place with a vapor barrier, and the standing seam roof installed over it. The clip rests on a bearing plate over the insulation and the fastener goes through the board insulation into the underlying structure. This is referred to as a "composite roof."

DESIGN FLEXIBILITY AND AESTHETICS

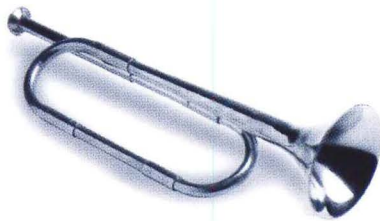
Current uses of metal building systems include malls, shopping, centers, offices, plants, warehouses, recreational centers, or any other use appropriate for a low-rise building. What distinguishes this type of construction today is a surprising aesthetic variety, due to the flexibility allowed through different combinations of the system's basic elements as well as the ability to clad the buildings in brick, precast concrete, stone, wood, or glass. Following are several examples of the aesthetic qualities possible to achieve through the use of metal building systems.

Continued...

CERTIFICATION

Designers may want to give consideration to the American Institute of Steel Construction (AISC) comprehensive certification program for the metal building systems industry. To maintain a high level of credibility, the program includes a rigorous third-party examination of the engineering and manufacturing policies and procedures of metal building systems manufacturers, as well as quality assurance and control standards.

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DESIGN FLEXIBILITY AND AESTHETICS continued...

**Bay Industries Corporate Headquarters
Green Bay, Wisconsin**

The new corporate headquarters for Bay Industries illustrates the versatility of metal building systems. Located on 26 acres of land in Green Bay, Wis., the building consolidates the operations of the company into a new facility. It was designed to be functional and economic and accommodate future expansion—and to meet the requirement of Bay Industries President Arnie Schmidt to be “housed in the most attractive building in Green Bay.”

Designed by Steve Klessig, architect, of Kaukauana, Wis., the building makes extensive use of limestone, masonry and glass to achieve a traditional yet timeless appearance. It features a 5,000-square-foot, octagonal-shaped, skylight entrance, flanked by two 30,000 square foot office wings. A 130,000 square foot manufacturing and warehouse building extends south of one of the wings.

“We looked at all the various methods of construction,” Klessig says, “including conventional steel, precast concrete, masonry systems, and some panel systems. We recommended a metal building system not only because it was the most economical, but because it offered the greatest flexibility in creating custom designs and architectural elements.”

The focal point of the design is the octagonal lobby, which rises 58 feet and is topped by a glass dome. Radiating from it are the two office wings, which visually creates a sense of symmetry and balance. The use of concrete, masonry, and glass lends a banded appearance to the exterior.

Adding to the visual variety is the roofing system. “We didn’t want the silver-colored roof to be entirely visible, but thought we could create an interesting look if we emphasized certain parts of the roof,” Klessig says. “So we accented the canopy, the hipped roof on the octagonal entranceway, and two front building corners and the middle sections of the office wings with a concrete tile roof. This technique created a dynamic contrasting appearance via the use of different materials.”

Soon after construction began, the Schmidts decided to enlarge the warehouse by 62,000 square feet, a simple process because of the metal building

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An Evaluation of Metal Building Systems

systems construction. “Since the structure was already designed for future expansion,” Klessig says, “all we had to do was order additional framing and roofing materials. It was easy to duplicate the frame design because the width of the building hadn’t changed. The engineering was already complete. It just became an additional fabrication job for the metal building systems manufacturer.”

The architect, contractor, and owner agree that the project, which was finished on time and within its budget, benefited from the single-source responsibility that defines metal building systems construction. The group worked closely with the metal building systems manufacturer and its structural engineers from the beginning—and throughout—the project.



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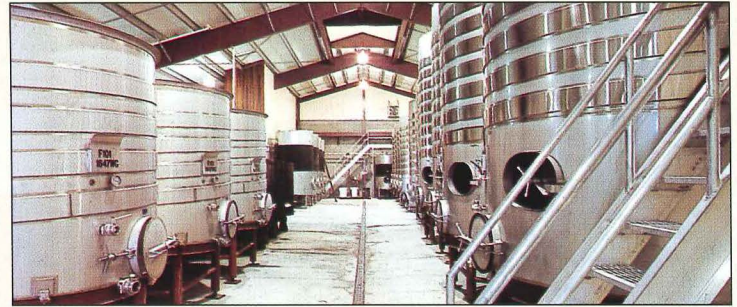




DESIGN FLEXIBILITY AND AESTHETICS *continued...*

**Bouchaine Vineyards
Napa, California**

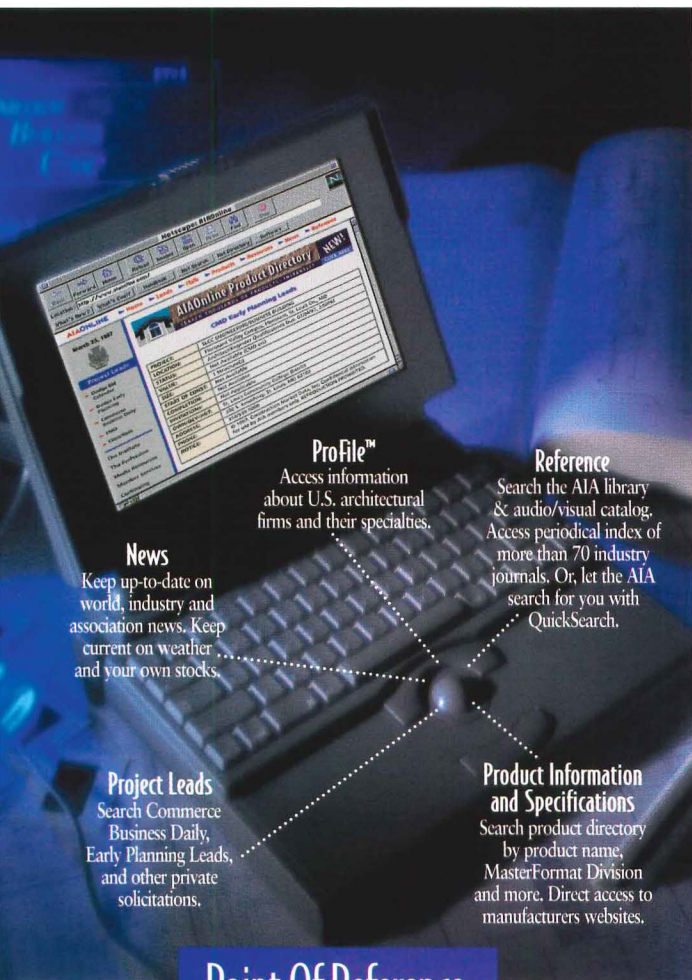
In Napa, Calif., the Bouchaine Vineyards used the slab of its original building and on it reconstructed a new metal building systems winery. Architect William Turnbull Associates, of San Francisco, obtained great visual variety through the use of a sloping shingle roof, exterior walls of re-sawn redwood wine barrels, windows, stone façade detailing, and a recessed entrance. Three cupolas allow for ventilation. The utilitarian nature of the interior is evident in the work areas, while the offices have more elegant wood and concrete masonry partitions. Construction of the 24,000-square-foot winery was phased so as not to disrupt the winery's operations.



**Staples Street Station
Corpus Christi, Texas**

The Staples Street Station was the first new station designed when the regional transportation authority decided to consolidate transfer points. Designed by John R. Wright, Architect, the station features a metal building systems roof, which gains visual attraction by fragmenting its sloped elements. This shed-like structure provides shade and protection from rain for transit passengers; about 3,000 bus passengers and 13 bus routes pass through the transit stop during weekdays. It was designed in an open concept approach so that a clear line of sight is provided through the entire structure, a design to promote a sense of personal security. The metal roofed shed is connected to a masonry head house featuring a clock tower.





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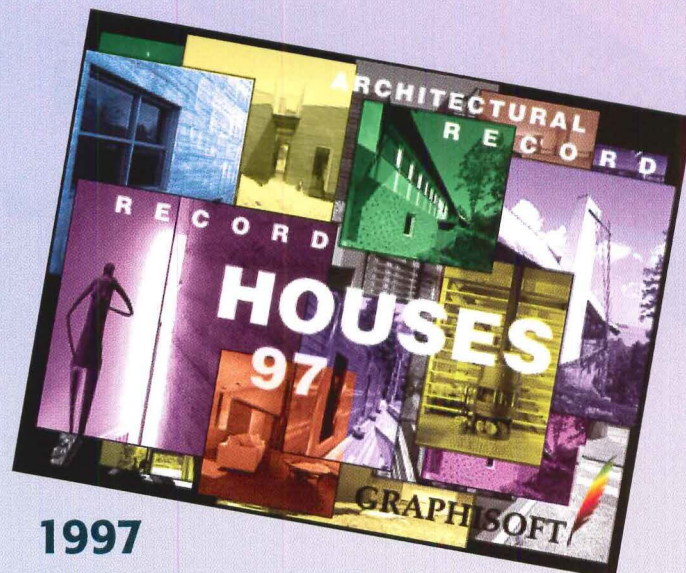
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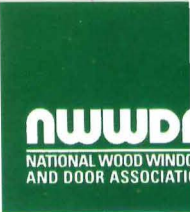
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(See Page 180)



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**In Association With
The National Wood Window and Door Association
Presents:**

Replacement Wood Windows & Doors Renew the Life of Old Buildings

Few features are as critical to reestablishing the character of an old building as its windows and doors. Of all the architectural elements to be renovated, therefore, windows and doors are most critical. Inappropriate changes can drastically alter the building's aesthetics, affecting its overall historical integrity. This holds true for landmarked masterpieces as well as vernacular structures.

Over the past decade, wood window and door manufacturers have risen to the challenge; the industry offers a broad range of wood window and door replacement products that replicate historic window and door profiles. As wood windows and doors offer the greatest flexibility in design and detail, manufacturers now produce true divided lite replacement windows and doors

and match existing exterior profiles. In semi-custom installations, historic styles can easily be replicated—from Palladian arched heads to narrow sidelites. Replacement wood windows and doors offer a durability and beauty approximating a building's original appearance.

Brought to you by the National Wood Window and Door Association (NWWDA) in association with the AIA/ARCHITECTURAL RECORD Continuing Education Series, the following synopsis offers practical information on the replacement of wood windows and doors in old buildings. The replacement process begins with an investigation of the old—what current problems and inadequacies exist and how those can be corrected with replacement units. Architects can earn two continuing education credits by

reading the section, studying the learning objectives, and answering the questions on page 182.

NWWDA is comprised of the country's leading producers of wood sash, frames, window units, flush doors, stile and rail doors, skylights, and sliding and swinging patio door units, as well as producers of the numerous other materials required to manufacture the industry's products. As a professional trade organization, it formulates and promotes high standards of performance for the industry. More information on NWWDA, its standards, testing procedures, and information literature can be obtained from NWWDA, 1400 E. Touhy Ave., Suite 470, Des Plaines, Ill. 60018 (847) 299-5200. Or visit NWWDA's website at <http://www.nwwda.org>.

Learning Objectives

After reading *Replacement Wood Windows & Doors Renew the Life of Old Buildings* and completing the following exercise, you will be able to:

1. Contrast today's windows with those found in historic buildings.

2. List at least ten key elements to consider when evaluating windows and doors.

3. Identify a change to NWWDA Standard IS 1-A-97.

PRESERVING THE HISTORIC FLAVOR OF WOOD WINDOWS AND DOORS

As with other building systems, technological advances have greatly altered the design of windows and doors. We take for granted the high thermal properties, noise control, and security characteristics currently available in windows and doors, for example, and when renovating buildings expect to achieve the same performance today. Yet, contemporary windows can be vastly different in appearance than those found on historic buildings—landmarks and vernacular buildings alike. While not always the case, the goal in renovation—be it strict preservation or adaptive use—most often is to save the architectural integrity of the old building even though its use may change drastically.

The desire to “identify, retain, and preserve” the functional and decorative features of windows and doors, and whenever possible, maintain the existing architectural fabric, is identified in the U.S. Department of Interior’s preservation standards. These standards, in turn, reflect those set forth in local preservation ordinances and by regulatory agencies. Increased awareness of the role of windows and doors in defining a historic building came in the mid-1970s with the establishment of the federal tax incentives for historic preservation. While those incentives have been significantly scaled back, the ethic remains strong. In general, appropriate solutions should respect the window’s original proportions and glazing divisions, and materi-

als, whenever possible. Since historic buildings predominantly feature wood windows and doors, replacement in wood is a logical step. Wood windows and doors also offer the advantages of

sash than found in the historic building. Alterations must be provided.

But before determining what alterations are necessary, the first step in any preservation project is the assessment of the current condition of the windows and doors. This assessment should include an examination of winter heat loss and summer heat gain from infiltration and conductive heat transfer.

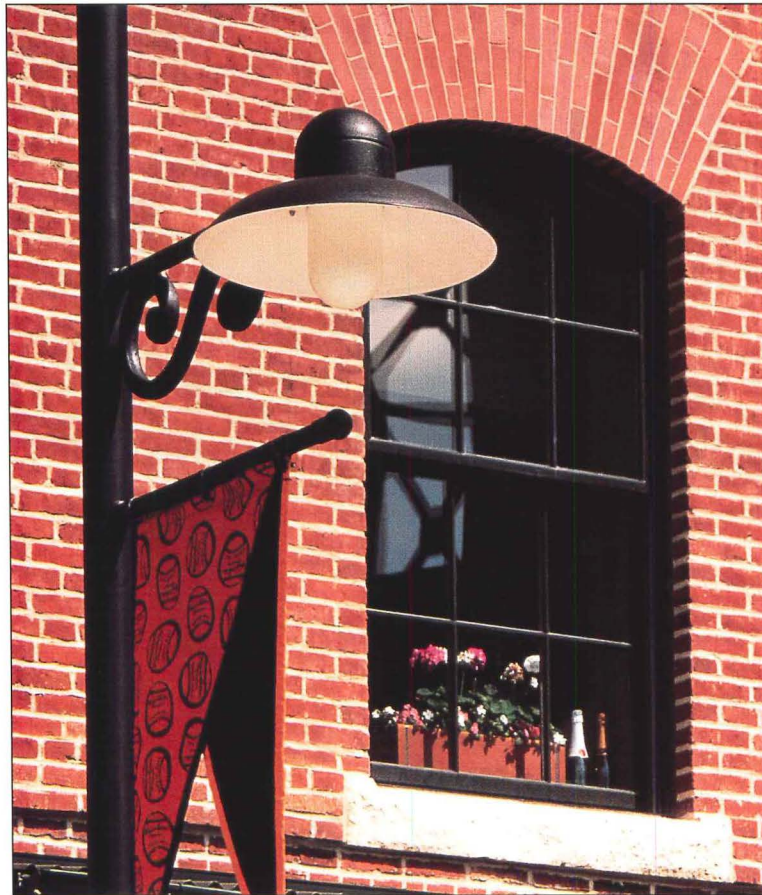
Basic information on each window should detail the location of the unit, condition of paint, condition of frame and sill, condition of sash (stiles, rails, and muntins), glazing, hardware, and overall condition.

Doors need to be examined for fire safety and accessibility qualities. Look at exterior doors differently from interior doors, for exterior doors are much more subject to abuse from sun and wet weather and extreme weather changes. Note all particulars, such as shape, width, height, thickness, finish, hardware type, operation (single, double, garage, pivot, sliding, or pocket) and location. Don’t expect to find the sophistication, stability or preservation qualities of modern doors and veneers.

The goal in replacing doors is improved performance, such as higher fire ratings, improved air and water infiltration control, better structural performance, reduced sound transmission and greater insulating efficiency. Door lites can accommodate the range of new glazing technologies, from dual and triple glazing to low-emissivity coatings.

The replacement of windows and

Continued on p-170...



All 843 windows of the former B&O Railroad warehouse were replaced under the direction of HOK Sports. The warehouse adjoins the Baltimore Oriole's new Camden Yards stadium.

durability and energy conservation. In the case of strict renovation, the use of wood window and doors may be the only choice.

This is more easily said than done. For example, as thermal performance has significantly improved, the size of window muntins has increased as drastically to provide a stronger structural system for heavier window panes. This, in turn, translates into a thicker window

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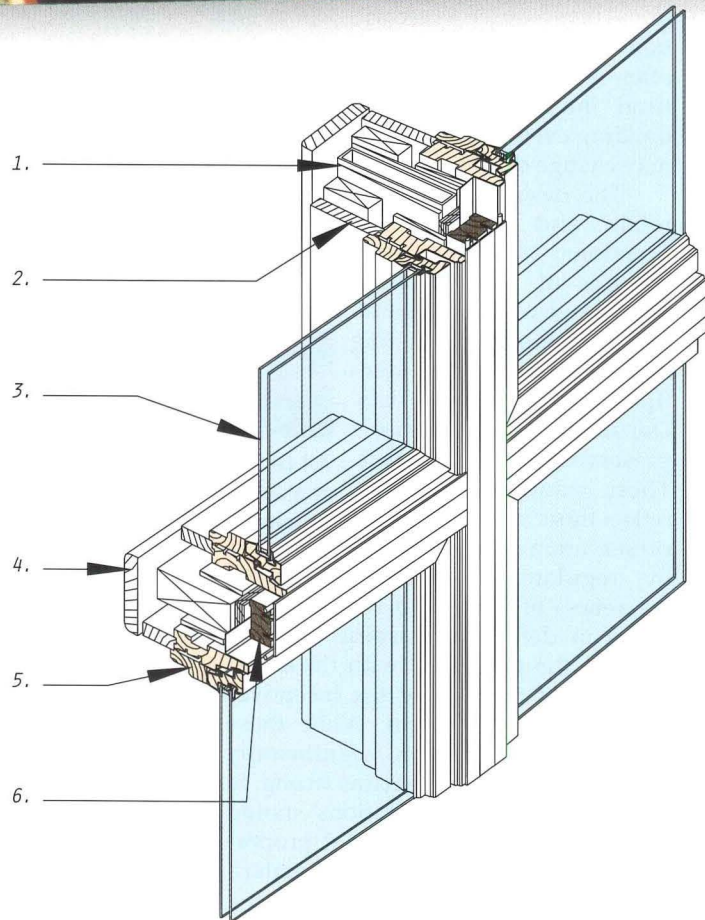
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CIRCLE 45 ON INQUIRY CARD

doors should start with a thorough understanding of the current conditions and should include the window and surrounding wall and the door and its frame, according to Michael J. Louis and Thomas A. Schwartz of the consulting engineering firm of Simpson Gumperz & Heger Inc. Problems, for example, such as excessive air and water penetration, may be the result of the way in which the window or door is integrated with the surrounding wall. Louis and Schwartz suggest the following:

- Review the documents of the existing construction (architectural and shop drawings, if available), reports of complaints (leakage, condensation, operability), and specifications and manufacturer's literature.
- Survey the interior walls for staining and other evidence of leakage.
- Survey exterior wall conditions.
- Probe internal conditions by selective disassembly of wall and window components.
- Test the existing window units, perimeter joints, and adjoining wall surfaces to isolate air and water leakage sources, which can include glazing, frame corners, perimeter sealant, and adjacent walls or roof.

Each building will produce a unique assessment, the results of which must be weighed in light of the extent and type of preservation planned—i.e., a strict renovation or adaptive use. In many projects, not all windows will need replacement. One must view the alternatives—repair, replication, or

replacement—with an eye toward the aesthetics of the final rehabilitation project. New windows and doors may significantly alter the building's visual appearance and architectural character through changes in materials, size, con-

with the windows and doors to avoid repeating mistakes the use of appropriate water tests is critical.

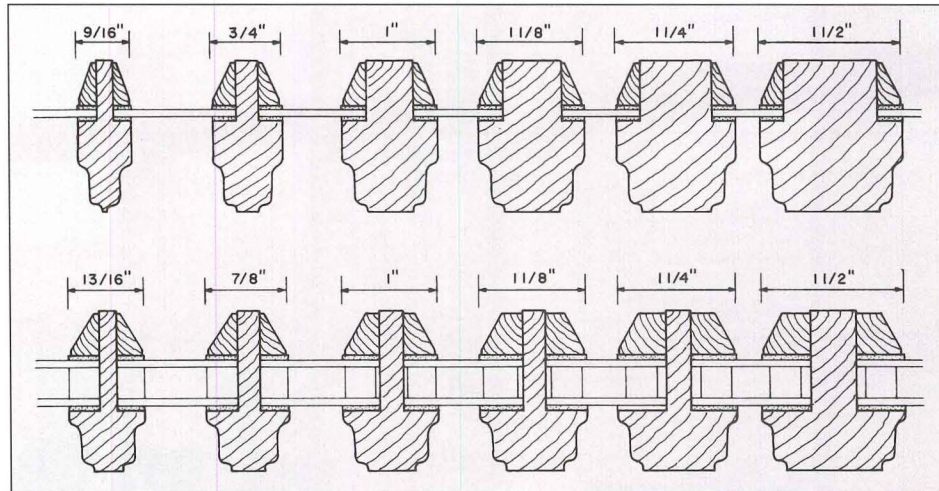
- Pay close attention to integrating the new windows and doors into the existing wall system.

- Off-the-shelf window assemblies from manufacturers may require modification to obtain the best results.

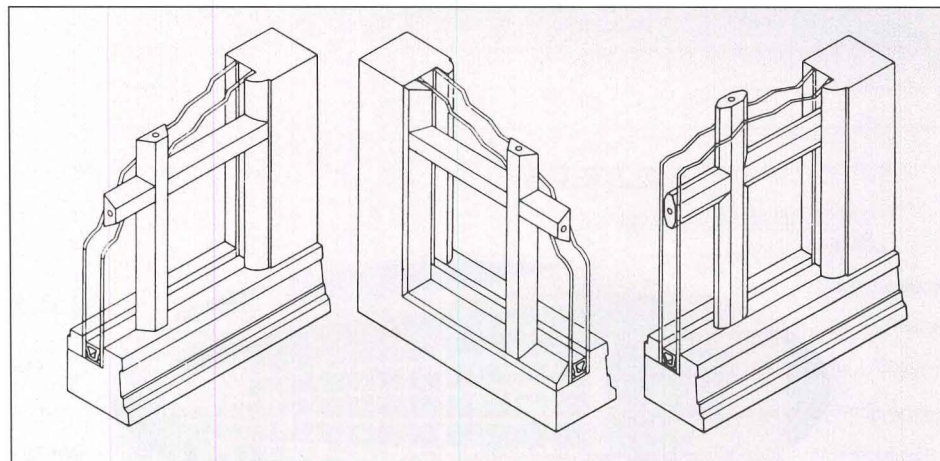
- Do not rely solely on sealants to keep water out of the building. Provide for the control of water that eventually bypasses the perimeter and corner sealants by using appropriate perimeter flashings.

Often, replacement windows and doors must incorporate special provisions to be integrated into an existing structure. Louis and Schwartz pose these questions regarding replacement windows, issues that can again be translated to door replacement: Should the frame be removed or encapsulated by the new system? Can the old frame be used as an anchor against wind loads? How much of interior finishes is desirable or economically and aesthetically acceptable? Overall, the following issues should be addressed:

- Structural—strength, stiffness, attachment, corner construction
- Air infiltration—through and around windows and doors
- Water penetration resistance—through and around windows and doors
- Integration with existing wall elements and finishes
- Expansion joints
- Energy use



Replacing sash with divided lights requires special attention to the design of integral muntins, particularly needed strength to carry the increased width of insulating glass and increased width required to cover the glass spacer.



Nonstructural muntin systems are typically fixed or removable grilles intended to simulate glazing divisions in sash equipped with insulated glass.

figuration, or color. Uniformity of fenestration, particularly on the same facade, seems critical.

Obviously, if windows are missing or severely deteriorated, replacement will be necessary. The design of replacement windows is tricky and "offers all the challenges of new construction, and then some," suggest Louis and Schwartz. Proper design of replacement windows and doors can result in years of quality performance. Louis and Schwartz suggest:

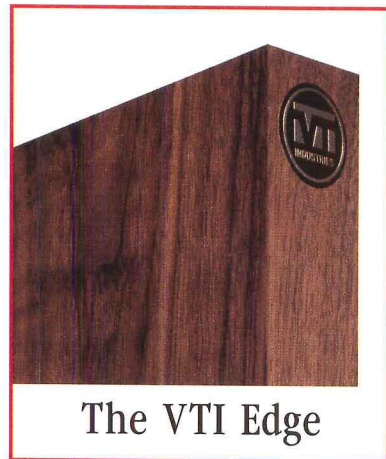
- Investigate the problems associated

Continued on p-172...

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When planning a replacement system, take into account the installation process. Energy savings are only part of the payback formula. If a unit is poorly designed, built, or installed, any anticipated energy savings will quickly evaporate. Proper design, construction, and installation are factors that usually increase the unit's initial cost but greatly reduce its subsequent operating, maintenance and repair costs.

Also of importance are the material compatibility of the new product to the existing structure, and the visual characteristics of windows and doors in relation to the rest of the building. Of particular concern are those cases where not all windows and doors will be replaced. The integration of new units into a facade where some existing products will be retained must be done with great care. The dissimilarities among units may become strikingly evident and undesirable when placed side by side in a facade. In the case of partial replacement, then, wood windows and doors would most readily meet aesthetic requirements, as the majority of historic buildings have wood products. Replacement wood windows and doors, therefore, can closely replicate original appearances and at the same time meet contemporary energy conservation standards as well as air infiltration, water penetration, structural performance, and thermal conductivity requirements.

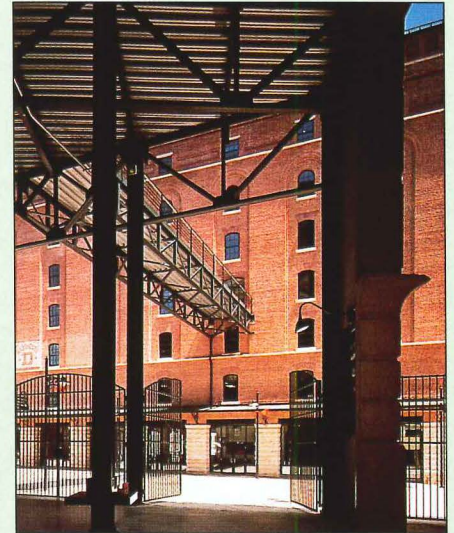
Replacing sash with divided lights requires special attention to the design of integral muntins. Replicating old muntins is not structurally possible if a heavier and deeper glazing system is used. Such systems usually require a minimum of 1 1/2 inches to provide a sound tenon and glazing rabbet deep enough to cover the insulated glass spacer. Affixing an interior storm panel to a single-glazed unit with integral muntins, until recently a custom modification, is a way to maintain the structural integrity of thin muntins.

Wood Window and Door Replacement Schemes Are as Individual as the Building Itself

There is no one solution to replacing windows and doors in historic buildings, as no two historic buildings are alike. As the following illustrate, the strategies are unique to each building.

Camden Yards, Baltimore, Maryland

A former B&O Railroad warehouse sits next to the new Baltimore Orioles Stadium. Housing the stadium club and team offices, all 843 windows in the eight-story warehouse were replaced under the direction of HOK.



Washington County Courthouse, Tennessee

Custom-designed vertical muntins were added to stacked, standard new windows to match the original appearance of the courthouse through a scheme developed by Architect Joe Lusk.

Former Police Building, New York City

This 1905 building, a former police station, was converted to residential and commercial space. Ehrenkrantz & Eckstut chose a sash replacement scheme in which specially insulated glass storm units are separated from tempered glass windows by wide air space.

Hospital for Sick Children, Washington, D.C.

For this residential-style hospital, Shalom Baranes Architects chose a window replacement scheme.



Monadnock Building, Chicago

The deteriorating original doors at the Monadnock Building were replaced—more than 400 of them. John Vinci worked with a local company to create doors that matched the originals.

Ellis Island Immigration Museum, New York Harbor

While the windows in the Registry room—the building's main showcase—were faithfully restored, other windows were replaced with replicated versions with improved thermal and light transmission characteristics in a scheme developed by Anderson Notter Finegold and Beyer Blinder Belle.

Pittsburgh's Carson Street Historic District

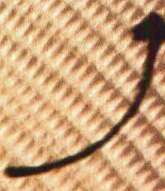
New wood replacement sash, shutters, storefront windows, and doors helped bring a revitalized Carson Street back to its historic appearance.

THE EXPOSURE

KIDS / GUEST ROOM



LAKE VIEW
SCREENS?





The Young Apartments, Los Angeles

Cavaedium Architects used the existing window frames and put in new sash fitted with laminated glass for sound control since the building is next to an on-ramp for the Santa Monica Freeway.

The Riverheads, N.Y., Schools

For the rehabilitation of two elementary schools in the Riverheads, N.Y., 600 new double-glazed, argon-gas-filled windows were created that matched the profile of the existing units. Key to the new windows was a unique aluminum panning system that covers the existing frames and into which the new windows were installed.



N Street Village, Washington, D.C.

This housing project for the former homeless consists of four renovated townhouses connected to new housing, under the direction of Shalom Baranes Architects. The windows in one townhouse were restored; the rest were replicated to match.

Former Police Station, New York City

This 1905 building, a former police station, was converted to residential and commercial space. Architect Ehrenkrantz & Eckstut choose a sash replacement scheme in which specially insulated glass storm units were separated from tempered glass windows by wide air space.

Modeled integral and thinner applied muntins, complete with exterior putty lines, and a broadening vocabulary of molded pane systems and interior trim, are now available. Pane systems, applied directly to the wood frame, require a thinner extrusion, and have been tried out but with limited success. The impact of the reduced sight line is minimized in one-over-one units that have been installed in monumental openings with deep reveals.

It's important to assess replacement systems as to the life-cycle costs. An investment in a quality system that may initially cost more can prove less expensive in the long run, as the lower cost of buying and installing a nonquality system will be offset by the subsequent higher costs of maintaining, repairing, and replacing the system.

Wood Window and Door Replacement Checklist

The New York Landmarks Conservancy offers a checklist of what to look for in a replacement window, which we have supplemented to include replacement wood doors. It's important to examine the performance standards of a given window or door as to its air infiltration, water penetration, structural performance, and thermal conductivity. In addition, standards are available governing weather-stripping, hardware, and finishes. It's generally the standards relating to energy and structural performance that affect a window's appearance, particularly the sizing of sash and frame members.

Operation. Does the original window or door operation suit your needs? It's possible, for example, to change a window's operation without substantially altering its appearance—and may be desirable to allow for easier cleaning. It is also possible to replace double-hung sash with single-hung sash, two-awning sash or a pivot sash.

Shape. How well does the replacement product fit within the existing opening? For windows, sometimes this is determined by how flexible a unit's construction can be. According to the New York Landmarks Conservancy, many stock window units sold as replacement units are comprised of modular parts that offer a limited range of predetermined sizes. To fit units into the old window slot, the size of the

Continued on p-178...

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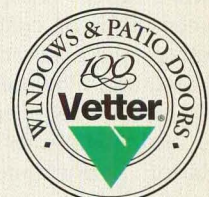
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CIRCLE 49 ON INQUIRY CARD



opening can be reduced by installing fill panels or pane trim pieces, a process that will alter the window's appearance. Placement forward and backward in the existing slot is also an important consideration. Replicating windows in openings with arched heads or other unusual shapes usually requires some custom construction. Obviously, the better fit the window and door, the greater the potential for high energy performance.

Dimensions and proportions. Can the original design and detail be replicated in the replacement window or door? If not, how closely does the replacement unit replicate the original? For windows, replication of the sight line is particularly significant. A comparison between wood, metal, and vinyl units reveals that wood windows require minor added mass to carry insulating glass, compared to the other two.

Glazing subdivision. Does the replacement window or door replicate the glazing division of the original? And, for windows particularly, is that desirable given the high cost of customizing windows to produce that same glazing subdivision? Although replacement units are available with structural and nonstructural muntins, the New York Landmarks Conservancy suggests "the former are preferable, both structurally and visually.... When equipped with insulating glass, exact replication of the muntin profile is limited to windows originally containing larger muntins, because an increase in the width and depth of the muntins and in the depth of the sash is required. Nonstructural muntins are available as applied interior, exterior, or combination grids."

Trim. Is the replacement compatible with interior or exterior decorative finishes? Interior wood trim with molded profiles is obtainable in stock profiles that blend with original details.

Color and finish. What colors are available and how will they hold up?

Construction. How do stock and custom units compare? Choosing between stock or custom construction influences the accuracy of the replication, cost, and availability. More expensive, generally requiring a longer lead time, and sometimes with unknown insulation performance, custom windows and doors are more often used for strict rehabilitation and stock units for

adaptive use projects. According to the New York Landmarks Conservancy, "how well the unit is put together has even greater cost implications in the long run" affecting the overall performance and long-term durability of a replacement unit.

Two types of stock window units are available today—those built of modular parts to predetermined sizes and those built of standard parts, sections, and extrusions that are adaptable to the size of the opening. Due to increased demand, manufacturers offer much more variety in sizing and shapes than they did a decade ago.

The New York Landmarks Conservancy suggests the following regarding the window construction. "Wood joints should be interlocking, either mortise-and-tendon construction of finger jointing. Joints should not depend on staples or nails for tightness because these corrode and loosen over time. Surface planes of adjoining sash and frame stiles should be flush and tightly butted, with all end grain protected from exposure.

It is also important to select a rot-resistant species or make sure proper fungici-

dal treatment is provided. The durability of operating mechanism and hardware is also an important consideration.

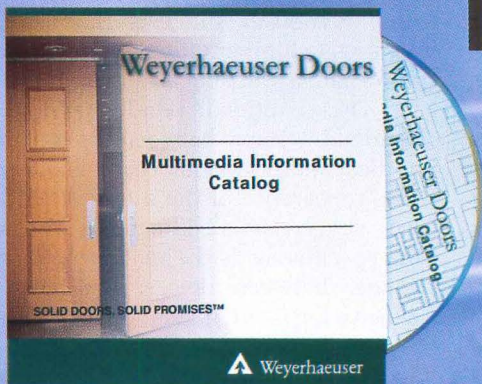
Extent of replacement. Will all or just some of the units be replaced? For windows, how does partial and complete unit replacement compare? It's important to know what options are available as one conducts a needs assessment. For windows, complete unit replacement can be considered brick to brick. It involves removing all existing sash and frame parts and nearly always requires additional removal of interior trim. The replacement unit is then positioned, wedged in and caulked in place and interior repairs made. Partial replacement ranges from sash replacement using the existing frame to no-tear-out units that cover the existing frames. Sash replacement usually requires some repair and reworking of the frame to receive new weather-stripping and may also require the reconfiguration of stops and balances or installation of jamb liners. No-tear-out-units reduce demolition and installation time.

Continued on p-180...

Checklist for Replacement Wood Windows and Doors

1. **Operation:** Does the original window or door operation suit your needs?
2. **Shape:** How well does the replacement unit fit within the existing opening?
3. **Dimensions and proportions:** Can the original design and detail be replicated in the replacement window or door? If not, how closely does the replacement unit replicate the original, particularly in terms of sight line? Is near replication important to the project?
4. **Glazing subdivisions:** Does the replacement unit replicate the glazing division of the original?
5. **Trim:** Is the replacement compatible with interior and exterior finishes?
6. **Color and finish:** What colors and finishes are available and how durable are they?
7. **Construction:** How do stock and custom units compare?
8. **Construction details:** How well is the replacement window or door made?
9. **Product testing:** Can you expect the replacement window or door to perform as well as expected?
10. **Extent of replacement:** How does partial and complete unit replacement compare, particularly for window units.
11. **Quality control:** How well will the window or door be installed?
12. **Durability:** How durable will the window or door be?
13. **Maintenance and repairs:** What kind of maintenance will the window or door need? How difficult will repairs be?

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CIRCLE 50 ON INQUIRY CARD

Divergent Architectural Wood Flush Door Standards May Cause Confusion For Architects

The National Wood Window and Door Association has expressed concern that the recent issuance of two different standards for architectural wood flush doors will cause great confusion among the architectural community. NWWDA contends that important aspects of the AWI standard are in conflict with the new NWWDA standard IS 1-A.

Under contention is AWI's definition of a "premium" grade door. The new AWI standard requires balanced or center-matched "AA" grade face veneers for premium grade doors. "This grade change is totally unrealistic in light of the availability of such veneers in the market," NWWDA President Alan J. Campbell maintained. "It forces the customer to pay a significantly higher price for their doors. Beyond the cost issue, a balanced veneer requirement places a greater strain on our natural resources because this process actually reduces the veneer yield. Furthermore, customers will probably be faced with extended deliveries because AA grade veneer will have to be accumulated over a period of time in order to produce enough veneer for a standard size project."

The NWWDA IS 1-A-97 standard recognizes three grades of doors—premium, custom, and economy. Premium grade is defined as "the highest grade commercially available in both material and workmanship. This grade is intended for the finest commercial, industrial, and institutional buildings, and is differentiated from custom primarily in the appearance of vertical edges, balance and center matched faces, and pair or transom face matching."

Another point of departure between the two standards is related to the use of structural composite lumber (SCL). The AWI standard allows the use of it for rails on custom grade doors, but not on premium grade, as a viable stile back material and as a substitute for stave lumber core. NWWDA has endorsed the use of structural composite lumber for stile backs, rails and also as a completely new category of door core in all grades.

"Once again, this requirement to use mill option hardwood on rails in premium grade doors places an unnecessary cost burden on customers," Campbell said. "This requirement is totally out of step with an environmen-

tally sensitive approach to our natural resources."

NWWDA also points out that the new AWI standard does not rate waterborne finish systems as premium grade. "In fact," Campbell said, "AWI includes some veiled references that such systems may contain hazardous air pollutants and warns of assuming responsibility for inherent risks. NWWDA researched this issue and we are completely comfortable with this finishing process."

NWWDA Standard IS 1-A-97:

Issued in 1997, Standard IS 1-A-97 is meant to be a general industry standard providing quality levels for the construction of architectural wood flush doors. "Function, performance, and aesthetics are combined in producing a wood flush door for a particular opening," the standard suggests. "Function and performance are primarily controlled by the wood door construction. Aesthetics are primarily controlled by species, veneer cut, matching of veneers and finish selected, or by the laminate selected."

The NWWDA standard is to:

- Define, in exact terminology, the grades of architectural wood flush doors available.
- Provide general information, standards, and tests that ensure all products comply with this standard can be evaluated on an equal basis.
- Provide a logical, simple system of reference specifications, keyed to guide specifications, that enable the architect to specify wood flush doors thoroughly, precisely, and accurately.
- Provide information necessary for the owner's representative to properly determine whether or not there has been compliance with this standard. The responsibility for determining quality compliance rests with the owner's representative. A review and approval, by the owner's representative, of all details and submittals for compliance is essential.
- Applies to architectural wood flush doors for interior application.

The NWWDA Standard IS 1-A-97 replaces the earlier architectural wood flush door standard to reflect the latest technical and material aspects of the architectural flush door industry. For the first time, the NWWDA recognizes

structural composite lumber as a core material—in 3-, 5-, and 7-ply construction. NWWDA suggests that use of composite lumber offers further protection against warping and telegraphing.

The traditional bonded and non-bonded interfaces between the core and vertical and horizontal edges is offered. The appearance of the different cuts of face veneer is well illustrated to assist the specifier, as is the matching of face veneer between pieces. The way in which a log is cut, in relation to its annual growth rings, determines the appearance of veneer. The beauty of the veneer is in the natural variations of texture, grain, figure, color, and the way it is assembled on a door face.

The face veneer characteristics have been updated. For example, plain sliced and rotary dimensions have been reduced by one inch, yet allow for greater widths. This decision was partially based on the diminishing supply of wood for veneer. The characteristics of several types of wood are offered—ash, birch, maple, poplar, walnut, cherry, African and Honduras mahogany, red and white oak, pecan and hickory. In addition, construction details, beveling and glazing options are listed. NWWDA will begin the ANSI approval process for this new standard in early 1998.

An entire section is devoted to understanding and describing finishes. And the section illustrating the dimensions, cross-banding, and core requirements have all been reviewed for clarity.

At A Glance: 'AA' vs 'A' Grade

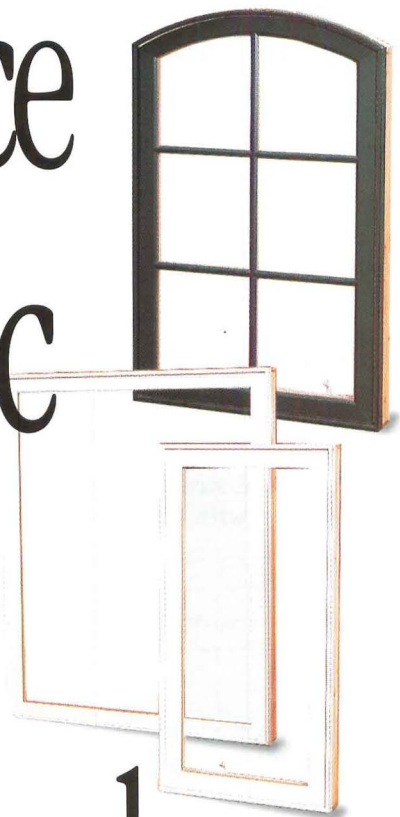
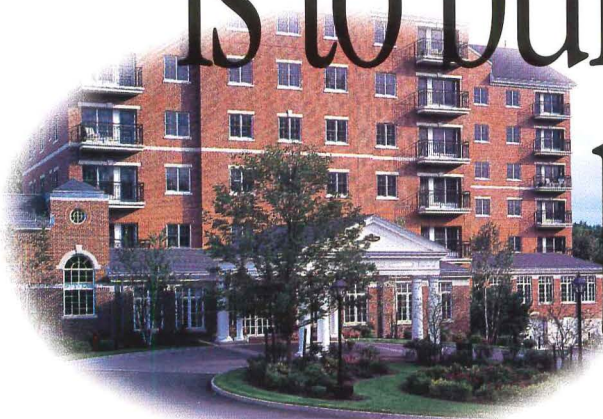
'AA' Grade:

- Increases cost significantly
- Reduces veneer yield
- Places strain on natural resources
- Extends deliver time

'A' Grade:

- Available at a reasonable price
- Optimizes veneer yield
- Allows responsible use of limited natural resources
- Maintains reasonable delivery time

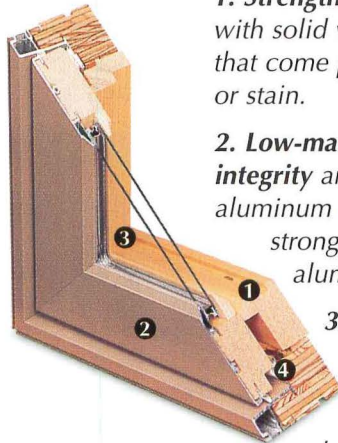
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CIRCLE 51 ON INQUIRY CARD



Learning Objectives

After reading *Replacement Wood Windows & Doors Renew the Life of Old Buildings* and completing the following exercise, you will be able to:

1. Contrast today's windows with those found in historic buildings.
2. List at least ten key elements to consider when evaluating windows and doors.
3. Identify a change to NWWDA Standard IS 1-A-97.

Questions

To earn two continuing-education credits through the AIA / ARCHITECTURAL RECORD Continuing Education Series, check your answers against those provided below and return the self-report form as indicated on page 248.

1. What are the structural implications of replacing historic windows with high thermal performance windows?

2. Develop a short checklist for assessing windows and doors during historic building alterations.

3. List a particularly important aesthetic to keep in mind when replacing an external door.

4. What are two solutions to sizing integral muntins when replacing sash with divided lights?

5. Identify major reasons for specifying costly door replacement.

6. What is the position of the NWWDA Standard IS 1-A-97 regarding core material for wood flush doors?

with integral muntins, not necessarily a custom modification, maintains the structural integrity of thin muntins. Also, consider using nonconductive but easily machined materials that are stronger than wood, modeled integral and thinner applied muntins, complete with exterior putty lines, and a broadening vocabulary of molded paning systems and interior trim, are now available.

5. Justification can be built on improved performance, greater insulating efficiency, reduced sound transmission and over the long term, a quality system may lower the costs of maintaining, repairing and replacing less expensive systems.

6. NWWDA Standard IS 1-A-97 now recognizes structural composite lumber as a core material in 3-, 5-, and 7-ply construction.

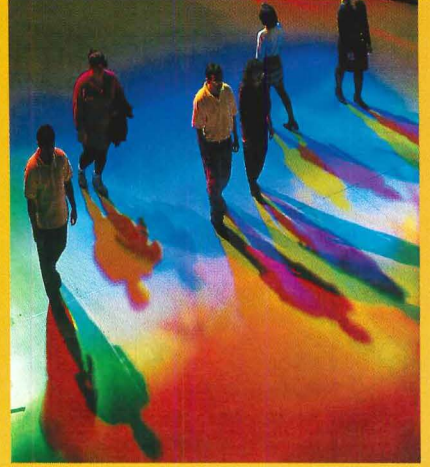
1. The size of window muntins may dramatically increase to provide a stronger structural system for heavier window panes. This translates into a thicker window sash than found in the historic building and requires alteration.

2. Check seasonal heat loss and gain, location, paint, frame and sill, sash, glazing, hardware, overall condition including integration, and review documents and complaints.

3. Uniformity of fenestration is particularly important on the same facade to avoid significantly altering the building's visual appearance and architectural character through changes in materials, size, configuration, or color.

4. Affixing an interior storm panel to a single-glazed unit

LIGHTING...



The recent passing of Edison Price, the renowned inventor of lighting products and founder of the extremely successful and well-respected Edison Price Lighting corporation here in New York City, reminds me that while pioneers in lighting sciences come from all kinds of backgrounds, the best of them love light and what it can do for people. And they love sharing their knowledge with others. Lighting designer Craig Roeder wrote that when he started out in the business 20 years ago, he used to wander up to Price's studio with a problem or question. Anticipating that he would spend a few minutes quizzing the master of lighting optics, Roeder usually ended up spending hours watching demonstrations of principles that some might consider arcane but that Price felt every lighting designer ought to know: the geometry of reflectors, for instance, or the intricacies of spread lenses. Price's inventions or innovations in lighting technology can be seen in virtually every museum, art gallery, and modern office building in the world.

We still have people in our midst who love to share what they know about lighting and use it to improve our lives. Peter Erskin, a sculptor based in Venice, California, whose latest work is for a shopping mall (featured on page 201), is one such individual. Erskin designs and builds huge machines that break sunlight into its pure spectral components and pour it over people, surfaces, and anything else in its path. The machines themselves are not Erskin's sculpture; rather, the sculpture occurs in the play of the colored light on objects and architecture. Erskin says, "As has happened so often in the 20th century, this new art came from taking something that was used in one context and putting it to a new use." The tracking mirrors that follow the sun in his latest work, Sundance, are borrowed from

the oil industry; the flat prisms are used in astronomical instruments. Erskin's work is not unlike something Edison Price might have done insofar as he takes ordinary objects out of context to create an entirely new and extraordinary synthesis.

Professor Moji Navvab, of the Department of Architecture and Urban Planning at the University of Michigan, has a less fanciful goal. Like Erskin, Navvab predicts the behavior of the sun and harnesses its rays, but he is working to control light so that great works of art can be viewed under optimal conditions without being overexposed to harmful light (see page 210). Navvab has researched a number of ways to predetermine what the sun's impact on spaces will be over the years, including scale-model photometry and computer imaging. His latest work involves using a video camera to scan a model and special software to determine the characteristics of the sunlight as it falls within the spaces represented by the model. I don't always understand exactly what Navvab is saying about his new technology, but every time we talk, I get a kick out of thinking that the age of the lighting enthusiasts—people who are constantly looking for a new or better way to work with light—didn't pass with Mr. Price.—Charles Linn, AIA

187 Lighting Observations

191 Skylights Let Sun into Dark Heart of Johnson & Johnson Building

The Lighting Practice

195 Bright GM on 5th Showroom Takes Visitors on Fantastic Road Trip

Haverson Architecture and Design

201 Diffracted Sunshine Creates Spectacular Display at Puente Hills Mall

Gallegos Lighting Design; Peter Erskin, solar artist

205 Lincoln Looks Best Basking in Incandescent Glow

208 Motion Sensors Come into Their Own

210 Designing Daylighting Systems for Art Museums

213 Lighting Resources

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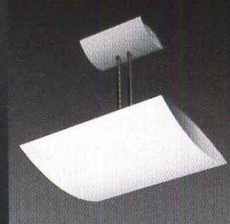
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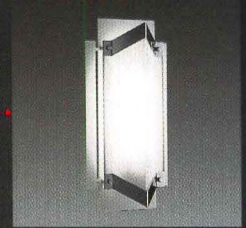
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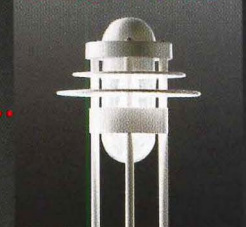
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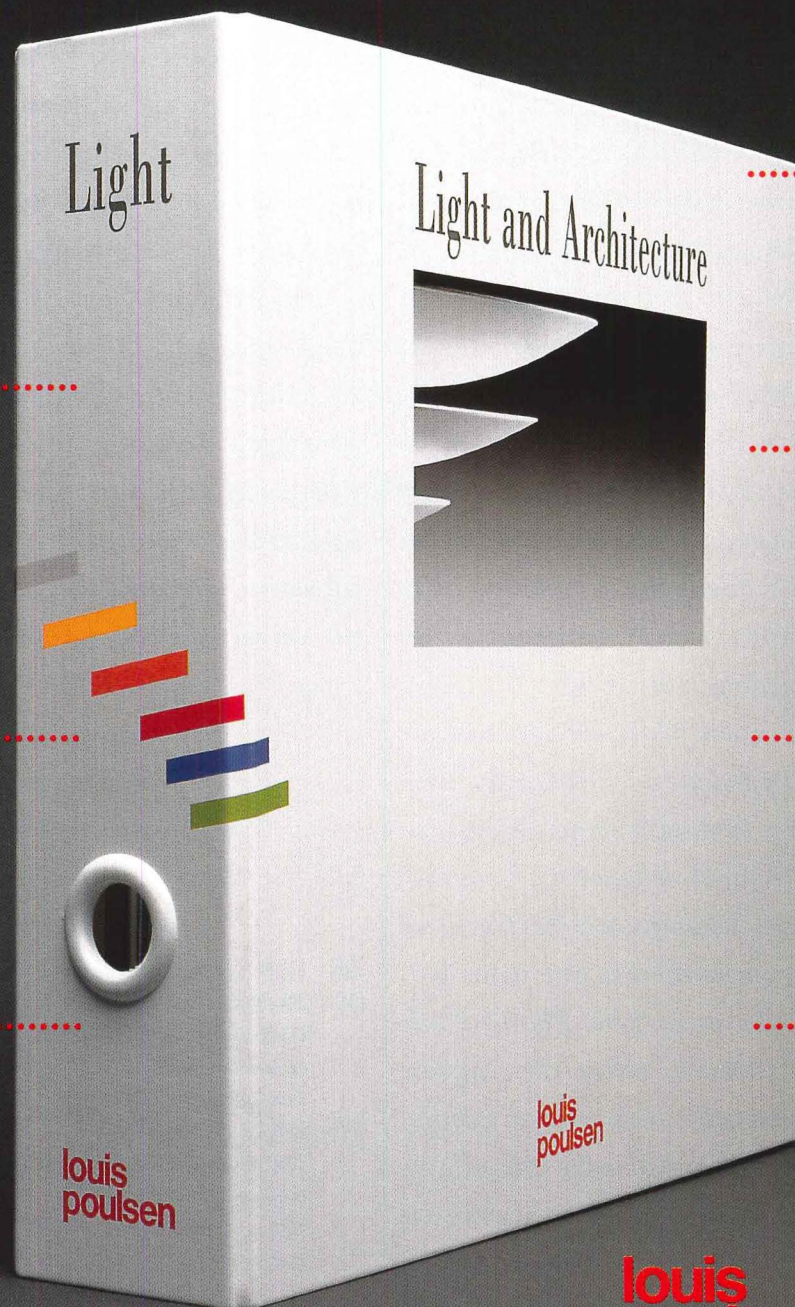
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CREATIVE USES

LANDMARK SEOUL SHOPPING MALL BRUSHED WITH BRIGHT LIGHTS

Assaulted by the crush of steel, glass, and neon that is Seoul at night, the Galleria, in its classical grandeur, has managed to hold its own. In fact, this exclusive shopping center with the glowing facade has become a landmark in the bustling, crowded metropolis of 10 million people. It's also a favored nighttime backdrop for local soap operas, according to Craig Roeder, whose Korean firm Ener Ken designed the new facade lighting.

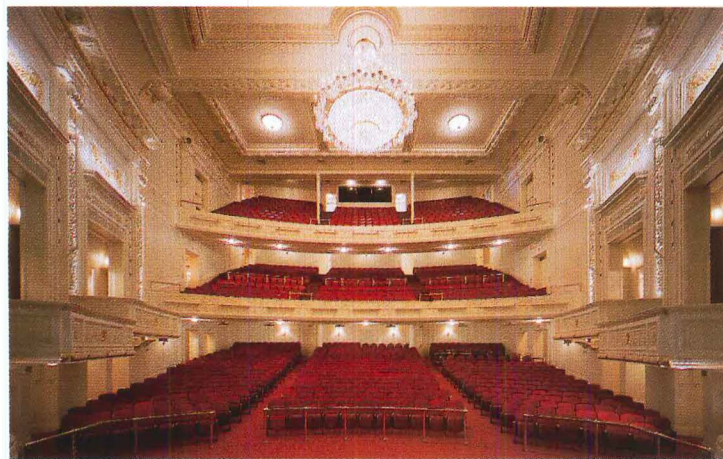
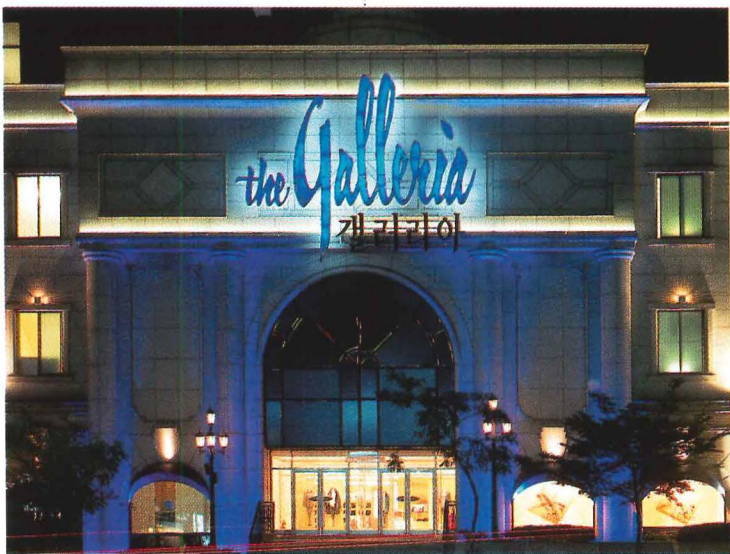
The Galleria is an elegant 1920s building that houses high-end shops such as Hermès and Escada. During a facelift of the building, the owners spent a major portion of the refurbishing budget on lighting the exterior. Roeder, with his partner, John Robertson, concentrated on using light to articulate the architecture and fenestration of the building. "It was a gorgeous piece of architecture to light," says Roeder.

The entire building has been lit with 3000K lighting, including newly available 3000K metal-halide lamps. Concealed in the overhang atop the building and on an intermediate ledge, 120-milliamp cold

neon lights create the overall glow that defines the elevation. The lamps have been housed in custom fixtures manufactured by Ener Ken's Korean factory. Paints in several colors were mixed with sand before being applied to the lamps; as a result, the fixtures seem to recede into the building facade.

The entrance columns have been washed in deep blue to match the existing blue of the Galleria signage. They are framed with five 3000K, 150W 10-degree spots with dichroic blue filters. Tiny MR16 lamps with 11-volt custom transformers for low maintenance are installed on top of the entrance canopy.

"This is the first job we did with the help of the computer program Lightscape," says Roeder. "When we drew up the Galleria on the computer, we discovered that the lintels would cast a shadow on the wall." The solution was to add light above the windows, which Roeder accomplished by housing 400W clear quartz lamps in custom-designed aluminum fixtures, creating a striking sunburst above every window.



BOSTON'S SHUBERT THEATER SHINES ON

When lighting designer Josh Feinstein of Standard Electric's Lighting Design Group, in Boston, was working on a restoration of the Shubert Theater with architect Graham Gund, FAIA, he found himself in the midst of his own set of tryouts and auditions. "You can draw things and try to describe them," Feinstein says. "But sometimes I found it worked better to just take the lights, get up on a ladder or scaffolding, and show how they were going to work."

Much of the period lighting in the building—like the massive chandelier in the main house and the sconces in the corridors—was in extremely good condition and needed only to be cleaned, rewired, and relamped. "We discussed fluorescent sources with the owner, but he decided to continue to use incandescent light. It looks more period." In the main house (top) flush-mounted crystal chandeliers were added to the upper balcony ceiling to provide more light and visually balance the large existing chandelier.

To add ambient light to the output of the chandeliers, as well as emphasize the theater's architectural details and raise the brightness to a level contemporary audiences are accustomed to, Feinstein used three elements. AR111 narrow spots hidden in the box-seat walls graze the gold-leaf



detailing on the pilasters. The gold-leafed laurel wreaths that decorate the panels above the box seats are cross-lit by 50W MR16 lamps fitted with frosted lenses mounted on the light ladders above. At the top level is fluorescent cove lighting: staggered strips of dual-circuit electronic T8 lamps are built into a box and covered with a black Alzak egg-crate louver to prevent glare. "They create a nice elevation and help with the spatial volume," says Feinstein.

The crystal pendant and semi-flush mount fixtures hanging in the foyer and over the stairs (above) are reproductions of period fixtures. At the columns supporting the stairs, Feinstein added bipin halogen lamps in two-inch quarter-round extruded aluminum to uplift the arched ceiling above. ■

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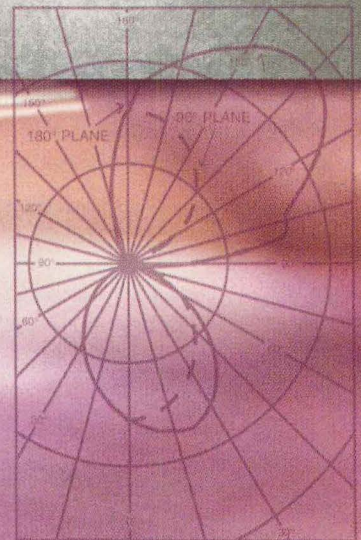
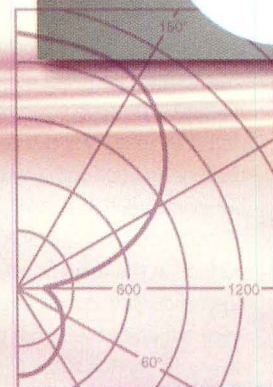
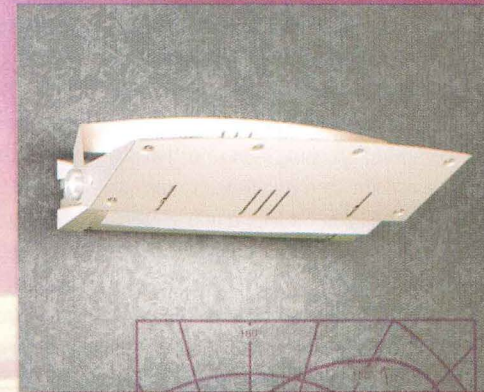
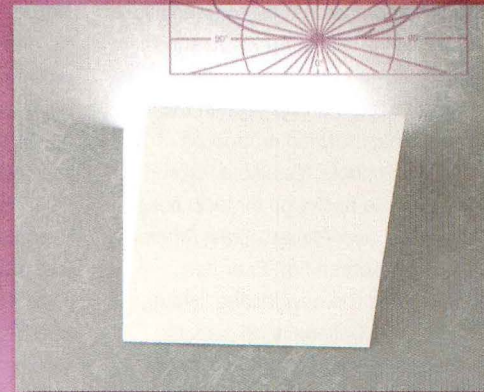
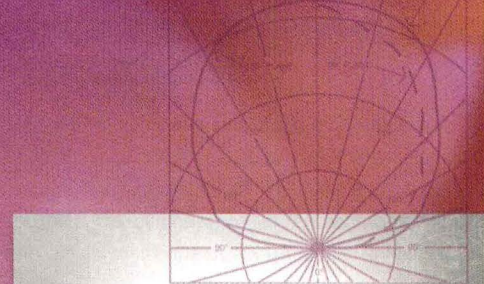
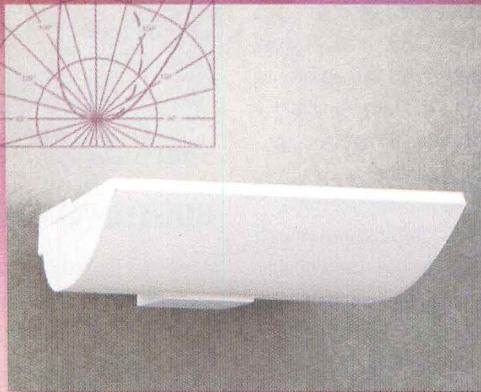
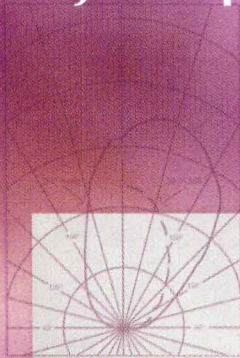
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Skylights Let Sun into Dark Heart of Johnson & Johnson Building

by Nayana Currimbhoy

A 450,000-square-foot, single-story building that was once a rather anonymous diaper factory has been converted into the consumer products headquarters for Johnson & Johnson. The client brief was to create a comfortable office that would reinforce a sense of community. For the architects, the vast expanse of the interior was also an opportunity to create space on a grand scale that is not usually possible in the average office building, says Terry Steelman, AIA, design principal for the architectural firm Ballinger.

The success of the design lies in its manipulation of natural and electric light and its use of the building's volume. Given the vastness of the space, it was clear that a conventional perimeter office plan would not create a pleasing work environment; light would have to be injected into the center of the space. To accomplish this, the architects punched an elliptical skylight through the roof to form a large light-filled atrium that works as a central anchor in the facility.

The atrium serves as the building's primary orienting device. Large gatherings are held here, all circulation goes through the space, and the conference rooms and cafeteria lead away from the atrium. Other interior spaces are organized around a series of outdoor courtyards, which introduce still more daylight deep into the interior and give employees inside the building a connection to the outdoors, acting as a series of garden oases.

A glass-skinned box on the facade articulates the building's entrance. The visitor enters through this box, whose stippled-glass ceiling and walls glow with light. The entry procession then leads through a light-filled corridor to the atrium, and on to a concave, faceted passageway leading to the workspaces within. "The idea was to create the illusion that you're walking through the lobby toward an object," says Steelman. "It was conceived as an elongated jewel in a box."

Nayana Currimbhoy is a New York City-based freelance writer who frequently writes about lighting and interior design. Her book on retail and restaurant design will be published this fall.



A vast, one-story building that was once a diaper factory has been turned into a bright and congenial office building.

"The magic of lighting has been used to modify the psychological perception of the space," he continues. "Without the creative injection of light—both natural and artificial—the space would be just one big, featureless box."

Designed by the Lighting Practice, the lighting in the building articulates the interior spaces, orients the user, and differentiates public areas from workspaces. "We were working with a large amount of natural light and extremely high ceilings," says Helen Diemer, principal lighting designer for the job. "Ceiling heights range from 24 feet to as high as 28 feet, creating vast volumes of space. Our solution was to use indirect lighting. The daylight has been supplemented by recessing lights into floors

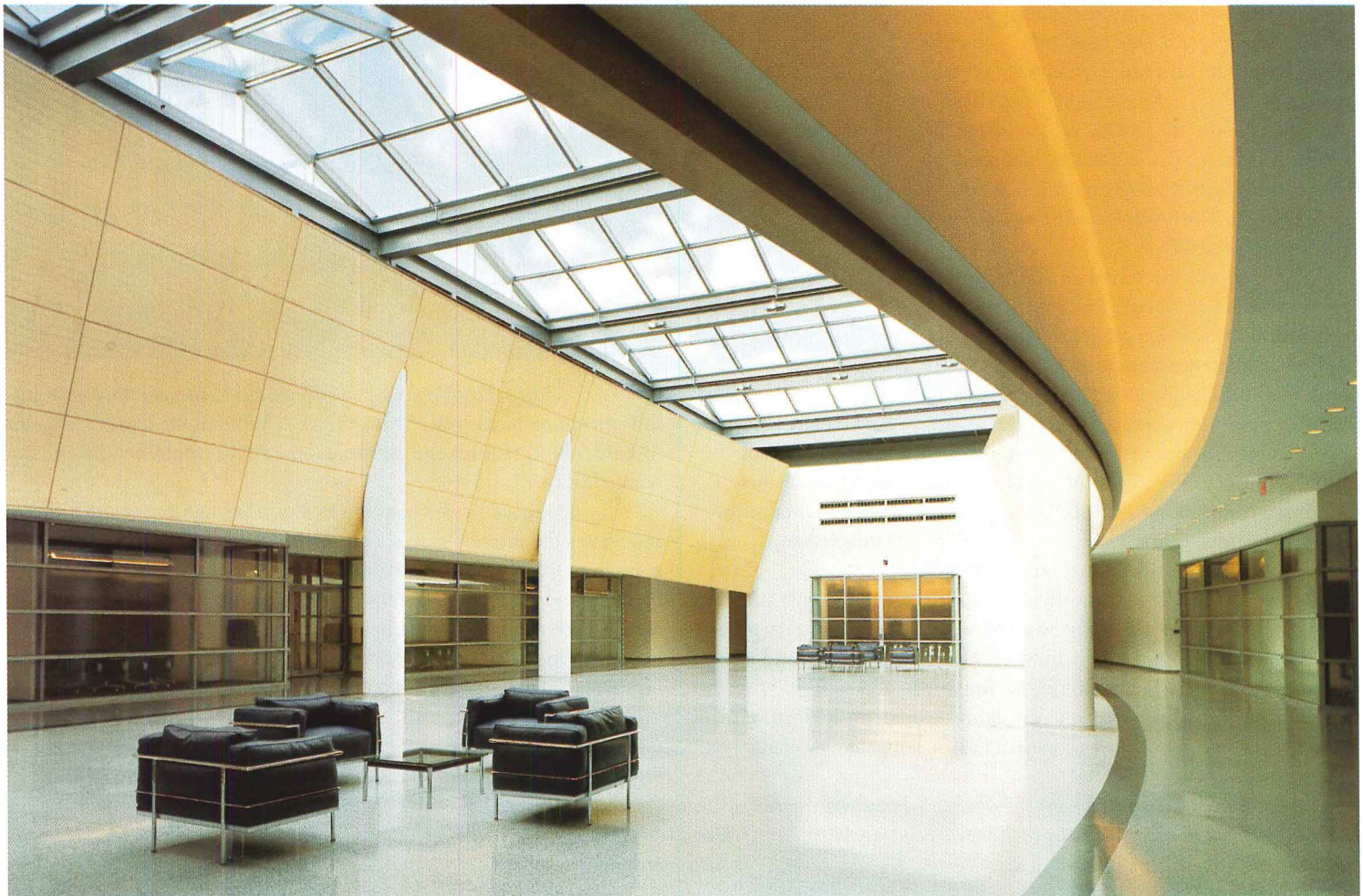
Owner: Johnson & Johnson
Project: Consumer Franchise Worldwide Headquarters, Skillman, New Jersey
Architect: Ballinger

Lighting Designer: The Lighting Practice—Helen K. Diemer, IALD, principal lighting designer; Julie Panassow, associate
Electrical Engineer: Ballinger



The client had a modest budget and a mandate calling for low maintenance, energy efficiency, and no incandescents. These goals were accomplished by using common catalog products, with only eight types of lamp. Indirect lighting in the lobby (left) and around the atrium (below) balances the daylight.

Triple-tube fluorescent downlights and indirect fluorescents in soffits can be found throughout the building—from the corridors to the cafeteria (opposite).





and walls to uplight the ceiling and create a pleasant, soft white effect.” The lighting program also highlights the unusual geometry of the interior.

In the main lobby, wall-mounted semirecessed metal-halide sconces provide a uniform 20 footcandles at floor level, which balances

within by T5 fluorescent wall washers. Small-aperture, 3500K, 32W triple-tube fluorescent downlights illuminate the frosted-glass corridor walls to visually expand the atrium space and provide a balance with the daylight. At night, the lights reflect off the light-colored floor to create a

“WITHOUT THE CREATIVE INJECTION OF LIGHT — BOTH NATURAL AND ARTIFICIAL — THE SPACE WOULD BE JUST ONE BIG, FEATURELESS BOX.”

the daylight streaming in through the glass entrance facade. A fluorescent pendant above the reception desk gives a sense of scale to the 24-foot-high space. From the lobby, the curved corridor leading to the atrium has been lit with T8 strip fluorescents with electronic ballasts. Recessed into a wall soffit, the fluorescents create a band of light that leads to the atrium.

Three light sources in the atrium provide a carefully balanced level of illumination. Modified gimbal rings house 100W PAR38 metal-halide lamps, which provide the downlighting. In order to minimize their visual impact, these fixtures have been mounted on the beams of the 28-foot-high skylight. Recessed into the floor, 3200K metal-halide uplights accentuate the columns that frame the atrium as well as the surrounding wood wall. End walls of frosted glass are illuminated from

pleasing glow around the atrium.

The sequence of spaces at Johnson & Johnson is artfully articulated by soft, indirect light. It fulfills the client’s requirement for a comfortable, memorable working environment while using energy-efficient lamps that are, for the most part, off-the-shelf. The building’s pleasant interior is a striking departure from its humble origins. ■

Sources

Compact fluorescent track lights: *Halo*
Fluorescent downlights and wall washers: *Halo*
Metal-halide uplights: *Hydrel*

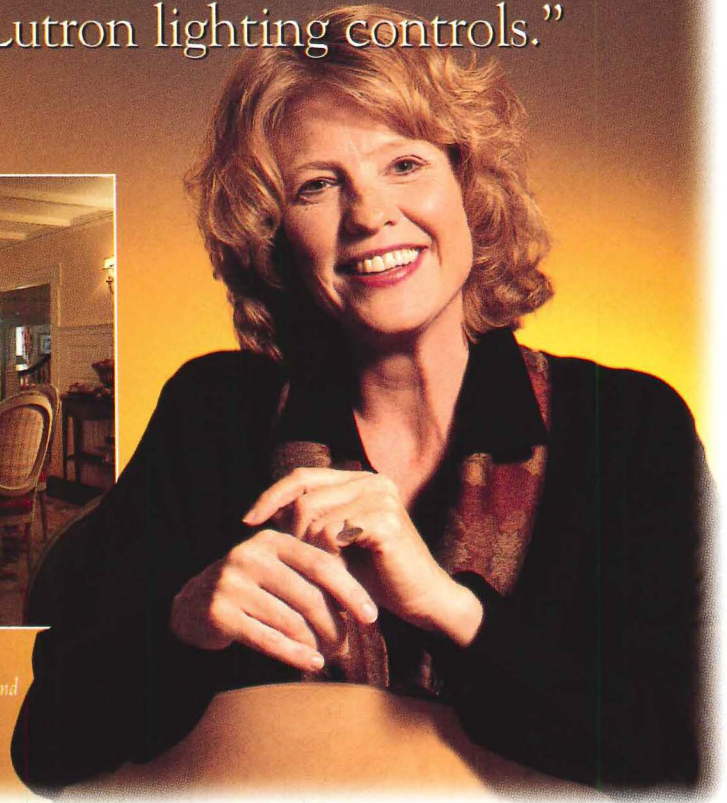
Metal-halide wall uplights: *Elliptipar Lamps: Philips*

Metal-halide downlights: *Sterner*
Decorative fixtures: *Koch & Lowy, Artemide*

“When it comes to dimming,
I look for products that I know are reliable.
That’s why I specify Lutron lighting controls.”



Barbara Kristiansen, Lighting Designer
Light/Resource & Design, Inc., Rhode Island



Lighting designer Barbara Kristiansen knows the ultimate judge of her work is how well it functions. “I design within architectural and interior spaces to accent, reveal and illuminate. To me, dimming is crucial.” Ms. Kristiansen also specifies Lutron lighting controls because of the quality of their technical support. “When you call with a question, you talk to an engineer; someone who can help you with even the toughest problems and give you *accurate* information. That’s important to me and the electrical contractor.”

Ms. Kristiansen also knows the importance of keeping her clients satisfied, so she appreciates the way “Lutron’s aesthetic simplicity complements the surrounding environment” and how Lutron lighting controls save energy, extend lamp life, and add functionality to any location. As she says, “I know I can depend on Lutron. They’re a superb company with a reliable, high-quality product. And for support – they really are the best I’ve found.”

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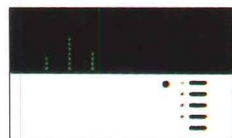
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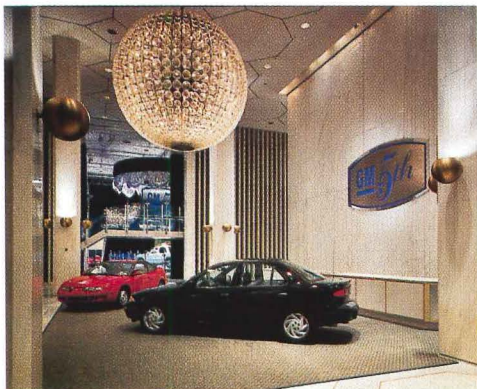
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CIRCLE 57 ON INQUIRY CARD

Bright GM on 5th Showroom Takes Visitors on Fantastic Road Trip

by Charles Linn, AIA

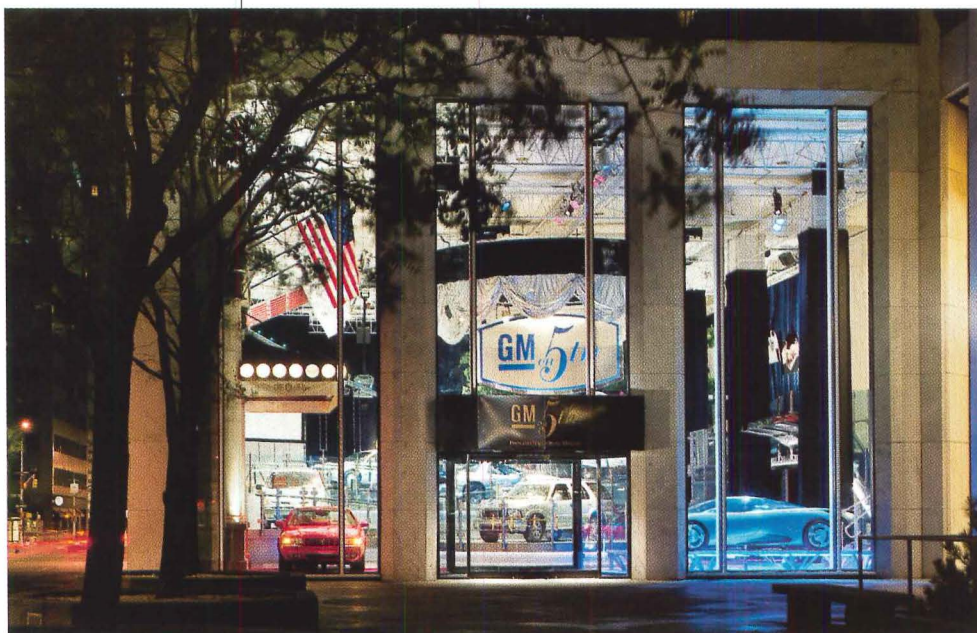


The General Motors Building, at 59th Street and Fifth Avenue in New York City, stands at the terminus of one of the greatest shopping streets in the world. Bergdorf Goodman and Tiffany's are a stone's throw away; FAO Schwartz is on the building's first floor; and the Plaza and Pierre hotels are within a block of the main entrance. Because there are so many attractions vying for the attention of visitors, luring them into a showroom—even to see Detroit's latest and greatest—is no small challenge.

Architect Jay Haverson's recently opened showroom, called GM on 5th, occupies the northern third of the General Motors Building lobby, and has been pulling in passersby in droves to view the automaker's new models. "On weekends the showroom has been getting about 3,000 people per day," Haverson says.

Haverson's job demanded that he have an understanding of demographics, a familiarity with recent lifestyle trends, and a sense of what might attract customers to a particular GM brand. "Brand recognition is critical for automakers. Most people aren't even aware that GM makes eight different brands," he says. "What is the real difference between a Buick and an Oldsmobile? Which brand is targeted at whom? To help us with the design, we actually built a matrix that cross-referenced lifestyle types with different models and brands." That led to the design of a showroom that uses an imaginary coast-to-coast road trip, complete with cleverly lit, interactive automobile displays that are memorable and informative in addition to being loads of fun.

The starting point of the journey and the centerpiece of the showroom is a reveal, a special circular stage. The most recent models are



Using personal computers located in the main lobby (above left), visitors may "design" their own cars, choosing a brand, options, and colors. The original starburst light fixture still hangs here. The brightly lit showroom (above right) was once "invisible" after dark.

debuted for the automotive press here and then left on display for the public. A silver lamé curtain, which rises at the appointed moment, hides a car that rotates slowly on a turntable uplit by bright white neon. Footpads in the floor trigger informational messages, which emanate from Plexiglas domes overhead that keep the sound acoustically isolated from the rest of the room.

The road trip takes visitors over a rambling highway, which is really a set of connected ramps, on whose floor are backlit dividing stripes that flash in sequence to indicate the direction of travel. The highway takes viewers past a series of vignettes, each of which features a different vehicle. Each display is like a miniature stage set equipped with accent lighting appropriate to the theme.

Visitors are encouraged to sit in each car, where video displays may acquaint them with a given model's attributes. In some cases, the car

Project: *GM on 5th Showroom, New York City*

Owner: *General Motors Corporation—Joe Meagher, project director*

Architect: *Haverson Architecture and Design—Jay Haverson, principal-in-charge; Carolyn Haverson; David Jablonka, project manager; David Jimenez, project architect; Lisa Bianco, interior designer*

Lighting Designer: *Joe Kaplan Architectural Lighting—Joe Kaplan, partner-in-charge; Christopher Coe, project manager*

Engineers: *MGJ Engineering (electrical); M. G. McLaren (structural)*

Scenic Fabricator: *Showman Fabricators*

Construction Manager: *Structure Tone*



itself may deliver a message, such as a reminder to children of the importance of seat belts. One car's display uses a hidden camera to put visitors in the middle of a wide-screen action movie—a slightly unsettling effect to the unprepared.

The first stop, directly inside the showroom entrance, features a likeness of the entry canopy of the Plaza Hotel, complete with the approp-

GM ON 5TH ISN'T REALLY A SHOWROOM— IT'S MORE LIKE A ROAD TRIP.

riate luxury car—a touring sedan or a sports utility vehicle. The canopy is backlit by a row of exposed lamps and has a period lamppost fitted with glass globes, not unlike the lights outside the real Plaza.

A display for a “ready to go” car is placed in front of a garage door, grazed with floor-recessed uplighting, and surrounded by sporting goods. A re-creation of the George Washington Bridge includes red warning lights at the tower and exposed blue incandescent lamps that outline the suspension cable, reminiscent of the mercury vapor “string of pearls” mounted on the real bridge. For a trip to the mountains, scenic designers built an artificial forest, whose leafy canopy is created by a theatrical projector backlighting a frosted-plastic panel mounted overhead.

Most of the illumination on the cars comes from theatrical lighting mounted on overhead trusses; ambient light comes from existing architectural downlights recessed in the ceiling. Both systems are connected to the same central dimming system, which has 216 circuits and 14 preset levels.

All of the superstructure for GM on 5th “floats”—it's modular so that it can be reconfigured, and it isn't permanently attached to the building. “This is a good way of allowing different vignettes to be changed without having to shut the space down for a long time,” says Haverson. “After all, market segments do change. And, obviously, car models change constantly.” ■

Sources

Transom and guardrail lights:

Celestial

Uplights: *Hydrel*

Red warning lights: *Hubbell*

Backlit ceiling and floors: *Duratran*

Beyond the rear deck of a new concept car (above) are vignettes of the Plaza Hotel entrance, the George Washington Bridge, and a forest overhead. A rotating reveal is in the center.

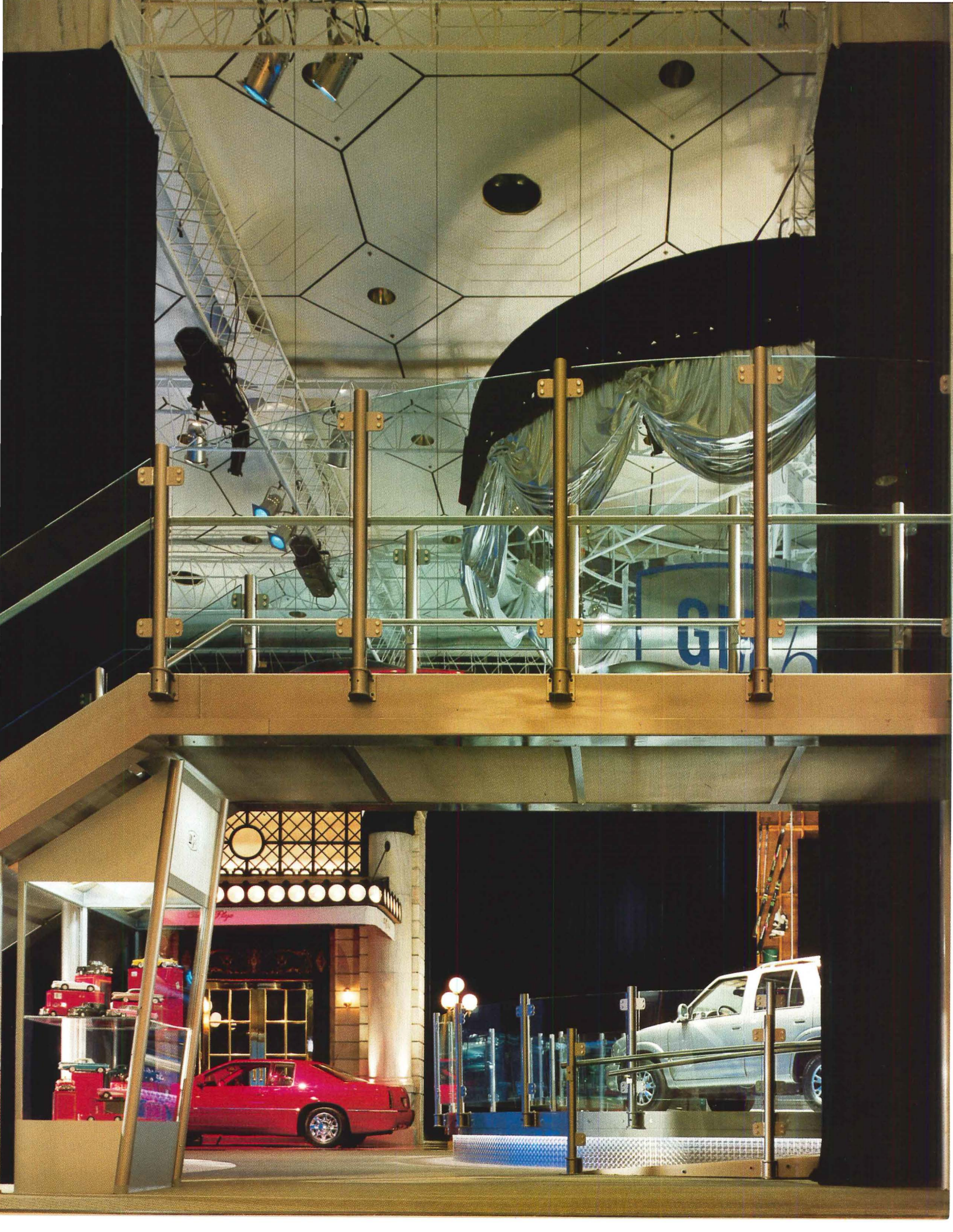
Base reveal lighting: *Warm white and bromo-blue neon*

Marquee downlights: *Halo*

Floor lighting on ramp: *Bega*

Flag lighting: *Lightolier*

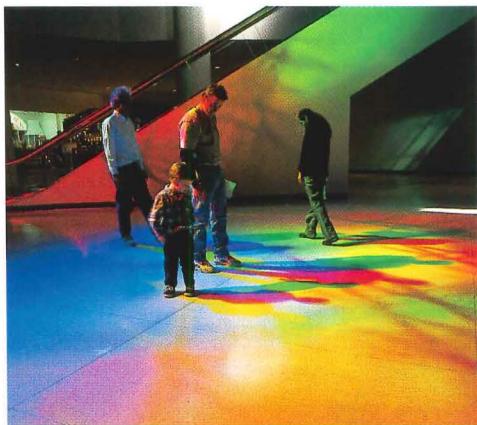
Dimming system: *Colortran*





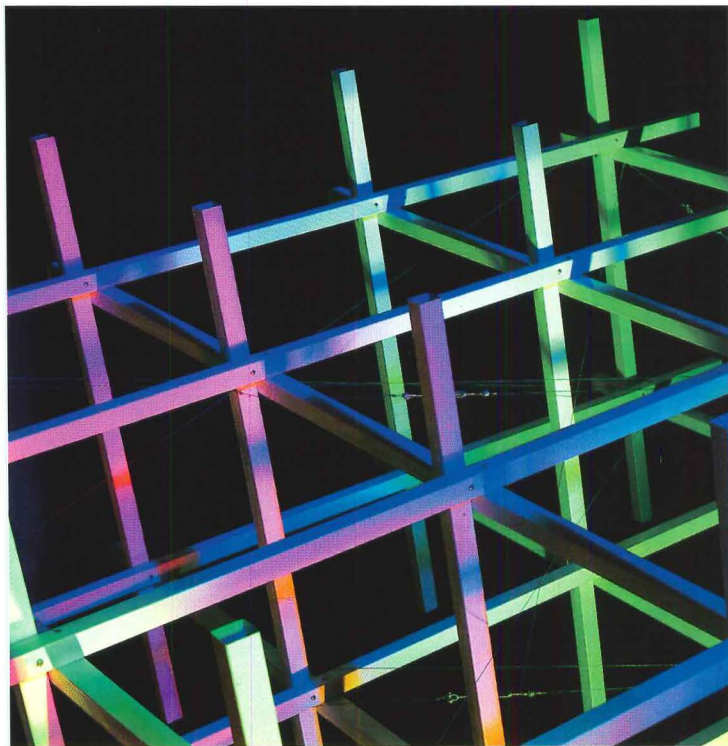
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Diffractioned Sunshine Creates Spectacular Display in Puente Hills Mall



Children and adults alike are captivated by the large fields of color produced by sunshine bouncing off huge prisms. A grid (right) hung from the ceiling catches more rays.

by Charles Linn, AIA



When the owners of Puente Hills decided to demolish a huge, empty department store and anchor their mall instead with a 20-screen cinema, architect Todd Stoutenborough, AIA, had to determine how to turn moviegoers into mall walkers. In addition to designing the theaters, he was asked to create a transitional space between what remained of the mall and the new theater lobby. The space had to be visually stimulating and memorable—compelling enough to coax people out of the lobby and into the mall for shopping.

“When we started looking at different ways to work with the space,” says Stoutenborough, “like installing a dome in the roof and a garden below, everything we tried was way beyond our budget. We had to accomplish so much for so little money, we actually code-named this part of the project Smoke and Mirrors.”

At the suggestion of a colleague, Stoutenborough looked up Peter Erskin, a sculptor from Venice, California. Erskin had previously used sun-tracking mirrors, or heliostats, and prisms to produce rainbowlike light for sculptures in Rome and Berlin. “We weren’t sure that the idea would work at the mall at first,” says Stoutenborough. “But after we looked at all the alternatives, we estimated that this could be done for a fraction of the cost, so we decided to try it.”

“I was given drawings of the space,” says Peter Erskin, “and pretty-much carte blanche to make the sculpture work as well as possible. We built a one-inch scale model that was about four feet by eight feet and experimented with a miniature solar tracker to help establish the traffic patterns and where the escalators would go.” Adds Stoutenborough, “The only restriction is that by the time we got to this stage, the structural steel had already been ordered, so we were kind of limited as to where we could put the machines.”

Erskin’s optical machines create sun sculptures by tracking the sun and bouncing its rays onto a prismatic sheet that breaks the light into the spectrum. The rainbow of colored light is then projected onto the surfaces of a building, such as the escalators and floor around the lobby at Puente Hills.

The computer-controlled heliostat at Puente Hills is a modifi-

cation of a design Erskin originally developed for the petroleum industry to run steam generators in the desert. For the machine at the mall, a 16-by-20-foot panel of mirrors is directed at the sun; the mirrors are positioned by a pair of motors, one on the x-axis and one on the y-axis, with respect to latitude and true north. Once the heliostat is set up, a computer instructs the motors to move wherever necessary to bounce the sunlight from the mirrors to a periscope mirror, adjusting their position every 20 seconds by as little as 1/300 of a degree. The periscope mirror throws the light down through an opening in the roof onto several flat, laser-cut prisms.

Project: Sundance at Puente Hills Regional Mall, City of Industry, California

Owner: The Krausz Companies—David Pyle, developer and project consultant

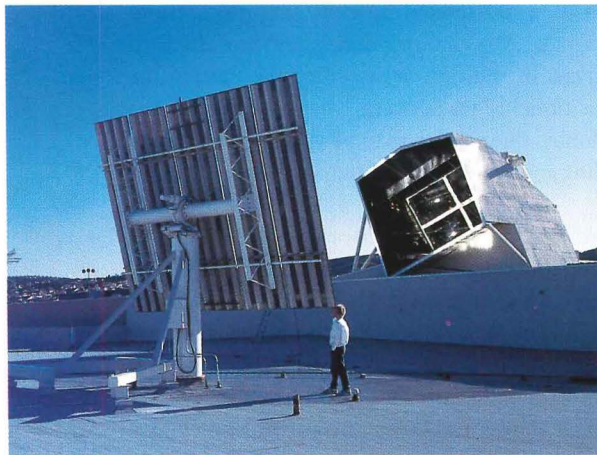
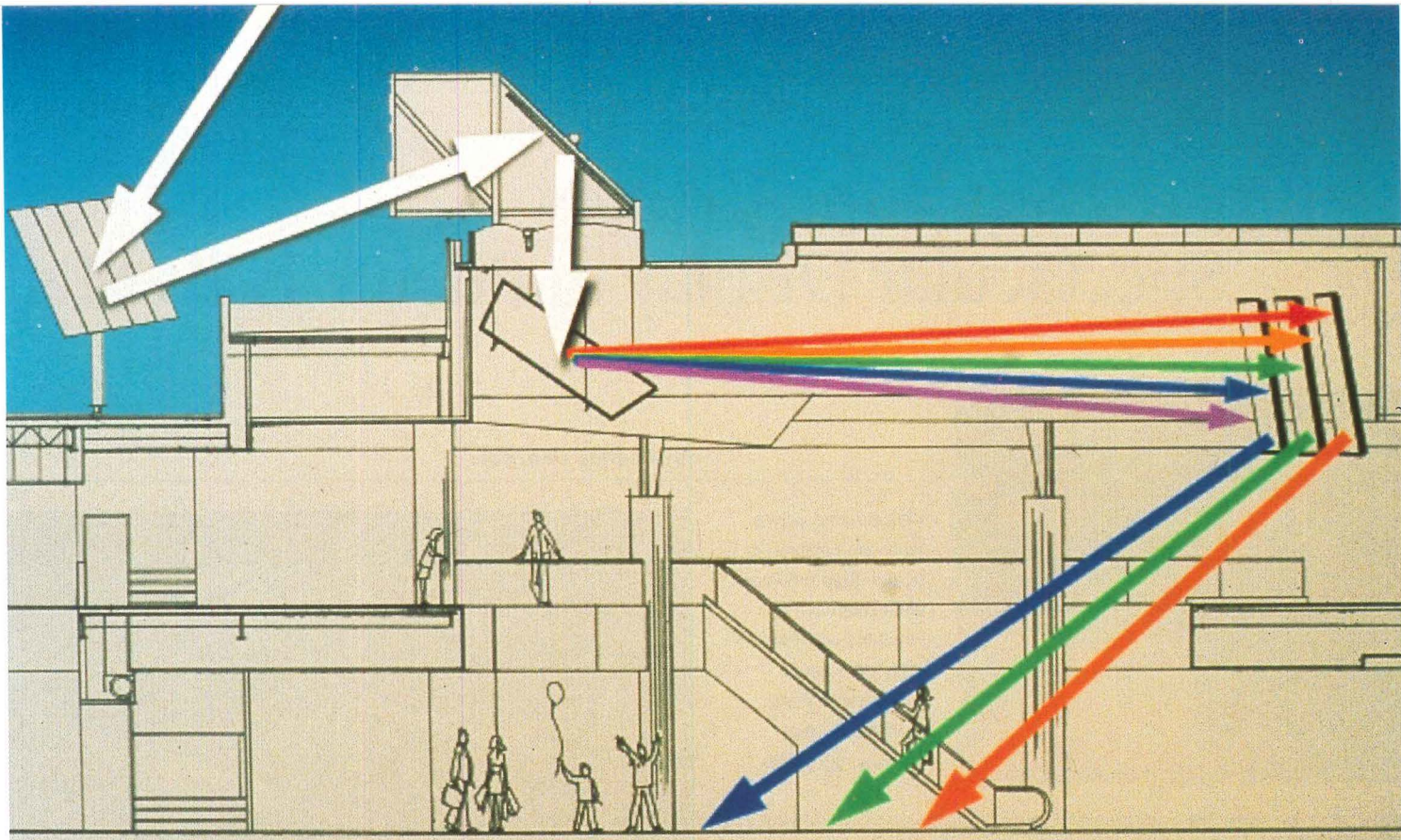
Architect: Stoutenborough Architects and Planners—Todd Stoutenborough, AIA, principal-in-charge; Joel Greer, project manager

Solar Artist: Peter Erskin Studio—Peter Erskin; Kima Wakefield, project architect; James Sullivan, fabricator and installation manager

Lighting Designer: Gallegos Lighting Design—Pat Gallegos, principal; Karl Haas, project designer

Engineers: ANF Associates (structural); RWR Pascoe (electrical)

General Contractor: Rudolph + Sletten



A 16-by-20-foot panel of mirrors (far left) tracks the sun, adjusting position every 20 seconds to keep the rays focused on the solar periscope (left), which bounces the light through the mall's roof. The heliostat's motors are controlled by software that predicts the sun's coordinates.

"When the light is finally spread out into the spectrum," says Erskin, "it falls onto a flat prism, which is made of a film that has been scored with a laser to create parallel microscopic lines the size of a wavelength of light—from 200 to 2,200 lines per millimeter. It's the same material that is in the spectroscopes that astronomers use to analyze atmospheric gases. The number of lines per millimeter depends on the spread of color I'm looking for."

To make a prism, the grooved film must be mounted on a surface that is optically flat—usually a glass or polymer sheet. In this case, Erskin and Stoutenborough mounted the film on flat structural sheet-metal plates, because glass or polymer sheet would have been too cumbersome, weighing hundreds of pounds. Two of the prisms at Puente Hills are 8 feet by 8 feet; another is 8 feet by 16 feet, and, according to Erskin, may be the largest prism in the world. An 18 foot by 18 foot mobile suspended below the mirrors (previous page) catches rays of light where they would otherwise be missed.

As the project was finished, the sobriquet *Smoke and Mirrors*

was supplanted by *Sundance*, which the designers adopted after watching children dance in the colored light. At night or when clouds cover the sun, a computerized light show by Gallegos Lighting Design fills in for the natural spectacle created by the heliostat.

And why is the experience of seeing *Sundance* so appealing? Erskin has his theories. "Jonas Salk," he says, referring to the American physician who developed the polio vaccine, "once told me that the colors of the solar spectrum evoke a strong response in people because the rainbow connects us to a very core, evolutionary experience." And so it seems, judging from the newly leased spaces and packed matinees, that *Sundance*, with its light in elemental hues, speaks directly to the souls of one city's mallgoers. ■

Sources

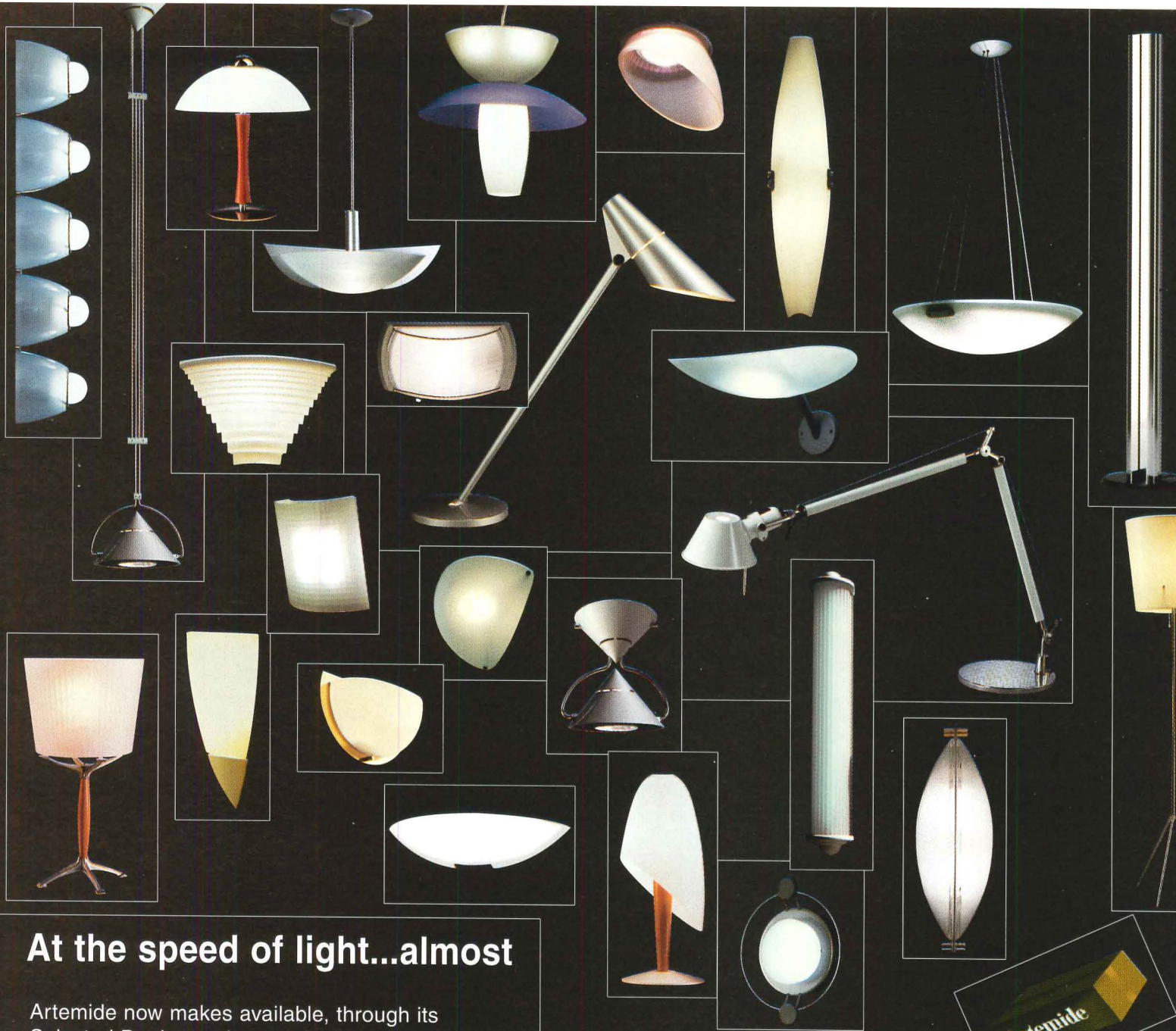
Solar tracking hardware: Peter Erskin Studio

Theatrical light fixtures: Clay Paky

Pattern projectors: *Electronic Theater Controls*

Dimming and control system: *Electronic Theater Controls*





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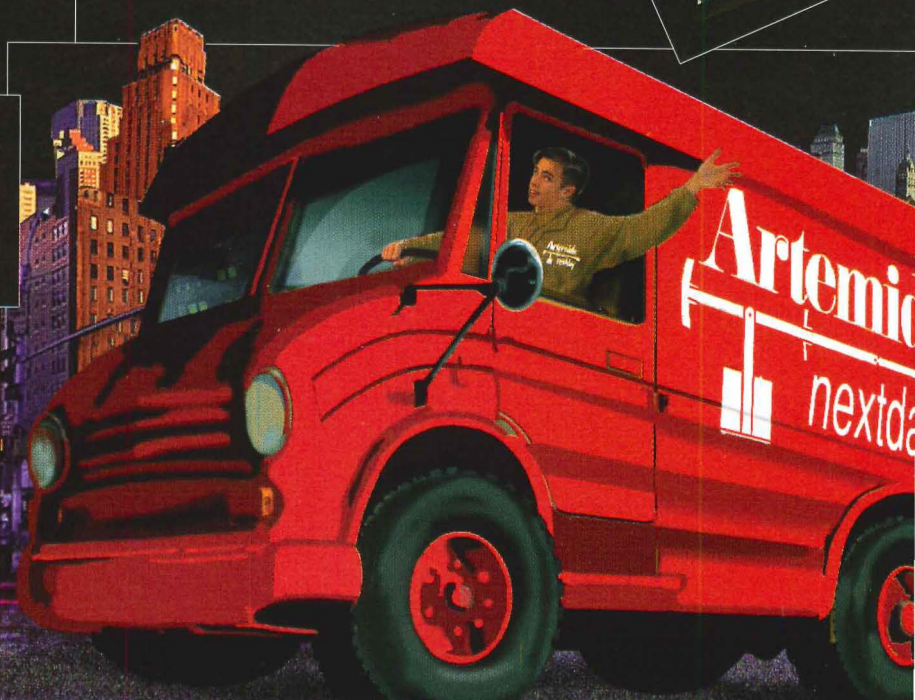
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CIRCLE 60 ON INQUIRY CARD



Study Finds Lincoln Looks Best Basking in Incandescent Glow

by Charles Linn, AIA

The National Park Service is nothing if not thorough when it comes to the preservation and care of our national monuments. That's what Einhorn Yaffee Prescott Associates' lighting specialist Dan Zuczek learned when he undertook a study for the Park Service to relight the Lincoln Memorial in Washington, D.C. Ordinarily such studies call for energy studies, computer simulations, and mock-ups, as Zuczek's did. But few require in-depth research into the nature of insects' vision, a fascinating aspect of Zuczek's research and proposals for lighting the memorial, which are, at this point, still proposals.

The Park Service gave Zuczek a number of specific goals for his study of the interior lighting. His mandate was to look at different possible lighting scenarios that would respect the intent of the original lighting design; to preserve the fabric of the building; to improve the visibility of the inscriptions and murals on the interior; and to improve maintenance and energy efficiency.

THE MEMORIAL IS A POPULAR DESTINATION FOR SHUTTERBUGS AND BUGS ALIKE.

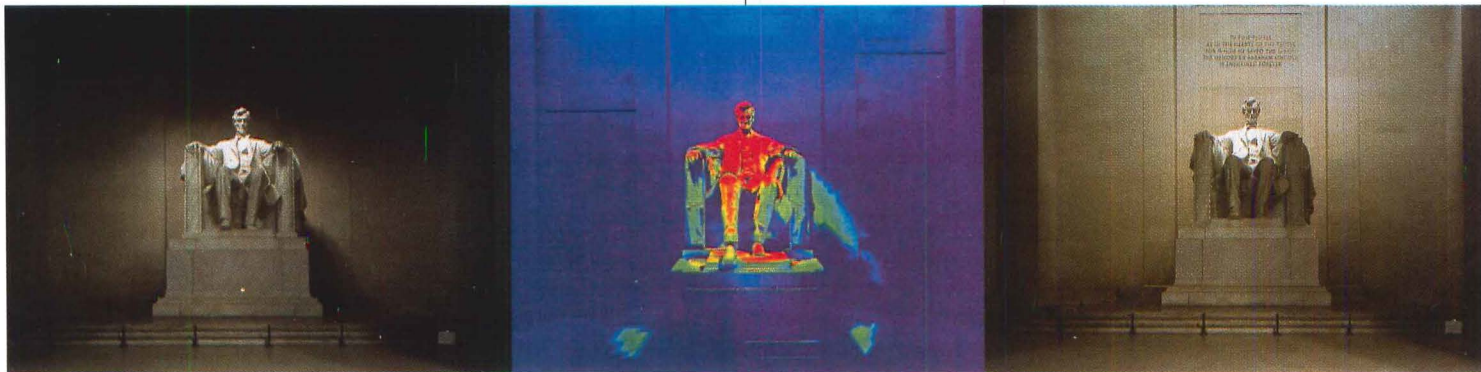
The existing lighting for the statue of Lincoln was installed in the 1920s when the memorial was opened. These huge, old-fashioned lamps, which operate 24 hours a day, are short-lived and inefficient. "And," says Zuczek, "the old fixtures are mounted behind big metal louvers that don't look so good." The entire roof structure is a skylight, and the ceiling below it is made of translucent marble panels. For most of the

Zuczek hoped that focused beams could be used to light the statue, and that perhaps the metal louvers could be replaced with marble panels that would match the surrounding area. The panels would be drilled to accept the fixtures. Zuczek and a computer consultant used lighting simulation software called Lightscape to help make preliminary fixture choices, estimate fixture positions, and produce renderings and printouts of illumination levels. "We knew we had to do mock-ups eventually," says Zuczek, "but you can't just mock up everything you think of. It's expensive and time-consuming."

The range of lighting types—incandescent, metal halide, and high-pressure sodium—was limited, and Zuczek wanted the statue to be lit with a theatrical projection fixture. "During the day, the intensity of the electric light has to be high enough to overcome the daylight, but at night, the light level can be decreased greatly. We recommend incandescent here because it is easy to dim." The final proposal is similar to the mock-up shown below right, except that besides the light on the statue, only the center panel behind Lincoln is lit.

Prior to Zuczek's study, the murals on either side of the statue had been restored, although they were still poorly lit, as were the accompanying inscriptions. Improving the lighting should have been a run-of-the-mill, no-fuss task, but the restorers ended up coating the murals with a very glossy finish that caused veiling reflections. "It's just like lighting a mirror,"

Below, left to right: A computer rendering of the statue in incandescent light; a computer image showing illumination levels; a mock-up using quartz on the statue and back wall.

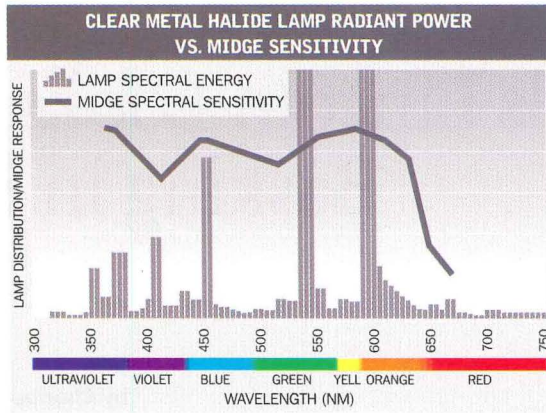
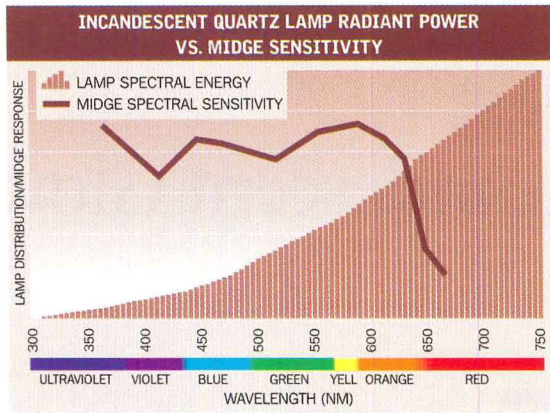


day, light filters down through the panels and illuminates the whole space.

"There is a history lesson here," says Zuczek. "Originally, there was no lighting. The daylight filtered down, bounced off the marble floor, and uplift the statue. It was like holding a flashlight under Lincoln's chin, and it seemed to give him a surprised look. But sculptor Daniel Chester French wanted Lincoln to have a contemplative look. He lobbied to have lights added."

says Zuczek. The people who restored the murals suggested that putting polarizing gels over the lights would substantially reduce the glare and give Zuczek much more leeway in aiming the fixtures. "I was kind of skeptical at first, but they really work well here," says Zuczek.

After modeling the different solutions on a computer, two schemes for lighting the murals were mocked up. One used theatrical framing projectors to outline the mural and inscriptions; the second



The midge, the tiny insect indirectly responsible for the overabundance of spiderwebs on the memorial, is more attracted to cool lamps like metal halide than to incandescents.

employed a simple wall-washer. “It was very difficult to get the framing to work. It was just clumsy,” says Zuczek. The wall-washer, in dimmable incandescent, was less problematic, and this was the solution Zuczek recommended to his client.

As for the study of the exterior lighting, the Park Service required that Zuczek grapple with the same issues he had for the memorial’s interior. “Overall, the exterior lighting was just in bad shape. Not only is it outdated, but some of the pole-mounted fixtures are so overgrown, they are just lighting tree limbs,” says Zuczek.

Where preserving the fabric of the structure was concerned, Zuczek was asked to determine if any particular lamp type had a propensity to attract midges, mosquito-like insects that breed in the nearby Potomac tidal basin. According to entomologists, midges are drawn to the memorial’s lights primarily at dawn and dusk in the summer months. Spiders spin webs on the outside of the building to catch the midges, and the webs end up making the stone look dirty. In the past the spiderwebs had been cleaned off with high-pressure hoses, but this procedure was wearing away the marble of the memorial. “That practice has been stopped, but the constant cleaning is a major concern,” says Zuczek.

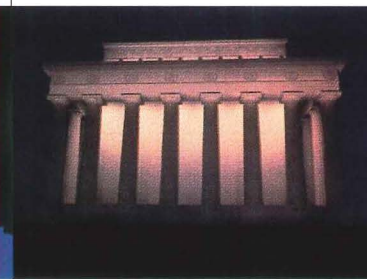
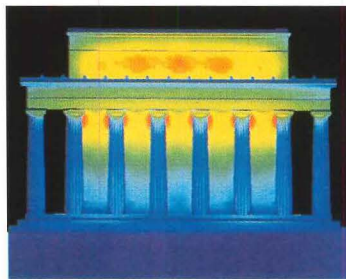
To find out if midges were particularly sensitive to any specific group of wavelengths in the spectrum, U.S. Department of Agriculture scientists conducted electroretinogram tests. “We found out that the midges can pretty much see what people can see, except that they’re more sensitive to bluer, cooler colors and are more attracted to them. It’s the same reason ultraviolet lamps are used in bug-zappers.”

Zuczek then took the theoretical work on the midges into the field for testing. “There are only a certain number of different lamp types we are planning to use, so we mounted one of each in a different collection box,” he says. The lamps were aimed through an electric zapper grid inside the boxes and shined toward a sheet of adhesive mounted sticky-side out on the wall. “So any insects drawn by the light reflecting off the wall either stuck to the sheet or were killed by the electric zapper and collected in the box.” Zuczek conducted the tests for a week, during morning and evening periods, and then recorded the body count. “That confirmed our findings in the lab,” Zuczek continues. “For example, high-pressure sodium attracted the fewest insects, and incandescent the next fewest. Metal halide had the highest percentage of blue light, and we confirmed that most of the insects preferred this kind of source. The study really

only tells us which kinds of lamps are better and which are worse in terms of attracting midges—it’s what you’d call a relativity study,” says Zuczek.

Zuczek again used computer modeling to study different lighting solutions and decide which to mock up. The first trial, with high-pressure sodium, was a big disappointment. “Nobody thought it was appropriate. It turned this beautiful white marble building yellow.” This led Zuczek to make the first compromise: the best light for keeping midges away because it was rich in the red end of the spectrum was not the best light for people. Zuczek also tried metal halide, which produced a crisp white color but attracted too many insects.

Zuczek’s report recommends lighting the memorial with quartz incandescent, which in terms of color stands somewhere between the high-pressure sodium and metal halide. As Zuczek points out, however, the existing lighting is incandescent, and people are used to it. Incandescent lighting is also easily dimmed, so automatic lighting controls could be used to discourage midge activity during the peak dawn and dusk hours and then slowly brought up to the appropriate intensity.



“It surprises some people that throughout the study incandescent was recommended for lighting the memorial over more modern sources,” says Zuczek. “But sometimes choosing a lamp isn’t just about saving energy or how long the light is going to last. What is equally and sometimes more important is illuminating an object or building so that it is beautiful to look at and brings pleasure to those who view it.” ■

Project: Study for relighting the Lincoln Memorial, Washington, D.C.

Commissioned by: National Park Service

Architect: Einhorn Yaffee Prescott Associates—Dan Zuczek, lighting specialist

Computer Consultant: MYN-ZY
Electrical Contractor: R. D. Moody
Entomology Consultant: Donald Messersmith; U.S. Department of Agriculture—Lawrence Pickens

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CIRCLE 61 ON INQUIRY CARD

After a Difficult Youth, Motion Sensors Come into Their Own

by Lindsay Audin

Tighter building codes and energy-conservation efforts made occupancy sensors common tools for controlling lighting and HVAC in the 1990s. However, a number of difficulties limited their use. Typical past problems included false “ons” caused by wind gusts from windows and air-handling diffusers; false “offs” caused by failure to detect small movements; incorrect initial time or sensitivity settings that required repeat visits by the installer; interference with some hearing aids; and inability to automatically adjust for room changes. Many of the flaws inherent in this technology have been addressed, and manufacturers are finally beginning to deliver on their “install-and-walk-away-forever” promises. To some degree, solutions to all these shortcomings have been sought through the use of dual-technology (infrared-ultrasonic or infrared-audible) sensors; adaptive chips that “learn” occupancy patterns; selectable-frequency oscillators; and improved mounting systems.

Sensitive types promise easy access

Older sensors on the market use security-alarm technology that dates back to the 1970s. Newer models have undergone several improvements, and now installing technicians have numerous options for fine-tuning them. Sensitivity to nearby air movement and ambient-light levels that could trigger the sensor can be adjusted, as can the degree of magnitude and location of the triggering motion. The MyTech Omni II DT-1000 series also claims that it can self-adjust for installation errors and compensate for changes to occupancy and room-layout patterns.

Watt Stopper’s new versions of dual-technology sensors boast a variety of other changes, including easier access to controls and a new swivel mount that simplifies locating and directing the sensor. MyTech also recently introduced a new mounting escutcheon for attaching sensors to hard ceilings that must use surface-mounted wiring in conduit or WireMold.

Extra options for adjusting the sensitivity of the motion sensors are not the only improvements. Many older-model ultrasonic sensors operated in the 25kHz frequency band, which sometimes interfered with certain hearing aids. Newer models use oscillators in the 32 to 40kHz frequencies, significantly higher than those of any device used by the hearing-impaired. While the coverage of a sensor may decrease when a higher frequency is used, greater sensitivity has been added to compensate. One model can be changed from 40 to 32kHz with the flip of a DIP switch, thereby increasing coverage without adding equipment.

Another pleasant surprise: the power packs, which contain a relay and low-voltage transformer, no longer have the heft and appear-

ance of bricks. Using lightweight solid-state transformers (instead of the usual heavy copper windings) and miniature air-gap relays, these units would easily slip into a cigarette pack—or one of the light fixtures they’re designed to control. Older models required a separate metal enclosure and heavy-duty mounting, with the attendant extra installation costs.

Communicating with the body electric

Some MyTech models also include a feature that allows the installer-technician to “interrogate” a sensor. Standing near the unit, the interrogator uses a series of quick forward-backward hand motions to ask the sensor to reveal its settings through coded flashes of its LED indicator light. Since installation can also involve standing perfectly still during part of the process, don’t be surprised if your next sensor installation looks more like Tai Chi. Information coming from the sensor includes timer setting and sensitivity, air interference, and failure from an internal error. Because this communication does not involve physical contact with the sensor, it may be done without the ladder typically required for servicing ceiling-mounted units.

An elegant twist on dual technology

Sensor Switch recently introduced a different twist on dual technology, using both infrared and microphonic technology. Sensing sound in the audible-frequency range (for example, room noise) and combining that with apparent motion of a warm body, its sensors can determine when to keep the lights on even when motion is not being sensed. Imagine, for example, a nearly motionless writer pecking away at a keyboard. While no infrared sensor can detect the small finger motions of typing, the clicking of the keys is sufficient to alert this sensor that the lights should stay on. While certain limitations could occur in high-noise areas, this method is an elegantly simple (and inexpensive) way to avoid the false “offs” that led to the removal of many sensors in the past. ■



The newest generation of motion sensors is easier to mount and adjust and provides improved access to controls. Some allow technicians to “interrogate” them with hand movements.

Lindsay Audin is president of Energywiz, an energy consulting firm, and lighting research consultant to E-Source, an energy-consulting group.

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New Technology for Designing Daylighting Systems for Art Museums

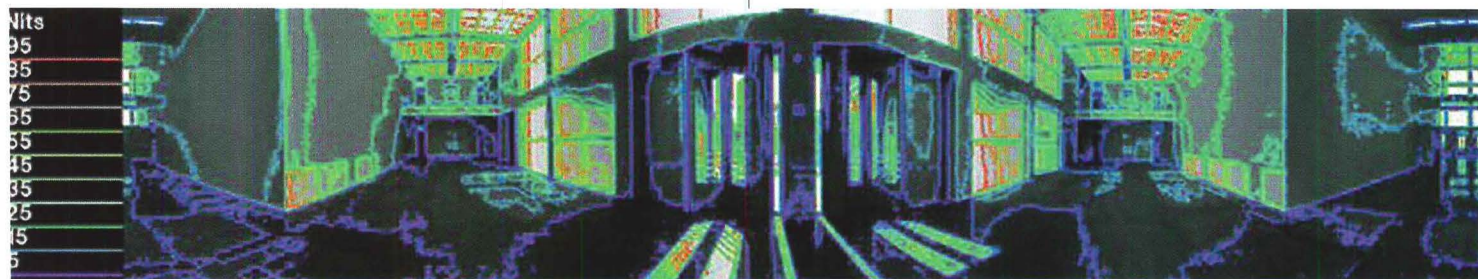
by Mojtaba Navvab

Light is essential in conveying a work of art's beauty to the eye of its beholder, but light can just as easily destroy the object it aims to honor. Because the museum curator's mandate is to both display and protect art, the effective and responsible lighting and daylighting of museums is of great importance to them as well as to architects and lighting designers involved in the art world.

The daylighting systems in the Museum of Contemporary Art (MCA) in Chicago, designed by Josef P. Kleihues [RECORD, August 1996, pages 80–87], were studied by the University of Michigan Lighting Simulation Laboratory using new daylighting design tools at the early stages of design, and just prior to being finalized. The two studies concluded that

Although hanging a diffusing material under a skylight might sound like the simplest way to eliminate direct sunlight without screening out all light, it can, if improperly done, produce an extremely bright ceiling plane overhead. An observer standing in front of a glass-covered photograph or a painting with a glossy varnished surface risks having to look at veiling reflections instead of art.

An art museum's location can present its own unique set of problems. The high-rise buildings that surround the MCA, for instance, cast irregular patterns of shadow on the skylights, and as the time of day and year changes, the buildings might reflect light onto the openings. The galleries' daylighting systems can control the variability of light striking the



A video scan of a scale model of the MCA was digitized and computer-processed to show luminance-level predictions (above) and to create a rendering of the space (right).



the lighting conditions were optimal for both viewing and conserving art. Kleihues's idea was that nothing should interfere with the visitor's enjoyment of art and that daylight should be used wherever possible throughout the second-floor galleries.

Daylight provides a more diverse color spectrum for viewing works of art than electrically generated light. However, to preserve works like paintings and textiles especially, direct sunlight must be kept out of the galleries. Minimizing the intensity of light and number of illuminance-hours per year prevents artwork from being damaged by ultraviolet radiation.

Mojtaba Navvab is an associate professor of architecture at the College of Architecture and Urban Planning of the University of Michigan in Ann Arbor. He is also the director of the University of Michigan Lighting Simulation Laboratory.

skylights so that the dynamics of outdoor daylight are perceptible but not strong enough to cause excessive nonuniformity in the lighting of the spaces.

Lighting designers dig models...

Designers have many tools at their disposal for predicting patterns of luminance (light measured directly from the source) and illuminance (light measured after it has reflected off a surface) distribution. Each tool has its own limitations, and no single one has the capability to solve all the lighting designer's problems. The data required also varies widely from tool to tool, so the choice of instrument varies during the design process. Some are needed during the preliminary design phase to help determine lighting needs, others not until later stages to help assess the performance of a particular design solution or to satisfy building codes.

Computer modeling uses mathematical representations of buildings, weather data for their proposed locations, and algorithms to predict daylighting performance. Computer modeling has become the tool of choice for many designers because it is fast and computer programs produce renderings as well as reports. The shortcoming of computer modeling is that its renderings tend to be far better than its numerical findings are accurate.

Scale-model photometry is another method of predicting luminance and illuminance values. A scale model of a proposed structure is built and fitted with tiny photosensors that measure quantities of light, either inside an artificial sky or with natural light if the model is being tested outdoors. This technique can provide a very accurate set of data for both quantitative and qualitative daylighting studies; however, the accuracy of the method is determined by the expertise of the person conducting the measurements and the quality of the setup. Models with specular surfaces—such as those that might be found on gallery walls—and irregularly shaped glazing systems are among the lighting scenarios that are particularly challenging to the experimenter.

...but videos are sexy, too

Now information that was unavailable with either of the modeling techniques discussed above can be gathered using video or photographic images that have been digitized and computer-processed. For example, detailed information can be gathered on the effect of daylight penetration inside a gallery and directly on the artwork being displayed. If clear and diffused glazing systems were studied, their luminance patterns would

AN INSTANT COLOR IMAGE OF THE LIGHTING CONDITIONS IN THE SPACE CAN BE PRODUCED FROM A VIDEO SCAN.

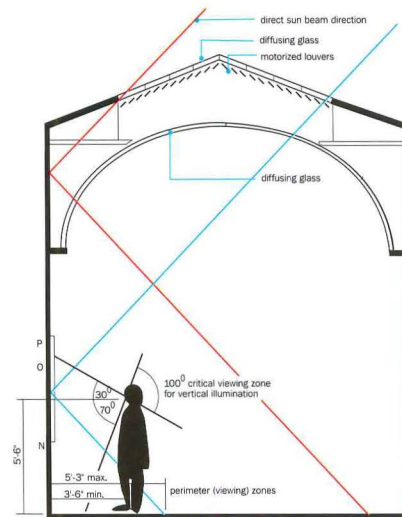
demonstrate the extremes in contrast in the distribution of light between the two systems, helping the lighting designer to make the best possible choice between these two and many other possible variations. A video camera can now scan a space and produce a digitized computer-generated image in color. A designer can observe the lighting conditions of the space from various angles and produce an image of each with various luminance, brightness, or color-temperature levels. The images can be reproduced as a panoramic view of the scene or enlarged and rendered as traditional drawings of lighting schemes. And a wall, window, shading system, or space layout can be changed and evaluated under the same

lighting conditions. The camera acts as a human eye to give on-the-spot feedback that records and processes the scene in photometric quantities.

Daylighting experiments for the MCA galleries

The University of Michigan's sky simulator was used to reproduce a variety of sky and sun conditions in a controlled and repeatable manner when experiments for the design of the museum's second-floor gallery were conducted. In addition to scale-model photometry, a video camera connected to a scanning system gathered luminance-distribution data for various lighting system scenarios.

The final roof system was developed based on physical as well as computer-generated modeling studies. Two of the many rendered images and luminance studies of the final space (opposite) show the patterns of daylight and luminance distribution

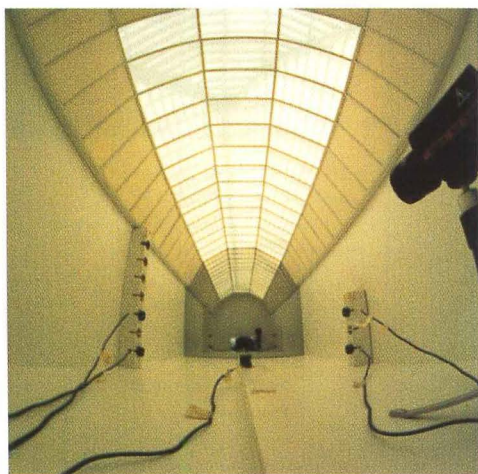


SCHEMATIC DIAGRAM OF MCA SECOND FLOOR GALLERIES SHOWING OPTIMUM VIEWING DISTANCE

of daylight penetrating the roof system. These patterns highlight some of the typical daylighting conditions found in the gallery spaces.

On the whole, the daylighting system designed for MCA was predicted to create a safe place to display art and a comfortable place to view it. The roof system over the galleries is complex: it is glazed with diffuse material with a system of louvers that adjust automatically to exterior lighting conditions. The louvers reflect light coming in from the south and direct it down to the north wall and exhibit areas. More diffusing material makes up part of the galleries' curved ceilings.

Daylighting design of gallery spaces is far from simple. The more that is known about how to protect art from light damage while displaying it for maximal enjoyment, the greater the role that new design tools like video modeling will play. There is no single design tool yet that can meet every lighting need, but today's technology advances what is possible. ■



A model of one of the proposed MCA galleries (left). Rows of photometers are used to collect luminance data, and the video camera will be used to scan the model. The model itself (right) is very large.





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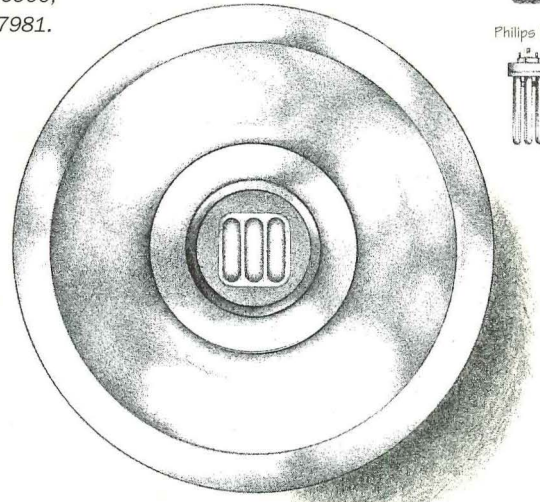
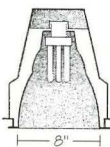
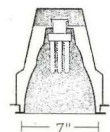
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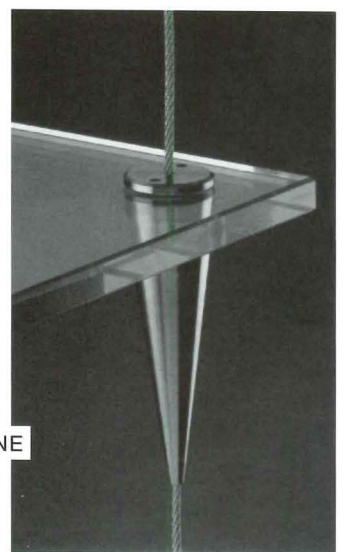
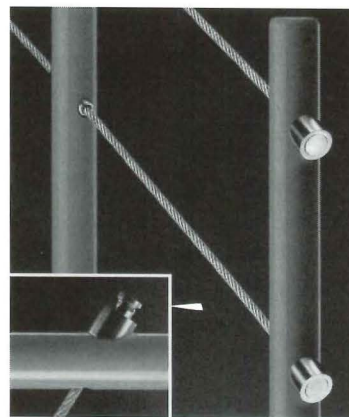
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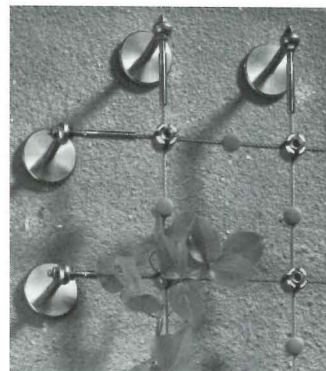
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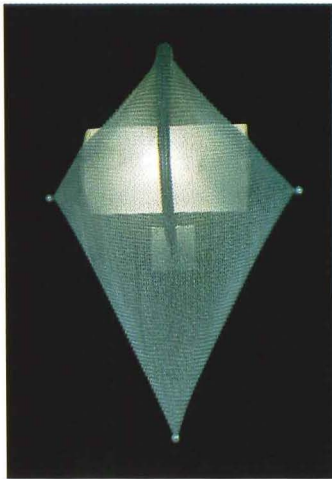


◀ **Sophisticated lamp**

Recognized as a rattan, bamboo, and teak furniture designer, McGuire recently introduced a collection of lighting influenced by Chinese Han Dynasty ritual vessels. The large Jarlet, shown here, is fashioned in antique copper finish with a natural ivory linen shade. Available also in a smaller size. 415/626-1414. McGuire, San Francisco. **CIRCLE 200**

▶ **A mark of distinction**

Designed for Lumid by Dominique Alary, the light fixture Mantaray, shown here, was inspired by aluminum chains. Available in two different weaving styles—regular and Japanese—and twenty-two color options. More information on Lumid and Mantaray can be accessed on the Internet at www.lumid.com. 888/TO-LUMID, Montreal. **CIRCLE 201**



For more information, circle item numbers on Reader Service Card

▶ **Colored pendants**

The six Soft Industrial pendant fixtures from d'ac include (from left to right) Boralo (yellow), Fonari, Boralo (silver), and Clareta. (Alanzia, Davidio, and Encino are not shown.) Each has an inverted drum-shaped canopy made of spun aluminum with a five-inch-diameter diffuser opening. Canopy choices include polished aluminum; seven metallic-finish baked-enamel colors; eleven gloss-, matte-, or crinkle-finish

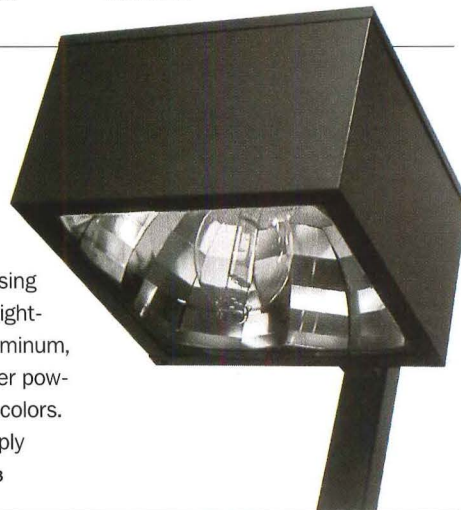


baked-enamel colors; and custom colors. All canopies suspend from black aircraft cable cord. 914/698-5959. D'ac, Mamaroneck, N.Y.

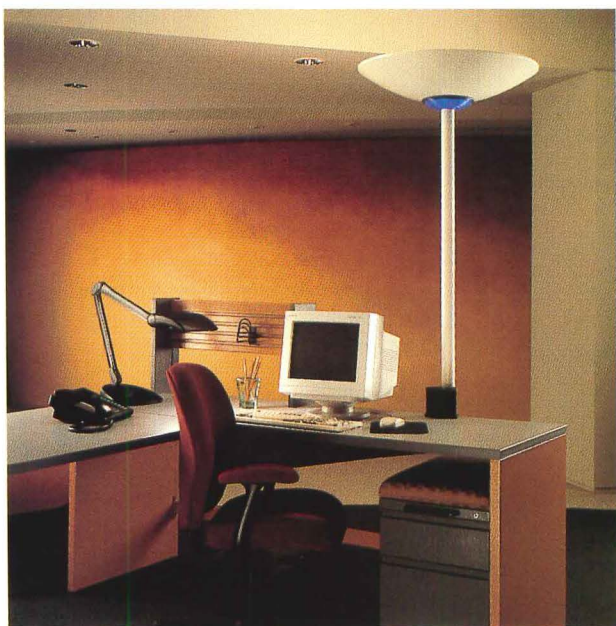
CIRCLE 202

▶ **Sturdy fixture**

Stonco has introduced the SVL series of high-output, vertical lamp luminaries for 400 to 1000 watt metal-halide or high-pressure sodium lamps. The housing is made of steel-reinforced, lightweight, precision-formed aluminum, with an electrostatic polyester powdercoat finish in a variety of colors. 908/964-7000. Stonco Supply Division, Union, N.J. **CIRCLE 203**



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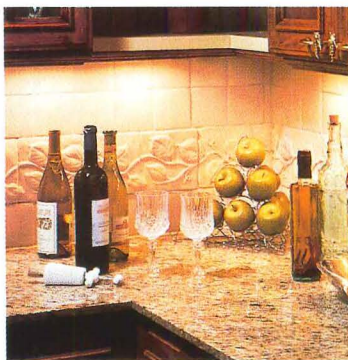
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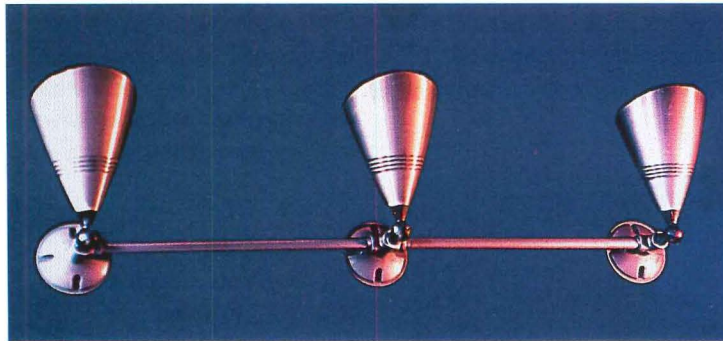
▼ Inconspicuous light

Lincs Halogen, from Alkco, is a miniaturized, energy-efficient, modular halogen undercabinet system with three-dimensional rendering that is dimmable with standard incandescent switches. Each fixture is 1.19 inches high and 4.19 inches deep. Illumination is provided by a choice of one, two, or three 12-volt, 20-watt, T3 bi-pin halogen lamps for 9-, 18-, or 27-inch fixture lengths. The fixture is UL- and CUL-listed. 847/451-0700. Alkco, Franklin Park, Ill. **CIRCLE 204**



▼ The three sconces

Since 1990 lighting designer Paul Merwin has illuminated restaurants, retail stores, offices, and exteriors in the United States, Mexico, Canada, and Ireland. One of his more recent creations, the Tri-Bullet Sconce,



shown below, is 43 inches long and can be mounted facing up or down. It's made of brushed aluminum. Pipes and canopies are painted a silver-gray hammer tone. 718/625-7661. Fabulux, Brooklyn, N.Y.

CIRCLE 205

▼ Enjoy the great outdoors

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CIRCLE 206

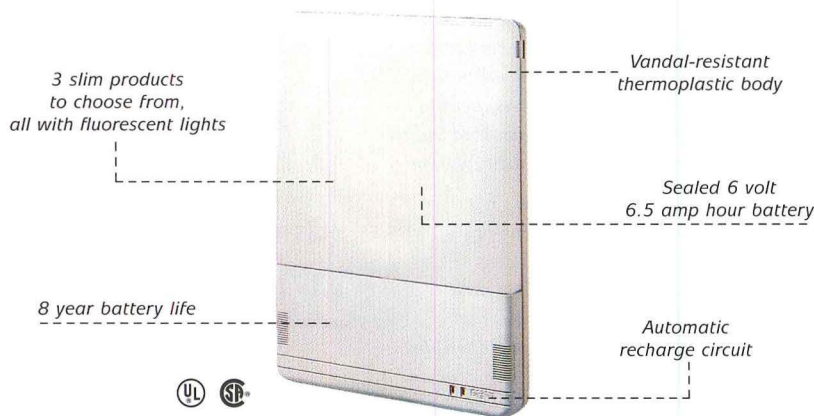


▲ Handblocked shades

Installed in hotels, conference centers, and restaurants around the country, the cone-shaped pendant fixtures with bent wire frames are made by the firm of Galbraith & Paul. The handmade paper shades, created with permanent fabric paints, are available in 16 patterns and can be mixed and matched with any of the company's 10 lamp bases. Shades are also available separately. UL is available upon request. 215/923-4632. Galbraith & Paul, Philadelphia. **CIRCLE 207**

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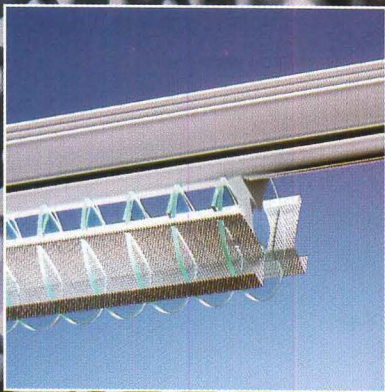
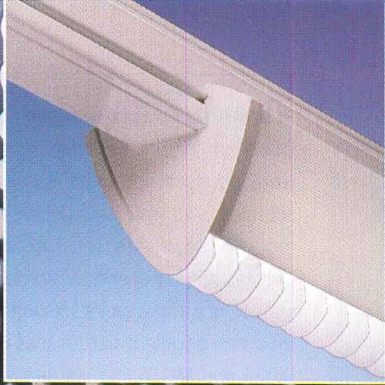
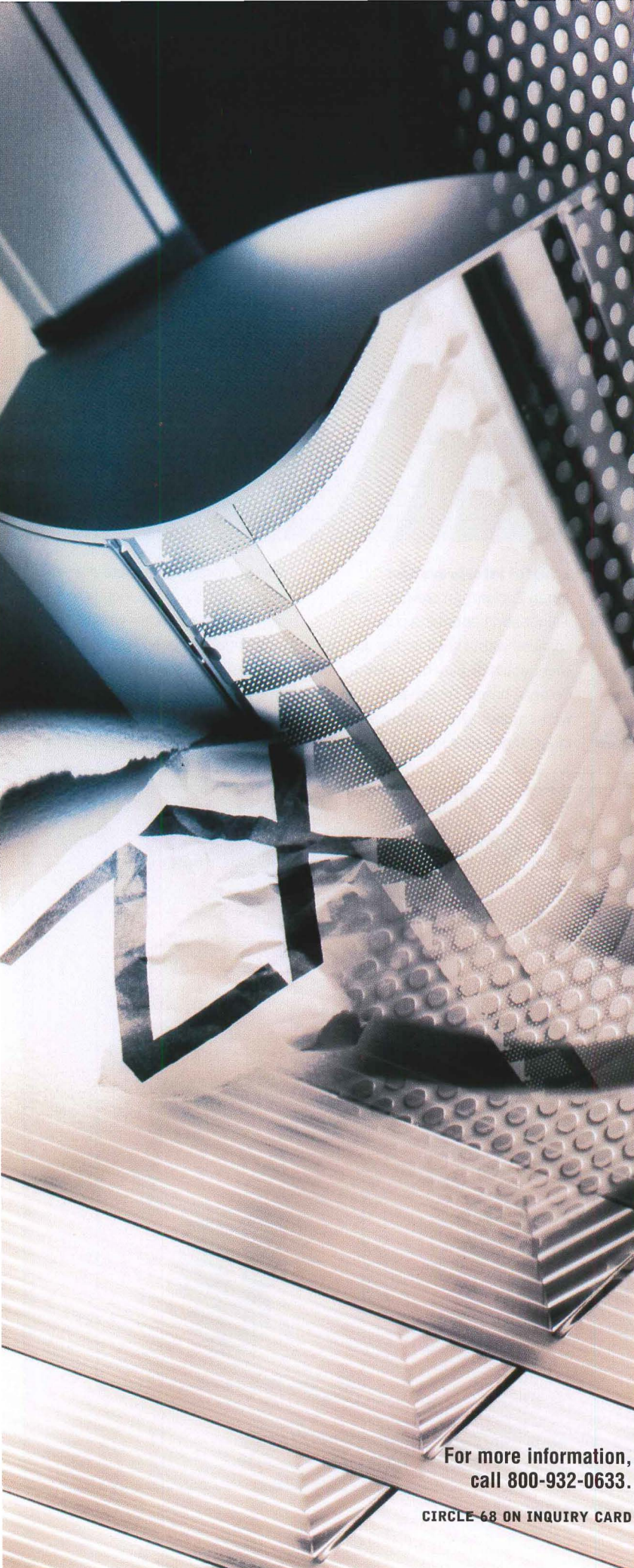
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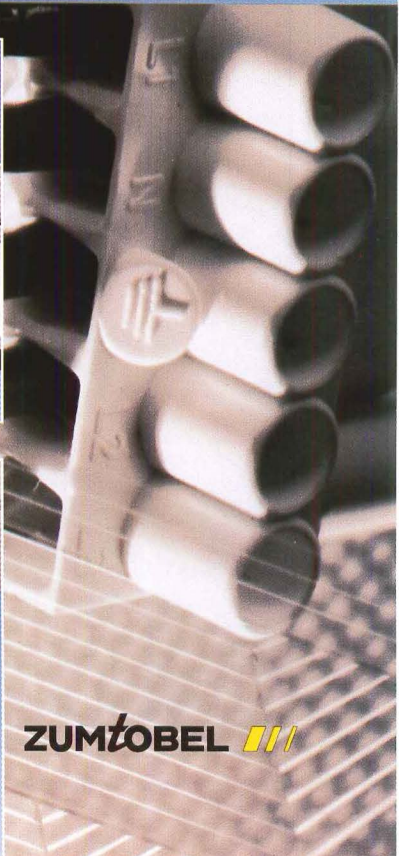
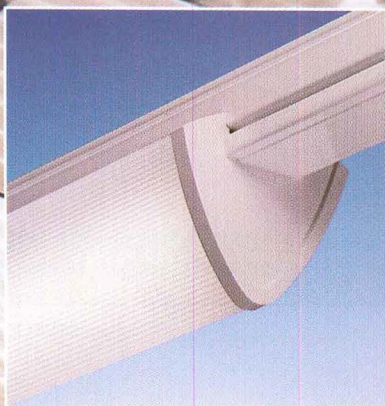
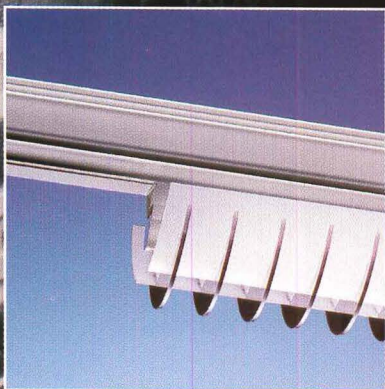
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◀ **Weight, counterweight**

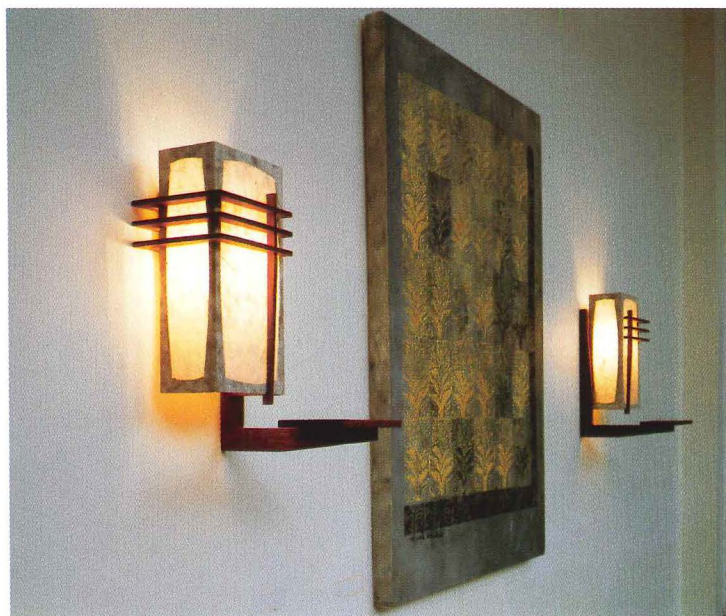
CSL's lighting line includes counterweight suspension units, wall sconces, and wall- and ceiling-mounted spotlights. The Trio-Spot Ceiling Unit in polished chrome, shown, is a triple-point, ceiling-mounted spotlight fixture that uses MR11 and MR16 low-voltage lamps. Also available in a white finish. 805/257-4155. CSL, Valencia, Calif.

CIRCLE 208



▶ **Interchangeable lighting**

Now available in the United States, the European-designed KlemLite CE Series 171, from KlemProducts, is a low-voltage halogen spotlight. It comes equipped with modular plug-in transformers for 110 and 220 current, allowing it to be used in the United States and abroad. The fixture and light heads tilt and/or rotate. Color choices include black, silver, or white powdercoat finishes. 847/364-6444. Skanda Lights, Elk Grove Village, Ill. CIRCLE 209



▲ **Artful interpretation**

Jonah Zuckerman created these walnut and handmade paper sconces with a shelf so the original client could display her collection of Chinese boxes. Designed to cast warm amber light across wall surfaces, these elegant fixtures can

now be used to illuminate any small object. The 15-by-8½-inch light is also available in other woods. For residential use only. 718/596-6502. City Joinery, Brooklyn, N.Y. CIRCLE 210

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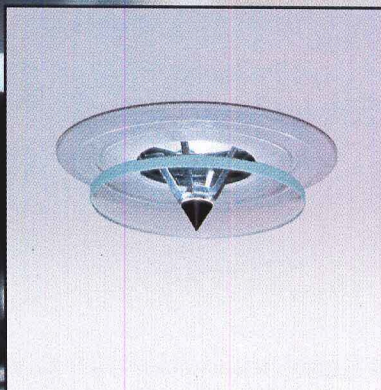
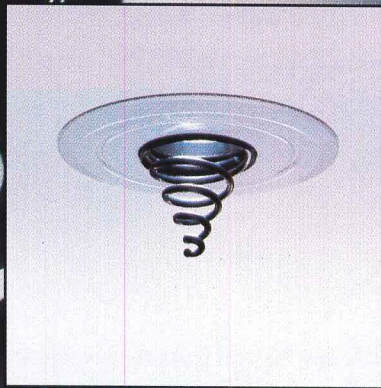


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STAFF 

LIGHTING BRIEFS

► **Hanging ideas**

This contemporary design is made of satin-finished nickel and acrylic. The bowl and cap, of faux alabaster, can be ordered in a variety of sizes and finishes. The fixture is 3 feet high and 45 inches wide with 6 lamps. 800/621-3907. New Metal Crafts, Chicago. **CIRCLE 211**



▼ **New exit**

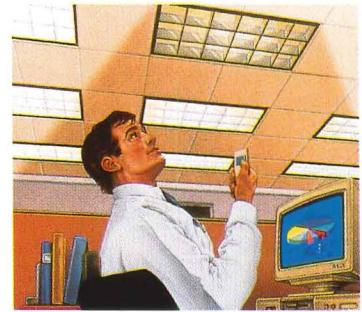
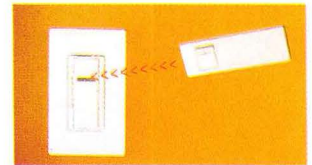
ProLight's exit sign retrofit kit, the 2.2-watt XFR, consists of two fixtures, each with 26 LEDs in a halo



configuration, and fits where 20T61/2 incandescent bulbs have been used. The real news is that the XFR is more cost-efficient than traditional incandescent fixtures. At \$.10 per kwh, the XFR costs less than \$20 to operate over 10 years. During the same period, incandescent 20-watt bulbs would consume about \$350 of energy and would have to be replaced as many as 60 times. 800/968-2558. ProLight, Inc., Holland, Mich. **CIRCLE 212**

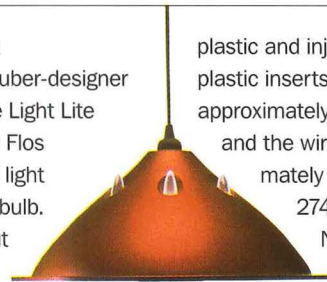
► **Personal remote control**

Many office workers suffer from eyestrain, headaches, or blurred vision caused by overly bright fluorescent lighting and its harsh glare. With the PerSONNA system, from Lutron, each worker has personal control of the lighting in his or her area. Using a hand-held remote control, workers can adjust the lighting with a simple touch of a button. This system complements the operable windows discussed on page 225. 610/282-3800. Lutron Electronics, Inc., Coopersburg, Pa. **CIRCLE 213**



▼ **Chic and sleek**

Created by French uber-designer Philippe Starck, the Light Lite pendant lamp from Flos gives off a diffused light from a fluorescent bulb. The streamlined but funky diffuser and reflector are made from serigraphed thermoformed



plastic and injection-molded colored plastic inserts. The light measures approximately 17 inches in diameter and the wire length is approximately 9 inches. 516/549-2745. Flos, Huntington, N.Y. **CIRCLE 214**

For more information, circle item numbers on Reader Service Card

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"Wallwasher"
by elliptipar



"Metal Halide Spotlight"
by Times Square



"Low Voltage Accent Light"
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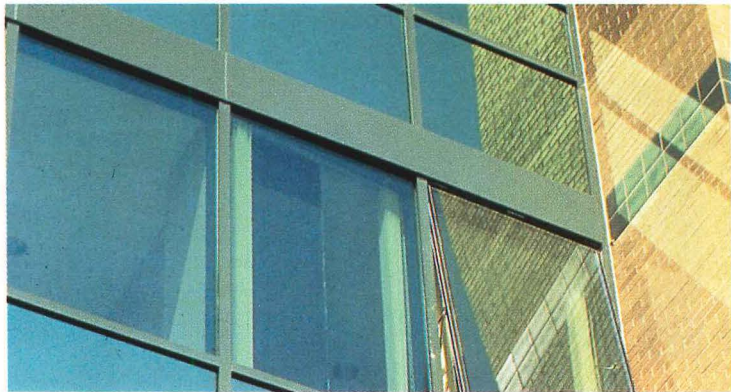
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CIRCLE 71 ON INQUIRY CARD



NEW PRODUCTS



HOW TO CREATE A SPACE THAT PROMOTES AN OPEN-WINDOW POLICY

The three window types displayed here are just a few of the operable window options on the market for commercial architects and builders. Among the favored features are full-tilt and in-swing modes and zero sight line.

Concealed vent

When installed with the CW-250 and ICW-250 curtain-wall system, the Vistawall 4500 Concealed Vent (above) provides a ventilation system that projects out but is concealed from the exterior when closed. The system has a zero sight line from the interior head and sill, blending into the surrounding transoms. Also available is a single-lever, multipoint lock as well as split-finish capabilities and anodized or painted finish. 972/524-1951. Vistawall, Terrell, Tex. **CIRCLE 215**

Operable roof window

ODL's Vista Deluxe Roof (below) is an operable roof window that offers

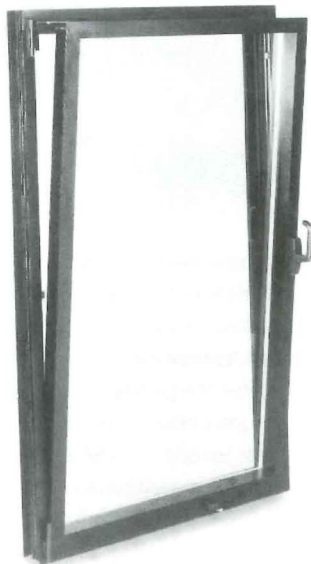


dual-sealed, 3/4-inch, argon-filled, insulated tempered glass with a low-E coating and Santoprene gasketing. Laminated glass is also available. The solid hardwood frame can either be stained or painted. 616/772-9111. ODL, Zeeland, Mich.

CIRCLE 216

Tilt and turn

The Tilt and Turn Series 7000 casement window (below), from Mannix, can be operated in full-tilt mode for ventilation or as an in-swing casement for cleaning. Custodial locks are available, and the hardware is offered in painted white, dark bronze, or clear anodized finishes. 800/752-6483. Mannix, Brentwood, N.Y. **CIRCLE 217**



To control the temperature in my office on the 41st floor of a Manhattan skyscraper, I have to fiddle with the thermometer in the news editor's office next door. Some days, I wish I could just open a window. Alas, that's impossible. And the building's maintenance department would probably go nuts if we could all open our windows. It might cost a bit more to cater to the comfort of individuals, but the end result is surely a happier workforce and thus higher productivity. So this month we're highlighting products that would fulfill one worker's simple dream. We also offer a look at impact-resistant windows that are stylish but strong.

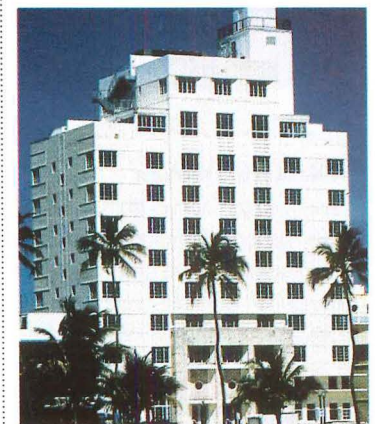
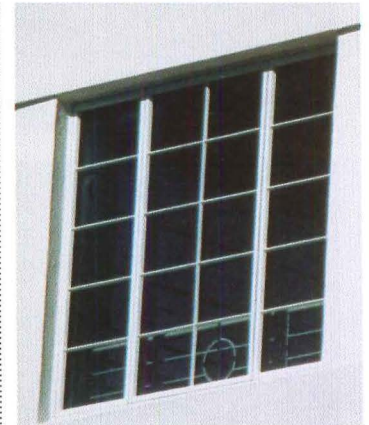
—Elana Frankel, *New Products Editor*

IMPACT-RESISTANT WINDOWS PROVIDE STYLISH PROTECTION

In areas of the country recurrently hit by hurricanes, roll-up accordion shutter systems are no longer the only way to protect windows. One popular choice, laminated window glass, is a safety glazing material made by bonding layers of glass with a polyvinyl butyral interlayer.

Complying with South Florida Building Codes, SBCCI and ASTM code-approved windows with laminated glass have been critically examined under new standards, including simulated hurricane-force winds and flying debris. Laminated glass has proven to provide a solid, impact-resistant product for states such as Florida, South Carolina, and Texas. And, in keeping with other current safety issues, laminated glass is also being considered for buildings where protection from bomb blasts is an issue—for example, federal buildings. Another added benefit: tinted laminated glass can reduce heat gain from sunlight and lower air-conditioning costs while also controlling glare.

So when Pavarini Construction needed Art Deco-style narrow-steel casement windows for the renovation of the landmark Tides Hotel in Miami's Art Deco district, the company chose Skyline windows, which are capable of withstanding 100 mph winds and flying debris. The windows, made with aluminum, also satisfied the Miami Historical Society Design Review Board. A final—and, for some, the most important—advantage is that the windows have an insulated glass package for sound attenuation, blocking out beach and party noise.



The renovation of the Tides Hotel in Miami (above) required installation of approximately 400 Skyline windows (top).

Skyline has a strong presence in the Miami area—the company has installed windows in six hotels including the Essex, Ocean Front, and Tiffany. And its product is cost-effective: Skyline's John Snyder estimates the cost to be about \$30 to \$60 per square foot, depending on conditions and spec needs. 212/491-3000. Skyline Windows Products, New York City. **CIRCLE 218**

ENERGY-EFFICIENT RESIDENTIAL WINDOWS

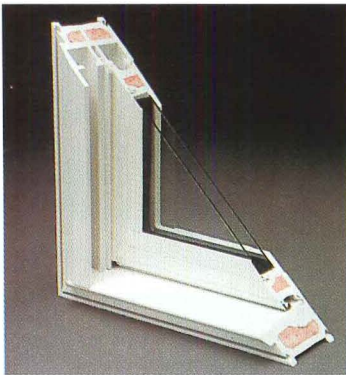
Various recent technologies have increased the energy benefits and all-around efficiency of residential windows. As a result, there are now more practical windows on the market that offer greater advantages.

Three examples: low-E glaze coating, which reduces a window's U-factor; gas fills, which reduce the U-factor by suppressing conduction or convection; and UV-absorbing additives in laminated glass, which screen out damaging rays. This page highlights products that incorporate such technologies.



◀ In the pink

The frame and sash of Generations, the new composite window from Owens Corning, have pink insulating foam as well as standard, 1-inch, low-E glass with argon gas. The frame and sash are fusion-welded to help eliminate air and water infiltration at the corners. The windows are available in a variety of styles, including flat or sculptured Colonial-style grilles; white, light oak, or medium oak interior finishes; and V-groove or decorative art glass. Also available is a 1-inch triple glazing with two surfaces of low-E and krypton gas. Backed by a transferable limited lifetime warranty. 800/GET-PINK. Owens Corning, Toledo, Ohio. **CIRCLE 219**



▼ Eastern tradition

Inspired by windows from Japan's Meiji period, the mahogany custom windows below are now available in the United States by special order. Designed by Suellen DeFrancis,

the windows are water-resistant, having withstood many typhoons, and earthquake-resistant, as well as sound- and shatter-proof. 212/879-8386. Suellen DeFrancis, New York City. **CIRCLE 220**



▲ Choices, choices, choices

Kawneer's Sealair 8400TL (thermal) windows are available as fixed, offset fixed, single- or double-hung, or horizontal sliding with a 4-inch master-frame depth. Options include a heavy-duty frame,

with or without applied or between-the-glass muntins; a standard flat face; or beveled putty-glazed replication. All are factory-glazed to ensure performance. 770/449-5555. Kawneer Co., Norcross, Ga. **CIRCLE 221**



▼ New vinyl

In addition to its full line, Hurd Millwork's new tilt double-hung Monument window is offered with insulated glass; low-E with argon; and/or Heat Mirror TC-88 and SC-75 for insulation and solar control. The window allows for the sash to tilt in and is available in a wide variety of sizes. Built to exacting specifications, the Monument line also includes casement and awning windows. 800/2BE-HURD. Hurd Millwork Co., Medford, Wisc.

CIRCLE 223

▲ Historic renovation

The 2250E EPIC series, developed for historic renovation projects, features a beveled exterior face that replicates the glazing on classic steel and wood windows. The windows meet or exceed ANSI/AAMA codes. Offered as projected, casement, or fixed. 715/845-2161. Wausau Metals, Wausau, Wisc. **CIRCLE 222**

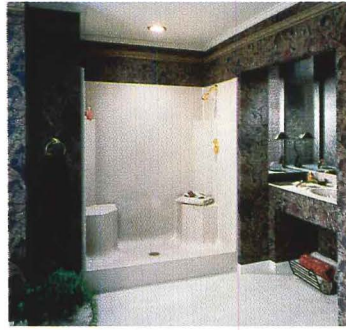


PRODUCT BRIEFS



◀ **Video surveillance**
V100, the new stylish and bullet-resistant video surveillance camera from Silent Witness Enterprises, is a compact all-weather camera that can withstand assault from a 9mm handgun as well as a 12-gauge shotgun. Just 5 inches long and 3½ inches in diameter, the V100 meets UL 752 requirements for bullet-resisting equipment. The camera comes fully assembled with either a color or monochrome camera, lens, enclosure, and mounting hardware. The marine-grade aluminum enclosure is fully weather-sealed to ensure reliable operation in various types of environments. 888/289-2288. Silent Witness Enterprises, Ltd., Surrey, B.C.

CIRCLE 224



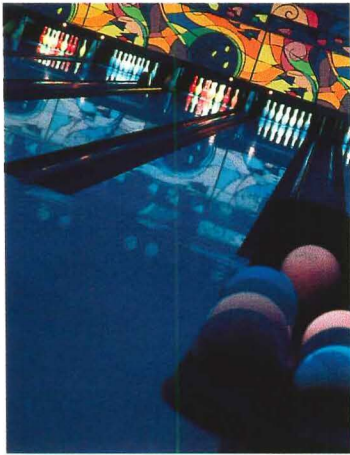
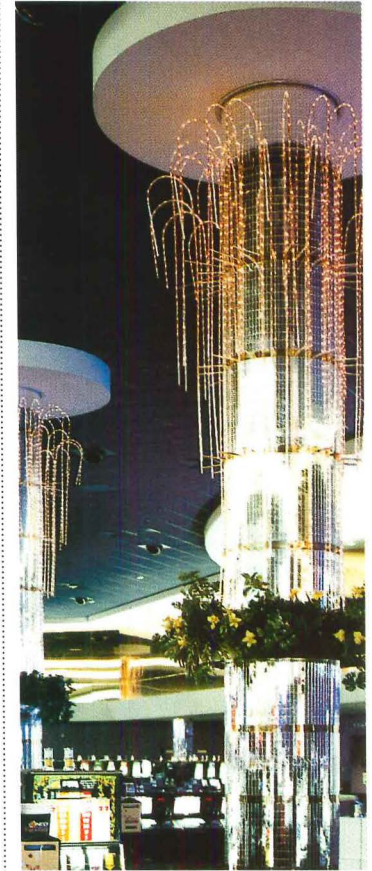
▲ **Germ-free living**
Through a new partnership between bathware manufacturer Aqua Glass and Microban, makers of antibacterial protection, Aqua Glass will license the Microban name and incorporate it into 40 percent of its gelcoat bathware line. 800/632-0911. Aqua Glass, Adamsville, Tenn.

CIRCLE 227



▲ **Construction choices**
Available with most Aristokraft cabinets, a new construction style called Ply Select features 3/8-inch-thick, 5-ply, plywood sides plus 3/4-inch-thick wall shelves and dovetailed drawers. 812/482-2527. Aristokraft, Jasper, Ind. CIRCLE 228

▼ **Mirror, mirror**
Prisma flexible glass mirror, which wraps columns and covers curved or flat surfaces, can be found in hotels and casinos, like the one shown here in Green Bay, Wisconsin. Available in 16 colors, Prisma is installed with standard mirror mastics or mechanical fasteners. 800/228-5276. National Products, Louisville, Ky. CIRCLE 229



▲ **Latest in laminate for '98**
Pionite has introduced 39 new colors to their 1998 laminate line. However, the real craze is glow-in-the-dark laminate, which, of course, could only lead to Cosmic Bowling. Shown here is the Brunswick Indoor Recreation Group's 100,000-square-foot entertainment complex, Red's, featuring glow-in-the-dark lanes. 800/746-6483. Pioneer Plastics Corporation, Auburn, Me.

CIRCLE 225

▼ **Wall coverings**
Woven of 100 percent polyolefin, Tek-Wall Naturals is a collection of linen-inspired, textured wall coverings. Nine patterns include plain and crepe weaves, stripes, simple geometrics, chenilles, bouclés, and a horsehair effect. All are 54 inches wide with backed acrylic. They feature a Teflon finish and have a Class-A fire rating. There are 40 neutral and warm colors available. 800/645-3943. Maharam Design Studio, New York City. CIRCLE 226



▼ **Roll-up garage door**
Although this Vintage Line Designer Door looks like it swings open, it's actually a wooden sectional overhead garage door that rolls up using

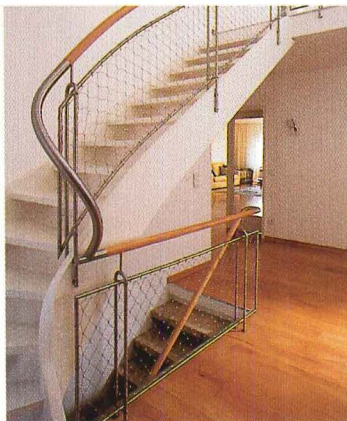
an automatic opener. It comes standard-insulated with a Douglas fir framework and cedar surface. 800/241-0525. Designer Doors, Rivers Falls, Wisc. CIRCLE 230



PRODUCT BRIEFS

► Flexible cable net

X-Tend stainless-steel cables, manufactured in Germany by Carl Stahl and available through DecorCable, have been used in furniture, railings, and zoo enclosures (shown), and zoo enclosures. Joined together with nonrusting ferrules of tinned copper, the cable can be coated with UV-resistant polyamide. 800/444-6271. DecorCable Innovations, Chicago, Ill. **CIRCLE 231**

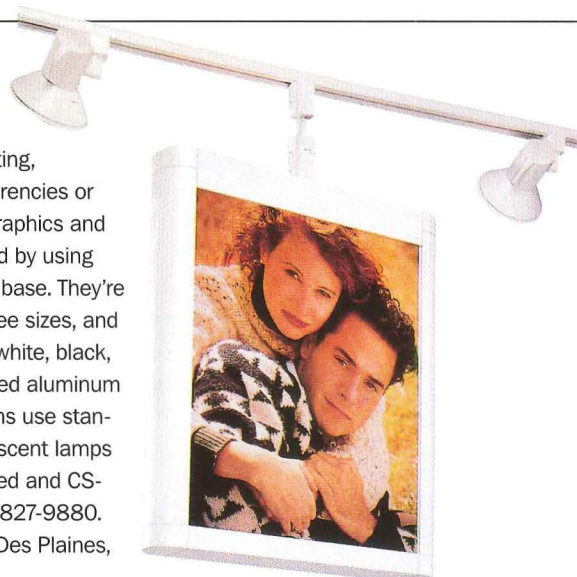


▲ Bold accents

Meeting the demand for larger wall tiles, Dal-Tile's Nouveau Country line is offered in an 8-by-8-inch size. The latest color choices include Winter White, Burnt Sienna, Harvest Gold, Cottage Blue, and Forest Green. Three accent patterns are also available, including a floral, a starburst, and a kaleidoscope design. 800/933-TILE. Dal-Tile Corporation, Dallas. **CIRCLE 232**

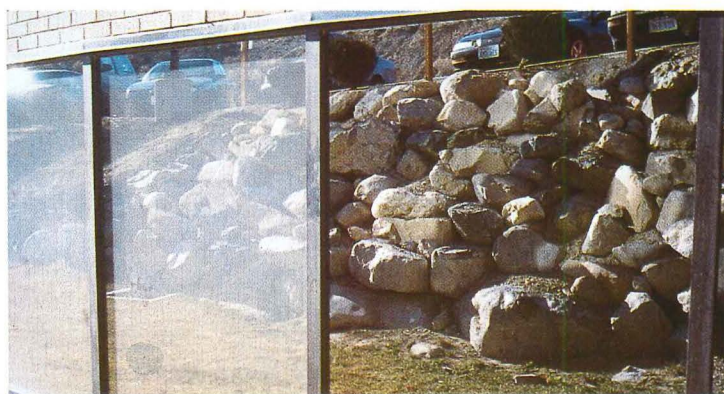
► Backlit signage

Trac-Signs, from Juno Lighting, display transparencies or digital ink-jet graphics and can be modified by using the drop-down base. They're available in three sizes, and colors include white, black, or satin anodized aluminum finish. Trac-Signs use standard T-5 fluorescent lamps and are UL-listed and CS-approved. 847/827-9880. Juno Lighting, Des Plaines, Ill. **CIRCLE 235**



► SB latex awareness

A new product-awareness program is being sponsored by the SB Latex Council (SBLC). Product information can be found on the Internet at www.regnet.com/sblc. 202/962-9400. SB Latex Council, Washington, D.C. **CIRCLE 233**



▲ Protective sealant

Diamond Seal is a water-repellent protective sealant for glass, glass-finished surfaces, and granite. 800/975-9988. Diamond Seal, Salt Lake City. **CIRCLE 236**

Shown is a piece of glass before (left) and after (right) Diamond Seal was applied. 800/975-9988. Diamond Seal, Salt Lake City. **CIRCLE 236**



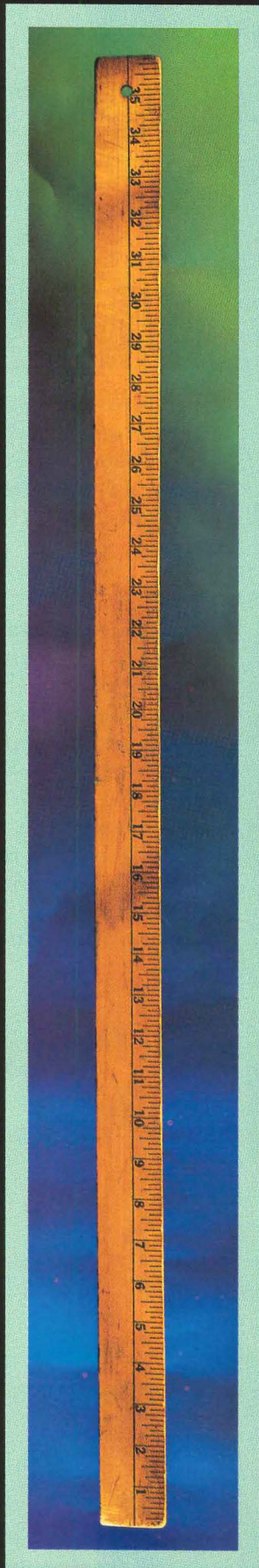
◀ Modern history

Since the 1880s Connolly's of London has provided leather for almost every luxury and sports car designer from Alfa Romeo to Zagato. Today the family supplies its high-end goods to Maximum Design, an upstart furniture company based in London. Shown is the Grand Tourner, a custom-made, limited-edition chair based on an Aston Martin/Ferrari design and a Rolls Royce interior. This modern take on an English classic is a bit more practical—the 6-by-3-foot chair is designed to come apart. 011/44/181-451-2710. Maximum Design Limited, Kent, England. **CIRCLE 234**

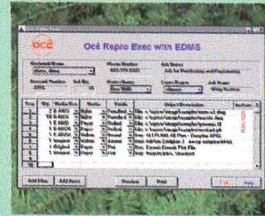


▲ Faucet friendly

Gerber's Mini-Widespread faucet provides a widespread profile in 4-inch lavatory spaces that were traditionally reserved for centersets. The faucet features elliptical handles that simplify gripping, turning, and cleaning. 847/675-6570. Gerber Plumbing Fixtures, Chicago. **CIRCLE 237**

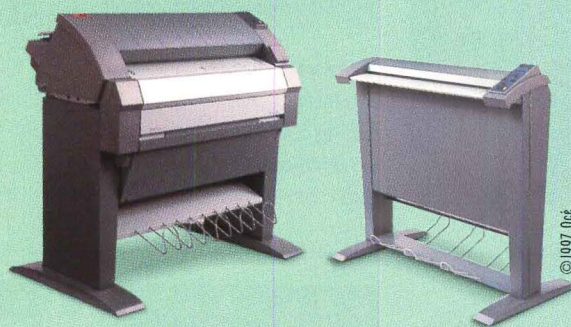


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CIRCLE 80 ON INQUIRY CARD

PRODUCT BRIEFS

► **Take a seat**

David Edward has acquired the exclusive rights to market and distribute Larsen's furniture collection worldwide. 800/394-2552. David Edward, Baltimore. **CIRCLE 238**



▲ **Domestyle original**

This 6-foot glass dome is in the entryway of a private Denver residence. Principal designer and company owner Susan Gold specializes in stained, leaded, zinc, and

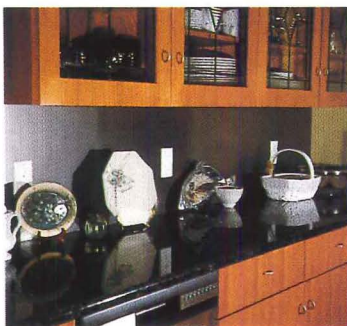
copper foil windows; etched, sandblasted, and carved windows; and copper foil and zinc lamp shades and domes. 303/939-9300. Elysian Art Glass Co., Boulder, Colo.

CIRCLE 241

▼ **Imitation stainless steel**

The latest high-pressure laminate from NuMetal is a lightweight, 4-by-8-foot sheet that has the look and feel of stainless steel. The new product also has a finish that eliminates fingerprinting, a common problem with stainless steel. Shown here is a typical kitchen application. Other color choices include polished and brushed finishes, patina, and copper. 910/668-0488. Advanced Technology, Greensboro, N.C.

CIRCLE 239



▲ **Indoor foliage**

The Interior Tree Freestanding Ceiling combines fabric- and acoustic-paneled leaves with a trunk that supports power, phone,

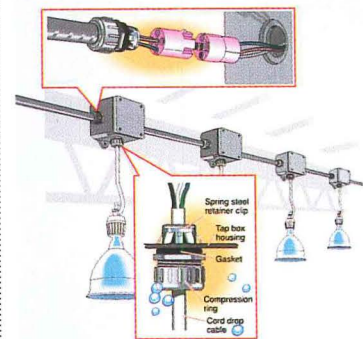
and data cable communications. Lighting in the lower branches illuminates the underside. 905/803-5616. CGC Inc., Mississauga, Ont.

CIRCLE 242

▼ **One-step installation**

The WetFlex wiring system, from America Cable Systems, is designed for high- and low-bay lights that function in wet, damp, dirty, or dusty environments. Moisture- and dust-proof, the system can be used in outdoor facilities, such as marinas and parking garages, or factories and heavy industrial plants. 800/426-3170. America Cable Systems, New Bedford, Mass.

CIRCLE 243



► **Time-lapse photography**

An automated time-lapse photography system provides a historical project record and accurate details. The system can be used to track project progress as well as weather. 703/578-3474. Latoff & Company, Arlington, Va. **CIRCLE 240**



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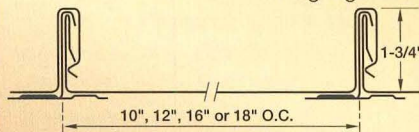
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Roofing Contractor: GRC Roofing Inc.
Color: Forest Green
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PRODUCT LITERATURE

Recessed downlighting

Lightolier's new full-color, 80-page Lytecaster catalog for recessed downlighting features detailed product specification information on the Lytecaster system; incandescent downlighting; low-voltage downlighting; and energy-smart downlighting. 800/215-1068. Lightolier, Fall River, Mass. **CIRCLE 244**

Pool products

KDI Paragon's catalog for 1998 features an extensive line of competitive and recreational swimming pool, deck, and underwater equipment, including starting platforms, lifeguard chairs, diving stands and towers, grab rails and ladders, custom railings, and underwater windows, lights, and speakers. New product additions include Track Start, a platform with a 24-by-32-inch top for extra-fast takeoffs; lifeguard chairs in an assortment of heights; a lookout chair with wheels; Quickset Anchor, a base for platform installation and removal; and custom railings made to customer specifications. 914/452-5500. KDI Paragon, LaGrangeville, N.Y. **CIRCLE 245**

Flooring display

Azrock, a division of Domco, has created a 4-foot-high, 2-foot-wide wall rack that displays the company's entire line of commercial

resilient flooring. The rack holds 2-by-2-inch samples of each color and design of Azrock vinyl composition tile, Azrock luxury vinyl tile, and Azrock solid vinyl tile. 514/293-3173. Domco, Farnham, Que.

CIRCLE 246

Concrete renewal products

Crossfield Products Corporation has published a brochure that describes the concrete renewal products available in its Miacote line of protective coatings, including 15 colors and finishes that simulate tile, brick, or stone; repair materials; and special membranes. 310/886-9100. Crossfield Products Corp., Rancho Dominguez, Calif. **CIRCLE 247**

Storefronts and entrances

Tubelite recently introduced its new storefronts and entrances brochure, which will be included in the *Sweet's General Building and Construction* directory. Descriptions and diagrams, as well as photographs, of each storefront and entrance are included. 616/832-2211. Tubelite, Reed City, Mich. **CIRCLE 248**

Low-E wall finish Web site

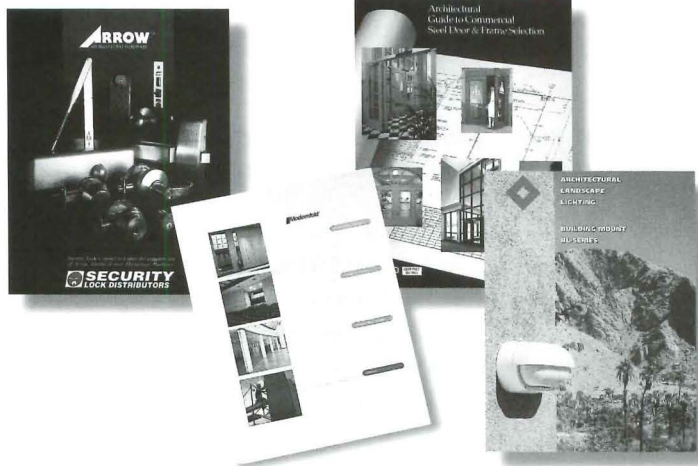
At the Web site www.radiancecomfort.com, browsers can see how to save up to 30 percent on heating and cooling bills with a new type of low-E interior wall finish. 800/766-6776. Chemrex, Inc., Shakopee, Minn. **CIRCLE 249**



CIRCLE 82 ON INQUIRY CARD

For more information, circle item numbers on Reader Service Card

PRODUCT LITERATURE



Architectural hardware

The new catalog from Security Lock Distributors features a range of products, including Arrow's mortise locks; grade 1 and 2 cylindrical locks; interconnected locks; auxiliary locks; Arrow cylinders; high security systems; door closers; exit alarms, devices, and device trims; and Flexicore interchangeable core systems. Technical assistance is also available by phone. 800/847-6400. Security Lock Distributors. Pompano Beach, Fla. **CIRCLE 250**

Operable wall systems

Modernfold, a company that manufactures operable wall systems and accordion partitions, introduced its 1998 Sweet's brochure—a four-color, 24-page publication with details on the company's complete line of flexible space-division products and services. Included are the Acousti-Seal operable wall system, accordion partitions, and folding doors. The brochure also highlights Modernfold's newest product, Cascadia, a flexible wall system that vertically divides a room with the touch of a button and offers a strong, glass-panel design. In addition, the brochure describes the concept behind Modernfold's Service Centers, nationwide networks of service centers that offer response and maintenance information as well as assistance in selecting the optimal system. 800/869-9685. New Castle, Ind. **CIRCLE 251**

Door products

The 20-page Ceco Door Products catalog includes specification information as well as important details on commercial steel doors and frames. The new Ceco Colorstyle doors are available in 13 colors. 615/661-5030. Ceco Door Products, a United Dominion Company, Brentwood, Tenn. **CIRCLE 252**

Landscape lighting

Architectural Landscape Lighting, a subsidiary of the JJI Lighting Group, has a new brochure available that details the company's complete BL-Series of building-mounted lighting fixtures. The full-color, 8-page brochure features application photos and close-up views of each model in the series. Information about construction, finishes, and product dimensions is also included. 714/668-3660. Architectural Landscape Lighting, Santa Ana, Calif. **CIRCLE 253**


The 1998 blue book

More than 415,000 copies of the 1998 *Blue Book of Building and Construction* hit the streets last month, including a new Houston edition. Free on-line information can be found on the Internet at www.thebluebook.com. The Web site includes 550,000 listings, 30,000 display ads, and 12,000 company profiles. 800/431-2584. The Blue Book of Building and Construction, Jefferson Valley, N.Y. **CIRCLE 254**



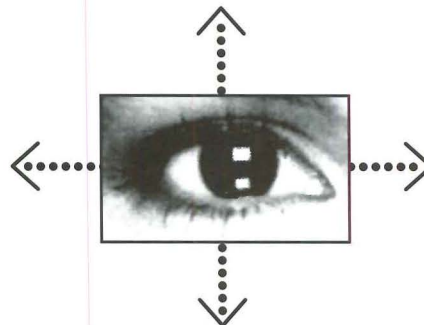
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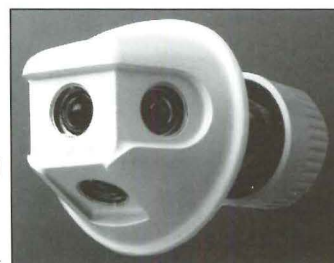
CIRCLE 83 ON INQUIRY CARD

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CIRCLE 84 ON INQUIRY CARD

DATESEVENTS

(continued from page 46)

pieces of furniture, 30 smaller objects, and 20 photographs of interior designs. This touring exhibition is the first major retrospective of the visionary designer's work. Grey Art Gallery, New York University. 212/998-6780.

Finnish Modern Design: Utopian Ideals and Everyday Realities New York City

February 26–June 28

This exhibition of Finnish design from 1930 to 1997 features glass, ceramics, furniture, textiles, metalwork, and industrial design objects.

Organized by the Bard Center for Studies in the Decorative Arts and the Museum of Art and Design in Helsinki. Bard Graduate Center. 212/501-3000.

Conference and Exhibition on Health Facility Planning, Design, and Construction Phoenix

March 2–4

Sponsored by the American Society for Healthcare Engineering and the Academy of Architecture for Health, this conference for AIA PIA's features an exhibition devoted to health-care products, services, and technologies; the Exhibition of Architecture for Health; and the

ASHE Project Team Vista Awards. AIA members may earn 28 Learning Units for their participation in the conference. For information or to register, call 847/384-7728.

Environmental Design Research Association Conference

St. Louis

March 4–8

The theme of EDRA's annual conference is "People, Places, and Public Policy." Research and design projects will be presented in papers, symposia, media presentations, and other formats. Design educators and professionals, planners, social scientists, and others interested in the relationship between people and places are invited. The conference qualifies for AIA Continuing Education credits. Contact EDRA, P.O. Box 7146, Edmond, Okla. 73083; 405/330-4863; or visit www.aecnet.com/EDRA.

General Contractors Convention New Orleans

March 11–15

The 79th annual convention/Constructor Exposition of the Association of General Contractors will focus on legislative and political issues, business strategies, technology, and construction-industry programs. For convention information, call Rick Brown at 202/383-2757 or E-mail brownr@agc.org; for exposition information, call Rich Bohan at 202/383-2752 or E-mail bohanr@agc.org.

Competitions

Boston Society of Architects Awards

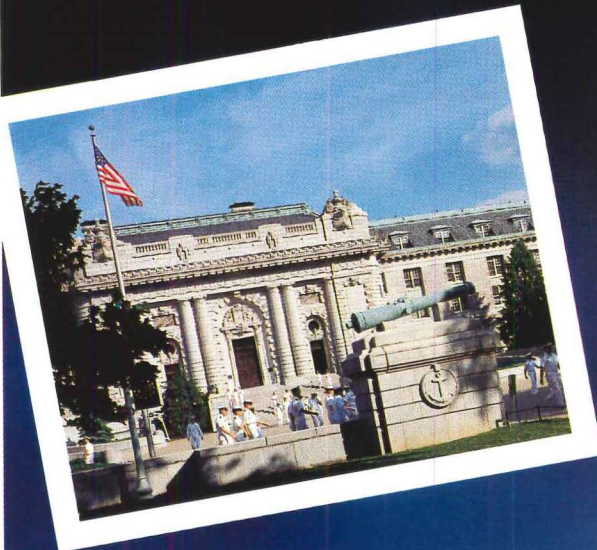
Housing and interiors deadline: March 1

Categories for the BSA's design awards program are housing (single- and multifamily) and interiors. Open to Massachusetts architects and architects who have designed projects in the state. The interiors category is also open to interior designers. Call the BSA at 617/951-1433 x221; fax 617/951-0845; or E-mail bsarch@architects.org.

New York State Council for the Arts Independent Project Grants

Application deadline: March 2

The Architecture, Planning, and Design Program of the New York State Council on the Arts announces the availability of grants of up to \$10,000 for architects, designers, and scholars who are New York State residents. Projects in architecture, architecture history, landscape architecture, urban and rural planning, urban design, historic preservation, graphic design, and industrial design (continued on page 245)



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CIRCLE 85 ON INQUIRY CARD

DATEEVENTS

(continued from page 238)

that advance the field and contribute to the public's understanding of the designed environment may be submitted. Contact NYSCA, 915 Broadway, New York, N.Y. 10010; tel. 212/387-7000; or fax 212/387-7164.

DuPont Benedictus Awards

Submission deadline: March 9

The 1998 DuPont Benedictus Awards for Innovation in Architectural Laminated Glass, sponsored by DuPont and the AIA with the support of the International Union of Architects, recognizes outstanding or significant commercial and residential architecture that uses laminated glass. Winners will be announced at the AIA national conference in May. Contact Stephanie Vierra at the AIA, 1735 New York Avenue, NW, Washington, D.C. 20006; 202/626-7446; or E-mail vierras@aiaemail.aia.org.

Italian Ceramic Tile

Submission deadline: March 15

Assopiastrelle, the Association of Italian Ceramic Tile and Refractory Manufacturers, announces its 1998 design award. The \$5,000 prize recognizes designers or architects who have created innovative settings using Italian ceramic tiles. Projects

must be completed by February 28. Write Abbate Communications, 222A Sixth Avenue, 2nd floor, Brooklyn, N.Y. 11215; or call 718/783-3160.

Van Alen Prize: The East River

Registration deadline: April 8; submission deadline: May 20

The 1998 Van Alen Prize in Public Architecture calls for entries that investigate, envision, and promote the design of a better public realm for New York City's East River. Entrants may propose design ideas from the vast scale of the entire district to the minute scale, as long as the proposal is conceived as having an impact on the East River's identity in the city. Students, studios, faculty, and professionals from anywhere in the world may enter. Contact the Van Alen Institute, 30 West 22nd Street, New York, N.Y. 10010; fax 212/366-5836; or E-mail vanalen@vanalen.org.

Development of the Al-Riyadh District

Submission deadline: April 22

Al-Dar Real Estate Investments has announced an international architecture and urban design competition, with professional and student categories, to develop residential accommodations for Muslim pilgrims in the Al-Riyadh District, Makkah, Saudi Arabia. The design for the 3,500-square-

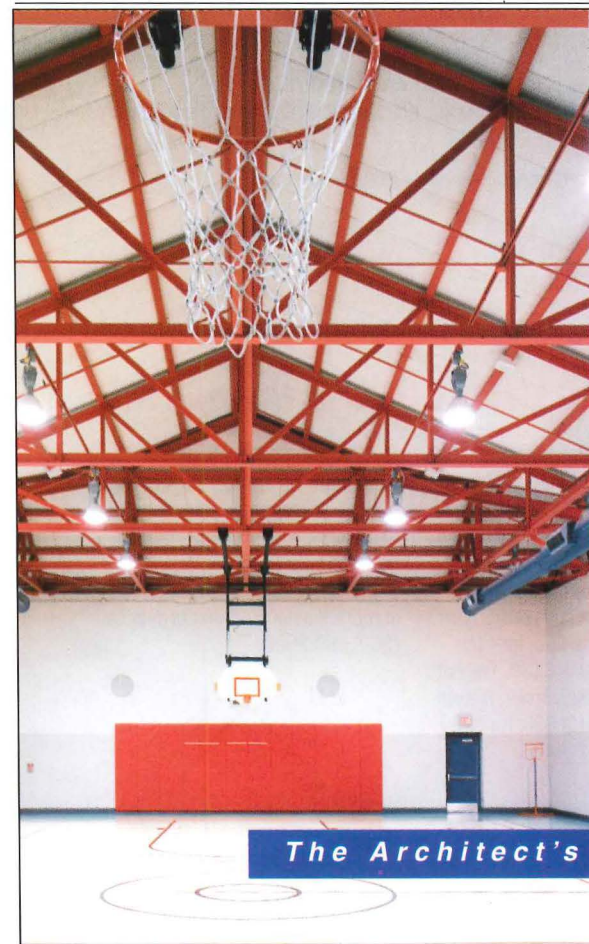
meter site should be sympathetic to natural and environmental factors, fulfill the requirements of the pilgrims, and recall the local architectural and urban fabric. First prize for professionals is \$50,000, for students \$4,000. Contact Salihiyya Center, Office 702, King Abdul Aziz Street, P.O. Box 17871, Jeddah 21494, Saudi Arabia; tel. 966-2-644-4690; or E-mail aldar@mail.gcc.com.bh.

Vital Signs Student Competition

Submission deadline: June 15

The Vital Signs Project, administered through the University of California, Berkeley, announces its 1998 Student Case Study Competition. Undergraduate and graduate students in ACSA member schools of architecture and ABET member schools of architectural engineering in the United States, Canada, and Puerto Rico are asked to investigate, measure, evaluate, and report on the performance of existing buildings. Contact Gail Brager, Vital Signs, UC Berkeley, Berkeley, Calif. 94720; E-mail vital signs@ced.berkeley.edu; or visit www.ced.berkeley.edu/cedr/vs/act/act_main.html.

Please submit information for exhibitions, conferences, and competitions at least six weeks prior to the magazine's publication date (i.e., March 15 for the May issue).



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**AIA / ARCHITECTURAL RECORD
CONTINUING EDUCATION**

INSTRUCTIONS

- ◆ Read the article “Lowering the Risks of Reroofing” (pages 141–44) using the learning objectives provided to focus your study.
- ◆ Complete the questions below, then check your answers (page 248).
- ◆ Fill out the self-report form (page 248) and submit it to receive two AIA Learning Units.

Questions

1. The penthouse suite of the Cosmos Building, a popular hotel erected in 1972, has developed roofing leaks. A quick visual inspection of the roof shows two skylights, a multilevel terrace with a partitioned lower deck housing a cellular communications tower, building-integrated photovoltaics, and rooftop HVAC equipment. Describe what to consider in a reroofing analysis for this facility.

2. Describe the resources available for commercial roofing from the National Roofing Contractors Association.

3. Summarize the suggested approaches for working with owners when selecting reroofing systems.

4. List five possible potential or existing roofing design problems that go beyond the scope of roofing itself.

5. Give two examples of building uses that affect roof selection and the degree of protection required.

6. Suggest solutions for the following environmental conditions that may damage roofs: a) high winds; b) a marine climate; c) chemical interactions.

7. Explain what architects can do to prevent “roofer figure out” design and detailing errors.

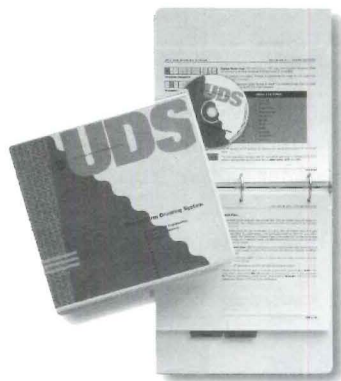


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CIRCLE 88 ON INQUIRY CARD

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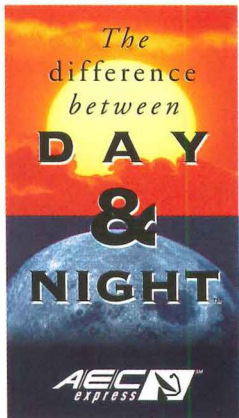
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CIRCLE 89 ON INQUIRY CARD

AR2



AIA/ARCHITECTURAL RECORD CONTINUING EDUCATION

ANSWERS

Questions appear on page 246. To receive CES credits, fill in the self-report form below.

- 1.** Check and consider the existing roof-drain system with regard to sizing, placement, and current codes; the optimum location of skylights; the location of penetrations; whether rooftop items are really necessary; adaptation to building movement; substrate and material transitions; base flashings and termination details; antenna placement; whether the roof will accept a new covering or will have to be torn off; existing structural damage; the condition of decks; the presence of hidden conduits; and trapped wet materials such as insulation.
- 2.** NRCA publishes a roofing manual and roofing-material guides, the *Handbook of Accepted Roofing Knowledge*, detail drawings on low-slope roofing on CD-ROM and for CAD systems, and maintains Project Pinpoint, a program identifying roofing problems and solutions using new technology.
- 3.** Owners want to know options and cost estimates for balancing installation and maintenance life-cycle costs, energy-conservation performance, and the degree of protection offered by various membrane alternatives. In their recommendations architects should consider the building use, the client's financial circumstances, and the environment. Many large owners look for proven track records or choose a roof because it is easy to maintain

a great number of buildings that have the same roof.

- 4.** These might include structural modifications, thermal-insulation improvements, improved thermal-movement or seismic-movement control, and better handling of roof or attic ventilation, in addition to upgrading the structure to meet current codes and designing to reduce needed maintenance.
- 5.** Buildings housing electronics, computers, and telephone equipment must offer absolute protection. Warehouses storing farm implements may need less expensive, low-maintenance roofs. Dormitories and college buildings may need to resist exhaust fumes, oil, and grease, which are detrimental to rubber roofing.
- 6. a)** Recognize that some roof types (such as loose-laid membranes or metal roofs), when poorly detailed, have performed badly in high-wind locations. **b)** Specify bird-proof preventive coatings. **c)** Investigate the interaction of chemicals with membranes and look for alternative materials and coatings. When considering new technology, always look for a track record and supportive research.
- 7.** Design reroofings based on cost efficiency with the proper material and wind-uplift requirements. Adequately detail drawings, avoiding excessive "RFOs." When referring to documentation, narrow down references as much as possible. Meet with the contractor and other relevant specialists and ask for information within their experience such as details for an expansion joint running into a wall, hazardous-material removal, or engineering applications. Standard details should be made project-specific rather than relying on generic manufacturer details.



AIA/CES SELF-REPORT FORM

(Use to report learning units earned for Architectural Record only.)

Member information:

Last Name	First Name	Middle Initial or Name

AIA ID Number _____

Program/project title: Architectural Record (02.98)

Check the following as applicable:

- "Lowering the Risks of Reroofing" (pages 141–44)
 - "An Integrated Design Approach Offers Flexibility, Economy, Durability" (pages 152–64)
- Section sponsored by the Metal Building Manufacturers Association
- "Replacement Wood Windows and Doors Renew the Life of Old Buildings" (pages 166–182)
- Section sponsored by the National Wood Window and Door Association

Completion date (M/D/Y): _____ / _____ / _____

Quality Level (QL) of this program: Each article or sponsored section will earn you a total of 2 LUs at Quality Level 2. (fill in:) _____ total LUs.

Quality Level of each article or section is 2. Completing all sections earns a total of 6. Material resources used:

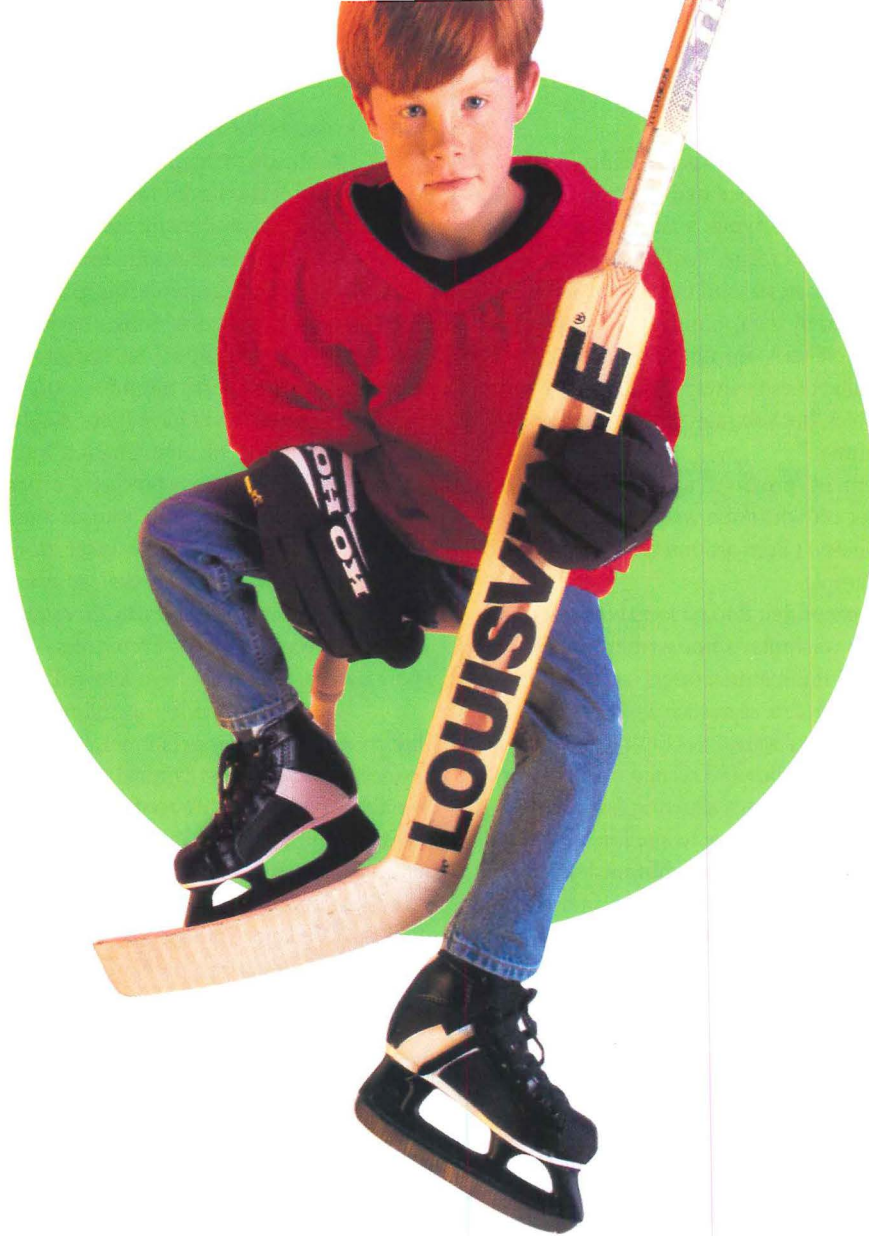
Journal article or sponsored section. This program addresses issues concerning the health, safety, or welfare of the public.

I hereby certify that the above information is true and accurate to the best of my knowledge and that I have complied with the AIA Continuing Education Guidelines for the reported period.

Signature _____

Date _____

Send completed form to University of Oklahoma, Continuing Education, AIA/CES, Room B-4, 1700 Asp Avenue, Norman, OK 73072-6400. Fax 405/325-6965. For additional information, call 800/605-8229.



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CIRCLE 90 ON INQUIRY CARD

REROOFING *continued from page 144*

problem. "They don't preclude the need for maintenance," explains Robinson; in fact, many are voided if prescribed maintenance is not performed. Warranties usually come in two types: materials only, which covers only defects in the membrane and related materials, and a system warranty, which covers defects in the material and installation of the roof membrane and related items supplied by the roofing manufacturer. Such warranties are useful because deficiencies are not always immediately obvious, explains Blaufeux. "The glue doesn't always hold. Adhesives and sealants may blister and form bubbles, but you may not see them until the sun beats down in spring and summer."

"A maintenance agreement provides a better value," says Robinson. "Most people are better off without a warranty." Some companies issuing 10-year warranties haven't been around for 10 years or lack the assets to back them up, for example.

"A warranty is a piece of paper that doesn't keep water out," says Cash. "The typical manufacturer's warranty is not written to serve the owner but to limit the exposure of the manufacturer," adds Robinson. "Warranties rarely cover related damage," he says, such as damage to insulation or roof decks. Some manufacturers' warranties limit liability to cost of material replacement only, excluding labor and related materials, or to costs at the time of initial installation, without allowing for inflation. If owners do not choose a warranty, they may have to sue for relief, if, for instance, a loss of business occurs due to a faulty membrane leaking into the interior. HNTB's Frerking observes: "A warranty is like an insurance policy; you should design a roof so you never have to use it. Most warranties help sell a product and aren't worth it."

Maintenance agreements represent an ongoing cost, but the

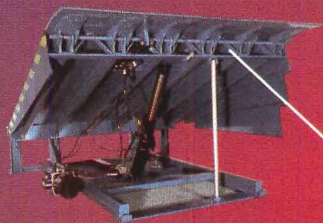
owner is assured of timely recognition of problems. According to the NRCA's Robinson, a maintenance agreement should include a twice-yearly roof inspection, roof maintenance work, and a schedule of what is to be inspected. Typical maintenance should include cleaning out drains, gutters, and scuppers; checking for proper roof drainage; repairing any minor flashing damage; replacing gravel or ballast where it has scoured; renewing coatings on flashings; checking for damage by other trades, such as repairs to rooftop HVAC systems; and checking flashing near roof penetrations, where leaks often first appear.

Manufacturers have increasingly stressed regular roof inspections and attention to maintenance, but most owners still don't visit the roof unless there is a problem, experts agree. But they also say a preventive-maintenance program is the best way to ensure roofing longevity. Once- or twice-yearly inspections are sufficient for most buildings, but more frequent checks are warranted when there are major storms, vandalism, or foot traffic. In rainy areas of the Pacific Northwest, notes Bensimon, plants—even trees—promptly germinate on roofs where natural debris has been allowed to accumulate.

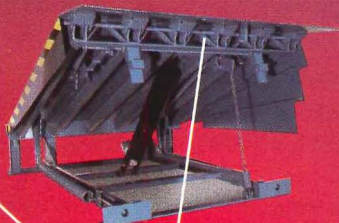
He recommends the following roof-maintenance strategies: limit roof access to key personnel, and hold them accountable for maintenance; provide access-control systems to keep track of who is going onto the roof; standardize roof systems and materials within a campus to facilitate training in maintenance, repairs, and quality assurance; supply maintenance personnel with repair kits and complete information, and train them to observe and document roof conditions; implement a seasonal maintenance strategy to allow for winter preparation, spring cleanup, and documentation of items for summer maintenance and repair. ■

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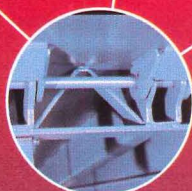
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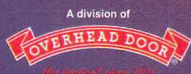
development to bring the new standard to the marketplace. As a result of the testing, McGuire has developed levelers that now include the (patent pending) "Truss Header" design. The truss header makes the lip area a mere extension of the platform, increasing the overall strength of the leveler. The Truss Header is similar in design to the construction of bridges and other long span creations.

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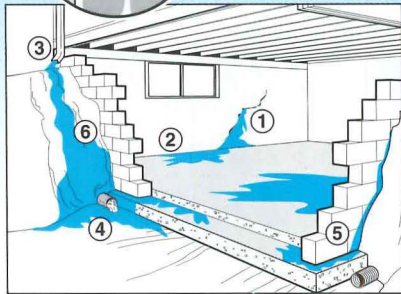
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VENTURI *continued from page 67*

RECORD: Did the Philadelphia Orchestra reject a design that rendered the budget limitations palpable rather than—let us postulate—disguising them?

RV: The design was not just reflecting the budget issue, even though that is extremely important. At the early stages, Broad Street was a civic monument kind of street and our project would have enlivened it at night. Later it was reconceived as the "Avenue of the Arts" [intended as the new location for several arts facilities], and we loved making a more gala facade [see page 60].

There is an irony that our buildings are often seen as not flashy enough. But at other times they say we are too flashy in a vulgar and commercial way, not in an architecturally expressionistic way. Interestingly, according to [University of Pennsylvania architectural historian] George Thomas, [original architect] Napoleon LeBrun said of the Academy of Music [the city's beloved landmark concert hall, completed in 1857] that he did not have enough money to do anything but a market house. The academy is only a little more elaborate than that.

RECORD: You also used a billboard approach at the Whitehall Ferry Terminal project [see page 61]. The competition scheme showed a giant LED clock, scaled to the skyscraper context. That scheme was reduced to a wavy-parapeted front. Critics found it aggressive if not somehow insulting.

RV: The Whitehall project was criticized for not dealing with issues of convention and scale, but that was a misreading. I have a feeling that architects are not dealing with the issue of what civic architecture is. They have such a desire to be so expressionist or individualistic that they make buildings that are not civic architecture by nature.

RECORD: What makes architecture civic?

DSB: It probably relies on convention. You could say it is not conventional to put an electric sign on a building, but electric signs exist. Let's say the New York post office, with its grand steps along the entire block, is civic. But it's not appropriate for today. Civic architecture is not really being faced in terms of needs.

RECORD: In discussing the idea of applying information to a generic building, you justified it in part because people "wear" information in the form of T-shirts with slogans on them. Isn't the resistance you've met from clients in part a reaction to the

idea that you might give them the architectural equivalent of the T-shirts people wear around the mall?

DSB: If clients are horrified and usher us out, so be it, because the relationship will not work out. We have to be who we are. But when clients want to be challenged, we go on a journey together; we may face something that at first seems awful, but we are going on an adventure. For the people we work best with, architecture is terribly important as a symbol of what they're doing.

RV: We could not in the end continue with one design because advice from the campus designer was antagonistic.

DSB: The irony was that it was Postmodernist criticism . . .

RV: It's ironic when your ideas are misinterpreted and used against you.

RECORD: Paul Rudolph's passing in 1997 was greeted as if we had lost one of architecture's enduring masters. In puncturing the "heroic" trend of Modern architecture in the 1960s, you made Rudolph one of your prominent targets. What do you make of the Rudolph revival?

RV: I think it reflects the cycle of taste to some extent. The *béton brut* he did was sort of Corbusian. Now Ando does it. He was a kind of revivalist. Call it a survival of the revivalist.

RECORD: Speaking of revivals, is the blurring of entertainment, retailing, and culture simply the belated vindication of ideas you've long promoted? Is, for example, an All-Star Cafe your NFL Hall of Fame proposal 30 years later?

SI: They are so literally alike that the jaw drops. You recognize that one could not have happened without the other. It is a total vindication. There it is, all around you. We weren't the ones to do it, and that hurts. But you realize in a sense that you have won.

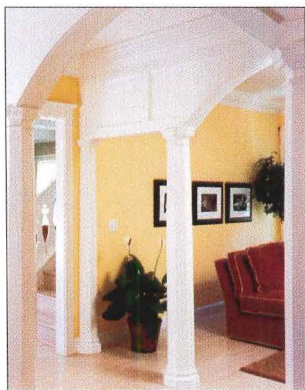
DSB: In another sense, the Modernists have won. What we recognize is that the shed we so often work with is essentially a Modern building.

RECORD: What kind of project would you like to do that you have not yet done?

RV: I'd like to do a skyscraper, but also a Catholic church. I'm not a Catholic, but I have been powerfully influenced by them, especially from my time in Rome.

DSB: I'd like to do a synagogue, both because I'm a Jew and because it is frangible. There's such a strong idea of what a church should be, but a synagogue is a meeting house. There's so much available to it. ■

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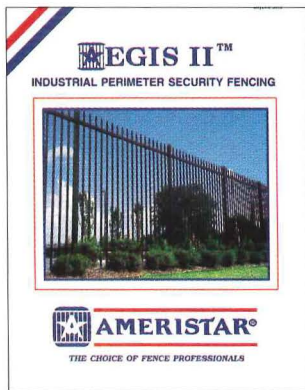


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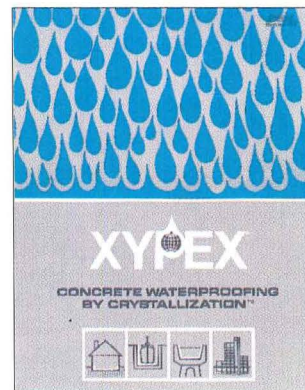


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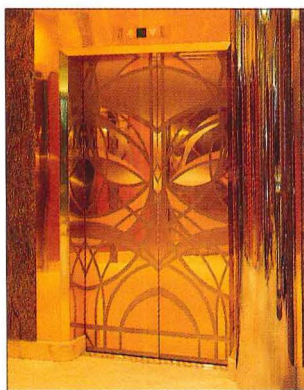


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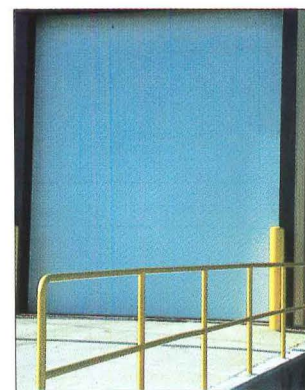


Our products have taken direct-vent technology & incorporated it into a new high performance fireplace. Model 6000 Supreme is a high efficiency fireplace (thermal efficiency up to 74%) & has an AFUE (Annual Fuel Utilization Efficiency) rating of 63%. The 6000 Supreme is standard with a variable regulator to adjust the flame & BTU input with the turn of a dial. Heat-N-Glo, 6665 West Hwy 13, Savage, MN 55378, 1-800-669-HEAT.

Heat-N-Glo

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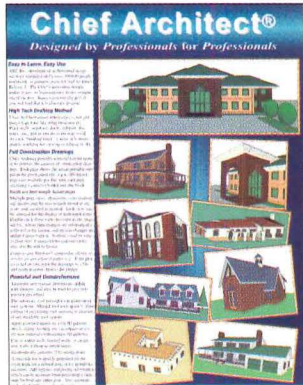


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ART

CIRCLE 158 ON INQUIRY CARD

Buckingham-Virginia Slate

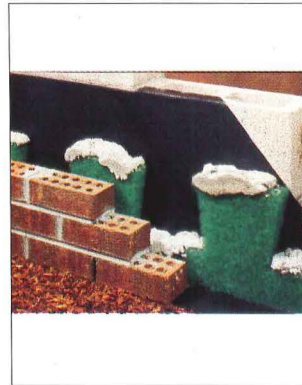


has been sheltering America for over two centuries. As a roofing material, it is prized for its high mica content, natural cleft and texture, as well as its non-fading and distinctive handmade quality. Because of its permanence and natural beauty, it was specified by Thomas Jefferson in the 1800's and remains today the roofing choice of eminent architects. Buckingham-Virginia Slate, P.O. Box 8, Arvon, VA 23004. T: 1-800-235-8921.

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Mortar Net Green

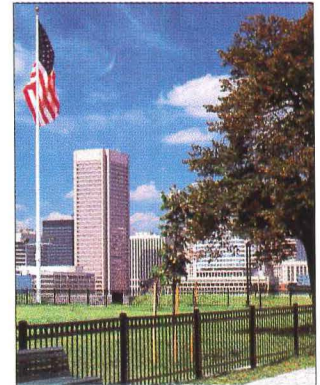


is placed on top of the flashing inside the cavity, where it catches & permanently suspends mortar droppings above the level of the weep holes. Its patented dovetail shape prevents mortar from forming a dam, its shape with its 90% open weave allows water & air to easily move through the net & out the weeps. It's 100% recycled non-degradable polyester and is available in a 2-inch width. For a CAD disk, call (800) 664-6638.

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Truebro, Inc.

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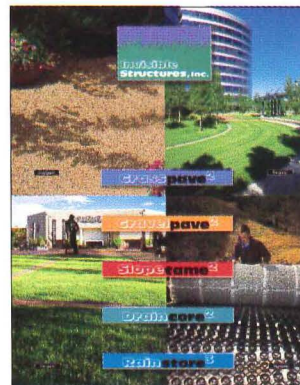


Among the new products featured in Pemko's 135 page 1998-9 catalog, are HSS2000 (an intumescent fire life-safety product), FG3000 (an amazing glazing compound which allows for much larger lites in rated doors), security door bottoms to deter lever handle break-ins), new special purpose continuous geared hinges, ADA compliant rubber and aluminum ramps, as well as expanded brush products.

Pemko

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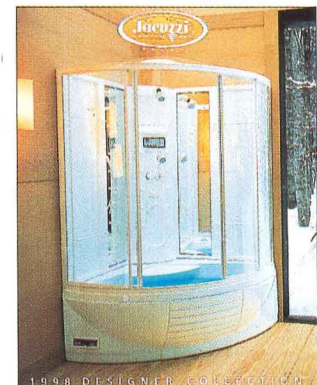


3 new invisible products have been added to the family of Grasspave² & Gravelpave² - Slopetame², Draincore², & Rainstore³. For 16 years we have provided grass paving ring structures with 92% void area for root development. Now we're applying this technology to erosion control, drainage, & water storage with easy installation in 9 roll sizes. Call our knowledgeable staff for CADD details, specs, & product specs at (800) 233-1510. Web Site: <http://www.invisiblestructures.com>

Invisible Structures, Inc.

CIRCLE 164 ON INQUIRY CARD

Jacuzzi Whirlpool Bath

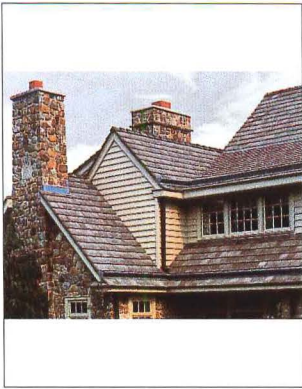


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Jacuzzi

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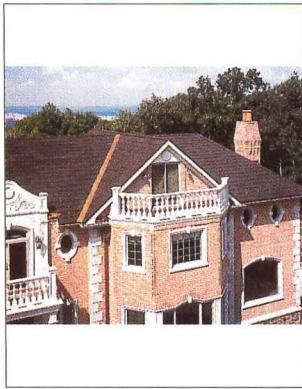


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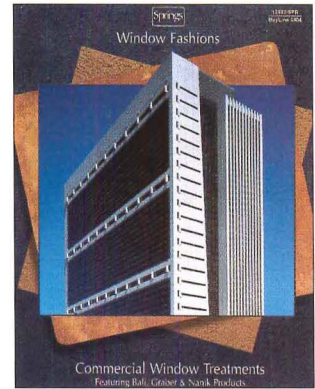


PORCH-LIFT® Vertical Platform Lifts from Access Industries are designed to raise and lower a wheelchair user from one level to another indoors and outdoors for public buildings of all kinds. Easy to install and operate, the lifts require little to no site modification to install next to stairs or a landing. Standard models can be installed in a custom hoistway (shown above) to blend with any building design or accessibility plan.

Access Industries

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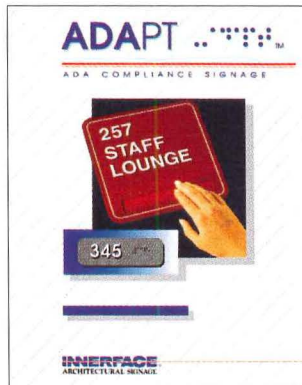


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Springs Window Fashions

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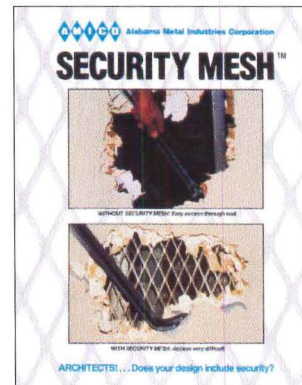


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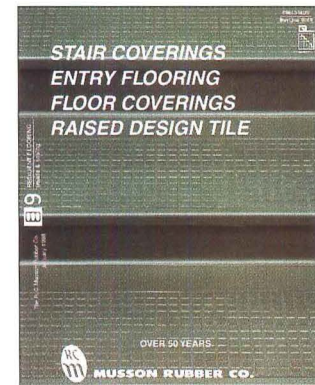


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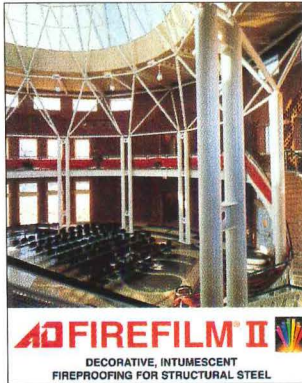


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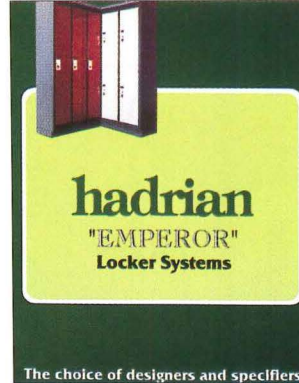


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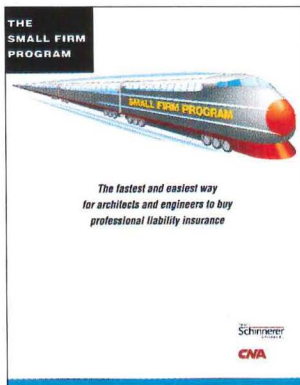


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Small Firm Program

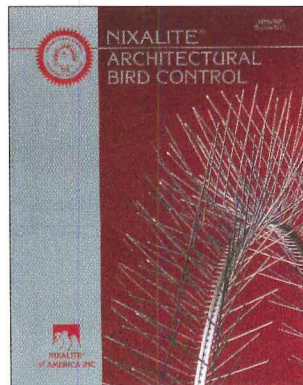


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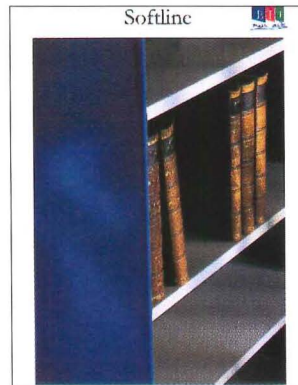


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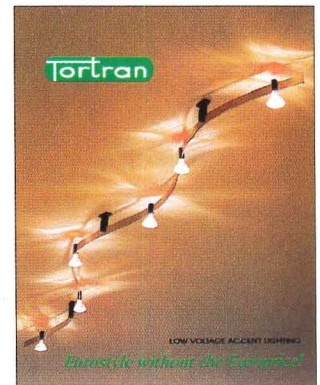


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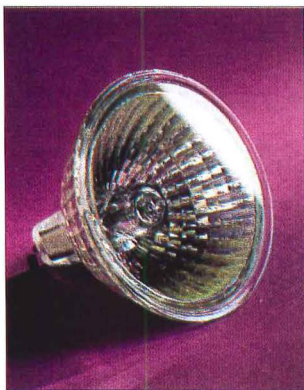


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Lexington Standard

CIRCLE 183 ON INQUIRY CARD

Hanover Lantern Commercial Lighting

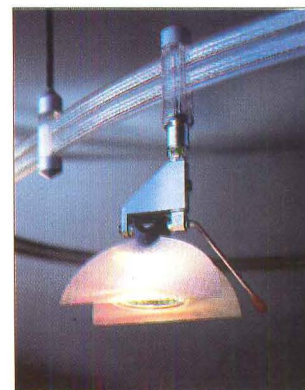


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Hanover Lantern

CIRCLE 184 ON INQUIRY CARD

Flex-Line

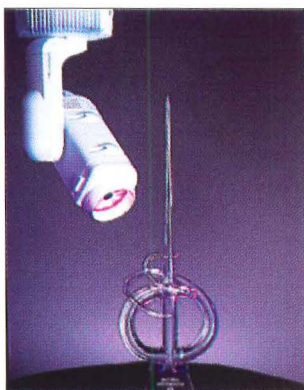


Bruck, the world leader in the area of low-voltage Track and Cable Systems introduces Flex-Line. A dual circuit rail that flexes to allow for curved or linear installations. Butterfly, shown above attaches by the way of "Plug and Lock". See Bruck at GlobalShop. Stand #5342.

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Cast Aluminum Lighting

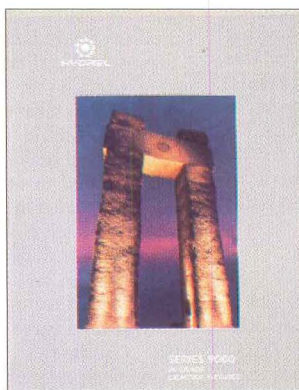


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Sun Valley Lighting

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In Grade Up Lights

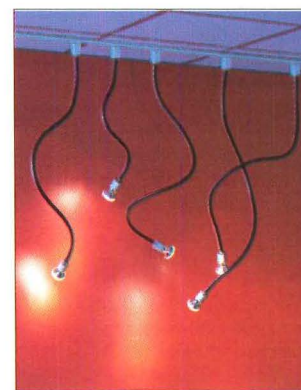


This 36 page catalog covers the new, innovative 9000 series Ingrade Lighting fixtures. See how modular design makes a difference in performance, installation, maintenance, and durability. Available in a variety of configurations, this series accepts lamps to 175W HID, 250W incandescent. Architectural and landscape illustrations include recommendations for the most common applications. Hydrel, Sylmar, California.

Hydrel

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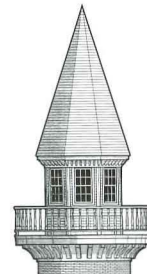
Seeks applicants for a visiting appointment at assistant or associate professor rank beginning September 1998. A search to permanently fill this position will be advertised in Fall 1998. This faculty position will teach courses in digital media and processes, and architectural design. A strong interest in the application of digital media to inquiry in spatial ordering, construction or other architectural subject areas is encouraged. Applicants must hold appropriate advanced degrees with teaching, research, and practice and/or practice experience. Full position descriptions, applications and related information are available from Nancy McNaught at (541) 346-3656. Information of the Department of Architecture and its programs is available at our Web site at <http://architecture.uoregon.edu>. To apply, forward a curriculum vitae, statement of interest, names of three references and no more than 10 pages of representative research/creative practice to the Faculty Search Committee, Department of Architecture, 1206 University of Oregon, Eugene, OR 97403-1206. To assure full consideration, applications must be received by March 9, 1998. The position will remain open until qualified candidate is identified. The University of Oregon is an AA/EO/ADA institution committed to cultural diversity.

DIRECTOR OF FACILITIES PLANNING

The Medical College of Georgia invites applications and nominations for the Director of Facilities Planning. The position reports to the vice president for Fiscal Affairs and Planning and is responsible for the management of all architectural campus planning and space utilization functions at the institution. The Medical College serves approximately 2500 students on a 110 acre campus consisting of 79 buildings, totally over 3.4 million square feet. The Medical College is organized into the schools of Medicine, Dentistry, Allied Health, Nursing and Graduate Studies. The college also operates a teaching hospital, The Medical College of Georgia Hospital and Clinics, with 632 licensed beds and a large Ambulatory Care program. A new children's medical center is currently under construction and scheduled to open in May, 1998. The Medical College is located in Augusta, Georgia, Georgia's second largest city within an easy drive of the mountains and beaches of Georgia and South Carolina. The candidate should hold a professional degree in architecture from an accredited university, an advanced degree is preferred; and current licensure. Candidates should have ten years of progressively responsible experience in architectural practice with experience in facilities design and planning, preferably in a complex health care setting. Candidates should have working knowledge of federal and state rules, regulations and programs related to facilities, and have strong communication, leadership and organizational skills. The ability to manage multiple priorities and complex projects is an essential requirement of this position. The Medical College offers an excellent compensation and benefits program. Applications should include a cover letter, a current resume and the names of at least three references including individuals with knowledge of the candidate's recent performance. Submit applications materials to: Director of Facilities Search Committee, c/o Project Accounting, HS-B134, Medical College of Georgia, Augusta, GA 30912-800. Closing date for receipt of resumes is March 1, 1998. The Medical College of Georgia is an Affirmative Action, Equal Employment Opportunity Institution. Visit our Home Page at WWW.MCG.edu.

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THE FUTURE A money revolution: When architects cash in on energy-sensitive design.

BY B. J. NOVITSKI

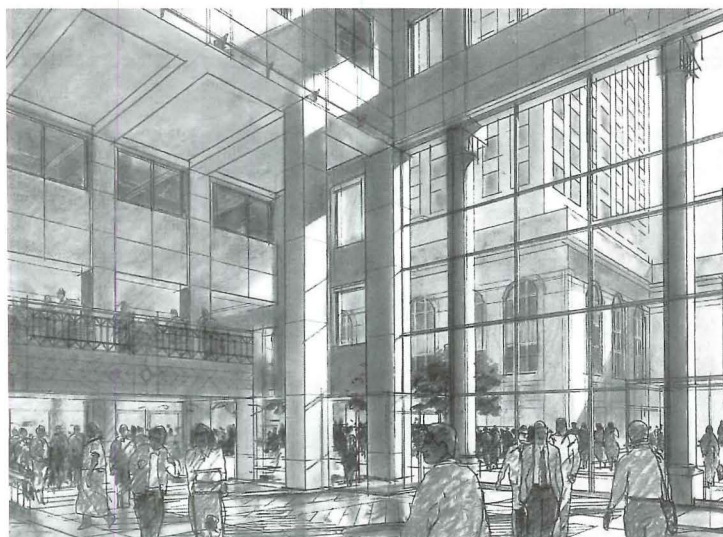


Imagine a future in which architects do well by doing good. They devote time to carefully integrating all the energy-related systems in a building, the resulting efficiency dramatically decreases our dependence on imported oil, and the triumphant architects are gratefully rewarded with higher design fees. That future may not be far off, says physicist and energy activist Amory Lovins. However, he cautions, it will require changes in the way buildings are planned, financed, and operated.

Architects have long been trying to make buildings less wasteful, and many are sincere in wanting to help ease energy-related problems. Why, then, do many buildings still barely meet minimum energy standards? Lovins argues that conventional practice rewards inefficiency. For example, developers seek to minimize first costs and leave it to others to pay future utility bills. Lenders favor known technologies, like mechanical equipment, over efficient ones, like passive solar design. Architects have no incentive to spend the extra time needed to minimize life-cycle costs if design fees are based on construction cost. We need to remove the disincentives, Lovins says, and establish a system of substantial rewards for energy-smart buildings.

Researchers at Lovins' Rocky Mountain Institute, a nonprofit research foundation, are developing model contracts to test this idea. They secured funding from San Francisco's Energy Foundation, which supports sustainability projects, and sought out four buildings as test cases in four climate zones.

Under construction are a New York high-rise office; government buildings in Austin, Texas, and Oakland, California; and a school in Portland, Oregon. The architectural research firm Eley Associates developed the contract for the Oakland building (photos above and below), designed by Denver's C. W. Fentress J. H. Bradburn and Associates. Eley and his staff created a computer model of the building's energy consumption at several phases and will continue the evaluation through the first few years of occupancy.



Lovins's concept for performance-based fee contracting is founded on rewarding architects and builders for meeting specified energy goals and penalizing them for failing to meet these goals. The bonus could be a substantial proportion of the design fee. The penalty could be uncompensated design time or a cash rebate to the owner. Building owners would offer the bonus because they would pay

less in the long run. The gamble would be worthwhile to architects who know how to optimize a building for low-energy consumption. The bonus pays for more time in schematic design, when attention to building form, siting, orientation, and the configurations of glazing and interior walls can have profound effects on daylighting and future energy consumption. If these are ignored, no superficial design treatments will make up the difference. Also, the reward system enables engineers to spend more time on

at several phases. And because the theoretical parameters of occupancy, scheduling, and weather may not match the reality of the building after it's occupied, the model will be revised several times during and after commissioning. The building's performance in its second year, compared to a theoretical baseline building, will determine whether the design team earns the bonus.

Exactly how that bonus/penalty is computed is based on many factors, including the legal structure of the design/construction team. Eley Associates developed a manual of model contract language and computational models for builders, construction managers, and owner/architect/contractor triangles; it is available at www.eley.com.

For the Oakland Administration Building, the energy performance target is about 30 percent more stringent than minimum requirements. Fentress Bradburn complied with a variety of measures, including limiting electric lighting to about one watt per square foot and minimizing solar heat gain. Although the final test won't come until after the building has been occupied for a year, so far it has met the energy goals in computer simulations.

It would be difficult for an architect to predict such positive effects, much less guarantee them, but it's a rosy future to contemplate—rational fee structuring in all areas, not just energy consumption, that will truly reward architects for good design. ■

analyzing, selecting, and sizing less expensive and wasteful equipment.

Performance-based fees are easier to implement for energy retrofits. Whether or not a building improves should be measurable by comparing utility bills before and after. With new construction, such a comparison is unavailable, so there is a greater reliance on computer modeling. The buildings included in Lovins's experiment will be analyzed

B. J. Novitski is a freelance writer specializing in architectural technology, practice, and education.

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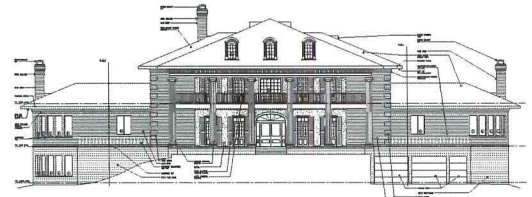
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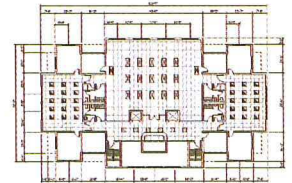
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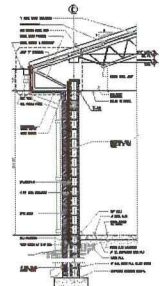
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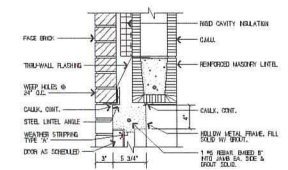
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