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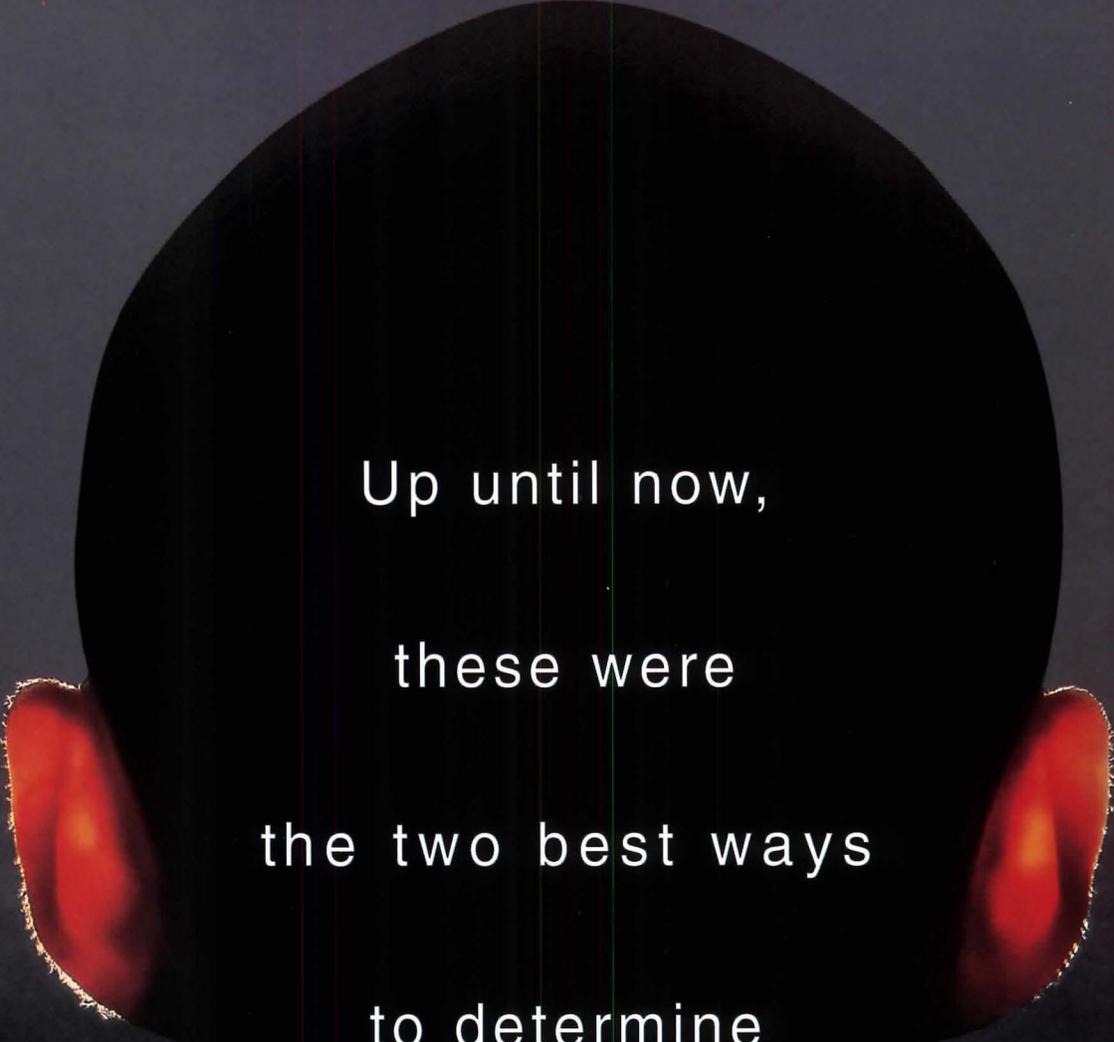
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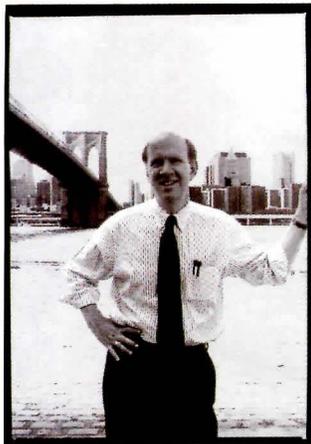
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EDITORIAL

Setting High Standards

BY ROBERT IVY, FAIA

We are entering the season of formal wear. The proliferation of black-tie evenings related to awards ceremonies, and the consequent investment of our time and money in entry fees and office time, begs us to scrutinize the honors and awards phenomenon, pruning and improving the programs to suit our needs.

Unfortunately, the honors and awards process can often be faulted for superficiality or for appearing self-laudatory. The results, arrived at in three or four hours, can appear like the in-crowd patting itself on the back.

Take heart. A new generation of architectural awards is redefining the entire process, elevating standards of quality and thoroughness with increasing sophistication. The American Institute of Architects, through its Honors and Awards Task Force, has been addressing the question head-on, cutting back outdated programs and tightening standards. The General Services Administration, America's largest landlord, has instituted a far-ranging design excellence program—a federal initiative with positive implications for an improved environment.

Many awards programs engage a wider public. The Pritzker Prize reached a crescendo with a glittering presentation at the White House earlier this year. The AIA's Accent on Architecture program reaches out to clients, government officials, and public users. On November 5 in New York City, Business Week and ARCHITECTURAL RECORD magazines, in association with the AIA, awarded projects that highlight the architect/client relationship.

Some awards programs build value systems into their bones. The Aga Khan Award, which Robert Campbell writes about in this issue, eschews glamour for meaning on a global scale. In addition to advancing the state of design in Islamic societies, the international program, which awards prizes every three years, seeks out projects that contribute to sustainability, community development, and cultural preservation. Perhaps its most enviable

characteristic is that a professional visits the projects long after completion to assess their construction and programmatic effectiveness over time.

Good awards programs like the Aga Khan are multidimensional, offering insight, through the choices juries make and how the juries articulate their reasons, into why projects are important and how they succeed. Creative programs probe into methods and means, economy, relationship to place, history, and culture.

What could improve the current state of affairs? A brief wish list, drawn from successful programs, follows:

Diverse juries that include clients and users as well as architects. It is amazing and humbling to hear other points of view.

The requirement that at least one juror visit every project, even in local competitions, to determine finalist status. Nothing—even three-dimensional graphics—substitutes for real-life experience.

Adequate time for deliberation. Jurors often must confront a large number of entries and rush to judgment.

An awards ceremony that recognizes the client and other key members of the team as well as the architect. No project arises in a vacuum.

Clear criteria and qualified jurists to judge urban planning, historic preservation, and interiors.

Ultimately, awards programs help to define the architectural agenda. The awards themselves are like snapshots, carefully considered or taken at random, hoarded for ourselves or widely disseminated. At their best, the projects we acknowledge set a vision, making friends for architecture, engaging clients, and raising our professional standards. A well-considered program makes dressing up worth the effort.

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LETTERS

Out of touch

Regarding Robert Ivy's editorial in the September issue [page 15], it is disturbing and inconceivable that "the relation of constructed space to human experience" is something architects, or social scientists for that matter, would have to be reminded of. That this relationship can be thought of as a fad that merely comes in and out of vogue explains a lot about our society—none of it good.

Our architecture schools' curricula should make it so that it becomes impossible to build what we call architecture without such a basic understanding of space.

—Gail Satler, Associate Professor of Sociology
New College of Hofstra
Hempstead, N.Y.

Zoning not that zany

I recently read responses to your September Pulse question regarding zoning [page 24]. While I agree that many current zoning laws are outdated and even inappropriate, I was shocked to see that someone educated enough to become an architect would suggest eliminating zoning altogether. Does Nathan Isley, AIA, not realize that without zoning he could wake up one day and find his home nestled quietly between a paint factory and an adult book store?

—Martin Jaster
via E-mail

ER architect defends design

The only negative reaction to the emergency room at North Oakland Medical Centers [News, July, page 40] that I know about appeared in the letter from an architect of sports facilities [Letters, September, page 18].

The comments we hear from staff and visitors alike are favorable and even commendatory. A local newspaper quoted the health-care professional who runs the place, who said, "It doesn't look like a waiting room anymore. It's no longer formal or sterile, and patients tend to feel more comfortable in that environment. Our waiting room used to be the typical square with seats surrounding it; now it's quite spacious, even though it's the same square footage."

With the same sense of humility expressed by the letter-writing critic, let me proffer two beliefs of my own. Everybody is entitled to an opinion. But an architect should have some imagination.

—Harvey Levine, AIA
Gunn Levine Associates
Detroit, Mich.

Everywhere walls are crumbling

I recently returned from Paris and read with interest your articles "Flawed Design and Falling Bricks" and "The Cartier's Troubles" [News, August, pages 41, 51]. These articles brought to mind the Bastille Opera, where the walls are covered with cargo netting and the exterior columns are bending severely. Have I missed something in the architectural press about this landmark building, still relatively new, suffering structural problems, or are these problems just not being publicized?

—Richard Bryant, AIA
WBGS Architecture & Planning
Eugene, Oreg.

Hungarian fears seconded

In response to your September News story about Hungary [page 58], I have been building and project managing in Hungary for over eight years. I have had the privilege of working with a series of Hungarian architects, including Josef Finta, who work hard to create a modern extension of the famous Budapest eclectic style. When one sees some of the bland structures imposed by foreign investors, one can understand the outcry of local architects.

Construction, meanwhile, is not as expensive as suggested in the story. Last year, HUF 100 million equaled about \$600,000, not \$950,000, the minimum cost stated in the story for 27 percent of the newly constructed single-family homes in Hungary. Where are these palaces, anyway? Construction costs are \$45–65 per square foot and land in downtown Budapest costs \$20–40 per square foot.

—S. C. Schiff, PE
Paris, France

Credits/corrections

The Design Center Linz, which appears on page 131 of the August issue, was a finalist in the 1995 DuPont Benedictus Awards.

The September news item about the Torre Mayor (page 51) incorrectly states that Eberhard Zeidler designed more than one building on Mexico City's Paseo de la Reforma. Also, the correct spelling of the name of the story's author is Miquel Adrià.

In the August coverage of the Kiasma Museum of Contemporary Art, a photo of the central atrium, in the bottom right corner of page 92, was printed in reverse. ■

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SPEAK OUT A lawyer finds that architects, in their intense pursuit of ethics, often deny themselves a pragmatic practice.

AVA J. ABRAMOWITZ

Ava J. Abramowitz, Hon. AIA, is a management consultant who works with design professionals to create profitable practices. Formerly deputy general counsel of the AIA, she is now the public member of the National Architectural Accrediting Board.



In 1985, when I joined the AIA as deputy general counsel, one of the attributes of architects that I found to be both admirable and enticing was their total, unquestioning commitment to ethics. That commitment is one of the reasons why the public ranks architects highly. A strong sense of ethics has made architecture a well-respected profession.

That respect is well earned.

But as I've interacted with scores of architects, I've often wondered: Is the way many in the profession interpret ethics also an obstacle? Does their ethical commitment sometimes represent too rigid a thought process, one that can actually isolate the architect, inhibiting the profession's contribution to society and the architect's personal success?

The question has been long in coming. For me, it surfaced most visibly in 1992 at the AIA/ACSA's Summer Institute in Santa Fe, where the dean of St. John's College introduced us to Aristotle's concept of the ethical man. To Aristotle, the idea, the act, and the result had to be individually ethical for the man as a whole to be ethical.

Interestingly, not one of the architects in the seminar could separate architecture into Aristotle's three components. For them, the ideas, the design processes they implemented, and the resulting buildings they created were one entity: a reflection of themselves, their essence.

If all went as planned, they felt they had been ethical. If things happened that compromised any of the three components, they did not

want their name on the building. What had occurred was unethical.

At best, a specialized language was at work that comfortably grouped the architects together in a common view of society. At worst, the architects were sharing an insular view of the world that excluded nonarchitects—including their own clients. The building was the architect's.

A good client was one who recognized this fact and worked to achieve the architect's design goals. A bad client was one who did not. An architect could, however, transform a bad client into a good client by educating him or her.

The point was reinforced at this year's Summer Institute. One participant declared it unethical to design a building that was not sustainable—a "green" building. I asked, why "unethical"? Why not just bad business for the client in the long run? The architect answered that sustainability was not a decision for the client to make; the architect's pledge to society's health, safety, and welfare made sustainability a necessity.

I was blown away. Did the problem rest with the words "good business"? Perhaps the speaker lacked the business know-how or the words to convince a client that green design makes good, economic sense over the life cycle of the building, or that these days good business encompasses far more than mere dollars and cents.

Perhaps a bit of both were true, but it was really irrelevant, because the architect, by labeling the decision as ethical, had taken

the decision upon himself. He did not need to be able to communicate his point of view or to provoke discussion. Not having a sustainable design was not an option. Anybody who challenged him on it was either unethical or in need of education, even if the challenger was the client himself.

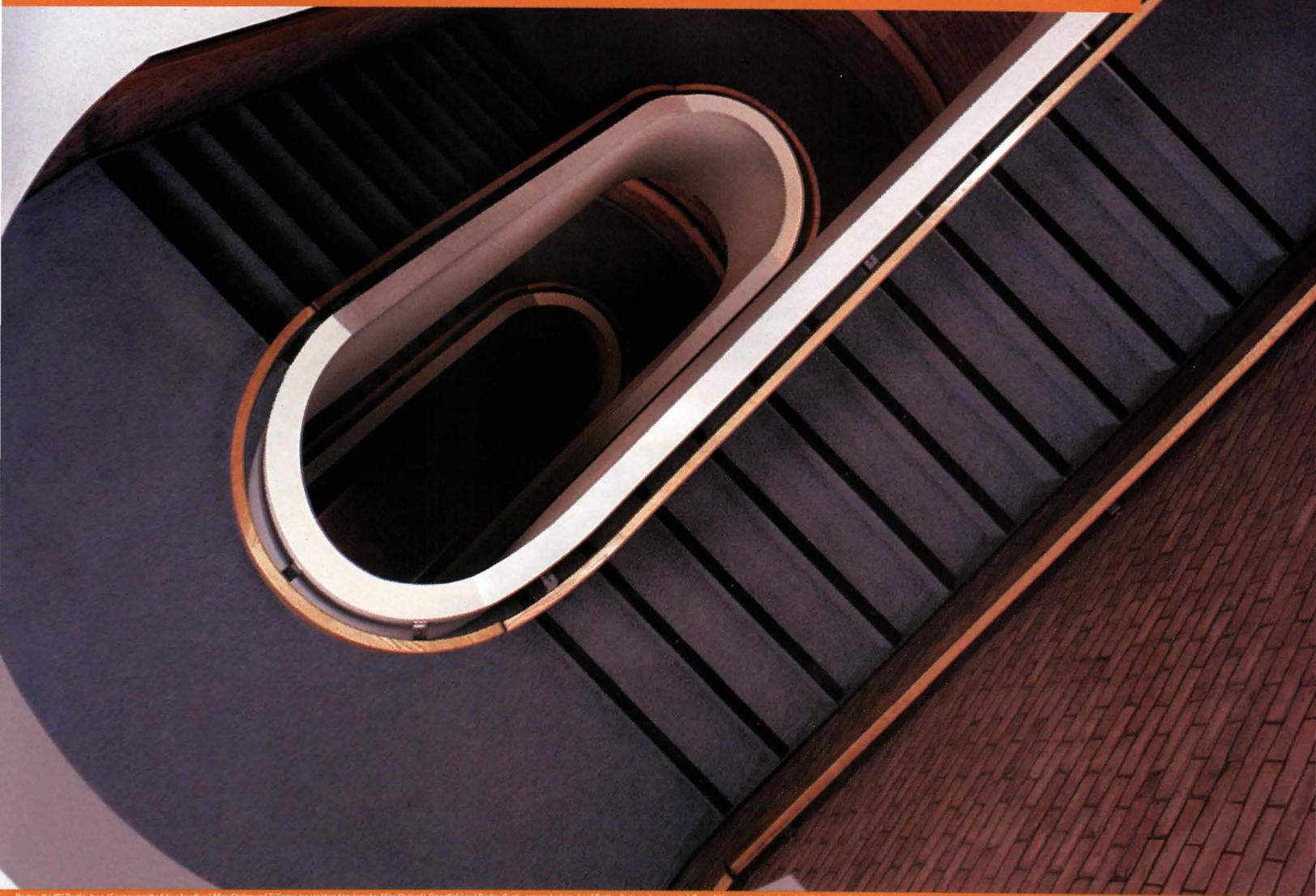
I then had to ask myself: Do ethics appeal to architects because the concept puts them on the side of the good? Or do ethics appeal because their invocation helps insulate architects from the hard decisions forced on them by a world not of their design? Could it be that, rather than submit to the rough and tumble of society and the free marketplace, architects hide behind their ethics?

Just review the history of the AIA's Code of Ethics. Architects did not want to compete for commissions? They made supplantation unethical. Architects had trouble getting paid for their services? They declared free services unethical. Architects did not want to competitively bid? They made that unethical as well.

One could conclude that architects were basically clear-cutting their own land. After all, it was architects who banned architects working as developers and architects as design/builders. The consequences were enormous: while the profession argued about ethics, the developers and design/builders of the world built themselves into center position.

A shared view of ethical premises is a good thing in many ways. It facilitates inter-architect decision

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making. It makes inter-architect communication faster, and it has produced a profession that is highly esteemed by the public and is rightly proud of its dedication to service and to the health of communities.

But it also appears that an inward-looking definition of ethics actually works to separate and insulate architects. It may also help foster the perception that architects march to their own drummer, regardless of client hopes and aspirations. And it may be a major factor in causing people to perceive the profession as arrogant.

It could even be that the result of that definition of ethics—because it fosters an unquestioning belief in the rightness of what an architect is doing—shortchanges client considerations. This gives credence to clients' oft-repeated complaint that architects don't listen. Could it be that architects' interpretation of ethics also gets in the way of listening and responding to client needs and ideas?

I have two suggestions for architects who are equally committed to ethics and to healthy client relationships.

First, when faced with a design or practice dilemma you would normally label unethical, force yourself to think through the dilemma first from your client's perspective—and only later from your own.

What are the short- and long-term implications of each available option (both positive and negative) for the client? Are there any risk-management implications for the client? Any legal implications? Any other business implications? How can you, as the client's consultant, help him or her through those options so that a sound decision can be reached? Then, and only after you have forced yourself to confront and work through the client's issues, should you deal with your own.

Second, consider believing and acting as if, all things being equal and legal, the building belongs to

the client first, to society second, and to you last (if at all). I know this may be an extremely tough concept for many readers. After all, licensing law and the AIA's Code of Ethics talk of the architect's obligations to society as much as they address the architect's obligation to the people who pay them for service.

But society doesn't hire you. People do. And these people expect you to hold their requirements and needs (as long as they are legal) paramount while you serve them. If you cannot put the client first—for whatever reasons, including ethical ones—that client is not a client for you, nor are you the architect for that client.

There are other practical reasons to keep the client at the forefront of your thinking. Risk management is founded on it. (Remember Risk Management 101? The architect makes recommendations. The client makes decisions.) Client satisfaction, repeat business, sound referrals, and paid invoices

depend on it. Design excellence also springs from it. Numerous star architects and award winners have found that great architecture comes about only when good clients and good architects work together to accomplish the client's goals.

In this way, realistic ethics can become the springboard for service and the source of communication that will bring architects and architecture successfully into the public realm. ■

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, Two Penn Plaza, New York, N.Y. 10121; by fax to 212/904-4256; or by E-mail by visiting www.archrecord.com and clicking on News/Features/Dialogue. 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 text approval.*

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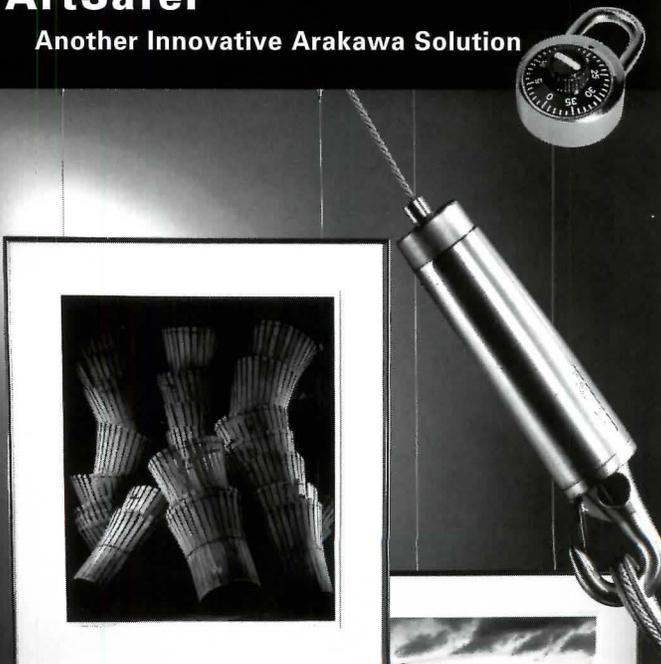
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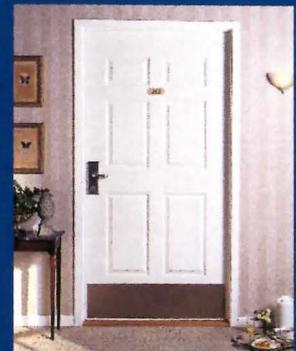
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MENTORS An African-American female architect describes the many challenges faced by minority women considering the field.

Patricia E. Harris, AIA, is owner of New Synergy Inc., an architecture and design firm in Durham, North Carolina. She earned a master's degree in architecture in 1986 from the Massachusetts Institute of Technology.



As one of 99 licensed female African-American architects in the United States, I'm often asked what I would say to young black women who are considering the profession. As a caveat, I should first say that the African-American community is not a monolith; my perspective may not be applicable to everyone. However, I have had experiences that are germane to the challenges faced by minority professionals in general and African-Americans in particular.

At the core of an architect's abilities is the skill to create something entirely new from existing references. This may seem obvious, but when it is applied to a group such as African-Americans—who historically have not had visible role models within the profession—the ability to apply indirect models and to develop support systems, mentors, and goals is of dire importance. Minorities need extra mental preparedness to work within the dominant culture. Seek out guides and references you can relate to.

In my experience, any African-American approaching the journey of becoming an architect must expect that models for design archetypes and professional achievement will be based mainly on Eurocentric history, theory, and construction methods. Minority students must be prepared for the fact that through much of their education and internship, their own cultural norms and historical figures may be invisible. They must find a way to make their education relevant to their own internal map.

Educational institutions do not

have a diverse faculty, mainly because there are still so few minorities (and women) represented in architecture. At MIT, my standard courses were based primarily on European models. If SIGUS (Special Interest Group in Urban Settlements, which focuses on developing nations) had not existed, my graduate education would have barely touched on non-European design.

For a minority student, it is imperative to seek models from one's own experience and history; recognize that diversity strengthens, not threatens, the whole; and understand that being able to work within the parameters of multiple cultures does not require assimilation, only flexibility.

Fortunately, our society is changing and there are more diverse role models to explore. We all know of notable African-American male architects, such as Paul Revere Williams and Julian Abele. But how many can name a female African-American architect? I would encourage young black women to look for us. We can be found; try the AIA, which has a commitment to diversity. Also, Dennis Mann, a professor of architecture at the University of Cincinnati, has published a directory of African-American architects.

I recommend that any African-American undertaking the journey realize it is just that—a journey—and that real challenges are part of any process as exacting as architecture. Young black architects will meet social challenges, because their presence in the firm and at the construction site may pose a threat

to some whose paradigm does not include African-Americans as architects. They may be viewed as tokens who are present only to meet some quota, rather than as people with skills equal to those of their peers. For these reasons, it is crucial that the minority architect maintain a strong sense of self-respect and determination.

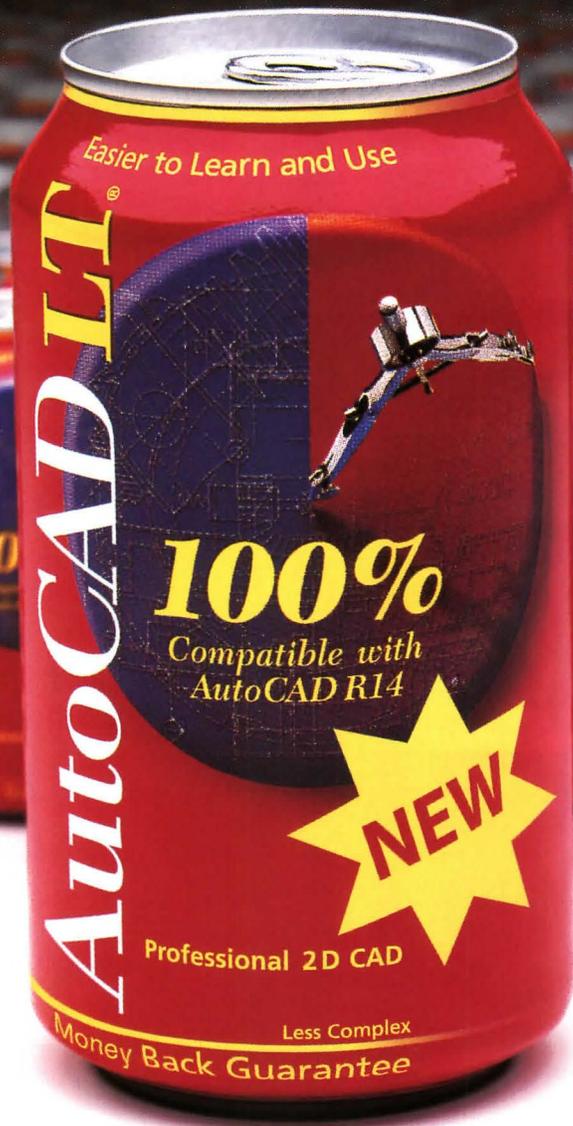
Architecture demands focus, persistence, and perseverance to survive the eight-year trek to licensing. Furthermore, ours is not a profession of great visibility, nor can one expect to garner the same income as a doctor or attorney—professions highly encouraged in the African-American community.

If you have no intrinsic drive or hunger for architecture, I suggest you try a more suitable field. There is limited monetary compensation for the years of intense effort that are required to become licensed.

However, if making a contribution to an environment of beauty and functionality is an inspiration, if giving yourself over to a muse that makes time stand still during hours of creative exploration causes the voice inside you to say "yes!" then I say: You go, girl! ■

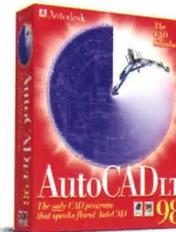
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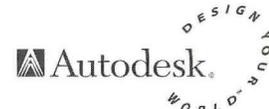


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PULSE RECORD readers were asked: What do you think of the Guggenheim Museum Bilbao?

Most Post-Modernists seem to have veered so far from any design philosophy and any relationship to function that they exist only for the shock value they impart to their viewers and, more notably, to the architecture critics who sing their praises. Gehry is at the head of the class in this respect.

—Keith Haag, FAIA
Cuyahoga Falls, Ohio

Be it a fish, a ship, or a blossoming flower, it is absolutely inspiring. Around every corner, there is a breathtaking composition of organic form.

—Brent Medsker
Edmonds, Wash.

At the Guggenheim Museum in New York, curved and angled walls and sloping floor lines resulted inevitably from the space and the display

technique within. Concrete as a building material was chosen as vital to the building's concept. None of this can be said of the forms or materials of the Guggenheim in Bilbao. There the result is not architecture, the art of building well, but an arbitrary display of form.

—Rem Huygens, FAIA
Wayland, Mass.

I've been there. It's exciting. I felt the energy. It ties elements of the environment together and creates a whole new dynamic for the place. It meets all the objectives. It shows how architecture can mobilize. The design, the use of materials, and the response to topography and urban zones make it the building of the century.

—Merritt Sher
Larkspur, Calif.

It's the greatest fraud of the 20th century. Man should create order out of chaos, not chaos out of order.

—Robert J. Burman, AIA
Glendale, Calif.



Fish 'n' Chips in Bilbao by Anatol Zukerman, AIA, Newton, Mass.

I am a young architecture school graduate with aspirations of becoming licensed, and Gehry's museum provides me with proof that there is more out there than the "cookie-cutter" architecture I have mainly been exposed to so far in my career. Rarely do I get the sense of individu-

ality that the Guggenheim invokes, since most of the time we are limited by functionality, cost, and convention.

—Kimberly S. Bondi
Orland Park, Ill.

Frank Gehry is basically an abstract artist—he could be a great one—but he is not an engineer, as Eero Saarinen, Felix Candela, Frank Lloyd Wright, and even Alexander Calder were. There is no clear engineering principle expressed in the free-form Bilbao museum. Whereas Saarinen's TWA Terminal, for example, is a clear expression of the properties of structural thin-shell concrete, the sculptural forms in the Guggenheim Museum are put together by steel armatures, computerized.

—George W. Sinnott, AIA
Oakland, Calif.

This Month's Question

Who is the world's greatest living architect, and why?

We use a host of different criteria when judging architects and their work. We may appreciate how an architect manipulates form, defines a streetscape, considers the environment, respects context, masters materials or building technologies, or just brings projects in on time and on budget. Tell us who your favorite living architect is—but remember that the most interesting part of your answer is why you've chosen this architect.

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CORRESPONDENT'S FILE Cincinnati, not thought of as a hotbed of design, has been building a portfolio of work by world-famous architects.

BY SUSAN R. BLEZNICK

Susan R. Bleznick, a former editor at *RECORD*, writes about the arts for magazines and television productions. She lives in Toledo, Ohio.

In 1993 the *Places Rated Almanac* picked Cincinnati as America's "most livable" city. It still ranks near the top today, with high scores for job opportunities, recreation, and the arts. The almanac does not include architecture as a factor in the selection process—but if it did, Cincinnati might garner an even higher ranking.

In the last decade or so, designs by some of the world's best-known architects have been popping up in Cincinnati in numbers unusual for a mid-size, heartland city. Michael Graves inaugurated the trend when he designed Riverbend Music Center, an outdoor concert venue that opened in 1984. Now, signature architecture projects are the rule rather than the exception. And as the new buildings take shape, the city's reputation for being conservative may be shifting. While some of the designs have generated controversy, there seems to be a willingness among citizens and politicians to support experimentation, at least in terms of design.

Cesar Pelli's design for the \$82 million Aronoff Center for the Arts in downtown Cincinnati is one striking new addition to the cityscape. The center's brick, glass, and steel structure forms a dramatic backdrop for theater, ballet, and other performances.

The three-year-old Aronoff Center is about to be joined by a new neighbor, the Contemporary Arts Center (CAC). This month, the center plans to reveal Zaha Hadid's long-awaited final design for its home (*RECORD*, April 1998, page 35). In a recent story in the *New*



Frank Gehry's design for UC (above); the master plan for redeveloping the riverfront, including two stadiums and the Underground Railroad museum (right).



York Times, Herbert Muschamp called the CAC the most important new building downtown and a "breakthrough" design. CAC director Charles Desmarais says the 10-level museum will resemble a three-dimensional jigsaw puzzle that symbolizes innovation and diversity.

While the downtown area is home to many of the new projects, it is the University of Cincinnati that has the city's most impressive collection of designs. This state university has created a master plan that looks to architecture as a unifying force, and when the plan is completed, works by seven renowned architects will be in walking distance of one another.

Ron Kull, AIA, the university's architect, says the students joke that UC stands for "under construction." Building started eight years ago and will continue for another six years, he says. Along with new

structures, the university is creating green spaces, pedestrian paths, and a corridor with commercial and recreational amenities.

Hargreaves Associates of San Francisco began work on the master plan in 1989, at a time when the university lacked both a strong image and a strategy for the growth of its campus, Kull says. The idea of employing major architects was seen as a means to project an image of diversity. "What better way to make a statement about diversity than to look at diverse architects who are at the pinnacle of their careers?" Kull asks. "We were also creating architecture to stimulate intellectual discussion."

Peter Eisenman's \$36 million Aronoff Center for Design and Art, opened in 1996, wraps around UC's College of Design, Architecture, Art, and Planning and is a conversational piece because of its irregular

angles, multicolored exterior, and dynamic use of space. Graves, a UC alumnus, designed the 175,000-square-foot, \$36 million Engineering Research Center, opened in 1995. The six-story sandstone and brick building has a prominent site on a main artery of the campus.

UC's Conservatory of Music is in the final phase of a \$91 million expansion and renovation that began in 1993. Henry Cobb designed the new, 184,000-square-foot rectilinear building, which will wrap around the existing building. It will most likely be completed next year.

Frank Gehry's design for the \$46 million Vontz Center for Molecular Studies is the gatepost for UC's medical school campus. The building's brick exterior puffs out as though it is about to explode. Originally, Gehry had thought about creating flat surfaces, but he later changed his mind; the more he thought about the building, Kull says, the more he wanted it to be daring.

David Childs designed UC's

203,000-square-foot Vera Clement Edwards Center, which opened in 1992. George Hargreaves and Mary Margaret Jones designed the Sigma Sigma Commons, a public space featuring a light tower by Rodolfo Machado.



Along with Kull and UC's administrators, a key player in getting these designs built was Jay Chatterjee, dean of UC's College of Design, Architecture, Art, and

Planning. He sits on Cincinnati's design review board and is influential in community decisions.

Another major player has been native Cincinnati Stanley Aronoff, whose name graces several of the city's new buildings. Most of the recent UC projects were paid for with state funding; Aronoff was president of the Ohio state senate from 1989 to 1996 and chairman of the finance committee on and off in the 1980s.

As at UC, a new master plan is guiding the restructuring of Cincinnati's downtown riverfront, where two stadiums may be built, the new Underground Railroad museum will soon stand, new parks are being constructed, and infrastructure is being improved.

In 1995 the owners of the Cincinnati Bengals alerted the city that the team was in dire financial straits. The Bengals were playing in Riverfront Stadium, built in the early 1970s for Cincinnati Reds and Bengals games. "Our owners des-

perately wanted to stay here in Cincinnati," says Troy Blackburn, director of stadium development for the Bengals. But other cities were interested in the team, so Hamilton County took action to raise \$550 million for two new stadiums—one for baseball, one for football—by putting a half-percent sales-tax increase on the ballot in 1996. Voters passed it.

The tax increase will generate funds to cover the majority of the \$280 million construction cost for the Bengals' Paul Brown Stadium. In addition, the Bengals kicked in \$50 million and the state contributed \$42 million.

NBBJ's Sports and Entertainment division designed the 65,000-seat stadium, a fractured, elliptical shape that opens up to downtown and river views. The project should be completed in 2000.

The tax revenue is also earmarked for a new 45,000-seat stadium for the Reds, although that project is currently in limbo because

PHOTOGRAPHY: © MAURICIO LUZURIAGA (OPPOSITE BOTTOM); CAC RENDERING BY ZAHA HADID; AQUARIUM RENDERING BY HOK/GBBN

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of a political battle. Some city council and community members object to a riverfront site for the stadium; they want it built in the northeast section of downtown, in part to revitalize a historic neighborhood. The city council placed the issue on the November ballot; this month, Cincinnatians will vote on the site.

The Reds prefer the riverfront, where both sports teams have always wanted to be, according to Bob Richardson, AIA, Cincinnati's city architect. In any case, the vote may have no real impact, since the county commissioners have the final say—and they favor a riverfront site. Meanwhile, in September, Hamilton County commissioners selected HOK Sport and GBBN Architects, a Cincinnati firm, to design the stadium.

Regardless of the unanswered stadium questions, the city is moving forward with the downtown and riverfront master plan created by Urban Design Associates, a Pittsburgh firm. "Our whole goal is to

reunite the downtown and reconnect the river to downtown," says Richardson. The city is working on a \$147 million reconstruction of Fort Washington Way, the highway that acts as a barrier between downtown and the river. Other plans include extending the downtown street grid to the river, creating more parking, and extending the park system.

In September, the National Underground Railroad Freedom Center picked a design team for its 125,000-square-foot riverfront museum: Blackburn Architects of Indianapolis, BOORA Architects of Portland, Oregon, and Martha Schwartz of Cambridge, Massachusetts. A design for the \$80 million museum—which will commemorate the Underground Railroad and promote interracial harmony—has not been finalized. Funding is from a mix of private and public sources.

Not to be outdone, the city that sits directly across the Ohio River



Zaha Hadid's idea for the Contemporary Arts Center (opposite); the Newport aquarium (above); and Rodolfo Machado's light tower in UC's Sigma Sigma Commons (left).

Aquarium is under construction and will open next year, with HOK Sport as design architect and GBBN Architects the architect of record. Two blocks away, plans are under way for the 33-ton World Peace Bell and the adjacent Millennium Tower, which will rise about 1,000 feet—higher than any building in Cincinnati. ■

from Cincinnati—Newport, Kentucky—has undertaken a number of projects of its own. The \$40 million, 100,000-square-foot Newport

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TALLEST OFFICE TOWER IN MUNICH TO BE BUILT WITH SUSTAINABLE DESIGN

IOKP, a successful “green” architecture firm based in Düsseldorf, Germany, has received the go-ahead to design an immense, ecologically minded tower in Munich.

After five years of discussing how best to develop the city’s industrial north side, with competition designs ranging from glass pyramids to twin towers, Munich’s municipal committee has approved plans for the 656-foot-tall tower to be built next to Munich’s beltway.

The new tower, which will be the city’s tallest office building, will complete a visual triad, along with the Olympia TV tower—at 950 feet, Munich’s tallest structure—and BMW’s 330-foot corporate headquarters shaped like a four-cylinder engine.

IOKP’s building, intended to house part of Munich’s burgeoning media and computer industry, will

comprise three sections of 12 to 15 floors each, crowned with a smaller top zone. Each tower segment will hang from a central structural core, freeing the exterior to work as a porous first skin, which the architects will wrap with another glass membrane.

This exoskeleton will block wind and noise and provide space for the installation of sun louvers in the almost three-foot gap between the two surfaces. More important, this narrow vertical space will also give inhabitants climate control independent of air-conditioning systems: corresponding “window” openings on both exteriors will permit those inside the building, even on top floors, to let in fresh air.

“This building will really breathe,” says architect Christoph Ingenhoven. “Considering that the ’60s skyscraper, with its sealed-in atmosphere, is still very much the standard today, the principle of a breathing high-rise is an important step forward.” The relative structural freedom of the exterior allows sun to enter, allowing for the installation of extensive winter gardens—meaning that the tower “will breathe from the inside out,” notes Ingenhoven.

IOKP projects energy savings of up to 40 percent (compared to traditional skyscrapers), as already demonstrated in Germany’s first ecological skyscraper, the Rhein-Westfalen Electricity Works Headquarters in Essen, which the firm completed in 1996.

Munich could profit from IOKP’s innovative engineering in more ways than one. City officials hope the new building will have the same impact as Günter Behnisch’s tent-like, suspension-cabled sports complex built for the 1972 Olympics and help to create an image for Munich as a world leader in progressive design. *Claudine Weber-Hof*



MINNESOTA’S TWIN CITIES NAVIGATE A RETURN TO THEIR RIVER ROOTS

The Mississippi River defined both Minneapolis and St. Paul. Minneapolis grew around the St. Anthony Falls power source; St. Paul came to prominence as the waterway’s last navigable port. But as milling and transportation declined, so did the Mississippi’s importance.

Now, after decades of neglect, Twin Citians are reevaluating the role of the river. Government and private initiatives, along with public charrettes, have produced ideas to highlight the Mississippi’s natural attributes and the cities’ unique riverfront districts. The common goal is to link the downtowns with the river, and in the process to create multiple opportunities through mixed-use projects.

Cass Gilbert, who was from St. Paul, wanted his hometown to be a ceremonial, processional city, but his designs were compromised by highway construction and short-sighted planning. In 1992, architect Benjamin Thompson offered a plan to return to Gilbert’s idealism by building a “Great River Park”; the city was then inspired to team with Toronto-based urban planner Ken Greenberg to create the St. Paul on the Mississippi Development Framework, which they finished in 1997.

The Framework (plan shown above) outlines a process to foster new connections between river and city. It is already guiding development, as indicated by major projects under way; for instance, Ellerbe Becket’s Science Museum of

Minnesota and its outdoor spaces will act as a hinge between downtown and the river. The RiverCentre convention complex and a proposed hockey arena by HOK have similar purposes.

In contrast to St. Paul’s emphasis on the overarching whole, Minneapolis’s efforts center on appropriate infill and infrastructure development. Urban Design Associates of Pittsburgh planned the West Side Mill District, a half-mile stretch of shore just north of downtown. Using “fingers of green”—corridors that reach from the river to downtown—alongside infill construction, UDA’s plan helps weave the district into the urban fabric. Other key elements include integrating light-rail transit, as well as possibly building a baseball stadium.

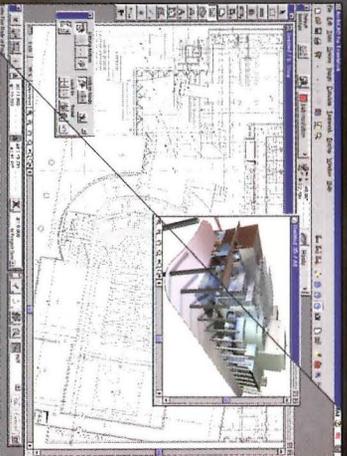
A proposed history center, designed by MS&R, will be wrapped in the shell of an old mill. In addition, Shea Architects is renovating the derelict Milwaukee train depot as part of a hotel complex. The projects are spurring development in adjacent areas; housing projects in the Warehouse Riverfront District, bordering the Mill District, have proven extremely popular. In response, local firm Cunningham Group created guidelines for development to complement the demand.

Recent designation of the Upper Mississippi as an American Heritage River has given residents even more impetus in their bid for reconnection. *Todd Willmert*

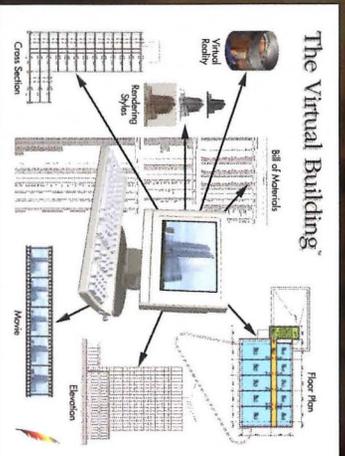
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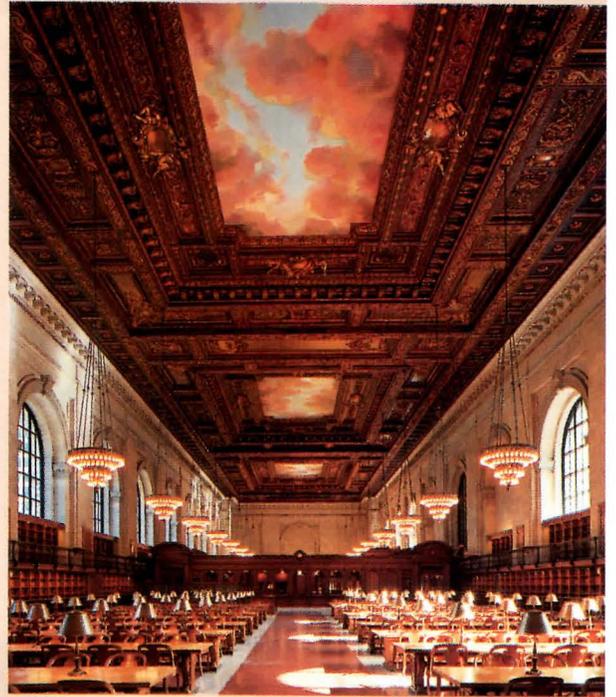


A READING ROOM'S REVIVAL These are proud days for New York's institutions. Grand Central Terminal was recently rededicated amid much hoopla. The news that Penn Station will be moving across the street to the stately General Post Office building was met with enthusiasm. And on November 16, the New York Public Library will reopen the doors to its main reading room, which has been painstakingly restored to its former glory.

The library contracted New York's Davis Brody Bond LLP to oversee the restoration, which necessitated closing the room for the last year and a half. When the architects—led by founding partner Lewis Davis, FAIA—arrived, they were faced with windows that had been painted black during World War II because of air raids; faded ceiling murals; an unsightly copy service center; and other factors that obscured the original design by Carrère and Hastings.

The firm stripped away the grime and decorating mistakes that had accumulated since the library was built in 1911, and then updated the electronic infrastructure to enable the easy use of modern technology, including Internet access via jacks on most tables. Intricate woodwork throughout the football-field-long room was stripped and stained, plaster was cleaned and painted, and copying and other services were moved to other parts of the building. Daylight was allowed in through new windows, and even the lampshades were returned to their original deep gold (they had been painted green). Along with the modern electronics, subtle architectural touches were added, such as installing recessed lighting to illuminate the blue skies of the ceiling murals.

The project was funded by a \$15 million gift from Sandra Priest Rose and Frederick P. Rose; the room will be renamed in honor of their children. *Soren Larson*



GLASGOW PREPARES A YEAR OF DESIGN

After winning a competition to be named the "U.K. City of Architecture and Design" in 1999, Glasgow, Scotland, has embarked on a series of projects intended to boost the image for the city as a center of creativity—and to generate tourism, of course.

The program, an initiative by the Arts Council of Great Britain, will revolve around the reincarnation of the Glasgow Herald Building—designed by the city's most famous architect, Charles Rennie Mackintosh—as the Lighthouse, Scotland's Centre for Architecture, Design & The City (right). Due to reopen in May, the building will house offices, exhibitions, and educational facilities. Glaswegians won't have to wait until May, however: programs begin in January.

Among the more highly anticipated events is Homes for the Future, a six-month expo where experimental designs will be built on the Glasgow Green as the starting point for a new community nearby. Working on a total investment of \$15 million from public and private sources, an international crew of



architects is designing projects with the intention of finding new methods to deal with the challenges of urban living.

Among other activities are the international festival, in October, and the Modern Masters exhibition series, which will highlight the works of great architects such as Mies van der Rohe and Alvar Aalto.

Glasgow wants to ensure that attendance is high during its big year: the vast majority of the exhibitions and events will have free admission. *S.L.*

CALLS FOR UPDATING AND BUILDING AT NATIONAL SYMPOSIUM ON SCHOOLS

Soaring student populations and a decaying infrastructure have combined to cause what AIA President Michael Stanton calls "the double whammy of unprecedented need and a rapidly aging stock of schools."

Stanton was interviewed at the National Symposium on School Design: Schools as Centers of Community, held on October 8 in Washington, D.C. The event was hosted by the Department of Education and the White House Millennium Council, with support from the AIA; other forums were held concurrently in 12 cities across the country.

School enrollment across the U.S. is at an all-time high, it was noted, with numbers not seen since the postwar baby boom. Additionally, with a life expectancy of 50 to 60 years, the stock of schools built to accommodate the previous hordes is nearing the end of its usefulness.

Add to this the expanding role of the school as a focus for the community, and it becomes clear that school design should be a national priority.

Many schools now have multiple duties as centers for day care, language and job training, immigrant services, and senior citizen programs. Secretary of Education William Riley noted that schools "should be a place that students, parents, teachers, and local residents are proud to share with one another."

The White House issued a statement outlining a plan of action calling for the modernization of old schools and building of new ones, encouraged by a proposed interest-free bonding authority; keeping public schools open longer in the year and investing in after-school programs; and expanding the role of schools in the community through programs for all ages and incomes.

The White House also suggested convening regional meetings across the country, spearheaded by the Department of Education, to discuss how schools can meet local challenges; and promoting energy-smart schools to lower energy costs and redirect those savings into school programs. *Ellen Sands*



GRAPHISOFT'S NEW OFFICES EMERGE ON HISTORY-LADEN BUDAPEST SITE

A stroll across the grounds of Graphisoft Park in Budapest is a walk through time. Located on the banks of the Danube River, Graphisoft's high-technology software research and development center, now being constructed, is surrounded by history—a fact not lost on its architects.

"There's a timelessness to this site," says Ferenc Csagoly, managing director of Epitesz Studio, who with Epitesz's senior architect, Ferenc Keller, designed the complex. The firm won the commission three years ago.

Graphisoft Park sits on about 18 acres in a section of the city called Aquincum, named by the first-century Romans who once occupied the area. Not far away are a large amphitheater dating from AD 160 and the remains of a villa, a chapel, and baths. "There were no basements dug for the buildings at Graphisoft Park because it's an archaeological site. They were erected on slabs," says Csagoly.

There are now three buildings in the park—including Graphisoft's newly opened 33,000-square-foot headquarters—which have cost a total of \$10 million. Plans call for seven to 12 more buildings, and construction will take approximately five more years.

"We designed the buildings based on a very detailed program of what the buildings would be used for and how [employees] do their

jobs," Csagoly says. "We spent a lot of time working with Graphisoft and learning what software development means. They gave us a free hand to be creative. It was a very pleasant situation."

The complex, he noted, was designed using Graphisoft's ArchiCAD visualization tools. Each of the three-story structures features a number of small balconies, a lot of interior open space, and integral communications, computer, and security systems. The landscaped campus, with small hills and trees, will eventually have a stream flowing through it.

"We used a lot of transparent and opaque glass to give the buildings a sense of openness," Csagoly says. "[It's] a bit similar to early-20th-century architecture, when modern movements like Bauhaus started."

Standing nearby is the former Budapest gasworks plant, built around the turn of the century, which features strange spires that conjure an illustration out of a book of fairy tales. Graphisoft is considering converting the building, vacant for more than 20 years, into an industrial museum, but Csagoly says it would be a formidable, expensive task.

"The towers are very beautiful, but the interior walls are impregnated with coal dust and tar, so it would be very hard to renovate them," he explains. *Carl Kovac*

DESIGNS THAT HUG THE TREES: THE FOREST CANOPY STUDY CENTER

In the interest of gaining a new perspective on forests, Anderson Anderson Architecture of Seattle is working with ecologist Nalini Nadkarni to develop the Forest Canopy Study Center on the campus of Evergreen State College in Olympia, Washington.

At the center, students, faculty, and visitors will wind their way along a 1,500-foot-long ramp that rises 80 feet above the ground into the treetops before burrowing 10 feet underground for a mole's-eye view.

Explains Nadkarni, a faculty member, "Creating a canopy network to view the forest from a variety of vantage points is the first step in understanding, appreciating, and managing forest ecosystems."

The Anderson brothers, Peter and Mark, plan to build a welded aluminum and wood ramp supported by tube steel stilts splayed—for stability—on a zigzag course through the forest. Trellis screens attached at various points to an expanded aluminum guard rail will provide spots for moss and lichen; rubber tubes will carry steam from the university's central plant along the ramp to create mist for the growth. If fundraising proceeds on schedule, construction could begin in 2000.

This fully accessible walkway system will be entered from the third floor of the existing college library and will be punctuated by a series of platforms for scientific experiments, instruction, and public

viewing. Each of the interpretive decks throughout the project will feature a hydraulic extending crane, to be used for flexible access to research projects deep within the forest canopy. A 2,500-square-foot seminar room will serve as the major way station and will have an adjustable glass enclosure with wood shutters to control light and air circulation.

The college's nontraditional, interdisciplinary curriculum inspired the center's creative programming, which includes an Epiphyte Screen: a vertical, dish-shaped structure overflowing with plants and rising mists that works as a projection screen, stage, and informal gateway into the canopy network.

While forest canopy systems exist in other parts of the world for research or eco-tourism, this one will be unique due to its location on a college campus, its subterranean component, and its incorporation of the public within a scientific facility.

"Recent research into [elevated] access systems has presented exciting new directions, including the possibility of integrating them into urban settings to grow high-value crops," says Peter Anderson, AIA. "This could offer a viable alternative to current agricultural patterns that contribute to deforestation." Similar issues will be explored at the upcoming Agro-Urban Ecology Conference, to be held at the University of Hawaii in March. *Sheri Olson*



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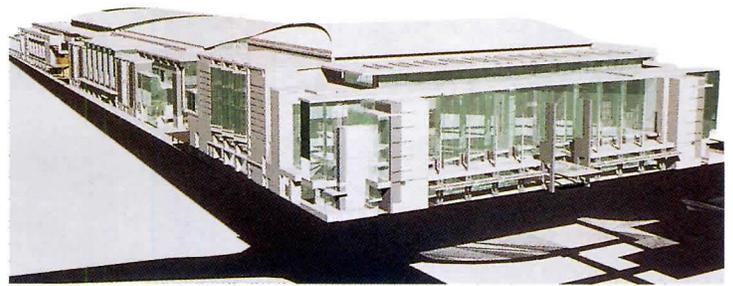
CIRCLE 29 ON INQUIRY CARD

LACMA'S ARTISTIC EXPANSION The Los Angeles County Museum of Art is undertaking its first construction since the 1980s, with a three-prong strategy of renovating its main plaza, improving the 28-acre surrounding park, and refurbishing the former May Co. department store that houses its LACMA West branch. The museum sees the overall project as a step toward creating a "cultural village green" along Wilshire Boulevard.

Santa Monica's Kirkpatrick Associates designed the \$2.5 million plaza overhaul. To start, the museum shop has been relocated to a new 2,200-square-foot building; unlike its predecessor, this store is wrapped with a retail-savvy wall of clear glass. A 1,000-square-foot café now occupies part of the former museum's space, while three kiosks—two on the plaza and one at the main street entrance—act as "conciierge" stations.

The Hancock Park Improvement Project, slated for completion in March, will be a boon to both LACMA and the adjoining George C. Page Museum of La Brea Discoveries. The \$12 million upgrade—financed by public and private sources—includes infrastructure improvements by landscape architect Laurie Olin and a 150-seat bermed amphitheater designed by sculptor Jackie Ferrara.

At LACMA West, Kirkpatrick has restored the old store's gold-leaf tesserae and black-marble Art Deco facade (below). The firm is now overseeing the \$3 million interior renovation, which involves linking three first-floor galleries—including an 8,200-square-foot space for exhibitions organized by the Southwest Museum—by a retail promenade. Next on LACMA's agenda is more visibly uniting the entire museum campus. *Terry Bissell*



DESPITE ARGUMENTS OVER SITE, WORK IS STARTED ON D.C. CENTER

Ground was broken and fences were mended as the new Washington Convention Center got under way recently in downtown Washington, D.C. It will supplement an under-sized, outdated facility several blocks to the south, and is scheduled for completion in 2003.

Designed by the Atlanta firm Thompson, Ventulett, Stainback & Associates (TVS) and topping out at 2.3 million square feet, the new center will be D.C.'s largest municipal (but not federal) project to date. It will feature a curved glass wall and extensive use of limestone, granite, and brick; the design is meant to assimilate with surrounding structures. Devroux & Purnell and Mariani Architects-Engineers are partners in the team.

Because the project straddles the commercial downtown to the south and a residential neighborhood to the north, it initially met with criticism. Residents of Shaw,

the area just north, feared noise and exhaust would undermine recent neighborhood improvements. They proposed an alternative site at the Union Station rail yards, a more industrial area and, they felt, more appropriate for a huge building.

Meanwhile, the business community argued that the site, two city blocks, was too small, and that since there were no additional lots available for expansion, the building would soon be outmoded—the same predicament that befell the existing center. They argued that the Union Station site offered better opportunities for expansion.

After reviewing the TVS scheme, however, both sides seem relatively content. Ken Stockdale, project manager for TVS, reported that as much of the building was placed below ground as was practical, and that the volumes step down in size and scale as they reach the nearby residences. *Ellen Sands*



NEW URBANISTS THROW A PARTY AND INVITE THEIR CRITICS TO COME

Some of the top practitioners of New Urbanism gathered in September to talk about their work. That in itself wasn't unusual—but the audience was. The invitation-only program featured a number of New Urbanism's leading critics, including Colin Rowe and Alex Krieger. The idea, says architect Andres Duany, was to assess the successes and failures of New Urbanism and subject it to rigorous intellectual tests.

In recent years, the designing of traditional towns and communities has been embraced by developers, homebuilders, and civic officials, and even the Department of Housing and Urban Development, which is applying New Urbanist methods to many of its troubled public housing projects. However, it has not been widely accepted in academia, where Modernism rules.

The September meeting, intended to illuminate this rift, was

held at Seaside, the Florida town that is in many ways the birthplace of New Urbanism and one of its shrines. Many designers presented projects, but they were immediately subjected to scrutiny and tough assessment.

Rowe pointed out that despite its achievements, New Urbanism hasn't developed a sophisticated formal vocabulary and suffers from lack of clarity in its use of forms. Other discussions ranged from design style to the appropriateness of "gating" communities.

Todd Bressi, urban designer-in-

residence for the city of Scottsdale, Arizona, is editing the debates for a book to be published by Rizzoli—and there was no shortage of debate. Jaquelin Robertson talked of the "mess" the country has made of itself; Krieger argued that all was not lost, saying that the word "urbanism" should not be applied only to high-quality new and renovated places, because this denies the inner city its chance.

Next stop on the New Urbanism circuit is Harvard, where a similar program is planned for the spring. *Beth Dunlop*

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DENVER DEVELOPER PLANS A TOWER INSPIRED BY PAKISTANI MOUNTAIN

Architecture critic Paul Goldberger once called downtown Denver “a disappointing collection of mediocre skyscrapers,” and businessman W. Scott Moore agrees. “They’re pretty unimaginative,” he says. Now Moore wants to build a landmark 86-story skyscraper in downtown Denver, “something that would make a significant statement.”

Moore has hired Los Angeles architect Richard Keating, FAIA, of DMJM Keating Architects to design his dream tower, which would be the tallest building west of Chicago.

Keating, former design partner with Skidmore, Owings & Merrill, has designed a number of office towers, including the 52-story Gas Company Tower in downtown Los Angeles. But Moore was unfamiliar with the architect’s projects. “I was just going by his reputation,” says Moore, whose office in the Republic

Plaza building—at 56 stories, Denver’s tallest—offers stunning views of Pike’s Peak and the Front Range. “When I met him, we just hit it off.”

At their first meeting, Keating asked Moore to name a building “anywhere in the world” that resembled what he had in mind for Denver. Moore responded by showing the architect not a building but a *National Geographic* photograph of the Trango Tower, a 20,469-foot granite dagger in northern Pakistan.

“That was a surprise,” Keating says. “Then it occurred to me that we could use the spirit of this mountain tower to inspire a design.” Back in Los Angeles, Keating began working on preliminary drawings of the building he and Moore were now calling the Trango Tower.

Keating’s design is indeed unlike anything Denver has seen. Set on a 17-story rectangular base, the wedge-shaped tower resembles a knife blade piercing the sky. One side tapers up to a 40th-floor observation plaza and then widens until it reaches the top, which is angled. Moore wants the building to be constructed of “golden brown” granite, just like the real Trango Tower.

The skyscraper, Moore says, would contain offices, shops, a high-end hotel, and luxury condos, some costing nearly \$2 million. He admits that the residences could be a hard sell, “not necessarily because of the price but because of the concept.” An increasing number of Denverites are moving downtown these days, but most have chosen to live in 19th-century commercial buildings that have been converted to lofts.

Moore’s next step is to put together a development team and begin raising the money—as much as \$400 million—to finance the project. Even if all the pieces fall into place, Moore says, completion of the Trango Tower is years away. But he’s determined to leave his mark on the Mile High City. *David Hill*



AFTER EARTHQUAKE DEVASTATION, SANTA MONICA GETS HEALTHY HOSPITAL

The 1994 Northridge earthquake badly damaged the St. John’s Health Center in Santa Monica, California. The center was subsequently required by law to begin construction on a replacement facility within five years.

In August, St. John’s broke ground on the replacement: a new 450,000-square-foot, \$270.8 million hospital that not only incorporates base-isolation seismic engineering to guard against future earthquakes, but is intended to raise the standard of health care design by taking new approaches to comfort and modern patient needs.

The building was designed by SMP/SHG Architects and HOK. The joint venture group worked with St. John’s to address fundamental changes in health-care delivery as well as rapid and ongoing advances in medical technology.

Because more and more hospitals are geared toward outpatient care, the new facility is smaller and provides fewer beds than the one it replaces. Adjacencies between outpatient services have been carefully considered, and the most frequently utilized services have been placed within 100 feet of a large entry atrium, the focal point of the new facility, which floods the interior with light.

Much as I. M. Pei’s glass pyramid at the Louvre serves to organize

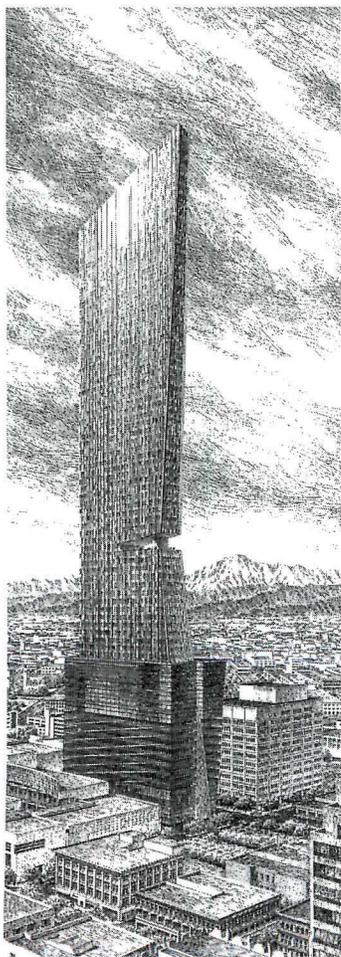
access to the museum’s vast wings, the atrium at the new St. John’s will make legible the myriad functions of the hospital that radiate from it.

Circulation routes for patients, visitors, and staff are independent. While staff corridors remain double-loaded and interiorized, single-loaded paths with views and abundant natural light, reserved for patients and visitors, will traverse the building’s periphery.

The ability to focus on familiar external landmarks will help to diminish pervasive feelings of alienation normally confronted in a hospital, according to the architects. “Dignity elevators” that connect underground parking and patient services will be available for those who wish not to be seen, either before or after treatment.

Finally, in keeping with the latest media technology, the new facility will be “paperless.” Patient histories, X-rays, and other important records will be stored electronically.

St. John’s is also planning on-line services for its patients and staff; direct access to the facility will be available for patients from their homes. With advances such as these, St. John’s and its architects hope they will contribute to the well-being of the community in a broader and friendlier manner than before. *Alice Y. Kimm*



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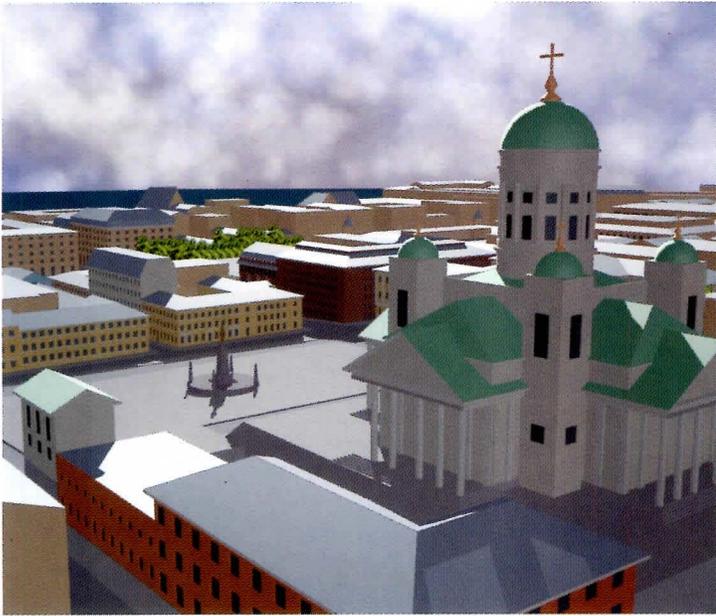
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ARCHITECTS' PATH ON INFO HIGHWAY CHARTED AT SEATTLE CONFERENCE

Just as highways influenced the form of American cities, the information highway will transform our cities in the future, according to presenters at "Seattle: City of Bits," a conference held at the University of Washington last month.

Keynote speaker William J. Mitchell, dean of the School of Architecture and Planning at MIT, said technology is issuing a wake-up call; architects need to understand the coming transformation and proactively address the opportunities it offers, which go beyond simple building design.

Speakers noted that bank branches are being replaced by ATMs and bookstores are losing business to Amazon.com. And as more work is conducted in home offices, suburban neighborhoods are becoming repopulated during the day. Services that cannot be replaced by electronic equivalents, such as restaurants and health clubs, could be relocated from city centers to these "live/work" neighborhoods, it was suggested.

The conclusion was that understanding which functions require face-to-face social interaction will become a critical skill for architects, whose choices could affect urban vitality. Increasingly, some client

needs will be best satisfied with Web sites instead of bricks and mortar.

But architectural work will not necessarily diminish; design prowess will be needed in other venues. "[Architects'] skills in three-dimensional thinking are essential in the design of virtual environments," noted Finnish architect Immo Teperi. "We can't leave it to graphic designers and computer professionals."

Teperi described the 3D model of metropolitan Helsinki (above) which his firm, Arcus Software, has created for the Helsinki Arena 2000 project. Web surfers can "walk through" the model city and click on icons to read train schedules, for example, or listen to live concerts. The model's links to physical infrastructure, like representations of buildings and underground utilities, will also be useful to professional audiences: the workload for modelers is potentially vast.

Conference attendees agreed that no one knows how cities will be transformed, but architects' creativity will be key to directing their development. The conference was sponsored by the Jeanette and David McKinley Endowment for the Design of Future Architectural Environments. *B. J. Novitski*

THE GREENING OF THE MALL Several 1960s strip malls in the Boston area are going green. The malls' owner, Gravestar, based in Cambridge, Massachusetts, has hired the Manhattan architecture firm Croxton Collaborative to guide the renovations and help attain the goal of sustainability. Randolph Croxton, a partner in the architecture firm, explains that Gravestar "has concluded that environmental sustainability will create the best return on investment." Gravestar will spend \$3 million per center, with completion due by 2000.

Storefronts will be daylit with long, slender skylights—just inside the front glass—to displace some of the electric lighting ordinarily used. Deeper into the stores, skylights of high-performance glazing will provide sharp shadows to animate the checkout areas. Solar panels, funded in part by a Department of Energy grant, are planned. And guidelines will be issued on topics such as selecting paints or sealants, recycling, and site-drainage techniques. Crescent-shaped ditches, used to percolate rainwater from the parking lots, will be planted with native grasses and trees.

If it uses the protocols, a supermarket with several locations will double the energy savings it could expect if renovations were undertaken without them, Croxton says. Improvements will be phased in as leases expire, although some tenants plan to undertake renovation immediately, with the landlord's financial support. The parties will split the savings in power costs. *Craig Kellogg*

A DISABLED ICON OF DESIGN IS REBORN AS OFFICE COMPLEX

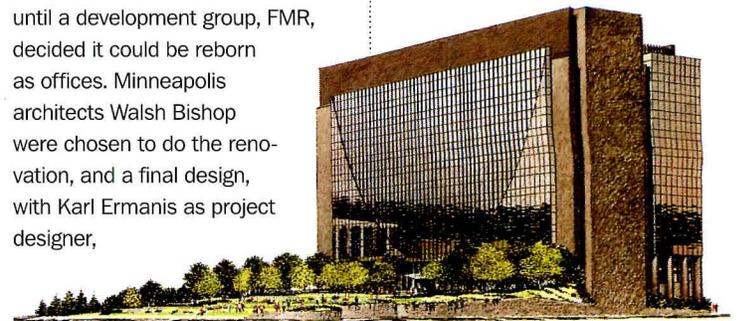
The former headquarters of the Federal Reserve Bank of Minneapolis, widely admired after its completion in 1973 for a bold structural system in which the building "hangs" from a catenary arch, is being transformed into an office complex.

Designed by Michigan architect Gunnar Birkerts, the bank's curtain wall of black reflective glass was constructed in two planes to allow the arch to be seen outside. However, the unique structure also allowed water to seep inside and condense. Experts agree that the curtain wall has now completely failed.

After the Federal Reserve built a new headquarters, the old bank building stood empty for two years until a development group, FMR, decided it could be reborn as offices. Minneapolis architects Walsh Bishop were chosen to do the renovation, and a final design, with Karl Ermanis as project designer,

was recently accepted. Construction should begin this winter on what is now called Marquette Plaza. The \$55 million renovation includes adding a 10-story office tower on the east side. For the famous west facade, the architects devised a new curtain wall with an aluminum frame, again composed of two different planes—but this time with both inside.

The developer also plans to landscape the forbidding black granite plaza, which will become public green space with terraces at four different levels. By November 1999, the entire project should be completed, with state-of-the-art glass guaranteed to last. *Bette Hammel*



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NEWS BRIEFS

We the architects The National Constitution Center has chosen the design team for its new \$130 million museum building: Pei Cobb Freed & Partners and Ralph Appelbaum Associates. Ground will be broken in September 2000 for the project, which will house interactive exhibits and activities that illustrate the U.S. Constitution's history and meanings.

Viva Venice Venice, which was built on a lagoon using a system of pilings and platforms, may be sinking. But the city isn't devoid of new architectural endeavors. British firm David Chipperfield Architects has won a competition to extend the San Michele cemetery, which sits on an island just north of Venice's main cluster. The project's first phase will involve a series of new courtyards, a crematorium, and a chapel in the existing cemetery. In the second phase, an uncultivated extension of the island will host the construction



Millennium monoliths: a vision for Newport, Kentucky (above); a tower design for Paris (right).

of courtyards, tomb buildings, and a system of gardens.

Towering achievements Among the many projects being built to celebrate the year 2000 are a number of new towers—in very different locales. Swedish architecture firm



Wingardh has designed the 900-foot-plus Scandinavian Tower outside Malmo, Sweden, with hopes of completion by the turn of the century. In Paris—where the Eiffel Tower is an emblem of the late 19th century—architect Nicolas Normier has designed a 656-foot-high structure called the Earth Tower. The building, to be made mainly from wood in a nod to fin-de-siècle environmental concerns, is budgeted at

\$41.7 million. Meanwhile, plans are under way in Newport, Kentucky, for a 1,000-foot tower to celebrate the millennium; the city claims it will be the tallest monument in the world (see related story, page 39).

Flight pattern HOK's aviation division is keeping busy. The firm has been chosen for two international projects: renovations and a new terminal at Johannesburg International Airport, and a new terminal at Wales Severnside International Airport. It will be HOK Aviation's first work in South Africa and in Wales.

Knock it off Faucet-maker Kroin has won a court battle to prevent Kohler, the largest plumbing fixtures supplier in the U.S., from distributing the Falling Water faucet. Kroin had claimed Kohler's product diluted the trademarked image of Kroin's Sanitary Fittings line, designed in 1968 by Danish architect Arne Jacobsen. Kroin says the decision has wide implications for designers

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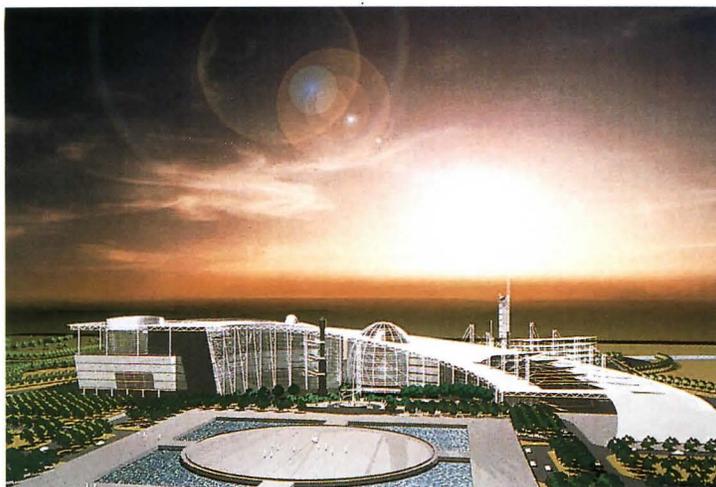
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and architects who want to prevent "knockoff" versions of their work.

Licensing update Congress has clarified a portion of the welfare reform bill it passed in 1996. As a result of that legislation, professional licensing (including architecture) was considered a public benefit; foreign architects who permanently reside outside the U.S.—even Canadians—started to have trouble obtaining or renewing licenses. Now, the issuance or renewal of a license to a foreign practitioner has been exempted. The AIA and the Canadian Architectural Councils had lobbied for the change.

Skate justice Skateboarding has become one of young America's favorite sports. But skating on the street has always been problematic, if not illegal. That's why Design Concepts has designed a 10,000-square-foot skatepark in Greenwood Village, Colorado. The park, which could open next summer at a cost



RTKL in China: the proposed design for Shanghai Scienceland.

of \$200,000, will feature a variety of courses and was designed with the input of teenage enthusiasts.

Honor roll This year's Chrysler Award for Innovation tapped two architectural firms among six honorees: Steven Holl Architects and Tod Williams and Billie Tsien.

Meanwhile, the Carlsberg Prize, Denmark's highest architectural honor, has been awarded to Swiss architect Peter Zumthor.

Shanghai special During his visit to China this summer, President Clinton took time to help unveil plans for Shanghai Scienceland, a science museum and research facility. The \$200 million, 950,000-square-foot project, slated for

completion in October 2001, is being designed by American firm RTKL International. RTKL has proposed an asymmetrical, futuristic design overlooking Civic Plaza that the firm says will showcase the latest advances in science and engineering; for example, louvered solar panels will allow the building to be partially solar-powered.

Delayed performance Opening night for Hungary's new National Theater has been postponed for a year because of escalating costs and design changes. Original plans called for a 190,000-square-foot theater costing \$28 million. However, during the design phase, the theater grew by 100,000 square feet and construction costs have soared to nearly \$90 million. A proposed 200-seat studio theater has been eliminated, and an expansion of the main theater to hold up to 1,000 patrons—instead of 650—is being considered. The building is slated to open in August 2001. ■

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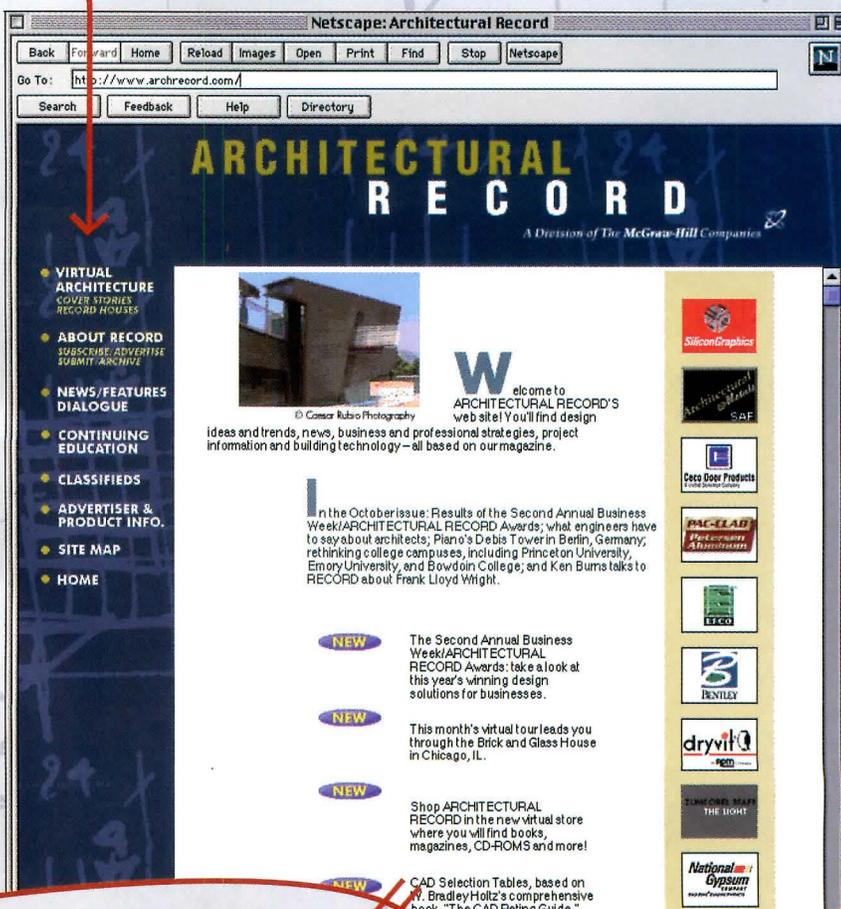
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DATESEVENTS

Calendar

Berlin Constructions; Kapital Architectures New York City

Through December 4

An exhibition and a symposium (on November 21) focusing on current construction in Berlin, both co-sponsored by Parsons School of Design and the Goethe Institute. Parsons Gallery (exhibition), 212/229-8987; New School (symposium), 212/229-8955.

Equal Partners

Northampton, Mass.

Through December 13

A celebration of male/female professional collaborations, featuring the work of 15 American firms founded and run jointly by men and women, including Arquitectonica, Asymptote, Hodgetts + Fung, and Tod Williams Billie Tsien Associates. Smith College Museum of Art. 413/585-2760.

The American Dream by Mail Order

Chicago

Through December 31

An exhibition exploring the history of Sears, Roebuck & Co. catalog houses built between 1908 and 1940. Chicago Architecture Foundation. 312/922-3432.

New Ways of Revitalizing the American City

Washington, D.C.

Through January 3, 1999

An exhibition illustrating how new cultural facilities have enlivened tired downtowns in Phoenix; Cincinnati; Fort Worth; Newark, New Jersey; San Jose, California; and Kansas City, Missouri. National Building Museum. 202/272-2448.

La Présence des Objets: Gaetano Pesce Montreal

Through January 3

Furniture, objects, and models and plans of recent projects by the architect and industrial designer. Musée des Arts Décoratifs de Montréal. 514/284-1252.

Japan 2000: Kisho Kurokawa Chicago

Through January 3

A retrospective of the Japanese architect's work, from his early Metabolist projects to his current addition to the Van Gogh Museum in Amsterdam. Art Institute of Chicago. 312/443-3600.

Robert Adam: The Creative Mind Washington, D.C.

Through January 3

An exhibition of work by the 18th-century neo-classical Scottish architect, demonstrating his process of design from conception to final presentation. Includes 66 drawings. The Octagon. 202/638-3105.

Bechtel's First Century Washington, D.C.

Through January 4

A portfolio of projects by the San Francisco-based Bechtel Group, one of the world's largest engineering and construction firms. Highlighted projects include the Hoover Dam, San Francisco's rapid-transit system, and the Channel Tunnel between England and France. National Building Museum. 202/272-2448.

Tensions in Architecture

New York City

Through January 5

An examination of the extraordinary recent developments in the materials and technology of tensile structures. Material ConneXion Gallery. 212/445-8825.

Designing the Disney Theme Parks

New York City

Through January 10

"The Architecture of Reassurance" examines how Disney attractions are conceived, planned, and built. On display are 200 plans, drawings, paintings, and models from Disney archives, many of which have never been publicly displayed. Cooper-Hewitt National Design Museum. 212/849-8300.

George B. Post: Great American Architect New York City

Through January 10

Among the works featured in this exhibition of the late-19th- and early-20th-century architect are renderings of the long-demolished Equitable Life Assurance Society (the first building to use elevators) and the Western Union Building (the first to reach 10 stories). New-York Historical Society. 212/873-0509.

Premises: Invested Spaces from France New York City

Through January 11

An exhibition of visual arts, architecture, and design in France from 1958 to 1998 that underlines the relationship between the artist/architect and the constructed environment. Included are models, drawings, photographs, and installations

by Christian Boltanski, Yves Klein, Le Corbusier, Jean Nouvel, and Annette Messager, among many others. Guggenheim Museum SoHo. 212/423-3500.

All Wright: The Dana-Thomas House
Chicago

Through January 31

An exhibition showcasing the most complete and best-preserved example of Frank Lloyd Wright's early Prairie houses. Chicago Architecture Foundation. Call 312/922-3432 or fax 312/922-0481.

Louis Comfort Tiffany at the Metropolitan Museum of Art
New York City

Through January 31

Nearly 100 Tiffany works from the museum's collection, including windows, lighting fixtures, and objects, are featured. The full-scale entrance loggia from Tiffany's Long Island estate is also on view. Metropolitan Museum of Art. 212/570-3951.

City Satire: The Cartoons of Roger K. Lewis
Washington, D.C.

Through February 28

More than 100 cartoons satirizing the state of architecture and urban design, originally published in the *Washington Post*. National Building Museum. 202/272-2448.

Build Boston
Boston

November 17-19

The Northeast's premier trade show and convention for building products will have more than 350 exhibitors and 10,000 attendees. Over 180 professional workshops will be offered. Call 800/544-1898 or visit www.buildboston.com for details.

AIA Leadership Institute
Los Angeles

November 19-22

The AIA has teamed with the National Leadership Institute to offer a three-day course in leadership skills for architects. AIA members

receive a substantial discount off the normal cost of the program. To register, call Emily Cole, manager of AIA Continuing Education, at 202/626-7445.

Healthcare Design Symposium
San Francisco

November 19-22

The health-care design industry's premier conference includes three days of plenary sessions, an exhibition of products and services, an awards banquet, and tours of local health-care facilities. Call the Center for Health Design at 800/955-1226 or visit www.hcaredesign.com for details.

Thermal VII
Clearwater Beach, Florida

December 6-10

A conference focusing on the latest technologies related to the thermal performance of building envelopes. The core conference and workshops meet AIA/CES criteria for quality levels II and III, respectively.

Sheraton Sand Key Resort. Call Mia Prater at 423/576-7942 for details or E-mail her at unb@ornl.gov.

IASTE '98
Cairo, Egypt

December 15-19

This year's conference of the International Association for the Study of Traditional Environments examines how nations are cultivating traditional architecture as a means of attracting tourism. There will be about 120 papers presented by scholars from around the globe. Contact the Center for Environmental Design, University of California at Berkeley. 510/642-2896.

Celebrating Chandigarh
Chandigarh, India

January 8-11

An international conference marking the 50th anniversary of the Punjab capital's conception includes discussions of how its design, by Le Corbusier and many others, affected city planning in developing

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nations around the world. Call 011/91/172/548742 or visit www.cperspectives.org for details.

Competitions

Intern Development Program Outstanding Firm Award

Submission deadline: November 13
Sponsored by the AIA's Intern Development Program, this award honors architecture firms that give outstanding support to interns by providing comprehensive training opportunities, promoting mentorship and participation, and encouraging supplementary educational activities. For an entry form, call David Roccosalva at the AIA, 202/626-7325.

FabStruct '99

Submission deadline: December 4
A competition that challenges students to design a hypothetical international student center, built from fabric membranes, for the Millennium Dome currently under

construction in Greenwich, England. Call Arik Hanson at 800/225-4324 or visit www.ifai.com.

Rudy Bruner Award for Urban Excellence

Submission deadline: December 18
This award is given to urban places that demonstrate a successful integration of effective processes and meaningful values into good design. The Gold Medal winner receives \$50,000. Call 617/492-8401 x139 (please mention ARCHITECTURAL RECORD) or E-mail info@brunerfoundation.org for more information.

London AIA Excellence in Design Awards

Submission deadline: January 15
The awards program honors excellence in architectural design for work completed between January 1, 1993, and December 31, 1998. Eligible are projects by U.K.-based architects working anywhere in the world; projects in the U.K. by archi-

tecs from anywhere in the world; and projects in the U.K. by U.K.-based students. For more information, write AIA, Kent House, 14-17 Market Place, London W1N 7AJ, or fax 011/44/171/636-1987.

James Beard Foundation/ Interior Design Awards

Submission deadline: January 29
Established in 1995 to honor excellence in interior and graphic design for restaurants, these awards are for projects in the United States and Canada. For information, write the James Beard Foundation, 6 West 18th Street, 10th floor, New York, N.Y. 10011 or visit www.jamesbeard.org.

Library for the Information Age

Submission deadline: January 31
The first international Web-based architectural design competition, sponsored by the Association for Computer-Aided Design in Architecture, calls for the design of a library that takes full advantage of infor-

mation technology while still serving the library's roles in culture and society. Proposals may incorporate spatial simulation and/or physical solutions. Open to student and professional designers worldwide. Visit www.acadia.org/competition/ for more information.

Union Internationale des Architectes Student Competition

Submission deadline: January 31
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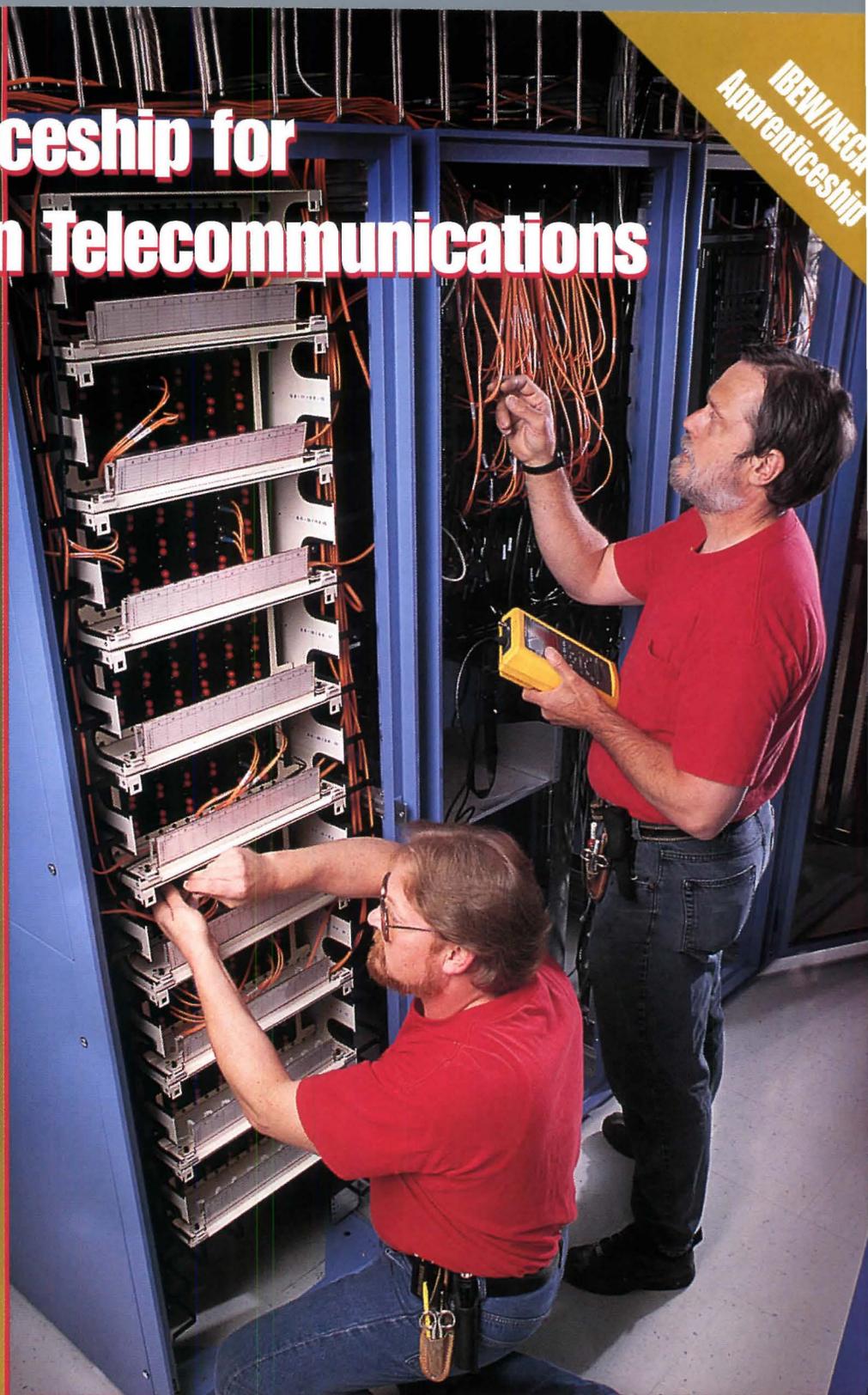
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FEATURES

THE AGA KHAN AWARD:

Honoring Substance Over Style

**INTERNATIONAL IN SCOPE, DIVERSE, SERIOUS, AND WELL-RESEARCHED,
THE AGA KHAN AWARD MAY BE THE WISEST ARCHITECTURAL PRIZE PROGRAM
WE HAVE, ACCORDING TO ROBERT CAMPBELL.**

Window detail, Lepers Hospital, Chopda Taluka, India.





A revitalized street in Hebron Old Town.

PHOTOGRAPHY: COURTESY AGA KHAN AWARD FOR ARCHITECTURE THROUGHOUT
© RAM RAHMAN (HOSPITAL); GUVEN INCIRLIOGLU (HEBRON)

by Robert Campbell, FAIA

The Aga Khan Award is the wisest prize program in architecture. It's the most serious, the most thoroughly researched, the most thoughtful. It's almost the only one that deals with anything more important than the latest fashions in forms or ideas. In fact, not being about fashion is one of its goals.

The awards are given, every three years, to distinguished works of architecture in the Muslim world. There are seven prizes for 1998, which were bestowed on October 9 at the Alhambra Palace in Granada, Spain. The Alhambra, of course, is an Islamic building that's on anyone's short list of the world's greatest works of architecture. The people at the Aga Khan Trust for Culture, which administers the award, always do that: they pick a stunning Muslim site for the presentation. So the ceremony itself displays Islamic culture to the international crowd of critics and architects who gather. It's typical of many smart moves on their part.

Historian William Curtis, writing in this magazine, gave an excellent definition of the award: "The Aga Khan Award for Architecture is more than just a prize that is given every three years for distinguished architecture in Islamic countries. It is also an evolving enquiry which has as its aim an authentic built environment for the Muslim world. The homogenization or deracination which stems from facile imitation of Occidental models is rejected. So too is the false remedy of a shallow imitation of the local past."

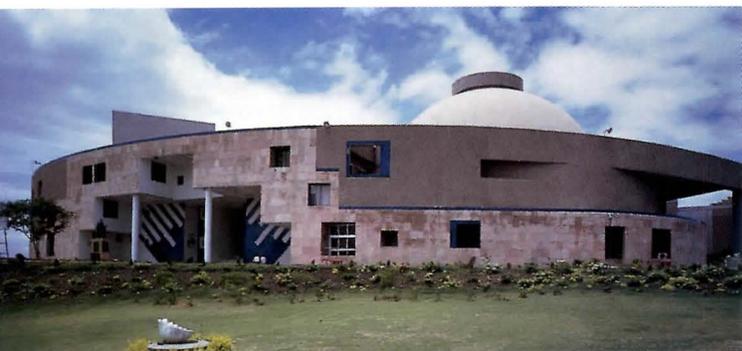
But this isn't merely a Muslim problem. It's an issue we all face. Western architects, too, create "facile imitations of Occidental models." If we all go on doing that, the whole built world will eventually look the same, a nightmare that comes closer every day. On the other hand, if we try to preserve a sense of place by cloning the local past, we're just faking. When Curtis talks about "an authentic built environment," he's describing the problem of striking the right balance between the local and the global—an issue that such critics as Kenneth Frampton have made central in architecture. Nobody else is investigating it with quite the passion and intelligence of those who present the Aga Khan Award.

This year's winners, as usual, run a wide gamut. There's a sewer-improvement plan for a desperately poor district, and there's a palace of recreation for diplomats. All of them address real-world problems, and they're not necessarily conventional architecture. Nothing this year comes quite as close to falling off the architectural screen as the 1995 prize for a tree-planting program in Turkey, but the seven 1998 winners range almost as far.

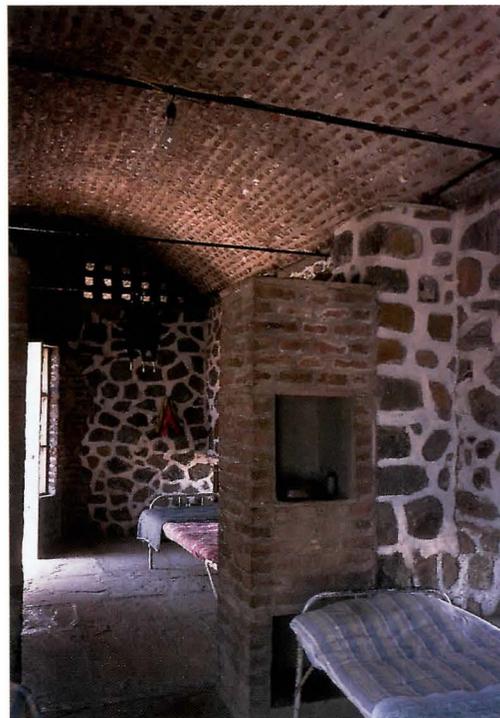
In Indore, India, a "slum networking" project upgraded a squatter settlement by installing a minimum of new infrastructure, especially sewers. It then engaged the energies of the slum dwellers by offering them free land leases. No longer squatters, the residents responded with further improvements of their own. They built their own connections to the new sewers, then went on to upgrade their dwellings. By means of a small public investment, a self-help community was formed.

Incidentally, nobody's queasy about calling a slum a slum, and they avoid inventing blather about the economically challenged. "A slum is an organic entity that grows and, if evicted, simply moves," reports the award jury. "Slums are present in all cities, but once acknowledged they can become meaningful parts of a whole city." Is "slum networking" architecture? Well, if you define architecture as the art of making places for human habitation, it is.

Robert Campbell, FAIA, is the architecture critic of the Boston Globe and a contributing editor of this magazine.



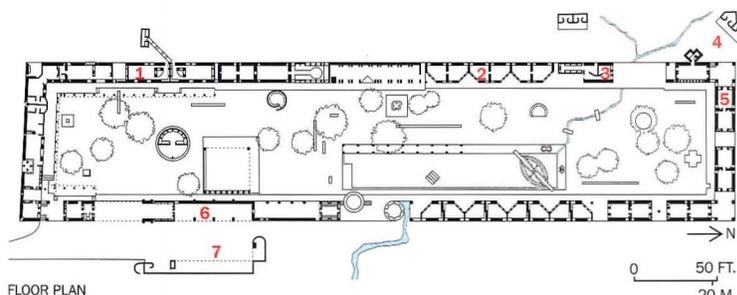
Lepers Hospital,
Chopda Taluka, India
Architects: Per
Christian Brynildsen
and Jan Olav Jensen
Client: Norwegian Free
Evangelical Mission,
India Trust



1. Staff quarters
2. Female ward
3. Clinic
4. Toilets
5. Male ward
6. Buffalo shed
7. Poultry shed



Vidhan Bhavan (State
Assembly), Bhopal, India
Architect: Charles Correa
Client: State Government
of Madhya Pradesh



In Hebron, now part of Israel, the historic Old Town was left 85 percent abandoned after the conflicts of the 1960s. In 1995, a group began restoring the neighborhood's historic stone houses. So far they've completed 127 dwellings, with 95 other buildings in progress. Residents and shops are moving back. In its usual dry, diplomatic language, the award jury touches on what must have been appalling political hassles: "Many sensitive issues had to be faced, among them such technical complications as land and property ownership, or such complex questions as cultural identity and historical consciousness."

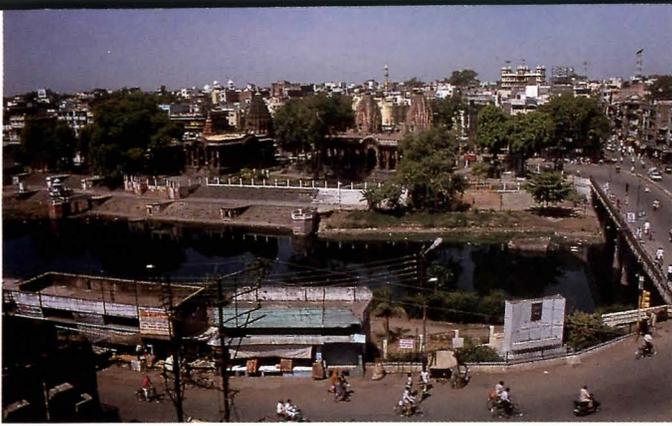
**NOBODY'S QUEASY ABOUT CALLING
A SLUM A SLUM, AND THEY
AVOID INVENTING BLATHER ABOUT
THE ECONOMICALLY CHALLENGED.**

In Chopda Taluka, India, two Norwegian architecture students on a study trip were convinced to design a hospital for lepers. The students created a square of dormitories that surrounds a protected center of trees and flowers, conceived as a "paradise garden." The students spent more than a year overseeing construction, which was performed by 70 workers using entirely local materials and working without power tools (except a truck and, for a time, a concrete vibrator). The students

developed a system of shallow brick arches, which were then roofed in broken glazed tiles salvaged from a nearby factory. After the students went back to school in Norway, the local residents finished the job on their own. Today the hospital serves several hundred outpatients and 30 to 40 live-ins.

In Selangor, Malaysia, a private residence for a physics professor and his family embodies three separate themes. It is a modern house with contemporary conveniences, it is a revival of traditional Malay construction and materials, and it is an exploration of sustainable ecological design that has minimal environmental impact. Using local chengal wood, which is noted for its resistance to water and termites, a master carpenter and his team spent six years cutting each wooden joint, then assembled the house without metal fasteners. The design includes climatically appropriate features, such as a wraparound veranda. It also includes a prayer space, and it faces Mecca, as do traditional Malay houses. In its contrast with recent architecture of the area—much of which is high-rise apartments—the villa points out a more responsible direction.

In Bhopal, India, a new State Assembly building—the equivalent of an American state capitol—avoids any imitation of the Colonialist power architecture of the Indian past. Instead, it breaks its many functions down into a complex system of courtyards and entrances. Its circular form, a rough mandala on a hilltop site, proclaims that this is a public building while also nodding to icons such as an ancient Buddhist

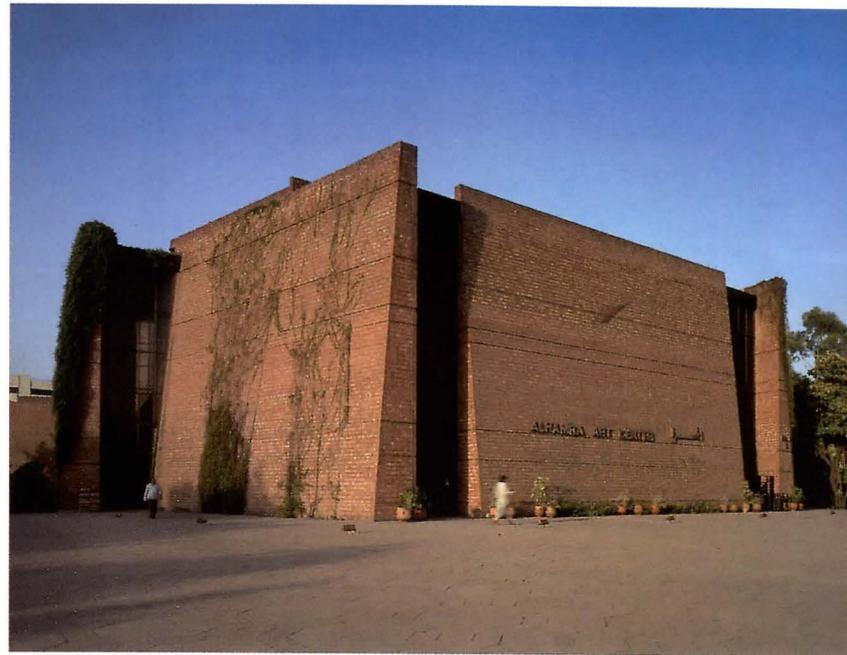


Slum Networking of Indore City, Indore, India
Planner: Himanshu Parikh, Civil Engineer

Client: Indore Development Authority
Completion: 1989 and ongoing



Rehabilitation of Hebron Old Town, Hebron, Israel
Planners/Conservators: Engineering Office of the Hebron Rehabilitation Committee



Alhambra Arts Council, Lahore, Pakistan
Architect: Nayyar Ali Dada
Client: Lahore Arts Council

stupa nearby. But the Assembly reads more as a walled city than a single building. Inside its outer wall, it is a labyrinth of bridges and ramps and courts and gates and small domes. The building, says the jury, “develops a new imagery based on local forms....It breaks the myth that modern architecture cannot be adapted to Asian nations and environments.”

In Lahore, Pakistan, the Alhambra Arts Council is a complex of galleries, auditoriums, practice rooms, and a theater, serving local artists, music students, and the public. Its bold polygonal volumes are intended to enhance acoustics, and its solid red-brick walls recall the traditional red sandstone of the Mughal era. Green courtyards thread among the buildings. The complex is used by more than 3,000 people a day, and the theaters accommodate two sold-out performances each night. The jury says the design, which “recalls the images of Mughal forts without reverting to clichés or symbols... has restored Lahore’s role as the cultural capital of Pakistan.”

In Riyadh, Saudi Arabia, Tuwaiq Palace is a new cultural and recreation center for the diplomatic quarter of a national capital. An astonishing collision of East and West, it’s the product of a limited design competition that included the following mandate: “Any form of revival style or copying traditional patterns and details in old or new material, thus creating false ‘Neo-Orientalism,’ will not be acceptable.” When the sponsors viewed the competition entries, they asked two of the competitors to join forces—usually a recipe for disaster. The two were Frei Otto of Germany, known for his signature high-tech Teflon tent structures, and

the firm Omrania of Riyadh. The two created a building in which Otto’s tents cluster around a stone building by Omrani that wraps itself, snake-like, around a green oasis. As the jury says, “From a distance, Tuwaiq Palace appears to be a ruined fort surrounded by an encampment.... Much Saudi development in the 1980s consisted of a slavish and glossy imitation of Western building models. Tuwaiq Palace is a bold departure from this trend, touching instead upon easily understood signals from past desert civilizations: tents, walls, oases, fortifications.”

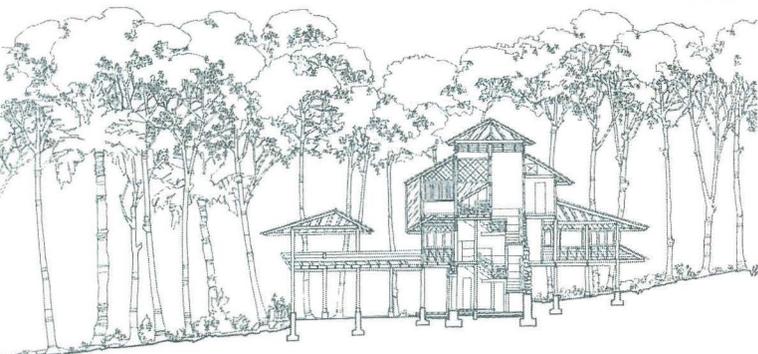
What is most striking about these seven winners is that each is, in some way, more than a building. Viewed purely as architecture, none of them ranks as a work of world significance. It’s better to think of them as probes, as explorations of a question: How best to create a responsible environment. And the jury report treats them that way. Each is lauded not so much for its individual excellence, or its success as architectural art, but rather for the issues it raises, for the way it contributes to an ongoing debate about human accommodation. Suha Ozkan, the current secretary-general for the awards program, puts it this way: “Many outstanding designs are being realized in the world; but it is the social dimension that validates one of those designs as being worthy of the Aga Khan Award.”

Certainly no other awards program goes to anywhere near the same amount of trouble. A steering committee of nine members, chaired by the Aga Khan, establishes the policies. Its membership currently includes scholars and architects from the Muslim world as well as Peter Eisenman and Charles Jencks. The steering committee then appoints a



Salinger Residence,
Selangor, Malaysia
Architect: Jimmy C.S.
Lim

Master carpenter:
Ibrahim bin Adam
Client: Rudin Salinger
and Munira Salinger



Tuwaiq Palace, Riyadh,
Saudi Arabia
Architects: OHO Joint
Venture: Atelier Frei
Otto; Buro Happold;
Omrانيا

Client: Arriyadh
Development Authority

master jury, which receives nominations of buildings from an international network of some 200 nominators. The nominators, whose names are kept secret, are persons familiar with the Muslim world. Other people are free to suggest candidates, too, and if these are found eligible, they are forwarded to the nominators, who may or may not choose to include them. The awards cover the entire Islamic world; there's never a bias in favor of the Khan's own Ismaili sect.

TECHNICAL REVIEWERS, ALL ARCHITECTURAL PROFESSIONALS, FAN OUT TO VISIT ALL THE SITES. THE PROCESS TAKES THREE YEARS.

The process results in some 500 nominations. The master jury then meets and cuts the list to around 100. The architects of these 100—who up to now don't usually know they've been nominated—receive a documentation package. They must submit some 30 to 50 pages of information about the building or project, including complete architectural drawings. The master jury then meets again, reviews the documented projects, and creates a short list of about 25 or 30 projects. Now the process gets really intense. Technical reviewers, all of whom are architectural professionals, fan out to visit all the sites. The only restriction here is

that a reviewer isn't allowed to visit a project located in his or her own country. This year, for the first time, these site inspections were documented on video. I saw rough footage of one such visit, and it was extremely thorough, with many hours of interviews of the architect, the users, the builders, and anyone else who mattered. The master jury then convenes for a final five-day session, at which the reviewers present their findings and the jury votes for the winners. The jury discussions are taped, edited, and published.

The whole process takes three years. The first awards were announced in 1980, making the 1998 awards the seventh cycle. The prize money is substantial: a total of half a million dollars is divided among the winners, several times the amount of the Pritzker Prize. This year's master jury, which chose the winners I've listed above, was, as usual, diverse: Mohammed Arkoun, an Algerian-born professor of Islamic thought at the Sorbonne in Paris; Zaha Hadid, the avant-garde deconstructivist who works out of London; Saleh al-Hathloul, a Saudi critic and educator; Arif Hasan, a Pakistani architect and planner; Japanese architect Arata Isozaki; Fredric Jameson, an American cultural theorist; and Rami Kosla, an Indian architect. Although the majority of jurors is always Muslim, past juries have included such non-Islamic notables as Kenzo Tange, Charles Moore, James Stirling, Hans Hollein, Robert Venturi, Fumihiko Maki, and Frank Gehry.

This elaborate jury process is only the tip of the iceberg. The Aga Khan Program in Architecture runs seminars on all kinds of archi-

THE AGA KHAN: BUILDING FOR HIS PEOPLE

As I get older, I find I have to explain who the Aga Khan is more often. That wouldn't have been a problem when I was a kid at the flicks, watching the Movietone News. Annually, the Aga Khan of those days, an overfed elderly gentleman, was shown sitting on one side of a scale while his followers piled gold and jewels on the other side until they'd equaled his weight. That Khan's son, Aly Khan, was a tabloid sensation for his marriage to film star Rita Hayworth.

Back then, today's Aga Khan, young Karim, was an unknown student at Harvard (in the same class with this writer, as it happens), a sort of superkid—honor student, athletic, handsome, charming, and much more sophisticated than the rest of us. Then, suddenly, the old Khan died, leaving behind an unexpected decree: his son Aly was to be passed over, and grandson Karim, instead, would be the new

Aga Khan. Karim dropped out of school for 18 months, then returned to prepare himself for his new career. "I've never worked so hard," he said.

The Aga Khan is the Imam, or spiritual leader, of a sect of Muslims known as the Ismailis, of whom there are perhaps 20 million scattered around the world, most of them in Asia, Africa, and the Middle East.

This Aga Khan doesn't get himself weighed in jewels. Almost as soon as he took the job, the Aga Khan found himself building schools and hospitals for his people. And he discovered that in a world overwhelmed by Westernization, nobody knew how to build in a way that could serve the needs of the modern world while still respecting the cultural heritage of Islam. The Aga Khan Award in Architecture, which was begun in 1977, was the result. *R.C.*



His Highness the Aga Khan, who presented the awards that bear his name in Granada, Spain, on October 9. Twenty years have passed since the program's inception.

tectural issues, all around the world. It sponsors a program in Islamic architecture, which is based at Harvard and MIT but linked to other institutions in Muslim nations. It maintains an Islamic architecture archive of more than 200,000 slides and prints, in addition to books and other publications. For some years, it published a magazine, *Mimar*, which is now defunct. And in 1988, the Aga Khan established the Historic Cities Support Program, which directly funds improvements to historic areas of Muslim cities.

I've had the good luck to talk with the Aga Khan two or three times over the years. It sounds corny to say it about someone who is, for millions, a spiritual demigod, but he's a warm, well-mannered, extremely intelligent man who thinks long and hard about everything he does. In one interview, I asked him what he considered to be typical characteristics of Islamic architecture. After making sure I understood that he didn't want his personal opinions to be considered anything more than just that, he did express some provocative thoughts.

In Islamic tradition, he said, "Vanity is an expression which in general has been discouraged. What is in competition with God's creation—you wouldn't necessarily find that in the tradition. The use of elements which are of God's creation in the physical environment—water, vegetation, anything which embellishes life, which improves the quality of life—is very much particular to Islam. If you think of the Arab climate, water is important.

"Changing the scale of the individual in the environment is

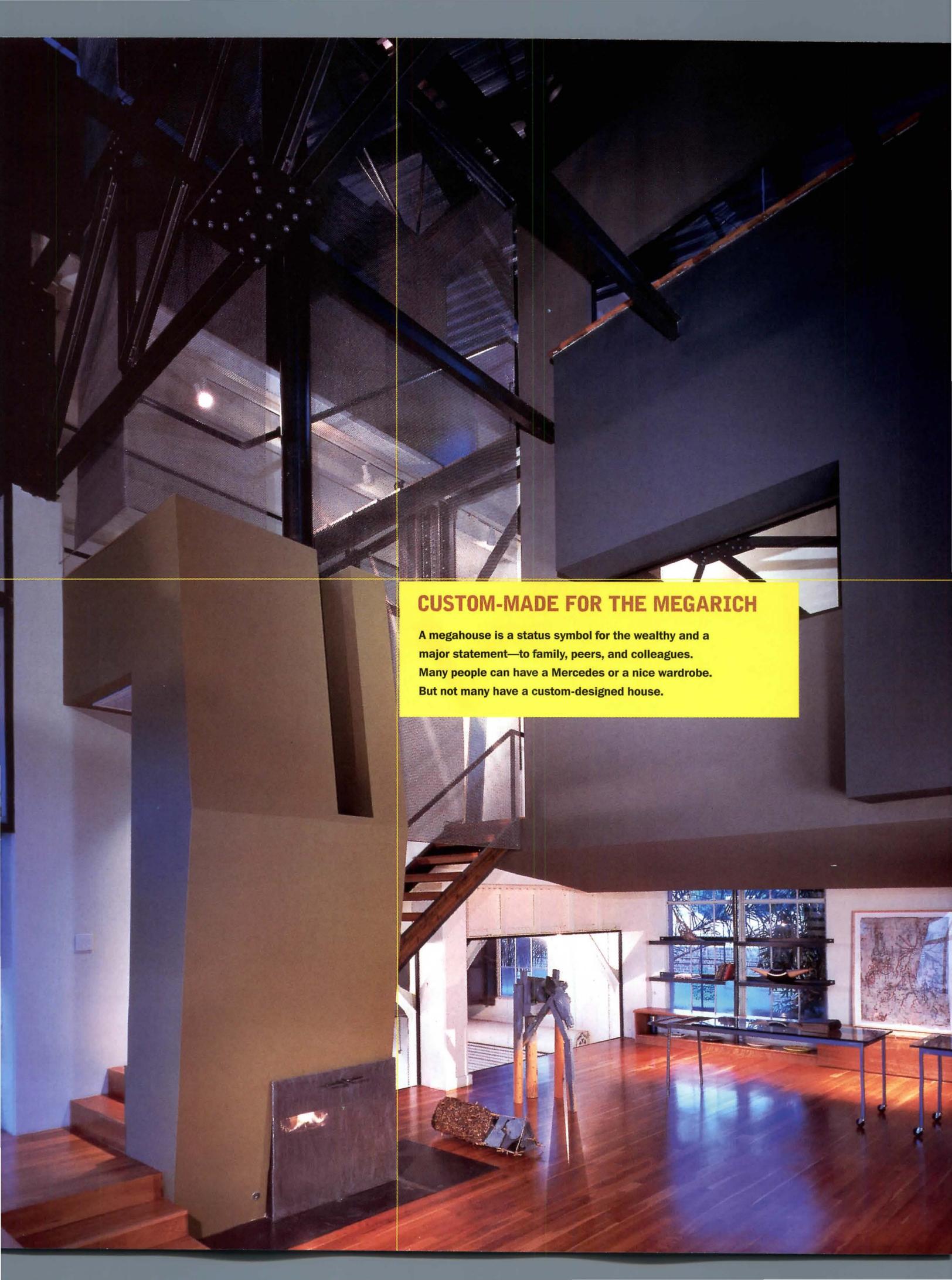
part of the tradition. You'll find doors of different sizes, sightlines that change, roof heights that change, because any sense of totality, of man's dominance over his environment, should be discouraged. He doesn't control his destiny, God controls his destiny. Anything that comes back and reminds man in his environment that things can change and change rapidly, over which he has no control [is part of Islamic tradition].

"I think you find more use of geometry and calligraphy [in Islamic architecture]. There was a tradition that the visual representation of God's creation was not acceptable; therefore, in the most rigid of interpretations, the representation of animals, flowers, birds, things like that, was disciplined. So geometric patterns and embellishment of calligraphy became the methods of embellishing a building. That changed as the culture expanded and absorbed other cultures.

"At least these things should be known. Whether they are appropriate or not appropriate is not for me to decide."

The seventh cycle: it sounds like a round number, almost like a closing. Has the award, perhaps, finished its work? What has it accomplished? Has it been worth the enormous effort?

I talked to people who, at one time or another, have been involved in some way with the Aga Khan Award. They were unanimous in believing that the program has achieved its original goal. The Khan defined that goal in the interview quoted above: "I was hoping to destroy the concept that the only way you can improve the quality of life is through the wholesale importation of other (*continued on page 196*)



CUSTOM-MADE FOR THE MEGARICH

A megahouse is a status symbol for the wealthy and a major statement—to family, peers, and colleagues. Many people can have a Mercedes or a nice wardrobe. But not many have a custom-designed house.

Designing Megahouses: When Money Is No Object

by Wendy Moonan

America's first megahouse was probably Mount Vernon. George Washington's mansion near Alexandria, Virginia, measured 17,248 square feet, not including the dependencies: kitchen, salt house, wash house, slave quarters, coach house, conservatory, threshing barn, grain barn, and livestock buildings. Washington was a great architect, and he was as skilled at planning and landscape architecture as he was at designing buildings.

We can still see traces of Washington's architectural ambitions in the Mount Vernons of today, but most other things have changed. The clients who commission huge houses are more numerous and diverse. The buildings themselves are getting larger and larger. The desire for the latest technologies has intensified. As a result, many architects are facing very unusual design challenges—and moral quandaries—as they work on plans that border on the surreal.

Start with the clients. Unlike Washington, who was often on the brink of financial ruin, today's megahouse owners are megarich. Most are either self-made men—entrepreneurs and computer moguls—or businessmen and investment bankers. They are smart, independent, and self-confident, and they all share the building bug.

Robert A.M. Stern, incoming dean of the Yale School of Architecture, has built at least 50 large houses for “people who like to make

decisions—and are not afraid of their possessions.” The megahouse trend, he explains, “has taken on a greater velocity as the baby boomers have come into their maturity and affluence. They are the yuppies who repopulated the cities in the 1980s and now want to have big places in the country.”

Giant houses, giant egos

Jaquelin Robertson of Cooper Robertson has designed several houses for CEOs, including a 30,000-square-foot house for Wall Street titan Henry Kravis in Casa de Campo, Dominican Republic; an Aspen house for publisher Mort Zuckerman; Hamptons beach houses for financial powerhouses like Leon Black and Alan Washkowitz; and a Fifth Avenue apartment for billionaire David Koch.

Charles Gwathmey of Gwathmey Siegel Associates in New York attracts creative powerhouses, such as Steven Spielberg, Universal Studios chairman Ron Meyer, and Jeffrey Katzenberg of Dreamworks. “Our clients endorse modern architecture,” Gwathmey says. “They are risk-takers interested in intellectual and artistic discovery. They believe in the idea that what they are getting is unknown. They are adventurers who love the collaboration and the intensity of it all.”

Mark Hutker, an architect whose boutique firm is on Martha's Vineyard, says his megahouse clients are “people at the top of their game: artists, writers, composers, bankers, and lawyers. They are A-types times four.” Preston Phillips, an architect in Bridgehampton, New York, says he often designs for “people who do not work for other people. They

Wendy Moonan is the architecture editor at House & Garden and a frequent contributor to ARCHITECTURAL RECORD.



“THE YUPPIES WHO REPOPULATED
CITIES IN THE 1980s NOW WANT TO
HAVE BIG PLACES IN THE COUNTRY.”

are major CEOs or creative types, like [composer] Samuel Barber and [artist] Lowell Nesbit."

Of course, some architects, like Bart Voorsanger in New York and Mark Simon of Centerbrook Architects in Essex, Connecticut, boast old-school, Social Register clients—but these are the exceptions. Old-money types tend to buy old houses. And what happens when they commission new ones? "Not all of them have an aesthetic sense," says Simon. "Some are tone deaf."

The space race

As in the glory days of the Newport mansions, the wealthy are asking for space, space, and more space. Why, exactly, do the houses have to be so large? "Good question," says architect Richard Meier. "Perhaps clients are more narcissistic than before. They also like to work at home."

"It's the economy, stupid," jokes Donald Rattner of Ferguson, Shamamian & Rattner Architects. Rattner's New York firm has designed a controversial 52,000-square-foot version of a Tuscan villa in Southampton, New York, for Ira Leon Rennert of the Renco Group, whose net worth is estimated at more than \$500 million. The house's size does not include the 17,000-square-foot garage for 100 cars or 14,440 square feet of porch and terrace areas. The compound's size and the estimated cost of \$100 million (as reported in the *New York Times*) have rubbed many locals the wrong way. In fact, the house has upset so many people that the Town of Southampton is considering a new law limiting the size of single-family houses. Nonetheless, construction is proceeding as planned.

Bill Gates's \$53 million house in Medina, Washington, seems, in contrast, relatively modest at just 40,000 square feet, with a 30-car garage. It was designed by James Cutler of Seattle and Peter Bohlin of Bohlin Cywinski Jackson of Pittsburgh and Seattle.

"Why not build a big house?" asks Francis Fleetwood, an East Hampton, New York, architect who says he has built at least six classic, Shingle Style houses in the Hamptons every year since 1979. "For most of my clients, the house costs a tiny percentage of their net worth. If they weren't so particular, they'd buy a house that's on the market."

Ned Forrest, an architect in Sonoma, California, says his clients "have an urge to look like old money, so they want houses that hark back to earlier eras. Vineyard owners gravitate toward Tuscan villas or Provençal manor houses. Computer whizzes want traditional European styles."

For some of Preston Phillips's clients, "A house is a statement—to families, peers, and colleagues. Today, anyone can have a Mercedes, a great wardrobe. But not everyone can have a custom home." He described a West Virginia couple who wanted a "spaceship" in a neighborhood of traditional red brick houses. They got it.

Special needs

Along with the desire to dazzle the neighbors and display their worldly success, megahouse clients often have specific lifestyle requirements. They may need an up-to-date home theater, or they may want special security measures, for fear their kids could be kidnapped. Though they want visitors to be impressed, they want to do it on their own terms.

"Why do people build such big houses?" asks Thierry Despont, a French architect based in New York City who has built several huge multimillion-dollar houses. "One word: privacy." Supporting that notion, most of the architects contacted for this article couldn't reveal the names of their clients. Despont's answer is echoed by one of Stern's clients, who says he likes his Aspen vacation house because "we can do every single thing we want to here without leaving the property."

Gwathmey recently designed a Modernist megahouse for two top Hollywood players. In their glass, steel, and stone Pacific Palisades hilltop aerie, the man, a director, and his wife, a producer, can do everything but shoot film. They have separate, his-and-her offices for writing (with shelves designed for film scripts), a large conference room, a rare-book library, a film-editing room, a sports bar, a lavish screening room with a separate entrance, a gym, a nanny suite, and a house manager's office. The "locations closet" is reserved for shoot preparations, with suitcases of all sizes, prepacked first aid and emergency repair kits, and rows of outerwear suited to every climate from Antarctica to the Amazon.

New York architect Peter Gluck has just completed a 12,000-square-foot house for an Orthodox Jewish client in Brooklyn that has 10 bedrooms and baths, a "mother-in-law suite" with maid's room attached, and a kitchen with separate areas for the preparation of kosher meals. "Because of the mobility of the society we live in, people want a place where the whole family can get together, even if it's once a year," says Gluck. "They are commissioning their own resorts."

According to Stern, "Kitchens now have spaces where he cooks, she cooks, and the cook cooks. There's a pantry and a breakfast room off the kitchen. A media room. A library for reading and visiting with small groups. There's a family room where people can gather to watch a sporting event on TV. The master bedroom often has a sitting area, his-and-her baths, his-and-her dressing rooms, and a separate place to pack."

Mark Ferguson, who started Ferguson, Shamamian & Rattner in 1988 after leaving Parish-Hadley, the old-line New York decorating firm, explains that one reason these houses are so big is "the duplication of programs. The den/media room duplicates the function of the living room. Once the library may have served as an office; today, there's a separate home office. Now there's also an informal dining area and breakfast room off the kitchen. Kids don't play in bedrooms anymore but in a playroom."

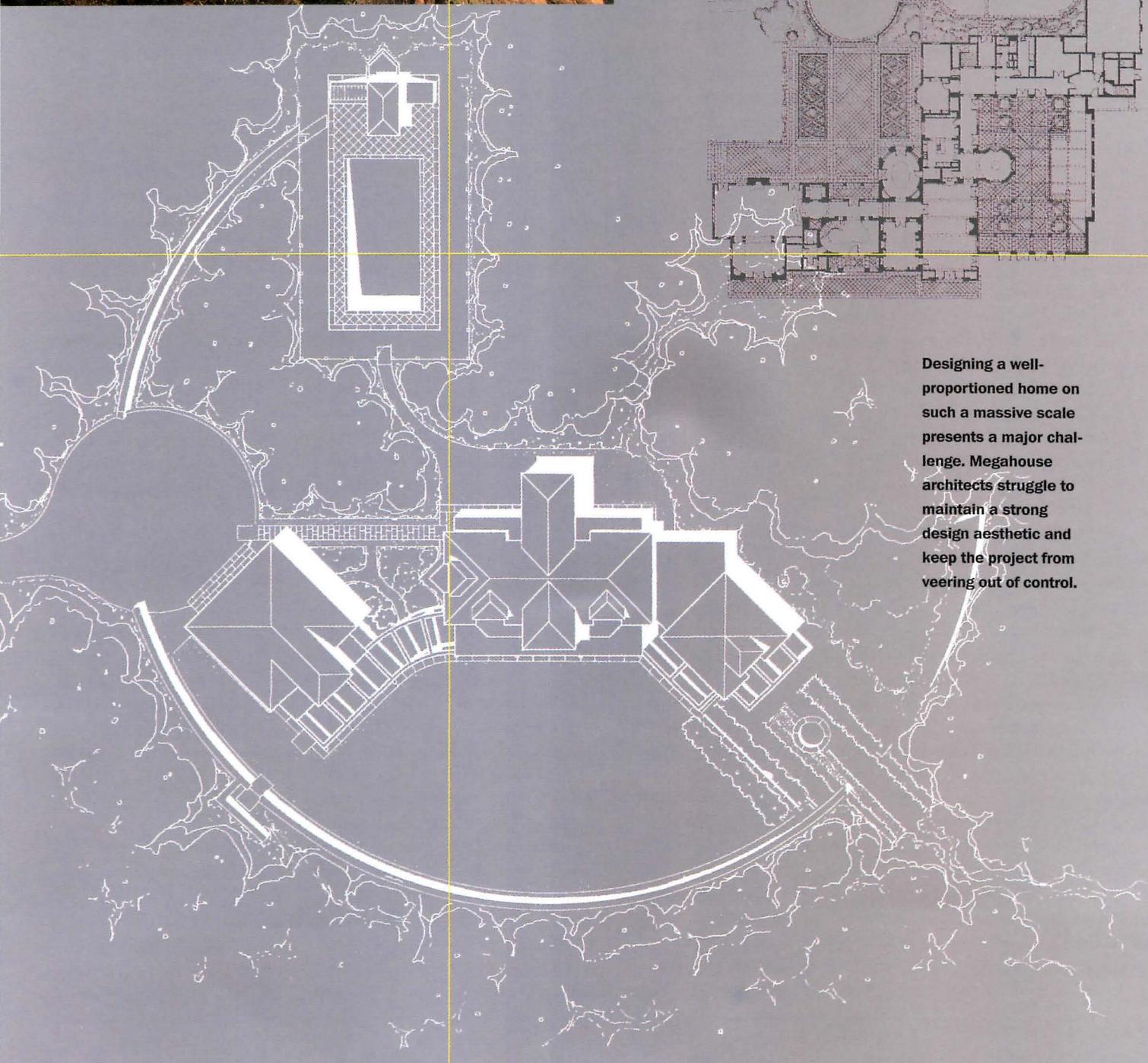
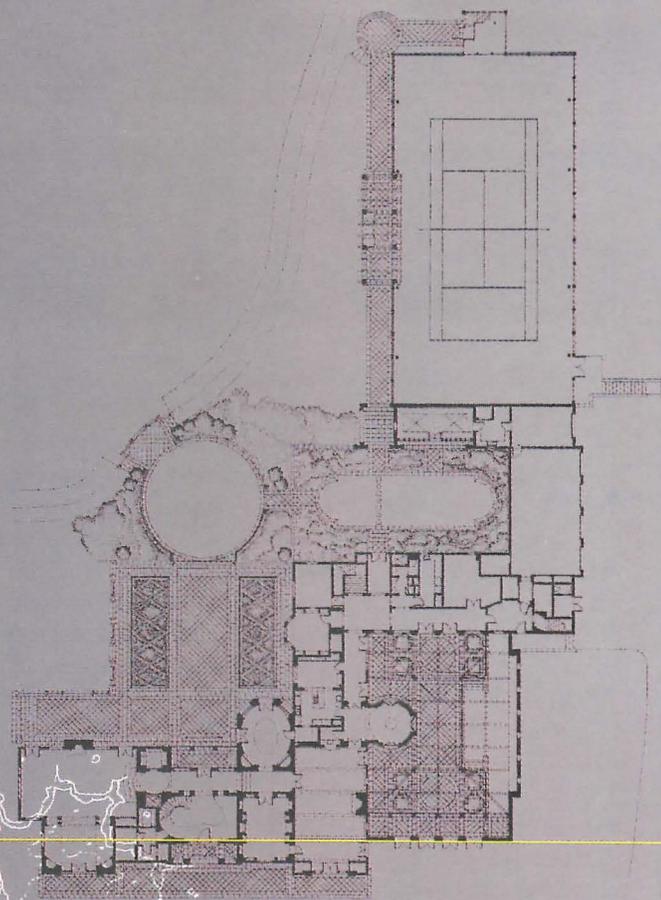
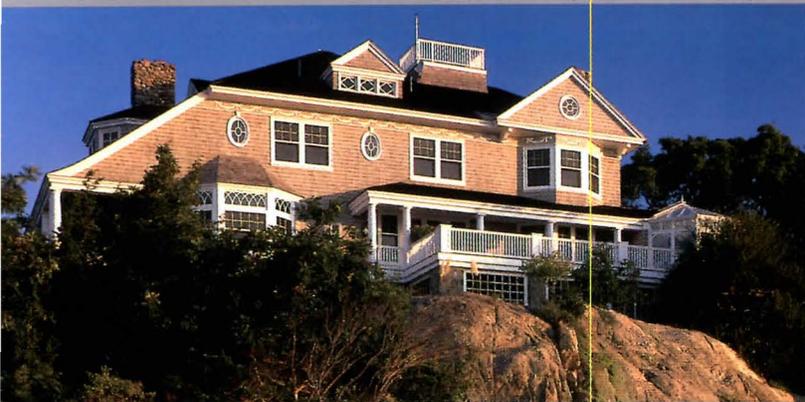
Allan Greenberg says he is being asked for greenhouses, stables, home theaters, gyms, underground garages, and custom windows and ironwork. Peter Marino is designing large staff wings, separate rooms for massage, and home hair salons. Paul Fortune is building meditation rooms with tatami mats and trickling water and has had requests for helicopter landing pads.

Peter Shelton says he has designed old-fashioned radiators, enormous dining rooms, multiple sets of stairs, an equipment room for sports paraphernalia, cedar closets, fur-storage rooms, wenge floors, anegré wood paneling, and caretaker's houses.

Alexander Gorlin, who is currently building a huge modern home in the Colorado wilderness, says clients are asking for moss rock, hard-wired cappuccino machines, secret passageways, roof terraces, crafts

MANY CLIENTS HAVE AN URGE TO LOOK LIKE OLD MONEY; AS A RESULT, THEY WANT HOUSES THAT HARK BACK TO EARLIER ERAS.





Designing a well-proportioned home on such a massive scale presents a major challenge. Megahouse architects struggle to maintain a strong design aesthetic and keep the project from veering out of control.



“WHAT’S GREAT IS THAT WE ARE REINVENTING THE WHEEL. EVERY ROOM IS AN OPPORTUNITY TO EXPERIMENT WITH THE FLOOR, THE CEILING, THE MATERIALS.”

rooms, leather-tile floors, Australian lacewood cabinetry, pearwood kitchens, and towers over the master bedroom.

“What’s great,” says Francis Fleetwood, “is that we are reinventing the wheel. Every room is an opportunity to experiment with the floor, the ceiling, the materials, the window systems.”

Reasoning and repercussions

Working in such a heady atmosphere can throw an architect for a loop. Budgets are no longer constrained. The tenets of Modernism and minimalism are often tossed out the window. Some designers may feel funny being part of such conspicuous consumption. But sometimes, designing megahouses offers chances to explore and experiment.

“Designing these houses does change you as an architect,” says Bart Voorsanger, echoing several of his peers. “When there’s no budget, there are perpetual opportunities for invention. You find varieties of stone and wood that are unique. I had a piece of glass fabricated in Florida—for a client in Montana—that is 34 feet long and 11 feet high. It cost \$600,000. With big houses, you can hire top-of-the-line contractors. What’s important is that things are done perfectly; the fees are irrelevant. Budgets go up to \$2,000 a square foot.”

Clark Stevens of RoTo Architects in Los Angeles says recent work on a large house design “taught us to improvise, because the program changed almost daily. We learned to go with the client’s values, not ours. If a client wants eight lavatories for his personal rituals, you should respond. Demand that your clients teach you what will bring them joy. Ask what they like about the process.”

Peter Bohlin says working with James Cutler on the Gates house changed his practice profoundly. “Both of us are noted as design architects, so it was unusual to have a true joint venture,” he explains. “But we did. I was out in Washington for ten days a month for six years. It was a seamless collaboration.” He continues: “We learned that working for technocrats requires a nimbleness in your response. We learned things about technology and electronics that I’m already incorporating in new projects. We were able to use extraordinary materials: Douglas fir recycled from an old warehouse, granite from the Cascades in Washington, green granite from the Adirondacks, green basalt from Mt. Baker in Washington State.”

Bohlin says that by working together, the duo also “developed design strategies about structure. We set up places in the landscape that looked like they were preexisting, almost like remnants of old buildings. Making a kind of false history can be a good way to organize a big building, so you can read it in layers.”

“We’ve had to change the way we organize the office,” Don Rattner says. “We can no longer approach it on a generalist level, where each architect has a multitude of tasks to perform. Now we’re more hierarchical, so we have to keep our internal communication channels very clear. When something unexpected happens on a job, there might be eight

people who need to know immediately. Specialization has set in; people who are particularly good in one area, such as audiovisual, have to focus on that throughout the life of the project.”

Though many architects did express consternation at being involved in Louis XIV-type extravagance, they agreed that moral qualms will only get in the way of a project. “Once you agree to work on a big house, you say goodbye to all that,” says Mark Simon. Adds Ned Forrest, “If you think in terms of the life span of a house, isn’t it better to do one that lasts? That’s a certain kind of economy.”

Jaquelin Robertson, who is also an urban planner, says, “I have a lot of moral qualms about ecological prudence, but there are things more important than the tiny percentage of big houses that are being built.”

Megahouses can also cause heartache for architects, because they are often decorated in styles not suited to the architecture. Francis Fleetwood just completed a Shingle Style home on the Atlantic coast in which an interior designer injected Chinoiserie into every room. The colors are the egg-yoke yellow of Chinese glass, the red of Chinese lacquer, and the blue of Ming vases. The decor includes faux bamboo chairs, table, mirrors, and desks, chintzes with idyllic Chinese scenes, large antique hanging scrolls depicting Chinese ancestors, and Chinese Deco rugs.

The proper proportions

But interior decorating isn’t the only problem. Simply designing a well-proportioned home on such a massive scale presents a major challenge. Megahouse architects struggle to maintain a strong design aesthetic and keep the project from veering out of control.

“Big houses are the hardest to do, to keep the scale domestic,” says Hugh Newell Jacobsen, an architect based in Washington, D.C. “Proportions are like a well-mannered lady who never shouts at the neighbors. For me, an ideal ceiling height is 17.5 feet. I like the minimal look with lots of light. No moldings. No trim. I make houses where people are more important than the furniture.”

“Size matters,” notes Stern, in the inevitable *Godzilla* joke. “It’s not the number of rooms or overall size of the house that’s important, but the size of the rooms and closets and hallways. It’s the leftover spaces.”

“The hardest part of doing a big house is to keep it proportioned properly,” agrees Mark Simon. “With a very large house, I often can break it into pieces so it becomes more like a village.”

“Bigger is not always better,” says Mark Hutker. “We tell clients to stay under 7,000 square feet so the houses fit in the landscape.” “Big houses are tough,” acknowledges Robertson, “but they are just like every other house. Scale is everything.”

“It’s about the hierarchy of spaces,” says Meier. “The important thing is the quality of human scale. It doesn’t matter how big a room is if you feel comfortable there. You have to think about the scale of the spaces. That’s the art in it.”

(continued on page 201)

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inside and out."*



"OK."

*"Oh, and I want it to
be really secure."*



"OK."

*"Maybe some
sidelights."*



"OK."

*"You know,
a different
design for the
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be better."*



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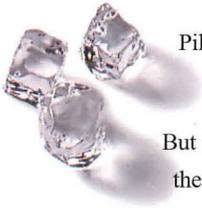
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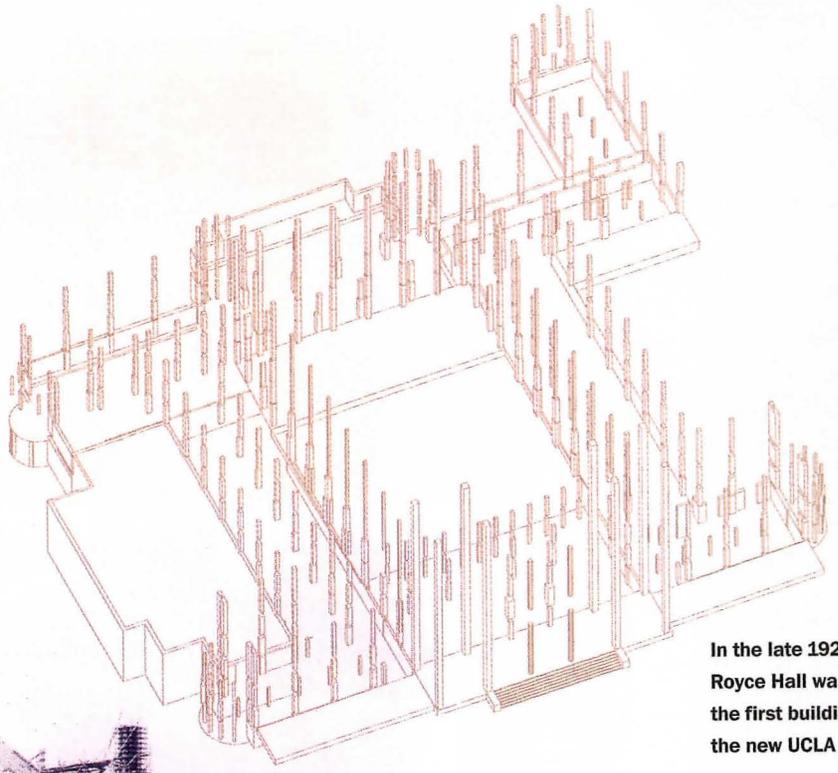
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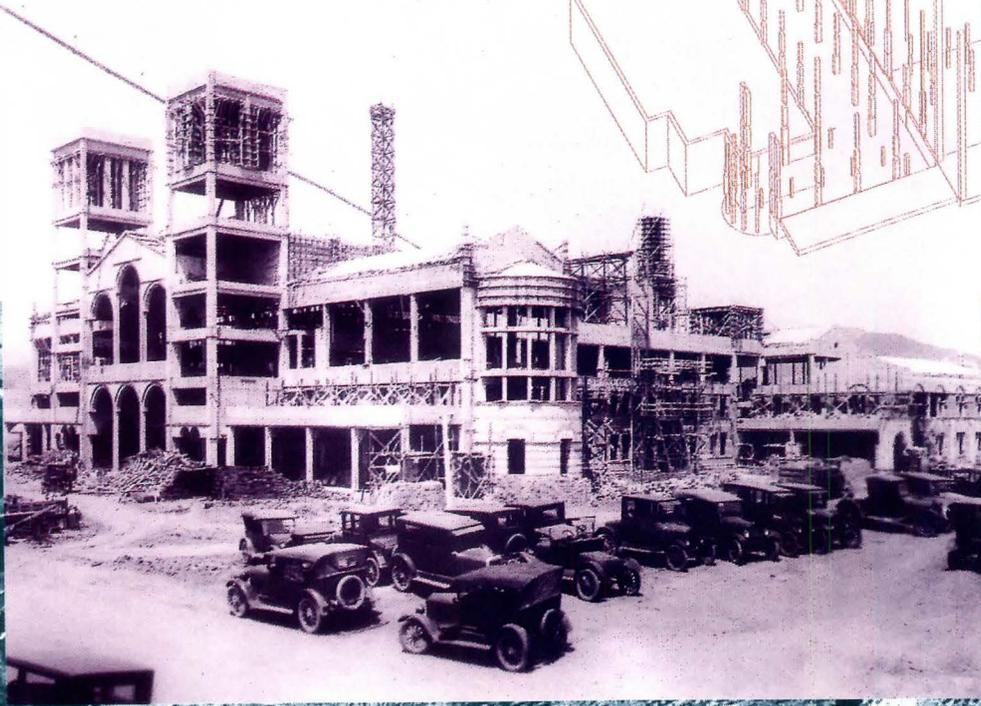
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The sturdy concrete and masonry frame of Royce Hall (drawing) is credited with minimizing damage to the building during earthquakes.



In the late 1920s, Royce Hall was one of the first buildings on the new UCLA campus.



PROJECT DIARY After earthquakes wracked its iconic towers, UCLA's **ROYCE HALL** is restored and, in the process, redefined.



"The world is a progressively realized community of interpretation," says the inscription over one of the entries to Royce Hall, a building named for the quotation's author, the California-born, early 20th-century philosopher Josiah Royce. While Royce's words may make him sound like a deconstructionist before his time, his observation holds true of the building that bears his name. From the time the building's doors opened in 1929 on the University of California at Los Angeles campus in Westwood, Royce Hall has been the school's symbol; the university logo is an abstraction of the main facade, with its three round arches flanked by a pair of towers. Reinterpreted several times in the seven decades of its history, Royce Hall was never more radically altered than during a \$68.8 million renovation that began, unexpectedly, with a 1994 earthquake. The ironic result of that reinterpretation is a building whose mass more closely matches its Lombard Romanesque architectural expression than ever before, says design architect Barton E. Phelps, FAIA. That's thanks, in part, to the distinctly non-Lombard Romanesque addition of 25.5 million pounds of concrete and 1.8 million pounds of rebar.

1926-1929 The founders of UCLA conceived of a university that would recall the dawning days of the Renaissance in the German-influenced towns of Northern Italy. One of the first four buildings on the campus was the 200,000-

Thomas Hine is a freelance writer and former architecture critic for the Philadelphia Inquirer. He is currently working on a book entitled The Rise and Fall of the American Teenager (Avon, forthcoming).

by Thomas Hine

square-foot Royce Hall, a concrete frame building that, despite its picturesquely irregular appearance, was organized in a basically symmetrical Beaux-Arts parti and cloaked with brick and terra-cotta. Structurally it followed what was then the common approach to earthquake safety: good craftsmanship and sturdiness.

The principal elevation is a loose interpretation of the 12th-century Church of San Ambrogio in Milan, Italy, while the other elevations, with their multiple levels and varied ornamentation, are designed to look as if they had been built in increments. The west front, atop a slope, evokes an Italian hill town. Though the Lombard Romanesque style that had been chosen for the new university was thought to be more appropriate to its setting than a Gothic style, early photographs show Royce rising incongruously from the empty, semiarid landscape of the rancho that had been acquired to house the university.

Royce Hall served originally as the university's main classroom and academic building and housed the auditorium, which was its only large indoor assembly space. Its exterior contains a virtual sample book of Romanesque decorative motifs. The painted ceilings of the loggia that runs along its front facade evoke great thinkers from Archimedes to Einstein; the latter eventually paid a visit. The ambitions of UCLA's founders were expressed in the auditorium lobby, decorated with cast concrete coats of arms of the most ancient universities of Europe.

When Royce Hall was first constructed, its architects, the Los Angeles firm Allison and Allison, seem to have run out of energy or, more likely, money by the time they got to the interior. The grandest gesture

Project: Royce Hall, University of California, Los Angeles

Architect: Anshen + Allen Los Angeles—Tom Chessum, AIA, principal-in-charge; Antoinette Bunkley, project manager; Jorge de la Cal, Anthony Moretti, AIA, technical advisors

Design architect: Barton Phelps & Associates—Barton Phelps, FAIA, principal architect; Markku Kari, project architect; David Haggerty, Jeanette Fabry, Celia Miller, Ron Calvo, design team

Interior designer: Audrey Alberts Design, Tina Beebe (color)

Engineers: John A. Martin & Associates, Inc. (structural); Kim Casey & Harase, Inc. (mechanical and electrical)

Consultants: Neal Matsuno and Joe Kaplan (lighting); McKay Conant Brook, Inc. (acoustics); Tatanya M. Thompson & Associates, Inc. (painting conservator); Melvyn Green & Associates, Inc. (building preservation)

General contractor: Morley Construction Co.



The original auditorium (below) included clerestory and stained-glass windows. By the time the 1984 renovation was completed (left), the windows had been covered up. At that time the hall was also made accessible.



was the ornate coffered auditorium ceiling, based on the one in Rome's Church of Santa Maria Maggiore, built during the 15th century. There were also stained-glass windows in staircases and others in the auditorium (later removed), and some ornamental ceilings in which concrete beams were painted to imitate timbers.

"This was by and large a state school building of 1929," says UCLA's campus architect, Charles W. Oakley. "There were a few attempts at decoration, but everything was pretty simple."

When the building opened, the auditorium was large enough to hold all of UCLA's students. It was conceived primarily as a ceremonial and assembly space. One year later, an organ was installed, which launched the auditorium's transformation from a collegiate space into a center for musical and theatrical performances. During the 1930s, it emerged as the chief performing venue for the west side of Los Angeles.

1978-1984 By the late 1970s, Royce Hall was an important center for the performing arts. However, the auditorium was sorely in need of an update. In 1978, the university commissioned a design for functional, aesthetic, and acoustical improvements, as well as a seismic reinforcement of the building's outer walls; many of the university's buildings were to receive a seismic retrofit at the same time. John A. Martin & Associates, the structural engineers who performed the seismic investigation, saw that Royce's frame and infill structure were poorly adapted to earthquakes. However, when it came time to fund the project, no money was available for the seismic work. Instead, renovation efforts were concentrated on the auditorium.

Oakley worked on that design as project architect for John Carl Warnecke and Associates, architects for the renovation. Also involved were acoustician Ronald McKay of McKay, Conant Brook Inc., and Martin & Associates. The work, completed in time for Royce to serve as an important venue for the arts festival that accompanied the 1984 Olympic Games, addressed issues of accessibility, provided additional lobby space, and created a pleasant roof terrace.

By this time, the classroom function of the building had diminished in favor of departmental and faculty offices. These departments had, over the years, modified their spaces to suit their needs and desires. Phelps likens the building to a village in which different families have co-existed, each on its own turf, since time immemorial.

1994 Then one morning, it looked as if this symbolically potent building might fall down. At 4:31 a.m. on January 17, 1994, Royce Hall—and the whole Los Angeles area—was shaken by the 6.8 magnitude Northridge earthquake. This quake, the most economically devastating in American history, damaged thousands of buildings, including many on the UCLA campus.

Oakley, who was by then the campus architect, recalls standing later that morning with Charles E. Young, then UCLA's chancellor, looking at some foreboding cracks that had appeared on the sides of the towers. Royce Hall was a problem, though fortunately not a ruin. Then a major aftershock shook the ground again. "It was easy to imagine those towers falling into the quadrangle," Oakley recalls, "and I believe the chancellor had much the same thought." The landmark building had become a potential disaster. Immediately, Royce Hall and its quadrangle were closed, and the building was girdled with 12-by-12 lumber to stave off further damage.

A subsequent survey of the structure indicated that the precautions taken were warranted. Indeed, while the towers had twisted in the quake and posed the biggest immediate danger, the entire building was in trouble. The classroom and office wings were pulling away from the taller 1,800-seat auditorium that occupies the building's center. Much of the structure's integrity was lost.

Ironically, Royce had been the next major building in line for a seismic overhaul—the one it never received in the mid-'70s—but the earthquake made the building's precariousness an emergency. "Young didn't want to have Royce Hall fall down during his watch as chancellor," Oakley says. "I didn't want to have Royce fall down during my watch as campus architect. The University of California regents didn't want to have Royce fall down during their watch."

Barton Phelps was standing on the lawn that January



Removing the corners of the vaulted ceilings beneath the towers provided access to supporting piers.

SEISMIC RENOVATION IS AT THE HEART OF THE ROYCE HALL PROJECT

How do you seismically upgrade a building without making it look seismically upgraded? That question dominated the restoration of Royce Hall. "The structural system was preeminent. It was designed first, it went in first," says design architect Barton E. Phelps, FAIA. During the course of the four-year project, a seismic frame, including reinforcing steel and concrete, shear walls, and drag beams, was implanted in the structure.

A study by structural engineer John A. Martin & Associates revealed that Royce Hall took a pounding from lateral ground acceleration and also, possibly, from vertical motion. Exterior cracking and spalling were matched by cracks in veneers and infills. Royce Hall was completed before there was any clear theoretical approach to lateral resistance. Only after the Long Beach, California, earthquake, which killed 115 people in 1933, did the state develop its first seismic code. Royce's survival was likely due to its old-fashioned craftsmanship. "Nobody could understand why the building hadn't fallen down altogether," Phelps says.

The original building was extremely well constructed, with a sound concrete frame and high-quality masonry. A combination of concrete columns and beams supporting reinforced-concrete floor slabs and joists, plus the mass of the hall's nonstructural masonry infill, provided the strength to ride out the quake without collapsing.

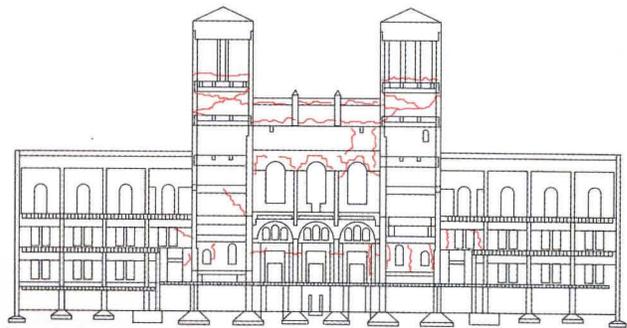
Now the design team faced a formidable task. First priority was saving Royce's 114-foot-tall towers. Torsional seismic forces nearly severed the towers' concrete columns at roof level, threatening them with collapse. Contractors removed, fixed, and replaced broken or displaced masonry and terra-cotta, then added a new concrete shear wall and frame structure.

Once the towers were stabilized, work began on the rest of the

structure. Royce's high profile and historic significance demanded a structural system that would protect occupants and save the building in case of another disaster. The building's shape, a rectangular box surrounded by four wings of varying heights, was problematic. A system had to be contrived that would tie Royce Hall together so it would respond to a quake as a unit, instead of as parts. The key to developing this system was computer modeling, which simulated the building's performance under an earthquake's forces.

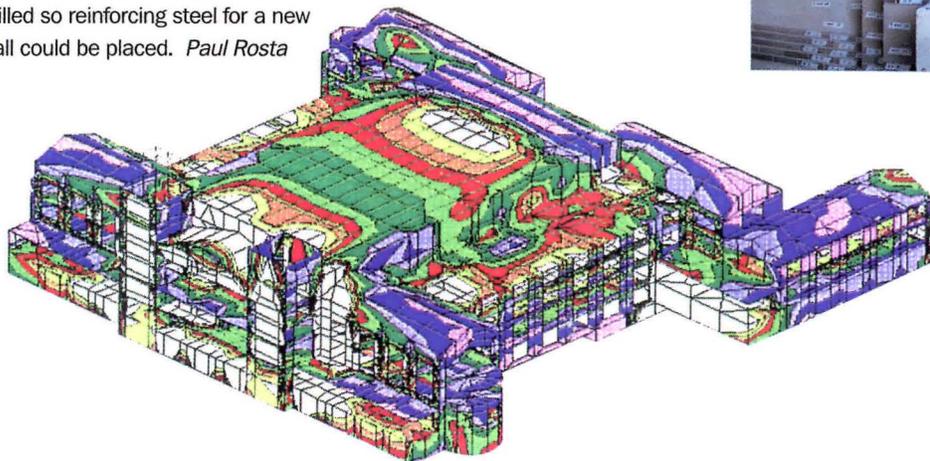
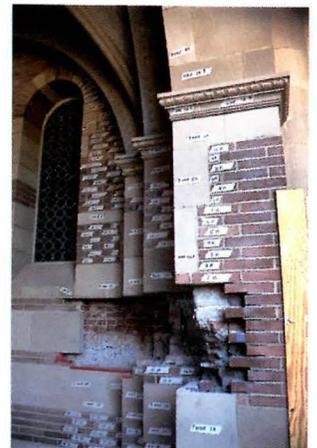
The result is a seismic system made up of 22 reinforced shotcrete shear walls distributed throughout the building. Steel dowels attach the shear walls to the original walls, though some of the shear walls are freestanding. About 650 linear feet of five-by-six-foot grade beams tie the new walls and existing columns. Drag and bond beams also help tie new and old walls.

Access to the site was challenging. Intricate sequencing was required to remove debris and bring in new materials through an extremely narrow passage. All work had to be done by hand, from demolition to installing shotcrete and rebar. Each new shear wall and beam presented a unique situation, sometimes requiring slabs and beams to be shored before a new wall's slot could be cut, and other times requiring existing beams to be drilled so reinforcing steel for a new wall could be placed. *Paul Rosta*



DAMAGE ANALYSIS

The towers were first stabilized (top). Then cracks were carefully mapped (above), while computer modeling examined how Royce Hall would respond to seismic forces (below). Building components were recorded before work began (right).





morning as well. His office had been hired to work with Martin & Associates to renovate the two towers. Their report on the building's condition was a week away from completion, and what had happened in the quake didn't really surprise them. Both Phelps and Oakley recall that the engineers seemed pleased, gleeful even, that the building had failed just as they had predicted.

It was quickly apparent that while the reinforcement of the towers should go ahead, the project would ultimately need to involve the building as a whole—and a much larger budget. Oakley believed that Phelps's office was too small to handle a project of that size, so he asked Phelps to put together a team that would have "institutional credibility." Anshen + Allen in Los Angeles came on as executive architect, while Barton Phelps & Associates became associate architect for design. Similarly, Morley Construction, which was finishing work on the campus's Powell Library, moved across the quadrangle to begin emergency work on Royce. This emergency team stayed together until the end, as investigation, design, and construction proceeded, often simultaneously.

While the earthquake didn't really change what needed to be done in the towers, it did change how it had to be done. One important reason was that the Federal Emergency Management Agency (FEMA) was to be involved. The university administration actually decided to go ahead with work on Royce before there was any commitment from FEMA,

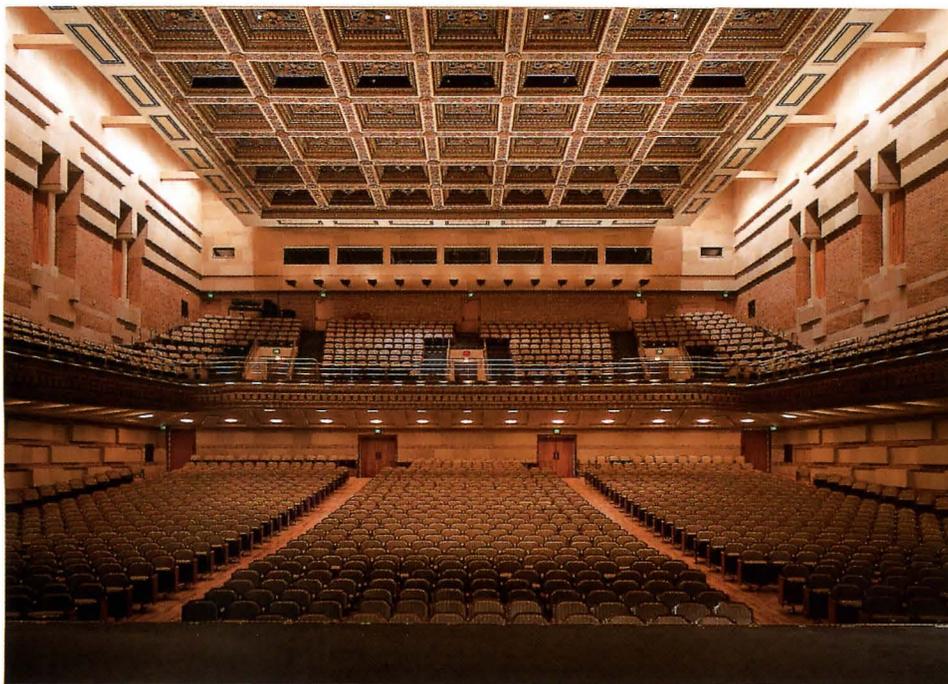
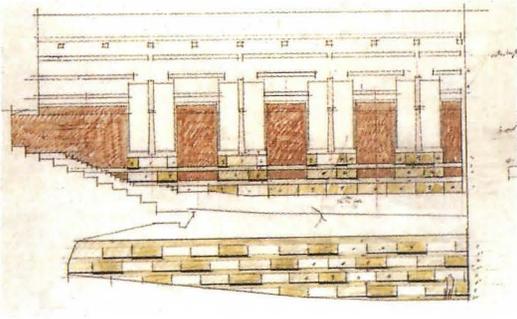
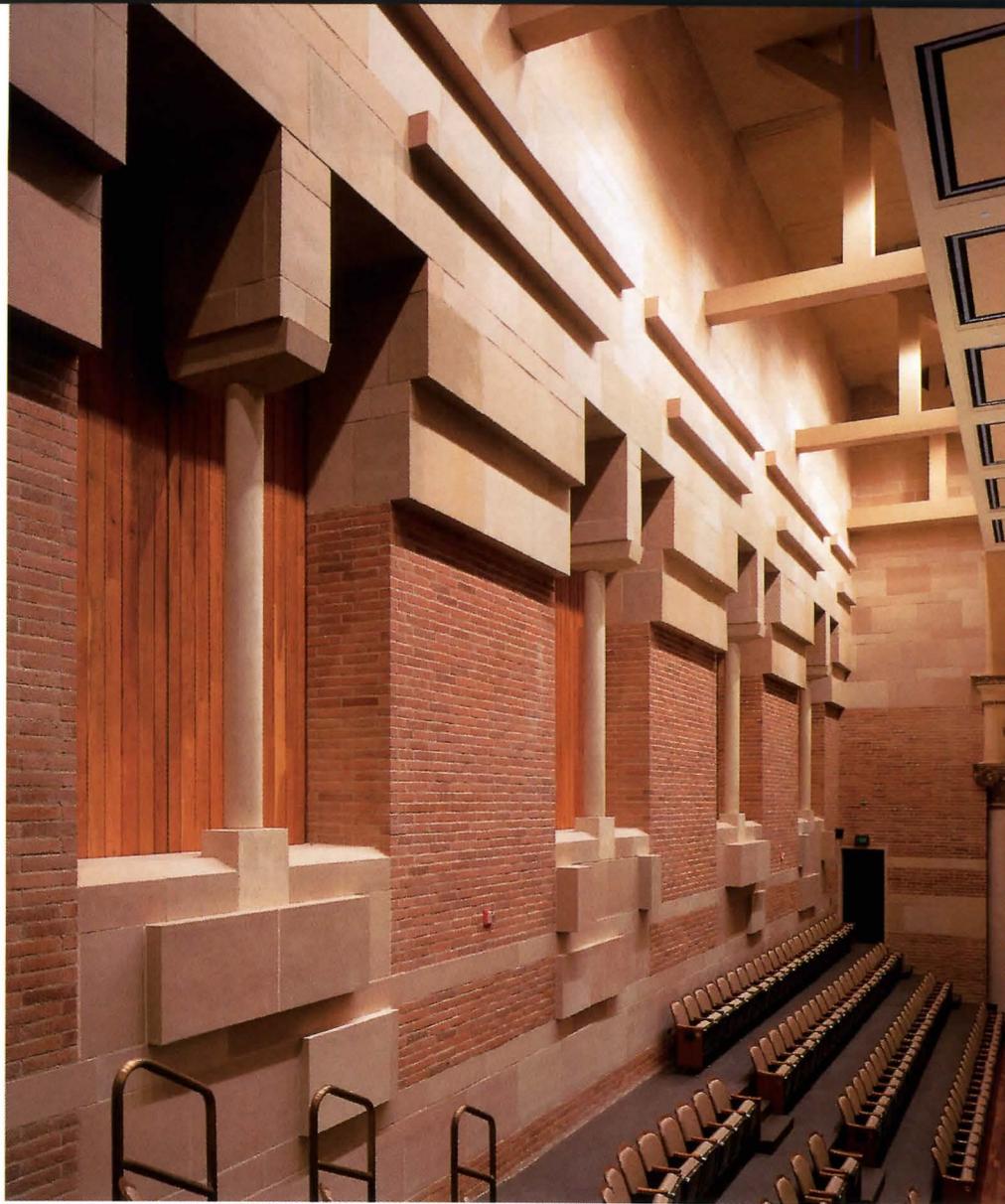
although they were fairly certain federal funding would be provided. The expectation that the agency would pay most of the cost of the renovation shaped the way it was done.

"This was a process nobody wanted, a project manager's nightmare," Oakley says, reflecting on how emergency work preceded an organized approach. "We were building before we even had a program."

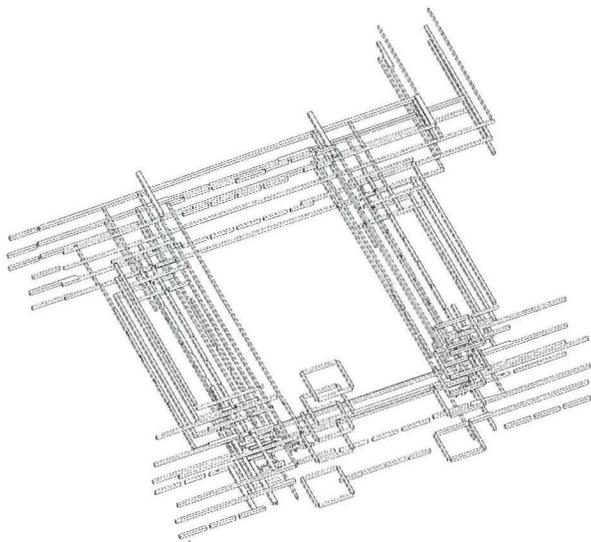
FEMA's involvement meant that this would be more than a standard seismic adaptation, which seeks to assure that a building's occupants will survive a quake and be able to leave the building safely. FEMA seeks assurance that the building itself will survive. FEMA money also triggered the Section 106 historic preservation review process. The agency's policy discourages improvements; it demands that the building be put back together as close to the way it was before as structural changes and code compliance allow.



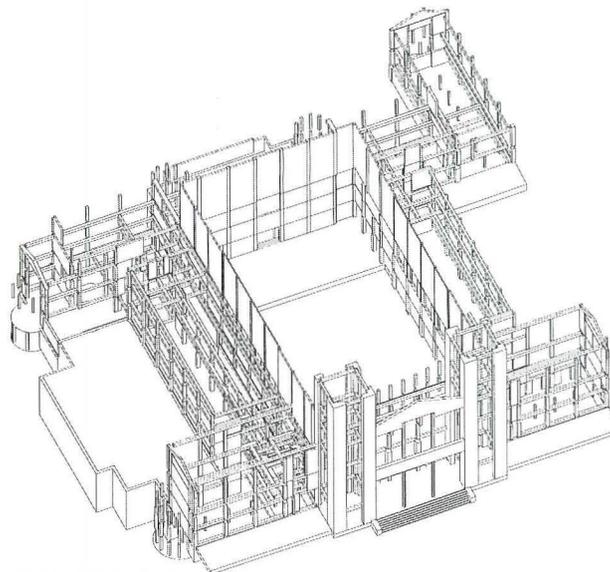
The auditorium's decorative interior belies the massive shear walls and acoustical elements added to the hall (opposite top). The renovated conference room, formerly the German department's exclusive turf, has become the best place on campus to stage a protest (opposite bottom).



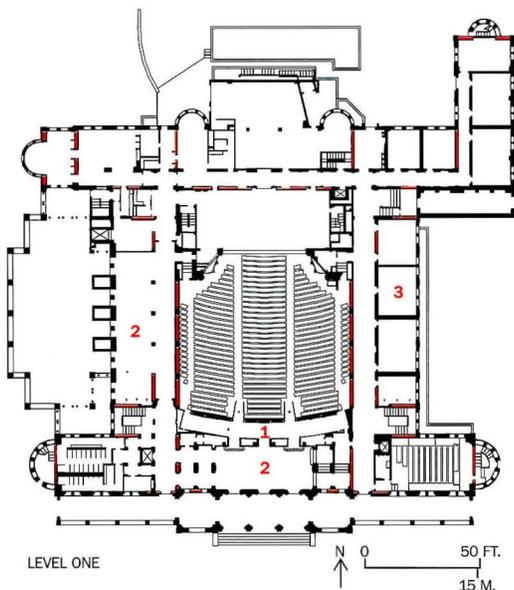
Cutting into the shear walls was one way to improve the acoustics of the auditorium. Adjustable panels (above, drawing above left) are opened or closed according to the type of performance. The coffered, ornamental ceiling appears to be suspended above the hall (left). The frame conceals ventilation openings.



HORIZONTAL SEISMIC ELEMENTS



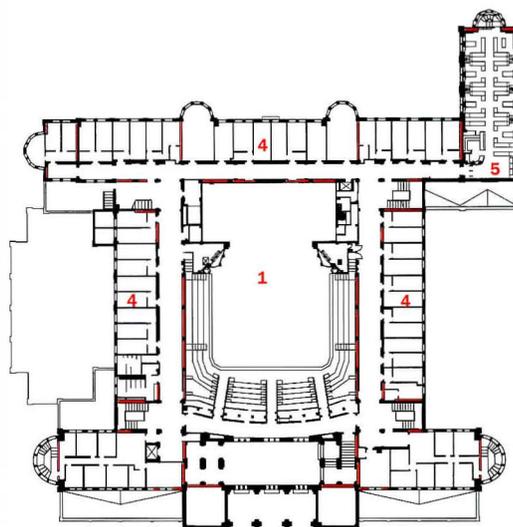
INTEGRATED STRUCTURE



LEVEL ONE



1. Auditorium
2. Lobby
3. Classroom
4. Office
5. Library



LEVEL TWO

The difficulty of complying with these requirements became clear as the tower project got under way in earnest in the spring. The towers straddle a loggia that runs across the front of the building. As a result, it wasn't possible to strengthen the piers at the towers' base without disturbing the ceilings of this loggia. These appear to be painted vaults but are actually plaster ceilings on iron frames, which are suspended on wire from the floor above.

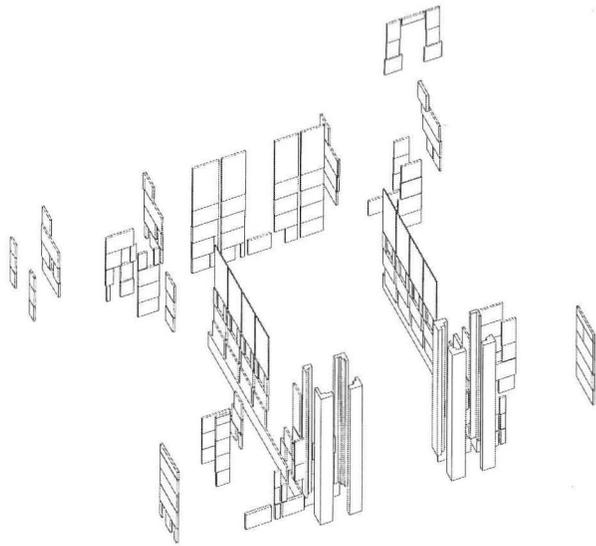
Unlike the vaulted ceilings across the entranceway, these ceilings, beneath the towers, were not particularly spectacular. There was a temptation to destroy them and re-create them later. However, the ceilings were part of the building's historic fabric; destroying them would have jeopardized the federal aid.

To preserve the ceilings, the contractors cut a hole in the floor above and workmen were lowered into the cavity to add reinforcing materials to the iron frame. Then cradles were built to hold the corners of the ceiling vaults, which were cut out and stored. The centers of the ceil-

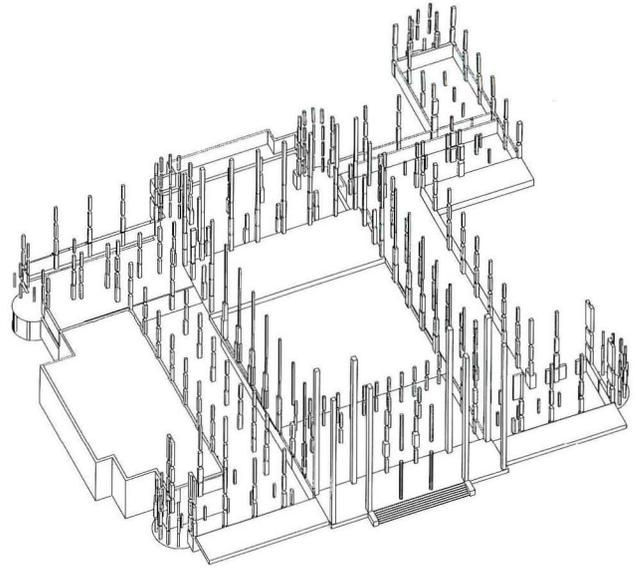
ings were still in place. All this made it possible to remove the brick veneer behind the piers and add concrete. Each of the bricks was then replaced in its original location (inadvertently restoring some graffiti scrawled long ago by former students) and the ceiling corners were put back in place and secured.

The project demanded intense concentration. Architects and engineers were usually on site consulting with the workmen, occasionally drawing design details on the wall, which were duly signed and photographed to become part of the documentation of the building.

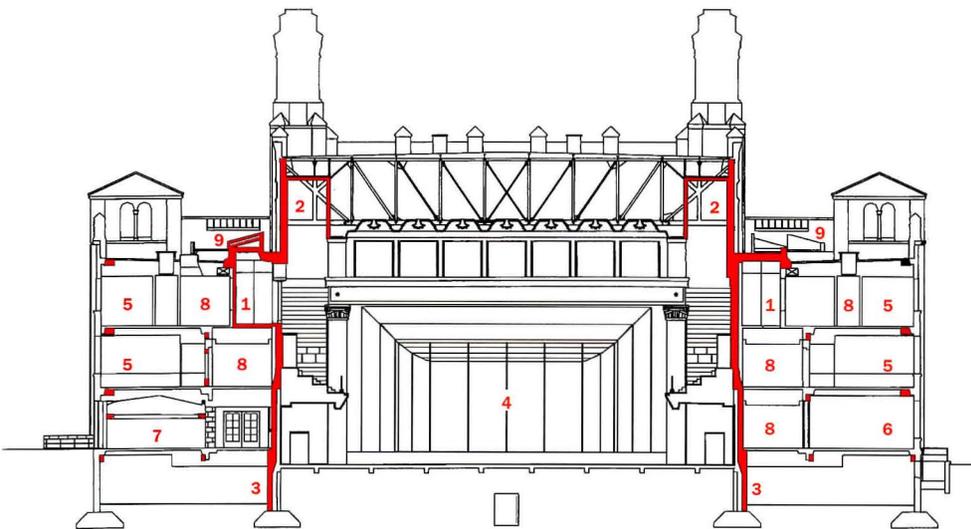
"This was, in a sense, the key moment of the project," says Tom Chessum, project director for Anshen + Allen. While other parts of the tower project, such as building the structure from the top while utility conduits were removed below, involved a lot more work, preserving the ceilings had great symbolic importance, Chessum says, giving builders and designers alike confidence in their own resourcefulness and a sense that care would be rewarded.



VERTICAL SEISMIC ELEMENTS

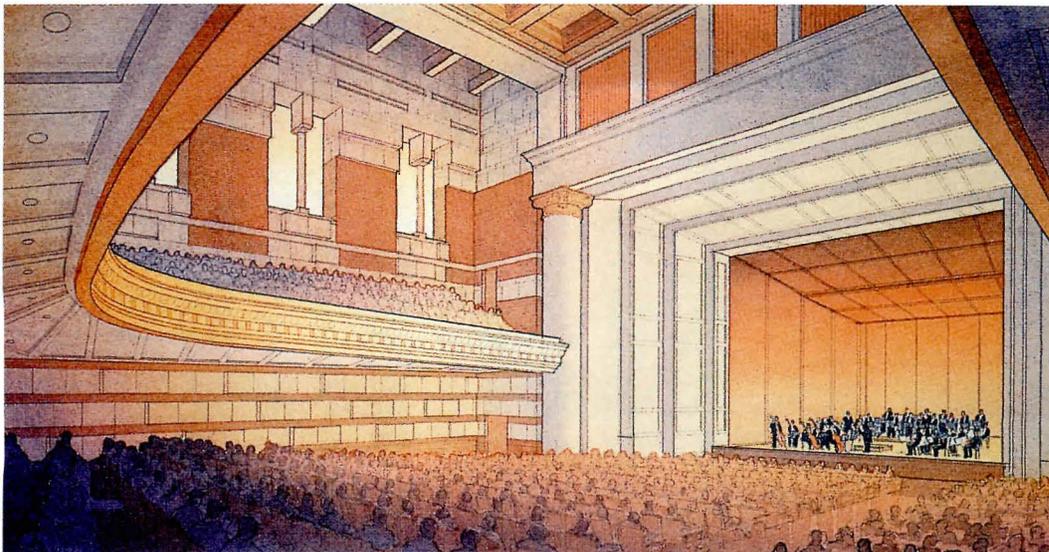


PRE-EXISTING STRUCTURE



TRANSVERSE SECTION

1. Acoustical gallery
2. Acoustical cove
3. Seismic-resisting frame
4. Stage
5. Offices
6. Classrooms
7. West lobby
8. Corridor
9. Skylights



About a year after the quake, the iconic towers were stabilized. But integrating seismic features into the auditorium was crucial to the building's strength. That process necessitated rebuilding portions of the auditorium (left). The resulting hall is acoustically superior to the original and even more appropriate to the building's Lombard Romanesque style.

1995-1998 Fifteen months after the quake, work on the towers was complete. “The problem was they really weren’t connected to anything else in the building,” says Phelps. “If there had been another earthquake, the towers might have fallen down together.” Only after the entire building was updated and unified would the structure be truly safe.

The fundamental strategy was to strengthen the walls of the auditorium, the five-story void at the center of the plan, off of which all the other pieces of the building hang. Essentially this meant putting a new building inside the old one. As Gordon Bradley, who ran the job on site for Morley Construction, expressed it, “We had to put 10 pounds of stuff in a five-pound bag.”

Despite the sentiment in favor of putting Royce back the way it was before the earthquake, the logic of the project was pushing in another direction. “This began as, first and foremost, a structural project,” says Chessum. “But the structural approach created an architectural logic that led to something that nobody could have predicted.”

FEMA was ultimately to pay about \$50 to \$55 million for the construction costs; the balance of the funding—about \$15 million—would come from university fundraising efforts. The federal agency’s strict preservation requirement meant that the classroom and office corridors—the plainest parts of the building—had to be stripped of decades of ad hoc design. It was a challenge to recover the simple, dignified rhythm of arched doorways and vaulted ceilings while incorporating sprinklers, new lighting, and utilities. In the end, these embodiments of ’20s pragmatism turned out to be as informative about the school’s history as the more expensive eclecticism of the exterior. Many faculty offices had to be disturbed or reconfigured, however, in the process.

The biggest disturbance came at the heart of the building, the auditorium. Most of the new shear walls could be installed inconspicuously outside the walls of the auditorium. But at the upper levels, the walls had to be within the volume of the auditorium itself to prevent them from being visible and thus changing the proportions of the building’s exterior. It was clear that it was going to be impossible to simply restore

the auditorium to the way it was in 1984, or even to its earlier configuration. The addition of the shear walls posed an enormous change to the nature of the building. It was up to the engineers, architects, and acousticians to make a new auditorium using pieces of the old.

The loss of 7,000 cubic feet of space, taken up by the new shear walls, was sure to change the auditorium’s acoustical qualities by shortening reverberation time. That would have lessened the suitability of the space for orchestral music. But even before the earthquake, while most were satisfied with Royce Hall’s acoustic performance, McKay, the acoustical consultant who worked on the 1984 redesign, was not. He felt that the auditorium lacked sonic richness, especially when filled with people. It needed a longer reverberation time, not the shorter one the addition of the shear walls would cause. Better still, he argued, would be an adjustable acoustic, one that would shorten the reverberation time for the spoken word and amplified performances and lengthen it when orchestras played.

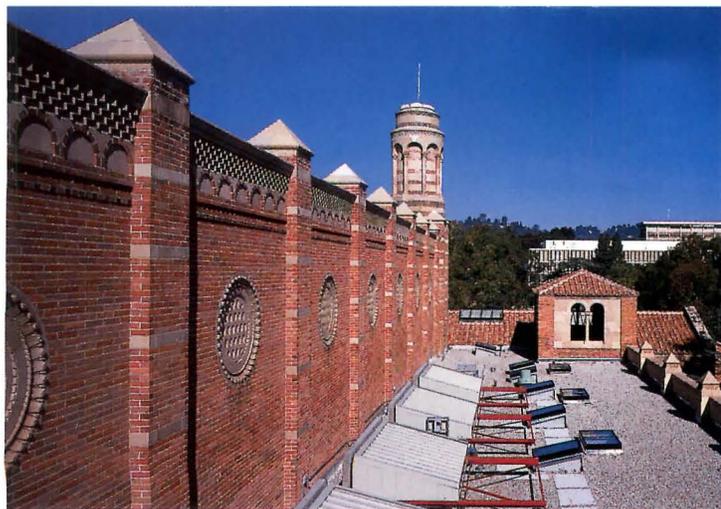
The idea of an adjustable acoustic for the hall had been rejected during the 1984 renovation, but the diversity of performances at Royce convinced McKay that the idea should be revived. In order for it to happen, though, some way would have to be found to adjust the acoustical volume of the hall.

Simultaneously, former chancellor Young was particularly drawn to the opportunity to reintroduce daylight into the auditorium. While natural light was of no interest to the Center for Performing Arts, a university-sponsored entity that produces performances on the campus and the hall’s chief user, Young believed that it would enhance the auditorium’s role as the symbolic center of the university and make it an even more pleasant space.

University officials and the designers had two choices: they could simply add the shear walls, or they could make radical changes that would improve the hall’s acoustical quality and lighting. Oakley, one of those making the decision, faced the additional dilemma of seeing much of his own work on the 1984 renovation removed or altered. The university chose to take the bolder approach. “If Royce was going to con-

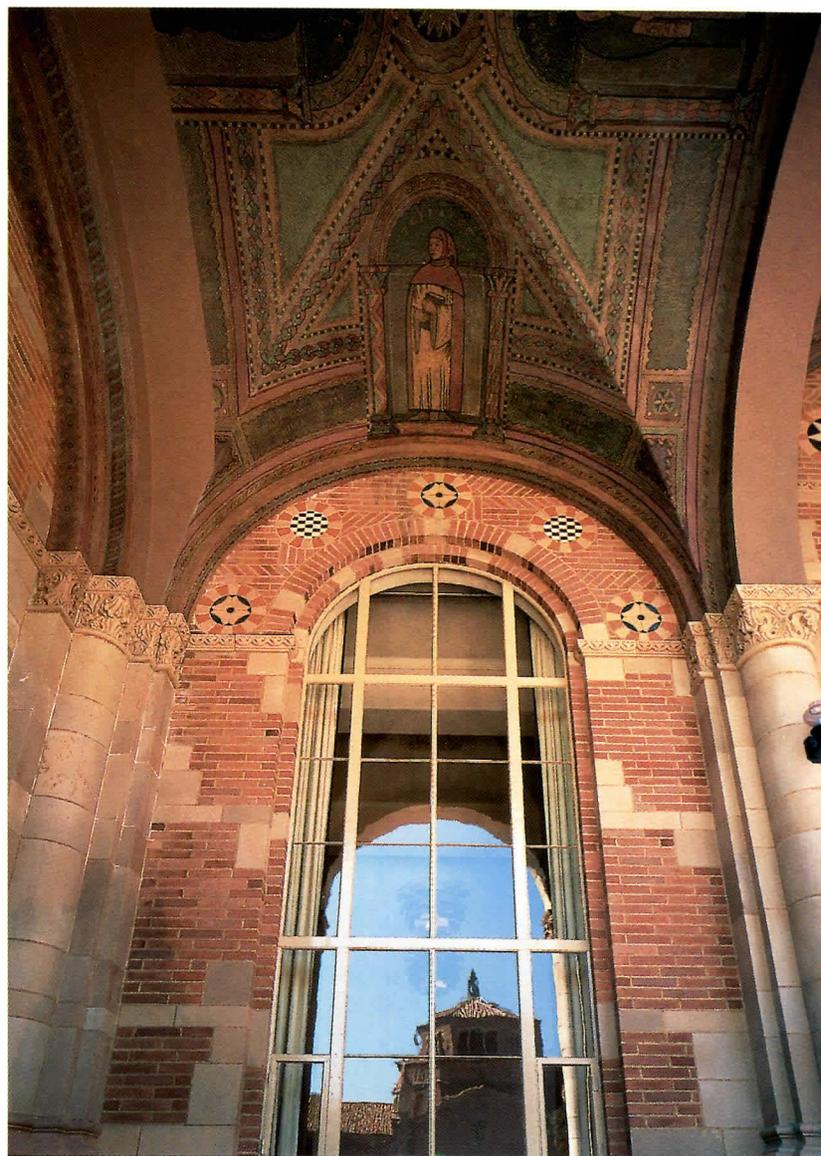
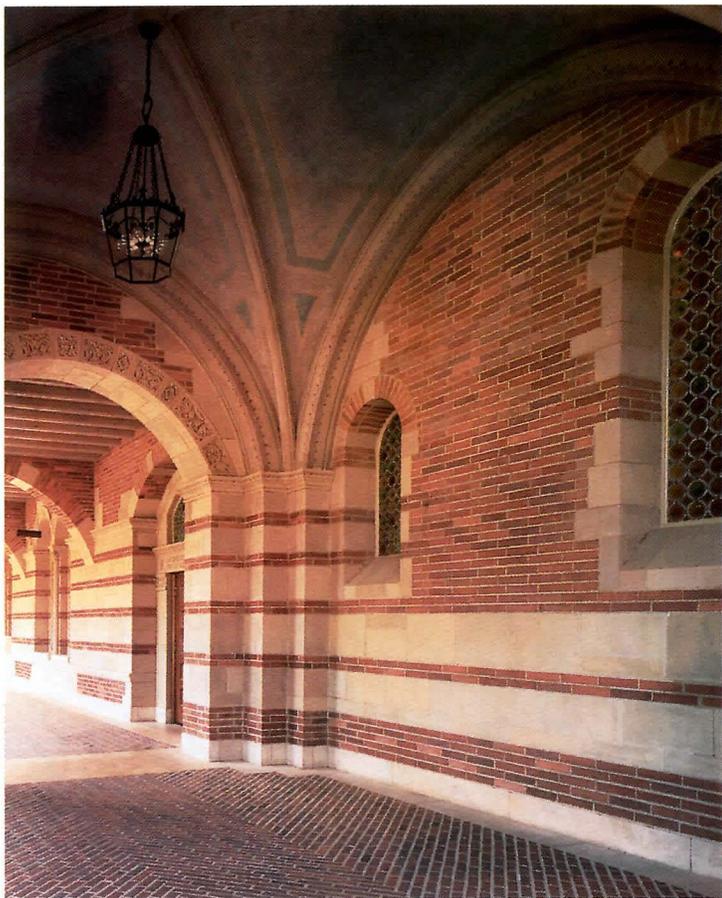
An exterior areaway was enclosed and skylights with motorized sliding covers installed (below). The covers control the amount of

daylight entering the auditorium, while laminated glass limits noise. The decorative north loggia (right) has terra-cotta columns.



One of the lobby bays at the base of the towers (below). The paintings on the loggia vaults (right) are by Julian Ellsworth Garnsey, a well-known

muralist from New York City. Made of canvas glued to plaster, then covered with gesso to appear old, the paintings were carefully restored.



tinue to be the major identification of UCLA for another 50 or 75 years, the building had to become more usable," Young says.

The designers devised two solutions to fulfill these needs. The first involved building a skylighted roof over what had been an exterior areaway and making large openings in the new shear walls below. This would introduce light and openness at the top of the auditorium, originally provided by the ceiling vaults and the stained-glass windows (which were blocked up and ultimately removed at some point in the building's history). By installing a series of panels to create acoustical chambers at each opening, the acoustical properties of the hall could be controlled.

The other new source of volume was created by opening some of the attic space adjacent to the coffered ceiling and exposing the ends of the original roof trusses. Because it does not touch the side or back walls, the ceiling appears as an ornamental object in the room, whose space flows upward and, indirectly, through the skylight. The hundreds of holes in the ceiling that had been used for ventilation were blocked for acoustical reasons and new overhead vents were added, as was an air-conditioning system. The vents were incorporated into what appears to be a frame around the ceiling, which further dramatizes the ceiling's separation from the architecture around it.

By changing the ceiling from an architectural enclosure to a decorative object—an effect furthered by uplights on the side walls that make the ceiling glisten—Phelps was able to realize his ambition of carrying the feeling of the exterior to the most important interior space. A Romanesque room with a Renaissance ceiling might look funny, but a Romanesque room containing a piece of Renaissance decorative art seems normal.

Since the walls were going to be rebuilt in any case, Phelps wanted to make striped walls using the same many-hued brick and terracotta found on the exterior. This idea became (*continued on page 199*)

Sources

Acoustical plaster: Pyrock, Inc.

Acoustical tile: Armstrong

Paints and stains: Benjamin Moore

Linoleum: Marmoleum

Wood flooring: Junckers

Fixed seating: Irvin Seating

Cherry chairs: Thomas Moser

Auditorium upholstery: Unika Vaev

Interior lighting: Shaper, Leucos,

Poulsen, Lightcontrol, Prudential, Zumtobel, Elliptipar, Engineered Lighting Products

Downlights: Lightolier

Task lighting: Alkco, Limburg Glass, Cole Lighting

Lighting controls: Lutron

Elevators, lifts: Amtech

Terra-cotta and roofing: Gladding McBean

Battling the clock and taming a huge space were two of the challenges facing the architects of the new **HONG KONG AIRPORT**.





Built on a 3,085-acre island that was mostly reclaimed from the harbor, the Hong Kong Airport's terminal stretches more than three-quarters of a mile. Roof vaults at the entrance (opposite) cantilever nearly 90 feet to protect the vehicular drop-off.

PHOTOGRAPHY: © DENNIS GILBERT/VIEW, EXCEPT AS NOTED; MICHEL PORRO (RIGHT)

by Clifford A. Pearson

Given the job of designing the world's largest airport terminal, Foster and Partners and its colleagues in the Mott Consortium made a curious decision: they would do everything they could to remind visitors that this shimmering, barrel-vaulted machine-for-travel is one continuous volume of space. A more conventional approach might have broken down the mega into the sub, addressing the project's vast scale with a collection of different parts. But instead of dividing to conquer, the architects working on Hong Kong's new airport at Chek Lap Kok devised a strategy of winning the battle of scale by unifying everything under one roof. Interiors were kept as open as possible, level changes reduced to a minimum, and clutter eliminated.

As a result, the building unfolds as a seamless experience, a great sweeping expanse that allows travelers to see from one end of the terminal to another. And instead of intimidating the visitor, it provides clarity of movement: you know where to go because the architecture points you in the right direction and because outdoor views let you see where the planes are.

Unity of space, though, should not be confused with uniformity of experience. While the great barrel vaults establish a standard 120-foot (36-meter) grid that runs throughout the structure, the roof curves in two directions—creating lower, more intimate spaces at the north and south ends of the terminal and higher, grander volumes at the busy center. And spaces where the vaults are bundled together (such as the departures hall) are quite different in character from those at the connecting concourse, with its single overhead vault. Daylight from rows of skylights running down the center of each vault and from generously glazed curtain walls provides a warm glow to interiors whose neutral tones and elegant detailing might otherwise have come across as being too cool or institutional.

Sir Norman Foster explains the project this way: "It is a quest for calm spaces bathed in filtered natural light—views to the aircraft, the sea, and the mountains, so that you always know where you are—an uplifting experience to bring a sense of occasion to air travel."

At 5.57 million square feet, the terminal is called "the largest enclosed public space ever made." From the car and train drop-off on the east end to the 38th jetway on the west, the building stretches in a Y formation more than three-quarters of a mile (1.27 kilometers) and is covered by a 45-acre



Project: Hong Kong International Airport, Hong Kong
Client: Hong Kong Airport Authority
Design consultants: The Mott Consortium (Foster and Partners, architects and designers; Mott Connell Ltd., engineering and project management; BAA, airport planning and operational systems)
Architects: Foster and Partners—

Norman Foster, Ken Shuttleworth, Graham Phillips, Donald Choi, Grant Brooker, Mouzhan Majidi, Robin Partington, Winston Shu, directors; Brian Edes, Brian Timmony, John Small, Mike Jelliffe, Richard Hawkins, project directors; Jonathan Parr, Ken Wai, Martin Riese, Paul Casey, Stephen Trstenjak, associates
(credits continue on page 103)

roof. When the final piece of the Y is completed next year, the terminal will encompass 5.94 million square feet of space.

The new airport, which replaces close-in but cramped Kai Tak Airport, was designed to handle 35 million passengers a year, six million more than the old airport accommodated last year. Plans call for a satellite terminal to be added sometime before 2040; the entire complex would be able to handle 80 million passengers each year. The economic crisis now sweeping through Asia, though, has wreaked havoc with the Hong Kong

“IT IS A QUEST FOR CALM SPACES BATHED IN FILTERED LIGHT,” SAYS SIR NORMAN FOSTER OF HIS DESIGN.

Airport Authority’s projections, reducing air travel to the city by 24 percent in the first quarter of 1998. The new airport may be good architecture, but its timing couldn’t be worse.

No one can accuse the British and Hong Kong authorities of being timid when they planned this airport. Indeed, the terminal is but one of 10 megaprojects conceived at the same time and now nearing completion. Called the Airport Core Program, the \$20 billion undertaking includes a high-speed rail line to take people the 21 miles from Chek Lap Kok to central Hong Kong in 23 minutes, a six-lane highway following a similar route, two suspension bridges (one with a central span longer than that of the Verrazano-Narrows Bridge in New York City), a tunnel under Hong Kong’s harbor, and a new town near the airport with shopping malls, schools, and housing for 20,000 residents (see Related Projects, page 102). Although the airport was the engine driving all this development, its price tag came to “just” \$6.3 billion of the total.

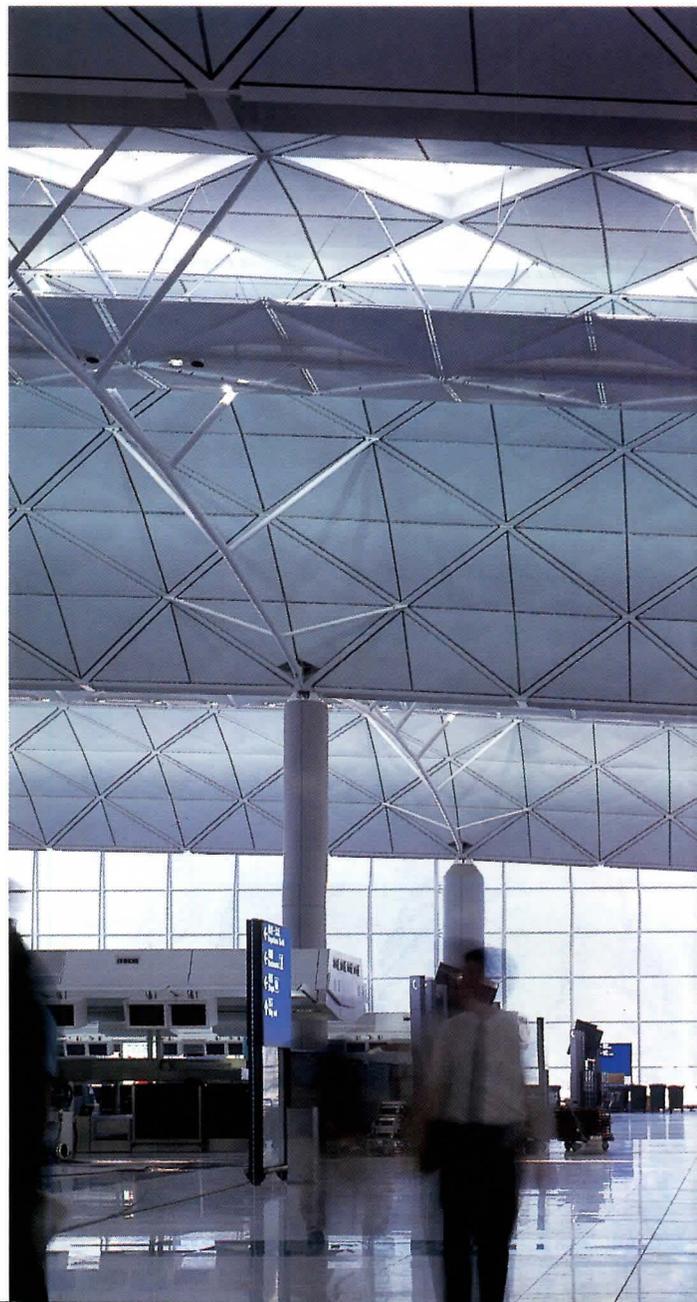
Since large flat tracts of land don’t exist in Hong Kong, engineers had to create one on which to build the airport. Originally a small island with a 330-foot-high mountain, Chek Lap Kok was leveled to a uniform height of 21 feet and expanded to four times its natural size. Constructing the 3.72-by-2.17-mile island required nearly half the world’s dredging fleet, notes Hong Kong’s Airport Authority. And because the island then had no land connections to the rest of Hong Kong, all materials, equipment, and workers had to be transported by boat. At its peak, construction of the airport involved a workforce of 21,000 on site.

As if its vast size weren’t enough to boggle the mind, the airport was built with extraordinary speed—a little more than six years from the start of design to the completion of construction. In March 1992, the architectural commission was awarded to the Mott Consortium, comprising Foster and Partners, BAA, and Mott Connell (a Hong Kong company formed by the British firm Mott MacDonald and the Australian firm Connell Wagner). Among many consultants, Ove Arup and Partners was brought in to engineer the terminal’s vaulted roof. The design of the airport—from parking, air conditioning, and security all the way to graphics and platform screens for subway trains—required more than 30,000 drawings but was done in just 21 months.

Making this speed possible was an integrated team of 230 people (including 72 architects) assembled by the Mott Consortium all in one office, explains Winston Shu, a director of Foster and Partners who is based in Hong Kong and has been involved in the project since its start. Directly above the designers’ offices in central Hong Kong were the offices of the Airport Authority, which made communicating with and getting approvals from the client much faster, says Shu. Unix workstations and,

WWW On the Web: Take a virtual tour of this project at www.archrecord.com.

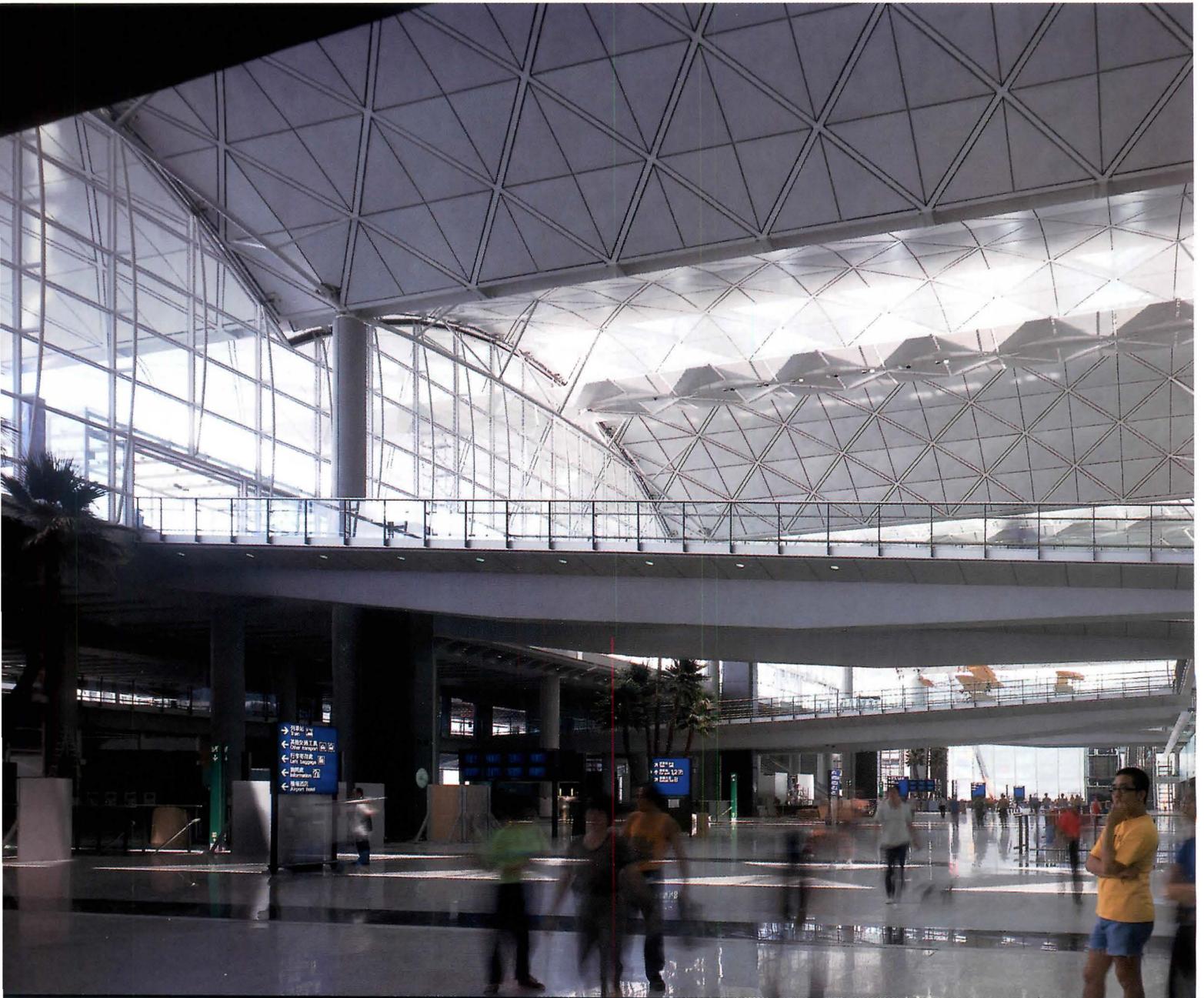
Departing passengers enter the terminal and cross the atrium over one of the slender post-tensioned bridges (right and page 96, bottom), which span 140 feet. To reduce energy consumption, cold air is emitted from access points integrated into the check-in islands (far left in photo below) and stand-alone floor units, which keeps only the lower portion of the vast space cool.







The terminal's barrel vaults end in curtain walls in which large expanses of clear glass are supported at 10-foot intervals by tall bowstring trusses (opposite). Daylight from skylights is reflected from suspended gantries so it washes over the vaults (left). The "meeters and greeters" hall (below) offers a sense of arrival to passengers after they've passed through customs.





later, PCs running Windows NT and MicroStation provided a common computer platform, allowing the design team, consultants, and contractors spread over three continents to exchange information rapidly.

Another critical factor in speeding up the design process was the expertise that Foster had developed while designing Stansted Airport in London, which was completed in 1991. “Stansted gave us a 10-year period to study airports and learn how they work. So when we got the commission to work on Hong Kong, we already had done much of the necessary research,” Shu explains. From Stansted, Foster learned how to develop a standard module and grid that could be applied to nearly every part of an airport, as well as how to integrate climate-control services, baggage handling, and transportation below the main concourse so the areas where passengers spend the most time are open, uncluttered spaces. The architects also borrowed from Stansted the idea of using a lightweight roof that allows sunlight to filter in from above, says Mouzhan Majidi, another Hong Kong-based Foster director. “At Stansted the roof is a series of domes that curve in two directions. Here at Hong Kong the roof is comprised of linear vaults,” explains Majidi.

Working with a master plan by the Greiner-Maunsell Consortium, which included Hellmuth, Obata + Kassabaum and Ng Chun Man & Associates, the architects of the Hong Kong airport inherited a Y-shaped footprint for the terminal. “Our concept was to take the planners’ original scheme, which was a series of events, and bring it all together into a unified experience,” says Grant Brooker, another key Foster director.

All of the project’s architecture grew out of a 120-foot (36-

meter) module devised to accommodate one check-in counter. (It also fits one baggage-handling unit and 1.5 baggage-claim carousels.) Everything from the size of roof vaults to the spacing of support columns, air-handling units, and fire stairs was based on this dimension. Such standardization was essential to keeping costs and construction time down. It also served to hold all of the different design elements together. As Shu explains, “We needed to find an architectural vocabulary that would unify all of the pieces.”

While the roof vaults are lightweight-steel lattices fabricated in modules and then lowered in place, most of the terminal is a poured-concrete structure. Lower floors have columns on a 40-foot grid, while

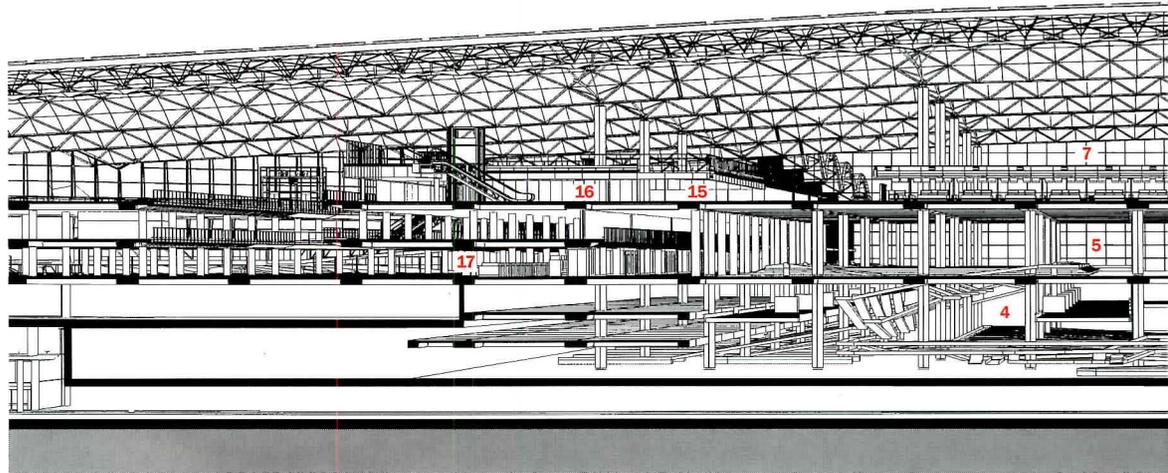
VIEWS THROUGH THE TERMINAL AND OUTDOORS HELP ORIENT TRAVELERS.

columns on the more public upper floors are 120 feet on-center. To bring daylight and views into the building, the perimeter curtain wall of the terminal is clear glass rising at least 13 feet and supported on the interior by vertical bow trusses. A special armature connects the roof and curtain wall, allowing each to move independently of the other.

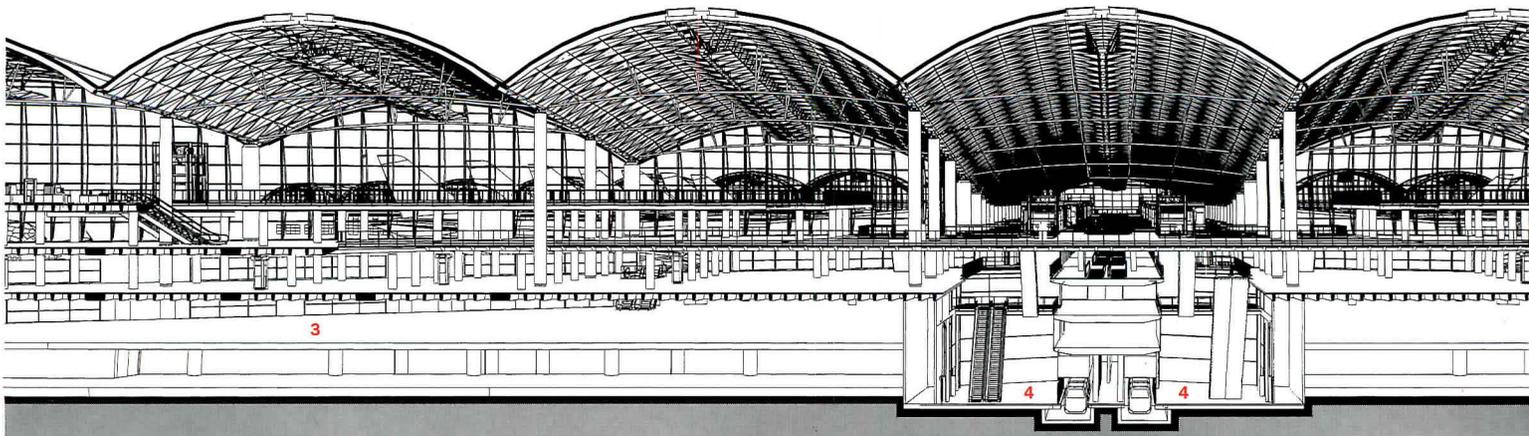
An essential element in creating a seamless experience for travelers is limiting changes in level. Indeed, arriving passengers can stay on one floor, from getting off the plane to stepping onto a train that will take them into town. Departing passengers change levels only once, going down one floor after passing through security. (*text continues*)

The 5.57-million-square-foot terminal is twice as large as Renzo Piano's building at Kansai Airport in Japan and covers an area about the size of London's Soho district. The baggage-handling hall alone is as large as Yankee Stadium in New York. The enormous size of the terminal was dictated by the fact that nearly half the world's population lives within five hours flying time of Hong Kong.

1. Departures level
2. Arrivals level
3. Baggage hall and plant
4. Automated people mover
5. Baggage claim
6. Customs
7. Check-in hall
8. Meeters and greeters hall
9. Staff entrance
10. Departures road
11. Ground Transportation Building
12. Departures train from HK
13. Arrivals train to HK
14. Arrivals cars/buses to HK
15. Immigration and security
16. Retail and restaurants
17. Arrivals immigration
18. Departures mezzanine

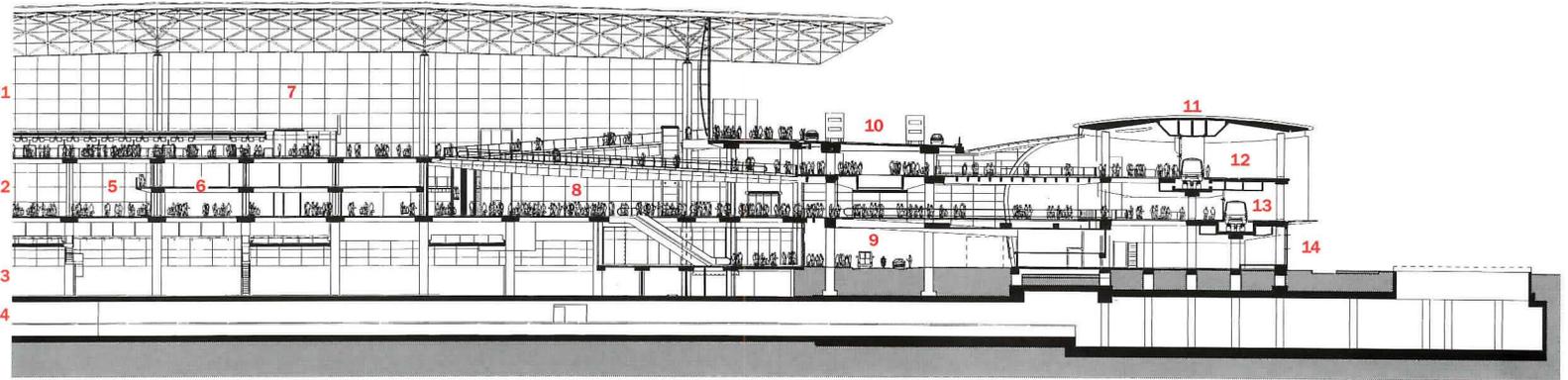


EAST-WEST SECTION LOOKING NORTH

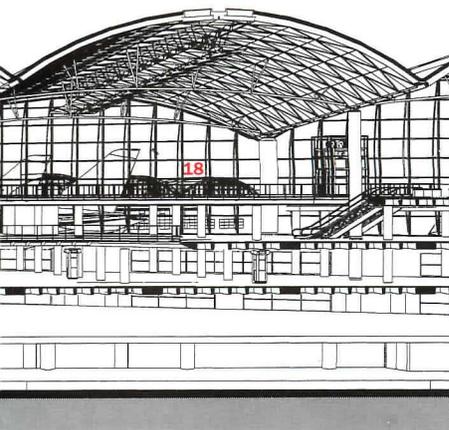
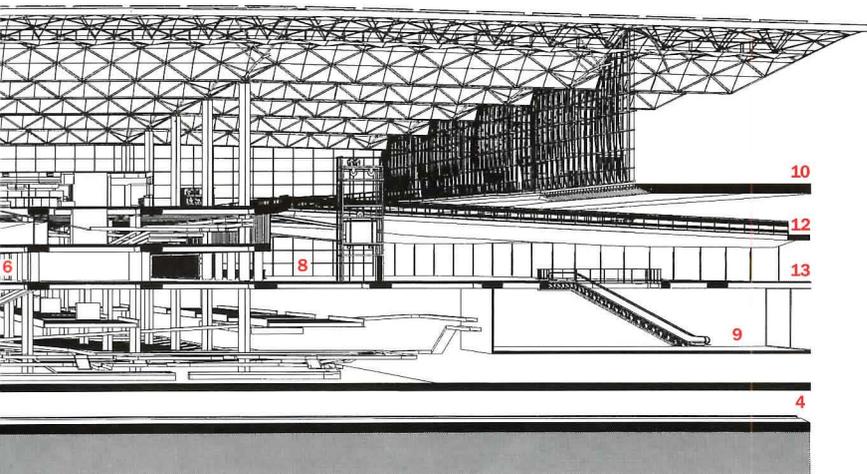


NORTH-SOUTH SECTION

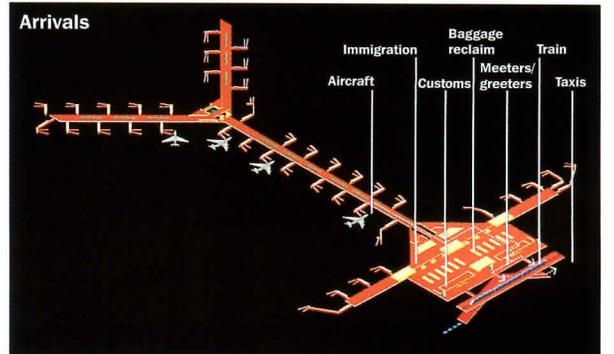
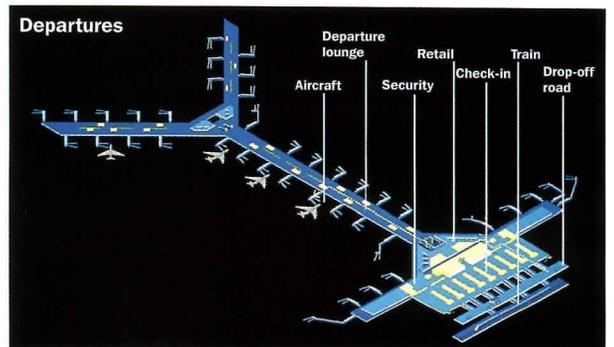
The Ground Transportation Building (right), which sits across a roadway from the terminal, provides access to rapid-transit lines, buses, and cars.



EAST-WEST SECTION



The terminal separates departures, arrivals, and baggage handling onto different floors, so travelers need to make few, if any, level changes. To get to and from the far gates, though, passengers take shuttle trains on the lowest level.



LIGHTWEIGHT STEEL ROOF ALMOST SEEMS TO TAKE OFF

The sweeping multivaulted roof that is the terminal's most distinctive feature is an intriguing combination of variable geometry and standardized parts. Engineered by Ove Arup and Partners, the roof springs in a series of parallel steel-frame vaults across the 120-foot (36-meter) column grid, gently swooping from a height of 40 feet above the entrance on the east, up to 73 feet over the check-in counters in the center of the building, and down to 13 feet at the far gates to the west.

Although the roof curves from north to south as well as from east to west, it consists of 120-by-120-foot steel modules made of interlinked diagonal universal beams, all of which are straight. The 129 different modules, which weigh only 132 tons each, were assembled on a different part of the site, painted, and then lifted into place using two of the world's largest mobile cranes. With an interior clad in triangular white perforated aluminum panels and skylights making up 5 percent of the terminal building's area, the lightness of the roof pervades and unifies the vast spaces.

For the engineering team, led by David Scott of Ove Arup, flexibility was key for both the roof's structure and the construction options given to the contractor. Running east to west, the roof is composed of four 1,188-foot-long sections with three movement joints. But the 2,244-foot width has no movement joints, as the vaults themselves are designed to flex.

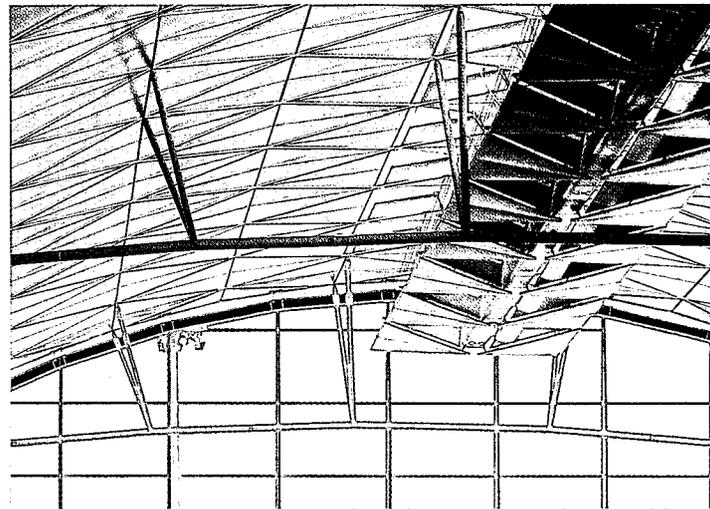
The vault structure was designed so it could be built year round, with or without the cladding, and by either bolting or welding the joints. While most of the roof is fully welded, the last arm of the Y-shaped plan, constructed after the

airport opened, is bolted. The exterior cladding is a single-membrane PVC over thermal and acoustic insulators and decking laid parallel to the vault.

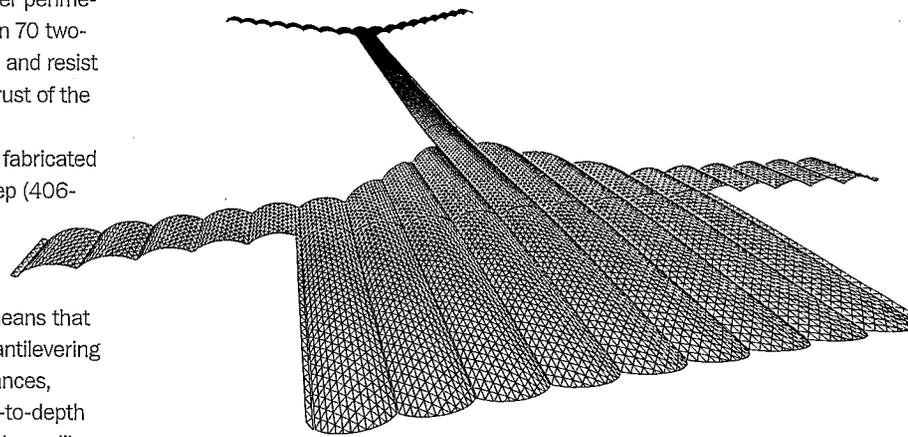
The support structure for the cladding is connected to the roof on a 10-foot grid by a special armature consisting of a spherical bearing that slides along a stainless-steel pole. At the curtain wall, the armature runs parallel to the roof and attaches to the window mullions. This system allows the roof to move completely independently of the wall, by as much as four inches both vertically and horizontally.

The roof frame is connected to the cast-in-place concrete columns by steel head nodes that allow each vault to be cranked at a slightly different angle, creating the roof's gently sloping curves in two directions. The geometry is different at each column; the contractor, given a choice of casting or fabricating the head nodes, opted to fabricate them. The column sizes range from slender central supports, 92 feet tall and four feet in diameter, which provide only vertical support and are restrained horizontally by the roof, to the 10.5-foot corner perimeter columns, which contain 70 two-inch steel reinforcing bars and resist the outward spreading thrust of the roof.

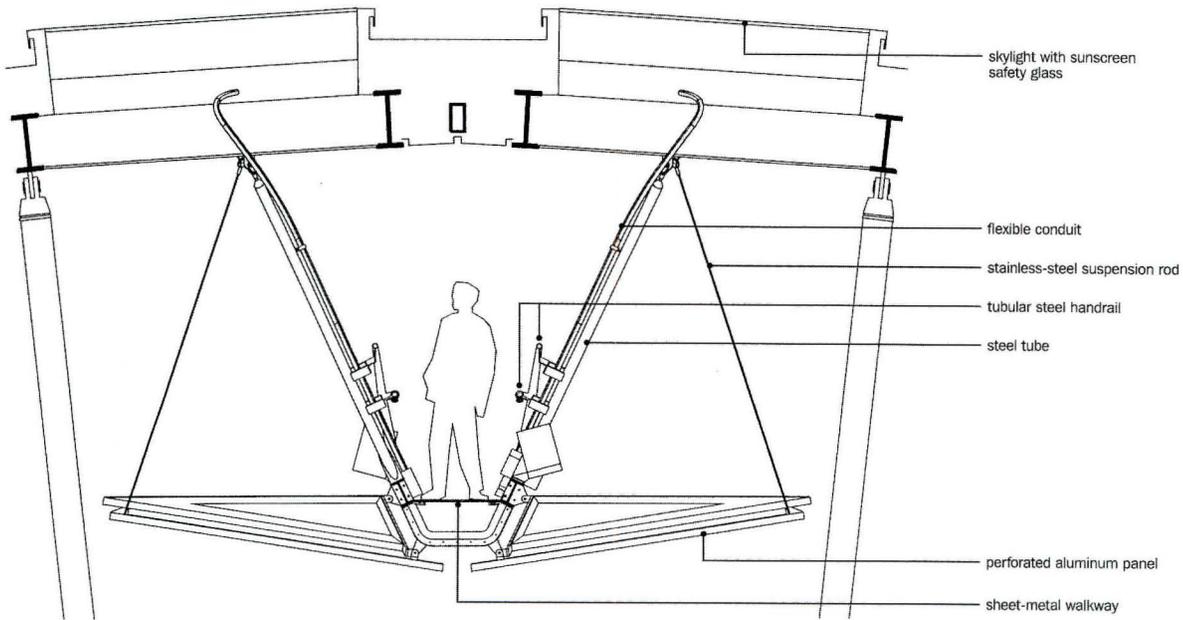
Most of the roof was fabricated with standard 16-inch-deep (406-millimeter) I-beams, the lightest standard section that could handle the buckling loads. This means that the vaults, dramatically cantilevering 90 feet out over the entrances, achieve an amazing span-to-depth aspect ratio of 88:1. With leaps like that, it's no wonder the roof seems to almost take off. *Jack Robbins in Hong Kong*



Daylight comes through triangular skylights running down the center of each vault and is reflected back up along the ceiling so it doesn't create glare (above). The gantry that bounces daylight up to the ceiling also carries light fixtures and a catwalk for maintenance personnel (drawing, opposite top).

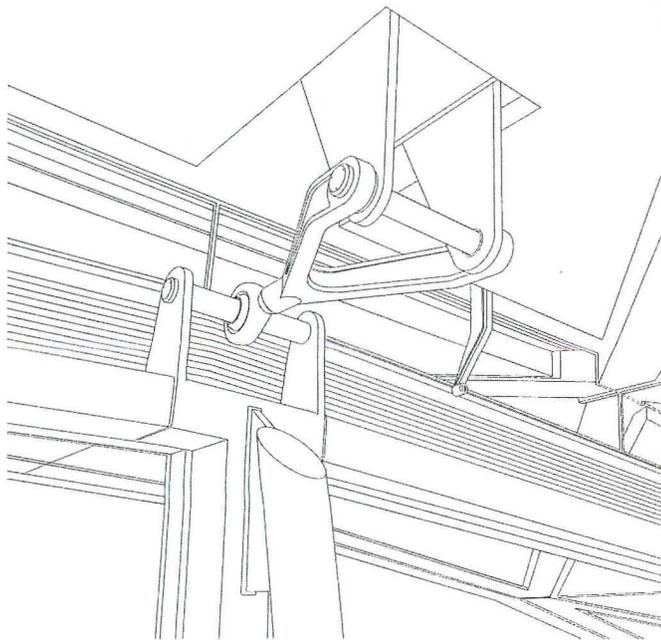


ROOF VAULTS

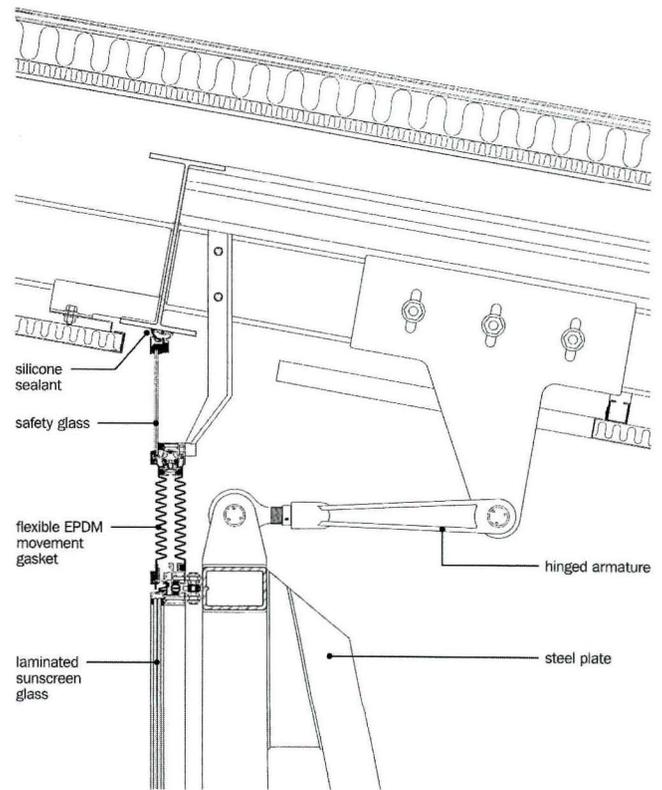


CEILING GANTRY

A special 29-pound, 22-inch-wide armature (below) connects the roof to the wall and allows each to move independently.



ARMATURE DETAIL



VERTICAL SECTION THROUGH WEST-FACING WALL

0 1 FT.
.3 M.

RELATED PROJECTS LINK AIRPORT TO THE REST OF HONG KONG

As an example of integrated urban development, the Airport Core Program has few peers anywhere in the world. Funded by a combination of bonds, government expenditures, and fees paid by private companies for the right to develop different pieces of the giant puzzle, the \$20 billion undertaking comprises 10 connected projects, including the new airport, a high-speed rail line linking the airport to downtown, a six-lane highway, two suspension bridges, a tunnel under Victoria Harbor, and a new town named Tung Chung.

By selling development rights to build huge commercial and residential complexes around the four stations along the new mass-transit route to the airport, Hong Kong has reaped some of the higher real estate values it created by building the new infrastructure. This scheme also concentrates new offices and housing at transit nodes, allowing most workers and residents to com-

mute by train. As a result, the program makes sense financially and urbanistically. Its impact on the environment, however, is a controversial subject, especially since it involved several huge land-reclamation efforts.

The two downtown terminals on the new rail line, Kowloon and Hong Kong stations, serve as multinodal hubs connecting rail, bus, and tram systems. They also act as in-town extensions of the airport itself, providing ticketing and check-in services for airline passengers. Kowloon Station (opposite top), designed by Terry Farrell & Partners, is a 1.87 million-square-foot complex that will be connected to future commercial property development. On the other side of Victoria Harbor, Hong Kong Station (opposite bottom), designed by Arup Associates in association with Rocco Design Partners, sits on an eight-acre land-fill site that will also be surrounded by future commercial towers.



The airport at Chek Lap Kok (1) is just one part of a coordinated program of infrastructure projects that includes the new town of Tung Chung (2), an expressway, and a rapid-transit line with downtown stations at Kowloon (3) and Hong Kong Island (4). The old airport was at Kai Tak (5).

Just across a narrow channel from Chek Lap Kok, the new town of Tung Chung is rising on Lantau Island (below). Master planned by Anthony Ng Architects, the 56-acre development is Hong Kong's ninth new town (most of the others are in the area known as the New Territories). Ng also designed two of the first three phases of buildings in

Tung Chung, including a crescent of housing towers rising 32 to 38 stories and a mixed-use town center that will include shops, offices, and a hotel. People who work at the new airport will find Tung Chung a convenient place to live, but planners expect even people who work elsewhere to be attracted to the great views of the water. C.A.P.

TUNG CHUNG NEW TOWN Anthony Ng Architects (master plan and some architecture). Plans call for

10.5 million square feet of development, including 12,500 apartments, 605,000 square feet of retail, 235,000

square feet of hotel, and 162,000 square feet of offices. Some apartment towers are already completed.





KOWLOON STATION
Terry Farrell & Partners
 (architects). The largest complex on the new airport rail line, this station provides access to three different rail lines, as well as buses and other ground transportation. A concourse links all the various elements and an atrium connects with nearby commercial projects.



HONG KONG STATION
Arup Associates and Rocco Design Partners
 (architects). The end of the airport rail line, this station connects with other rapid-transit lines and ground transportation, and features a shop-lined atrium.

(Travelers going to or from one of the far gates, though, will probably take the automated people mover, a train on the lowest level. Or they can use the moving sidewalks running the length of the connecting concourse.)

One of the most memorable spaces in the terminal is the grand departure hall, which is nine bays (1,073 feet) wide and rises to a height of 73 feet at its center. After checking in and going through passport control

THE GOAL WAS TO DEVISE AN ARCHITECTURAL VOCABULARY TO UNIFY ALL PARTS OF THE TERMINAL.

and security, travelers go down one level and find the largest single retail area in any international airport.

Although the departures level offers the best views of the terminal's dramatic roof vaults, light wells running down the center of the connecting concourse offer glimpses of the roof to passengers on the arrivals level as well. And when arriving passengers get through customs they are treated to a "meeters and greeters" hall that spans nine bays and is completely open to the roof above. The last stop for travelers arriving in Hong Kong is the Ground Transportation Building, a long tubular structure that accommodates trains, buses, and cars on various levels.

"The airport had to be the gateway to Hong Kong," states Douglas Oakervee, the project director for the Airport Authority of Hong Kong. "I think we've achieved that with a building that's as spectacular as the city itself." ■

Engineer: Ove Arup and Partners (structural)
Consultants: WT Partnership (cost); Fisher Marantz Renfro Stone Architectural Lighting Design (lighting); O'Brien-Kreizberg and Associates (construction programming); Wilbur Smith Associates (traffic planning)
Master planner: Greiner-Maunsell Consortium (a joint venture between Greiner International Ltd. and Maunsell Consultants Asia Ltd.) in association with Hellmuth, Obata + Kassabaum International, Ng Chun Man & Associates, Maunsell Geotechnical Services Ltd., J. Roger Preston & Partners, CES Consultants (Asia) Ltd., Balfours International (Asia) Ltd., Widnell, Coopers & Lybrand Associates Ltd., Flight Transportation Associates, KPMG Peat Marwick, The MVA Consultancy, Lea+Elliott Inc., Avsec Inc., TRA
Main contractor: BCJ Joint Venture (Amec International Construction Ltd.,

Balfour Beatty Ltd., China State Construction Engineering Corp., Kumagai [HK] Ltd., Maeda Corp.)
Other contractors: AEH Joint Venture (terminal building services); New HK Airport People Mover System Joint Venture (automated people mover system); Swire Engineering Services Ltd. (baggage-handling system); Gammon Nishimatsu Joint Venture (terminal building foundations); GEC (HK) Ltd. (flight-information display system)

Sources
Roof steel, link bridge, structural steelwork: Watson Nippon Steel Joint Venture
Lighting: Thorn Lighting
Indirect lighting: SPI Lighting
Internal cladding: Permasteelisa
Expansion joints: C/S Group
Elevators: Ryoden Lift & Escalator Co.
Escalators, moving walkways: CNIM
Seating: Wilkhahn, Wilkening & Hahne GmbH

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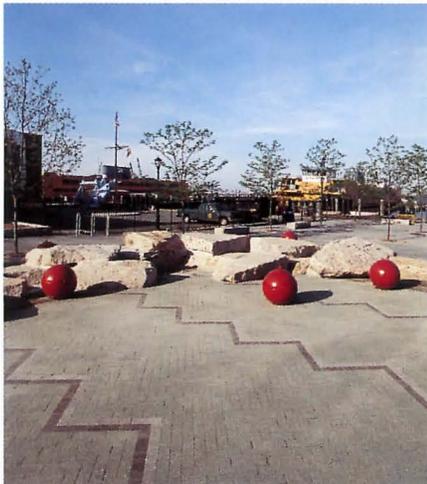


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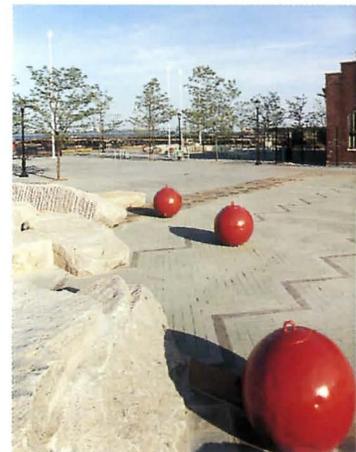


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RESORT HOTELS

Destination Architecture

RESORTS NEED MORE THAN NICE ROOMS TO SUCCEED; DEVELOPERS TODAY CAPITALIZE ON OUR DESIRE FOR ENTERTAINMENT, EDUCATION, AND PAMPERING.

by Véronique Vienne



1

San Pedro, Chile

Challenged by intense light and some of the driest conditions on earth, Germán del Sol created the rugged but luxurious Hotel Explora in Atacama.



2

Cabo San Lucas, Mexico

Working with local materials, plants, and craftspeople, the developers of Las Ventanas accentuated the pleasures of Baja's environment and traditions.



3

Braga, Portugal

Beginning with the skeleton of an 18th-century Cistercian monastery, Eduardo Souto de Moura crafted the spare but welcoming Pousada de Santa Maria.



4

Bali, Indonesia

At the Four Seasons Resort at Sayan, a large main building and 28 individual villas step down the terraced slopes of a Balinese river valley.

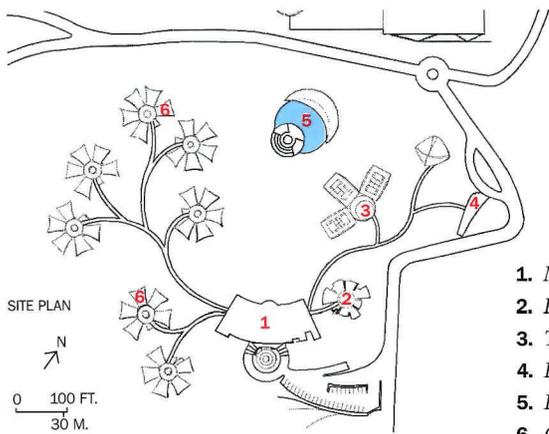
Think of the number four. Add 12 zeros to it. Then put a dollar sign in front. That's the size of our wanderlust: four trillion dollars, the amount we spend each year on tourism. And our leisure time and our appetite for travel continue to grow, the latter at a rate of some 15 percent a year.

With numbers like these, you'd think that globetrotting is second nature to human beings—especially to Americans, whose thirst for travel is legendary. But while Americans are today among the biggest spenders in nonbusiness travel (the 80 million U.S. citizens who went on vacation in 1997 spent an average of \$350 a day), they used to be homebodies, frittering away their leisure time on their front porch. At the beginning of the century, while wealthy Europeans indulged in month-long water cures at resort spas, Americans seldom took time off to get away, even for health reasons. Back then, taking it easy was frowned upon.

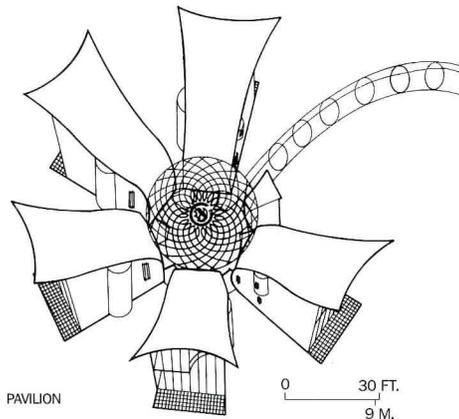
Everything changed about a century ago, when trolley companies on the East Coast created amusement parks at the end of their lines to boost their weekend business. The recreation facilities were located as far as possible from urban centers, to force people to buy round-trip tickets. Called "trolley parks," these primitive venues featured landscaped walkways, swing sets, picnic groves, refreshment stands, and gazebos. Palisades Park, at the end of New Jersey's Bergen County Traction Company line, opened to the public in 1898—an early blueprint for many resorts to come.

Old photographs of the Palisades Park swimming pool, complete with an artificial sand beach, deserted island, and waterfall, look strangely familiar today. The Victorian architecture of the bathhouses, with their latticework and gingerbread trim, inaugurated a style now associated with grand hotels and resorts. Even the bathing beauties, in their swimming caps and belted tank suits, look surprisingly modern. If these were color images rather than grainy black-and-white photographs, you might squint and think you were looking at the Renaissance Resort in Goa, India (minus the palm trees), or Disney's Grand Floridian Beach Resort (minus the monorail)—both themed resorts designed in the last decade by Wimberly Allison Tong & Goo (WATG), the world's leading design consultancy for hospitality, leisure, and entertainment.

Véronique Vienne, a freelance writer who lives in Brooklyn, New York, is the author of The Art of Doing Nothing: Simple Ways to Make Time for Yourself (Clarkson Potter, 1998).



1. Main building
2. Restaurant/shops
3. Tennis courts
4. Business center
5. Pool
6. Guest suites



Heydar Ghiai & Sons' high-security resorts are designed as a series of pavilions to ensure guests' privacy.

Designing the experience

Though much more imposing than their trolley-park ancestors, today's resort environments still attempt to attract customers to the end of the line. When guests get to their final destination, whether it is a palace hotel in Ka'upuhelu or a bed-and-breakfast in Kansas, they want to feel like they've arrived. They want to put down their baggage and exhale.

Resort architects have to be sensualists as much as builders—their work is not a success unless guests sigh and say, "It doesn't get any better than this." Yann Leroy, of Brennan Beer Gorman (BBG), a New York-based architectural firm known for its resorts and casinos, explains, "You should not see the architecture. You should experience the place, the landscape, the details, the atmosphere." The most critical challenge for architects is understanding what guests expect in terms of relaxation, escape, novelty, and enrichment. Howard Wolff, spokesperson for WATG, puts it bluntly: "The realization of these expectations is what sells hotel rooms and dining seats."

Today, though, regardless of how many of its guest rooms or restaurant chairs are occupied, a stand-alone hotel will have trouble surviving if it's not part of a larger complex. For that reason, there's a growing trend toward mixed-use resorts that combine recreation, retail, time-share, and spa facilities. Mark Hornberger, of the San Francisco architecture firm Hornberger + Worstell, notes that his clients are realizing that resorts with a residential real estate element can be very lucrative. "Time-shares are the fastest-growing trend in resort architecture," he says. Developers leverage the uniqueness of their resort to enhance the value of the land around it. Some analysts even argue that hospitality design is a subset of the real estate business, not the tourist industry.

This makes sense: unlike the traditional hotel industry, which caters to travelers in transit, the resort business is all about keeping people

in one location. Creating a sense of place—and selling it—is what resort development is all about.

No one does this better than Hong Kong developer Amanresorts Ltd. Its luxury hotels—with names like Amankila, Amandari, Amanusa, Amanpuri, Amanjiwo—are known the world over for the exquisite level of their services and amenities. But some of its competitors speculate that the lavish properties don't break even and suspect the company is capitalizing on the reputation of its resorts to build a real estate empire. Established in 1988, Amanresorts has certainly built an empire—in the resort-going public's consciousness, at least. The company's Bali and Thailand properties in particular have established a standard by which all other luxury "lifestyle resorts" are judged, always receiving the highest ratings on *Condé Nast Traveler's* Gold List.

The big theme: theming

But real estate booms don't last forever, and speculating on them does not appeal to everyone. For many resort architects, what supports their business is theming. "Everything seems to be themed these days," says Wolff. "Themed resorts. Themed restaurants. Themed retail. Even cultural institutions such as museums are looking toward theming to attract more people, keep them happy, and bring them back." After the success, in 1992, of their Palace of the Lost City, a 350-room South African resort built around a fictional lost kingdom, and of the Palace of the Golden Horse, a 500-room, five-star fantasy resort in Malaysia, WATG recently re-created the sunken world of Atlantis in Paradise Island, Bahamas.

Sometimes it seems as if all the developers, casino owners, and resort architects in the country have on their desk a copy of *Learning from Las Vegas*, Robert Venturi, Denise Scott Brown, and Steven Izenour's slim volume on architecture, urban planning, and the pleasures of decorated "sheds." Published in 1972, it may be the most influential book of the century on the subject—and probably the most misunderstood. Instead of becoming more receptive to the wisdom of "common" taste, resort builders saw in the critical essay permission to build immodest monuments of heroic proportions—the New York, New York casino being one of the latest over-the-top examples.

Today, the vernacular Vegas that inspired Venturi is being torn down, its hotels, motels, and wedding chapels replaced by multilevel retail, restaurant, and entertainment complexes folded into hotels and casinos. On the drawing boards are such projects as a Roman arena big



Brennan Beer Gorman's Fantasy Beach, in Hurghada, Egypt,

features highly stylized, modern forms in a desert landscape.



The Dharmawangsa Hotel in Jakarta, Indonesia, designed by Sandy & Babcock International, comprises 280 time-share apartments, all of which were sold before the resort opened.

enough to stage chariot races; a replica of the Pantheon; Paris—Las Vegas, featuring the Eiffel Tower under a fake Parisian sky; an Egyptian desert marketplace; and the old city of Venice, complete with campanile, canals, gondolas, and palaces. “You *can* improve on the real thing,” says Wolff, whose company is responsible for the Venetian project. “We know that people often prefer the experience of reality to reality itself.”

Tom Russell, managing director of WATG’s London office, notes that the controversy surrounding thematic architecture is nothing new. “The Houses of Parliament in Westminster was called a thematic ‘abomination’ by the architectural establishment of the time. So was the Natural History Museum in Kensington. Both are considered masterpieces today.”

Entertainment. Edutainment. Ecotainment.

Theming, though, is really just another name for entertainment. And, says Hornberger, “Resorts are becoming more entertainment oriented, just as retail and restaurant developments have focused on entertainment.” Today, edutainment—education made fun—is on everyone’s mind. Disney spearheaded the trend in 1996 with the Disney Institute, the first resort that aimed to educate its guests. A small lakeside town with a Jeffersonian feel, the 457-room enclave was designed by architect Thomas Beeby of Hammond Beeby and Babka. Its facilities include 28 “program studios” where vacationers partake in such activities as animation, travel photography, topiary design, and rock climbing.

Walking the fine line between educating guests and patronizing them are “ecosensitive” resorts that deliver a variety of cultural and regional experiences. It can be as simple as a good concierge acting as a full-time curator, directing guests toward their next discovery—a mountain hike, a farmers’ market, a religious festival, or a local spa. But it seems that any hotel incorporating indigenous crafts, customs, or cuisine can call itself ecologically (or at least politically) correct.

According to WATG’s Russell, though, the eco trend only makes sense for resorts in remote locations: safari hotels promoting animal habitat conservancy, ecological resorts promoting energy conservation, historical resorts promoting regional culture and heritage. “Culture can also be an alibi,” remarks BBG’s Leroy. “For the first few days, guests visit remote temples or explore distant marketplaces. It’s a way for them to deal with their guilt. It gives them permission to crash by the pool later.”

Celebrity appeal

A subset of the edutainment trend are “designer destinations,” small, cutting-edge, urban hotels where guests learn about good taste. At the

Mondrian in Los Angeles, designed by Philippe Starck for celebrity hotelier Ian Schrager, a casting agent was brought in to hire the staff; there is a furniture price list in the bathrooms; and Raymond Chandler’s *Farewell, My Lovely* replaces the hotel Bible. Other oh-so-tasteful boutique resorts are Starck’s Morgans and Royalton, Christian Liaigre’s Mercer, Bill Scofield’s Soho Grand, and Pasanella + Klein Stolzman + Berg’s Mansfield, just to mention some of New York’s chicest pieds-à-terre.

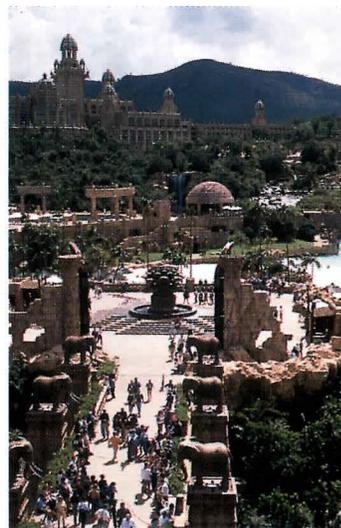
These urban getaways often attract wannabe celebrities—people who want the allure of privacy but hate to miss an opportunity to see their name in print. A much smaller number of designer destinations cater to the truly rich and famous. Architect Edward Tuttle, an American who lives in Paris, has single-handedly defined the genre by designing almost exclusively for Amanresorts. Breathtakingly beautiful, these hotels offer room and board from about \$1,000 a day.

But even that is not the top of the scale. Heydar Ghiai & Sons, an architectural firm with offices in Switzerland, Costa Rica, and San Francisco, specializes in (real) imperial palaces and high-security resorts for “political figures, monarchs and their entourages, and people who do not want to be bothered.” Yves Ghiai, who runs the San Francisco office, explains: “We design a series of pavilions on an old Persian architectural principle. We build layers of privacy into the access: arcades, foyers, antechambers. This is where the real intrigues and discussions take place.”

All the comforts of home

“Living healthy” resorts, anchored around a spa, try to teach guests how to relax and enjoy the moment. With the realization that no hotel today could survive without boasting at least a health club, more and more luxury resorts are enlarging their exercise, fitness, and body-treatment facilities—to up to 30,000 square feet—and offering classes on wellness of mind and spirit. These hotels often add “& Spa” to their names, suggesting a world of sparkling indoor swimming pools, relaxing body wraps, glamorous guests, and delicious light cuisine. Witness the Ojai Valley Inn & Spa, the Givenchy Hotel & Spa, the Sonoma Mission Inn & Spa, the Green Valley Fitness Resort & Spa, and so on.

The peace of mind that spas offer (or at least promote) is the ultimate resort destination. If guests can access this serene place within themselves, they will always feel that they have arrived. What most travelers are searching for is a unique transformative experience.



WATG’s South African resort, The Palace of the Lost City, is themed around a fictional “lost kingdom.”

Not surprisingly, spas exploit the same devices other resorts use to capture the experience of respite—just more so. Hassle-free environments. Architecture that’s part of the landscape. Meticulously detailed bathrooms. The sound of water. A seamless connection between indoors and outdoors. The ability to stroll from place to place. Offbeat objects. Technology that’s available but not seen. Surfaces you can touch. Furniture for hedonists. A staff that always says “yes.”

In resort architecture, it’s not the journey that counts—scrap that cliché. What guests really want is to come home. ■

1

Hotel Explora in Atacama San Pedro, Chile

A RUGGED BUT LUXURIOUS HOTEL DESIGNED BY CHILEAN ARCHITECT GERMAN DEL SOL CAPTURES THE SPIRIT OF ITS DESERT SETTING.

by Clifford A. Pearson

Project: *Hotel Explora in Atacama, San Pedro de Atacama, Chile*

Architect: *Germán del Sol, Arquitecto—Germán del Sol, principal-in-charge; Horacio Schmidt, Nicole Labbe, architects; Patricio Parada, designer; Hernán Fierro, Carlos Venegas, graphic artists*

Engineers: *Fernando del Sol V. (structural); Renato Lorca (electrical)*

Consultants: *Pedro Ibañez SM and Germán del Sol (landscape architecture); Francisco Cervantes (sanitation and heating installation); BAPA (water treatment and sewage treatment); Consejo de los Pueblos Atacameños (cultural); Jorge Schmidt (mature tree transplantation)*

Building contractor: *Salfa S.A.*

Cost: *\$18 million (Phase I)*

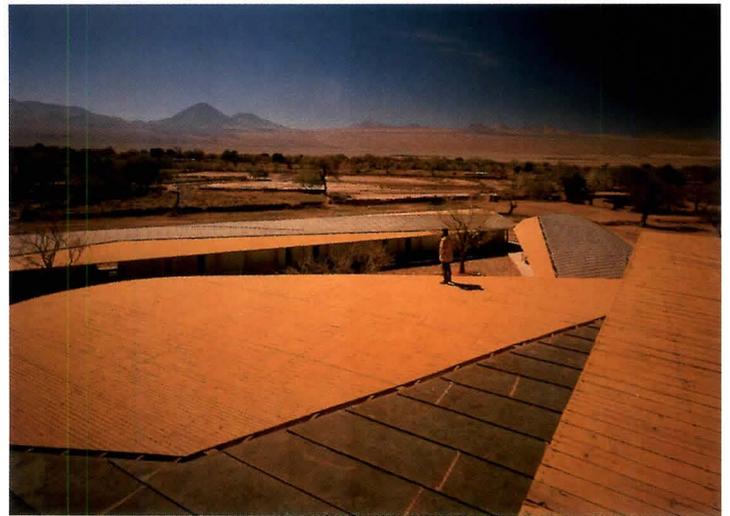
One of the driest places on earth, the Atacama Desert in northern Chile demands respect. Building there requires understanding the rules of the land and honing an acute sensitivity to place.

Like the Explora Hotel in Patagonia (RECORD, October 1996, page 108), the new one in San Pedro de Atacama is designed as a luxurious outpost in a rugged land, a comfortable haven from which visitors can explore a remote but beautiful place. Both hotels were designed by Germán del Sol, a Chilean architect based in Santiago, and offer guests a choice of daily guided tours into the wilderness.

In Patagonia, where winds regularly hit 70 miles per hour, del Sol designed the 30-room hotel as if it were a taut ship wrapped in laminated-pine clapboard. For the Atacama Desert, the architect took a different approach, creating a sprawling *estación* enclosing large patios and terraces.

Phase I of the Explora in Atacama encompasses 82,000 square feet and accommodates 100 guests in 50 rooms. A second phase with 26,000 square feet and 50 more guest rooms is envisioned and will be built eventually.

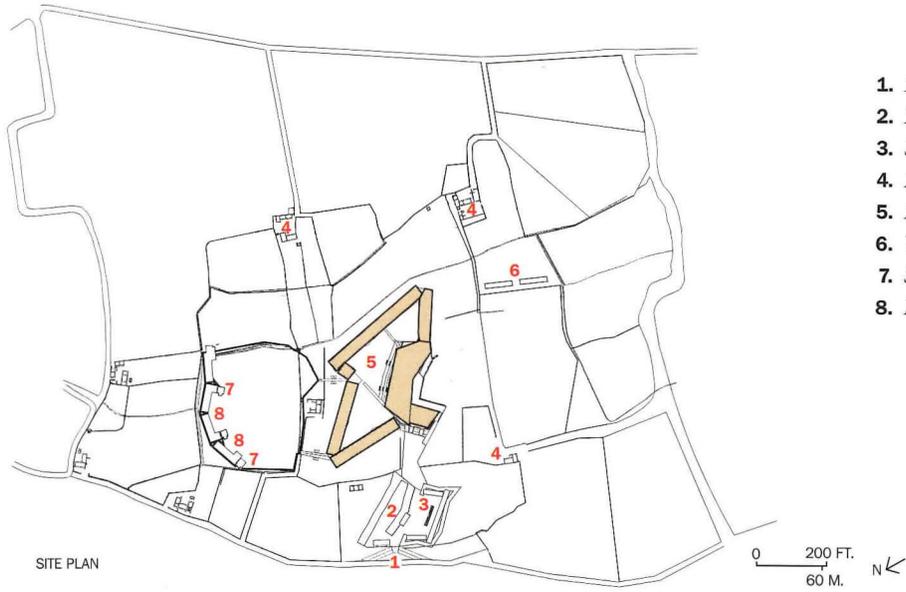
Because the relative humidity in San Pedro is often as low as 2 percent and sometimes even approaches zero, the sky is remarkably clear and the sunlight very



The hotel is “an invitation to guests to stop wandering and experience a unique place,”

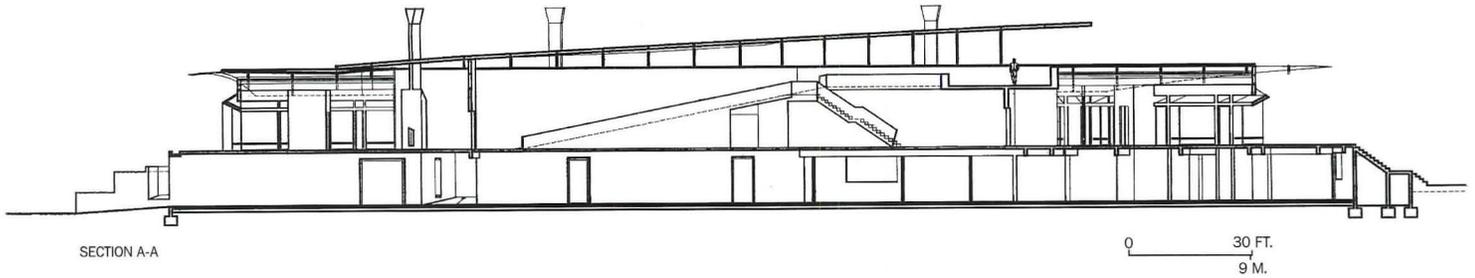
says the architect. Overhanging roofs and landscaped patios (opposite and above)

make for great places to relax. The low-slung buildings fit quietly into their setting (top).



- 1. Entry
- 2. Parking
- 3. Stables
- 4. Existing house
- 5. Hotel
- 6. Water-treatment plant
- 7. Sauna
- 8. Pool

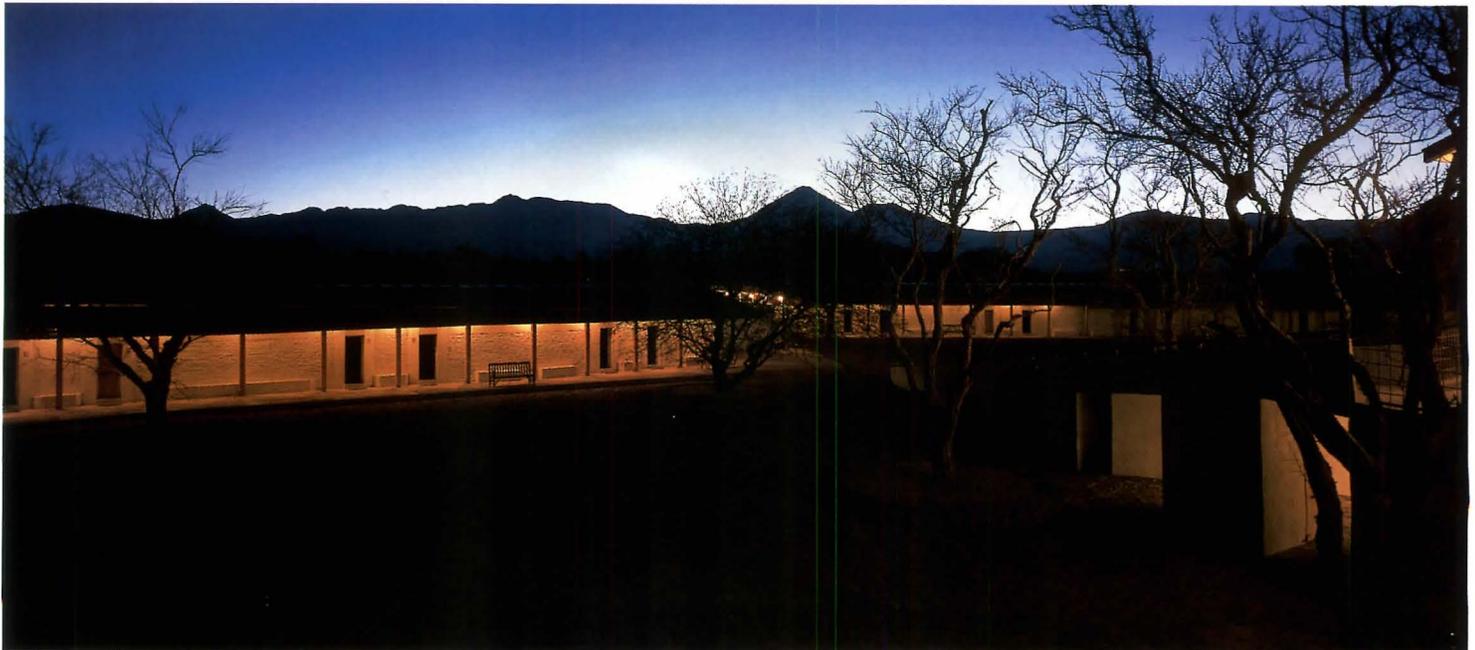


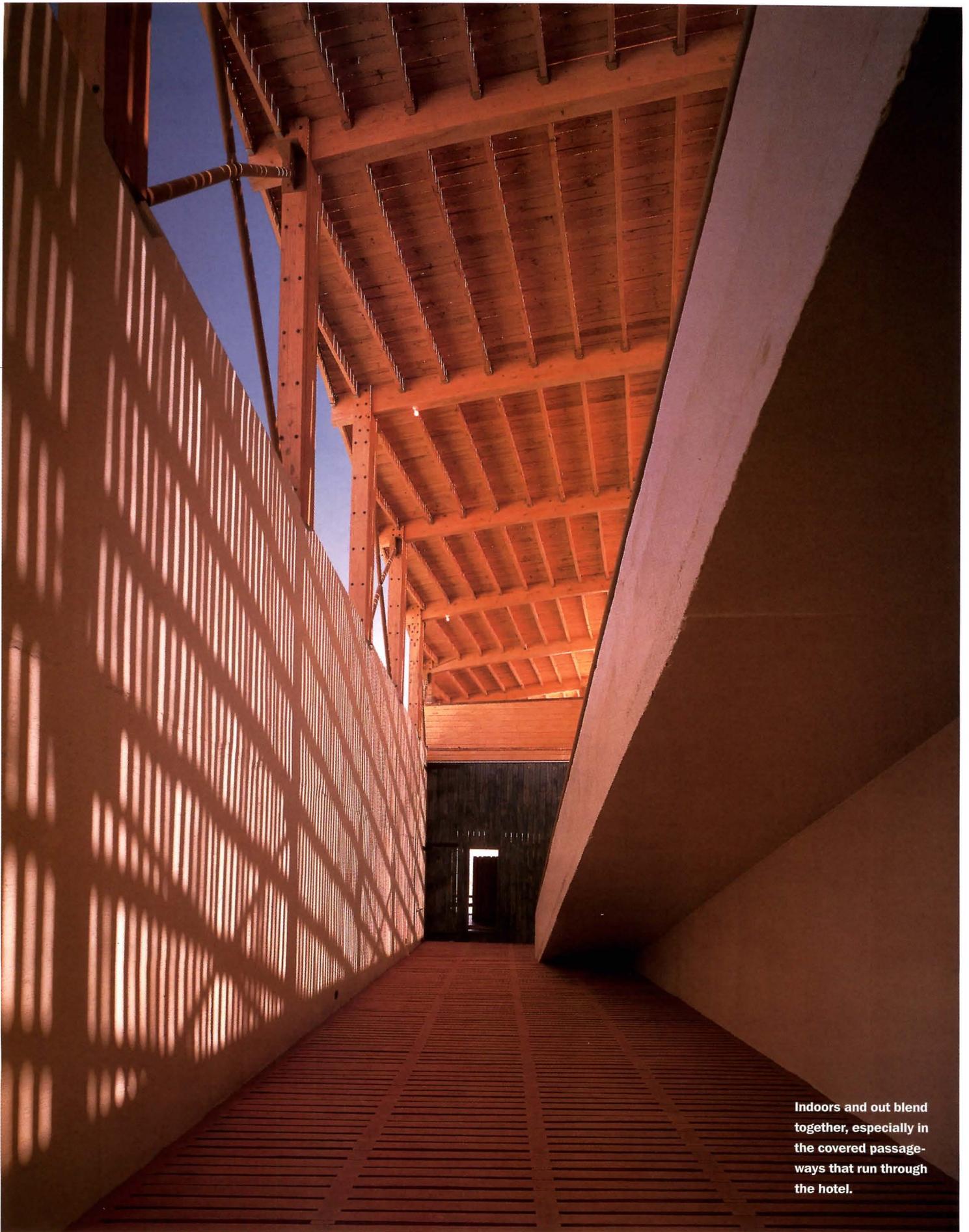


The main building (section above) is raised 14 feet above grade to give it views over the

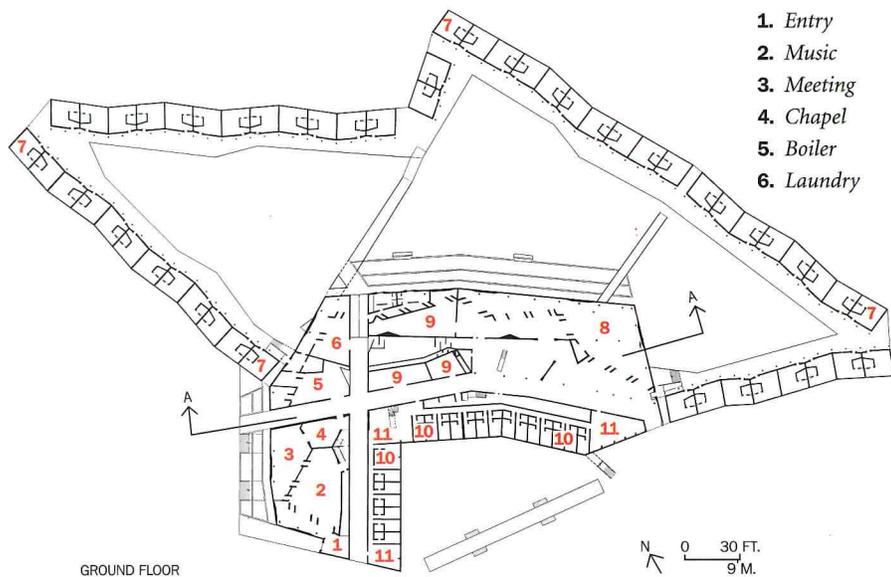
guest room wings (below). To minimize disruption in wildlife patterns, the hotel

is surrounded by irrigated fields that are open to roaming packs of llamas and alpacas.



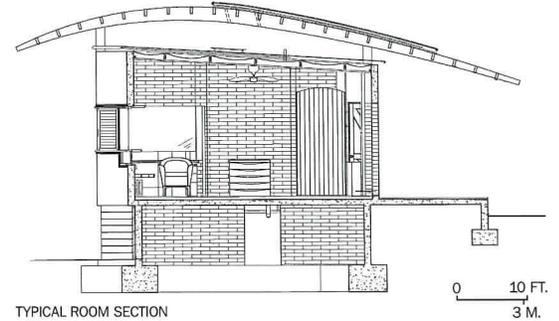


Indoors and out blend together, especially in the covered passageways that run through the hotel.



GROUND FLOOR

- 1. Entry
- 2. Music
- 3. Meeting
- 4. Chapel
- 5. Boiler
- 6. Laundry
- 7. Guest room
- 8. Exhibition
- 9. Storage
- 10. Staff bedroom
- 11. Staff living room



TYPICAL ROOM SECTION



Inside the hotel, the designers used color on elements that people touch, such as doors, window frames, and furnishings. Walls,

on the other hand, were painted white or kept unfinished. Colors were inspired by those found in old Atacaman textiles.



strong. After spending time outdoors, guests usually find that their eyes need a rest.

Controlling the light was one of the main design challenges facing the architects. "We needed to soften the light," explains del Sol. To do this, he and his colleagues designed gently arching roofs that extend beyond the building envelope to protect sitting areas. The curving roofs actually sit above lower flat roofs, allowing light and air to circulate between the two layers and—by means of skylights—to the rooms below. In the public portions of the hotel, deep piers block much of the sunlight from coming directly inside. "You don't want the rooms to be dark, but you need to temper the sun," says del Sol.

Although it is a desert, the Atacama has plenty of water, thanks to runoff from the nearby Andes Mountains and underground aquifers. Natives of the area, descendants of the ancient Inca and Tiahuanico peoples, have built canals and aqueducts to irrigate their fields for thousands of years, and del Sol preserved those found on the site. He also restored existing adobe houses that are now used by local guides employed by the hotel and for functions such as barbeques and al fresco dining.

Unfettered by any allegiance to gridded geometry, the natives of the Atacama have traditionally sited



An important goal in designing the hotel's interiors was to capture views while also softening the strong sunlight. Among the strategies used were slatted wood trellises to shade outdoor

rooms (opposite bottom), deep piers on bands of windows (left), and an angled transom beam that bounces sunlight inside (below). The overall effect is to wash interiors with daylight.

their buildings in response to the dictates of the land. Del Sol did the same in laying out the Explora Hotel in San Pedro, allowing the wings of guest rooms to snake around two stone-paved patios. Trees such as carob, oak, and pepper provide shade in the outdoor spaces.

Although the hotel's architecture makes no direct attempt to recall the local vernacular, the architects did evoke the raised irrigation fields found in the region by setting the hotel on a platform reached by a series of steps and ramps. They also clustered the buildings around outdoor spaces to recall the small towns that pop up in the desert wherever there is water, explains del Sol. Like traditional Atacaman structures, the indoor spaces in the hotel are much smaller than the outdoor ones and there is a purposeful blurring between the two. Indeed, two long "alleys" run through the main building, serving as outdoor corridors that seem almost enclosed.

The buildings have poured-concrete foundations and walls with laminated-wood beams supporting copper-clad wood roofs. Due to the very dry climate, the contractor had to water the concrete more frequently during setting and all wood pieces had to be specially dried so they wouldn't crack.

Although standardized sizes of laminated-wood beam (mostly 26



and 80 feet long) were used to simplify construction, the architects wanted the hotel to have a sense of irregularity. "In Atacama nothing is precise or regular," says del Sol. "We wanted to capture a feeling of imperfection." As a result, the plaster finish of the walls was kept rough, and natural materials like wood and stone were used so the hotel would age well. "The walls actually look better when they're covered with sand," notes del Sol.

The outlying buildings on the

site include a simple concrete stable near the entry and a series of slate-lined pools and small saunas. Water from the pools flows into irrigation canals that slice through the property.

The most important aspect of the entire project, says del Sol, was making all of the buildings feel as if they are integral parts of the landscape. "When you're here at the hotel, you really feel that you're in the middle of the setting, that you're part of the Atacama." ■

Sources

Copper roofing: *Salfa S.A.*

Slate floors: *Pizarras Ibericas S.A.*

Bathroom fixtures: *American Standard*

Sisal rugs: *Silacor Larrain*

Sofas: *Designed by the architect and made by J. Fuentes y Cia*

Stained native wood furniture: *Designed by the architect and made by David Barrios*

Light fixtures and painted steelwork: *Designed by the architect and made by Jorge Richter*

2

Las Ventanas al Paraiso Cabo San Lucas, Mexico

CAREFUL ATTENTION TO INDIGENOUS MATERIALS, CRAFT, AND VEGETATION DEFINES THIS BAJA RESORT.

by Kira L. Gould

Project: *Las Ventanas al Paraiso, Cabo San Lucas, Mexico*

Owner: *Fraccionadora Cabo Real*

Architect: *HKS Architects—Nunzio DeSantis, AIA, partner-in-charge; Jeff Jensen, senior designer; Richard Johnston, project architect*

Engineers: *W. L. Thompson Consulting Engineers (civil); Geox (geotechnical); Brockett Davis Drake Inc. (structural)*

Consultants: *SWA Group (landscape); Craig Roberts Associates (lighting)*

Contractor: *Urbec Lellis-Don*

Cost: *\$24 million*

It used to be that a resort getaway had to be lush, green, and tropical—no matter where it was located. But as vacation spots around the world began to look alike, indigenous character became increasingly appealing to some travelers—a fact that developers have not failed to notice. As a result, new vacation destinations are more diverse, incorporating regional materials, styles, craft, and landscaping.

The owner of 18 acres of beachfront near Cabo San Lucas, Mexico, understood the lure of the local when he asked a multidisciplinary design team to create a resort that would be more Baja desert than Maui, the Hawaiian destination many neighboring getaways seem modeled after. The team responded with *Las Ventanas al Paraiso*, a 61-suite resort that reflects its desert location and Mexican heritage.

The resort's name means "windows to paradise," and here it hardly seems an overstatement. The landscape and landscaping are dramatic and colorful, from the golden cragginess of the Baja coast to the deep blue of the Sea of Cortez to the bright desert wildflowers that are visible at every turn.

While the designers and the owner were seeking something fresh and comfortable, "we were

Kira L. Gould is a freelance writer living in New York City.

determined to avoid creating an artificially tropical place," says Nunzio DeSantis, AIA, managing principal with HKS Architects. "A desert environment can be just as beautiful [as the tropics] if you know what you are doing. *Las Ventanas* is among the very few places that are proving that resorts should be responsive to their environments."

A sense of place

Las Ventanas's success comes in part from the fact that tourists' expectations have changed. "The experienced world traveler knows now to go somewhere where he can find true sense of place," explains Chuck McDaniel, design principal with the SWA Group, which was responsible for the landscape architecture. "The fact that *Las Ventanas* is more reflective of its environment reverberates with people, whether they fully realize the appropriateness or not."

Nature had done a lot of the landscape work already. A riot of blues—sky, sea, and a three-level pool—provide a bracing counterpoint to the beiges and browns of rock, bleached pebbles, plaster, and sand. And this desert does bloom. "We knew that with just a little water, some indigenous plantings would flower and grow in ways usually reserved for the moments after a rainstorm," says

McDaniel, who grew up in arid West Texas.

Still, it's not all desert. Rectangles of grass framing the swimming pool introduce some coolness at ground level. "Large decks would have been very hot no matter what they were made of," McDaniel continues. "And this patch of verdant lawn at the edge of a sandy desert makes for an interesting visual contradiction."

And a sense of personal scale

DeSantis explains that it was important that the designers reduce the scale to a personal level. "We didn't want to create a monster project. We broke down each public area into its own jewel box of design. The guest can become very involved with each space."

The architecture manages to avoid Baja's pseudo-Mayan and Spanish Colonial clichés. According to William Calloway, president of SWA, "The team decided early on not to import building materials or workers from the United States or mainland Mexico, opting instead for local materials, plants, colors, and craftsmen." Contemporary Mexican architects such as Ricardo Legorreta also influenced the clean lines of the buildings here, DeSantis says.

The result seems like a small, pristine Mexican village. Low-rise buildings, connected by stairs, bridges, and curving paths, radiate



from the main lobby. According to DeSantis, “the guest’s first taste is a powerful one. From the lobby there is a spectacular view of the ocean, framed by architectural clusters and a desert landscape.”

The site slopes down toward the Sea of Cortez, to an escarpment above the beach, on which the hotel buildings seem to be hung. Every room has its own panoramic ocean view and welcomes the outdoors, though the rooms also feel private. The suites have patios or terraces, marble showers, traditional Concheula limestone floors with inlaid pebble work, fireplaces, and telescopes for whale-watching.

The focus on local materials and craft has resulted in an extraordinarily hand-molded feel. “Nothing is smooth and perfect—everything has an original touch to it,” McDaniel says. “There’s a culture of low technology in the area that forces the builders to touch everything.” That tooled feeling, DeSantis adds, is what makes Las Ventanas so sensory. “Every surface, every stone, looks as if it were created by hand and placed by hand. And they were.” ■

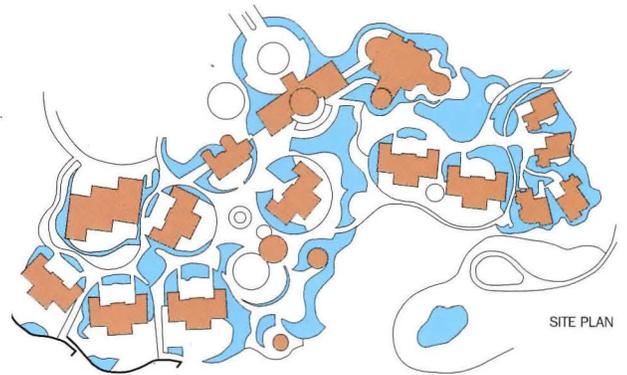
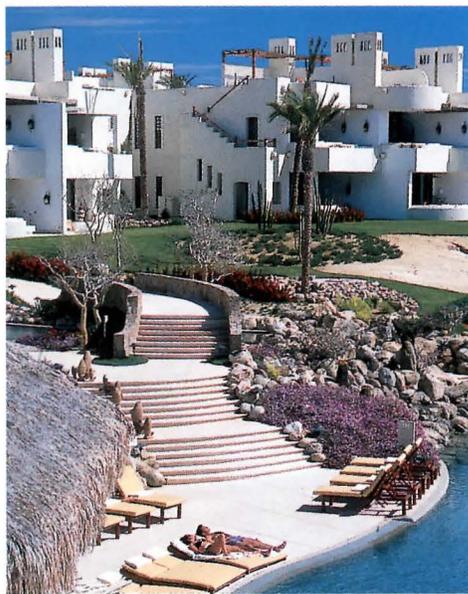
Sources

Wood windows and doors: *Custom*

Wood sliding doors: *Häfele*

Lighting: *Lutron*

Hardware: *Jado*



SITE PLAN

The SWA Group, the resort’s landscape architect, incorporated wildflowers and other vegetation indigenous to the Baja Peninsula.

The architecture, too, was inspired by local traditions, such as the *latilla* and *vega* roofs that cover the resort’s open walkways.



3 Pousada de Santa Maria do Bouro Braga, Portugal

WITH RESTORED AND NEW MASONRY, A SUBTLE ADDITION, AND PRECISELY DESIGNED DETAILS, A RUINED MONASTERY BECOMES A SPARE RESORT.

by David Cohn

Project: Pousada de Santa Maria do Bouro, Braga, Portugal
Owner: ENATUR (Portuguese National Tourism Corporation)
Architect: Souto Moura Arquitectos—Eduardo Souto de Moura, architect; Marie Clement, Ana Fortuna, Manuela Lara, Pedro Valente, design team
Engineers: G.O.P. (structural, electrical); Gestão Energia Térmica (thermal energy management)
Contractor: Soares da Costa

Cost: \$8.5 million

The Pousadas of Portugal, a chain of state-owned luxury hotels, are one country's answer to an enviable but difficult problem: what to do with a surplus of obsolete medieval castles, Renaissance palaces, Baroque monasteries, and disused convents. Since 1942, 22 such historic properties have been transformed into small, full-service hotels. (There are another 21 pousadas in modern structures.) Small, usually with fewer than 30 rooms, they are scattered across the country, often in remote rural settings and national parks. The pousadas also host weddings, banquets, business retreats, and other events. While not highly profitable in themselves, they form a prestigious support network for culturally based tourism, and help maintain a priceless architectural patrimony.

The Pousada de Santa Maria do Bouro, the latest addition to the chain, occupies an imposing Cistercian monastery in the tiny village of Bouro—a handful of houses above the lush banks of the Cavado River. Originally founded in 1162, the monastery has been rebuilt several times; the present structure dates to the 18th century and is attached to a church that is still in use. Today, the Pousada de Santa Maria serves

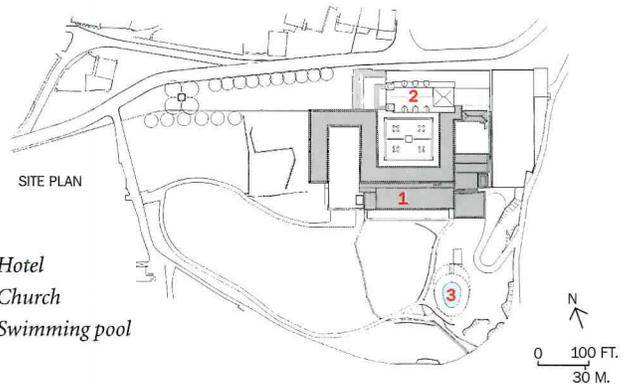
David Cohn is an international correspondent for ARCHITECTURAL RECORD and lives in Madrid, Spain.

visitors to the ancient northern city of Braga, 10 miles to the west, a religious center famed for its historic churches and its Easter Week processions.

Monks' cells as guest rooms

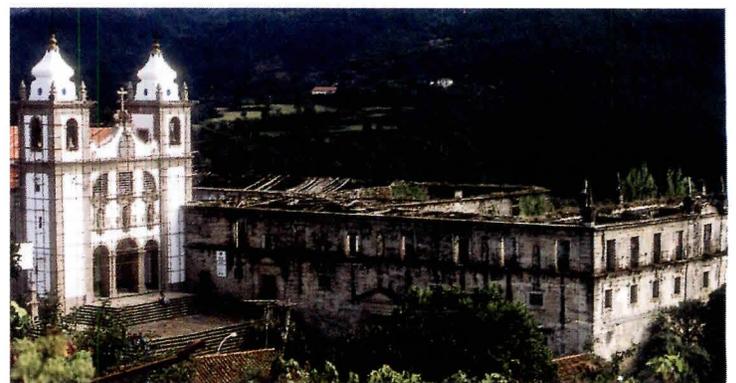
The pousada's 33 rooms are arranged around two open spaces:

a U-shaped court planted with orange trees, and a cloister one level above that has been restored as a freestanding circuit of arcaded walls. Guest rooms are austere modern equivalents of monks' cells. The former kitchen has become a dining hall, its massive, pyramidal brick chimney transformed into a



1. Hotel
2. Church
3. Swimming pool

Before the restoration, the monastery was a roofless ruin.





One of the pousada's main public spaces is this courtyard (left), which is planted with orange trees. The church, still in use, peeks over the former monastery's walls. The monastery's kitchen became a dining room, and its massive, pyramidal chimney turned into a skylight (below).

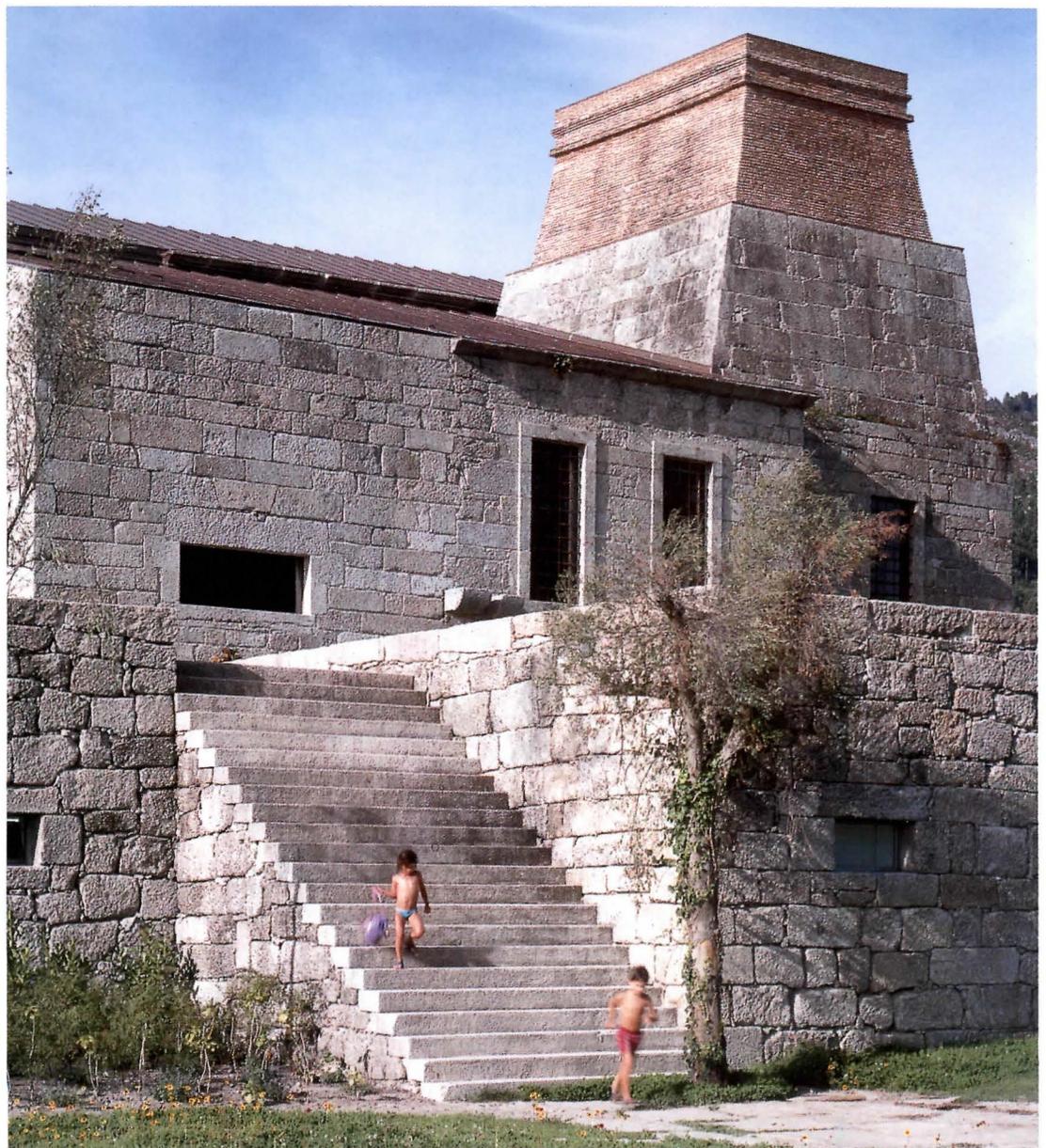
monumental skylight. A new service wing containing a laundry, kitchen, and mechanical plant was built against the lower flanks of the southern facade, its roof acting as a terrace to the public rooms off the cloister. A tennis court and small oval swimming pool are nestled into the semi-wild grounds, which retain their ancient paths and stone walls.

Beginning with ruins

When Portuguese architect Eduardo Souto de Moura began work on the monastery in 1989, the building was an overgrown ruin; it had been in decline since 1834, when the state seized and auctioned off church properties. By the end of the 20th century, little remained but its crumbling walls; there were no roofs or floors.

Souto won the commission largely because of his experience with traditional stonework. A student and frequent collaborator of architect Alvaro Siza, he has designed several private houses incorporating new and rehabilitated stone walls. Souto and a team of skilled masons labored for three years on the ruin, consolidating the walls and rebuilding large parts of the upper floor, the cloister, and the kitchen-turned-dining hall.

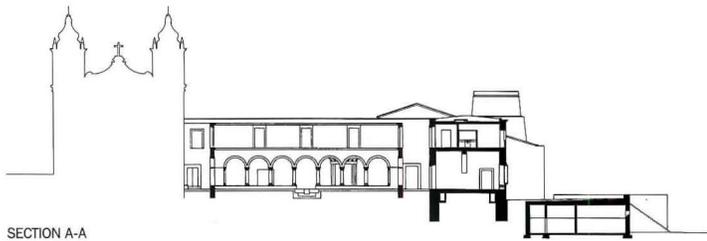
Souto did not attempt a literal restoration of the monastery to its 18th-century state. Rather, he decided to simply make the ruin



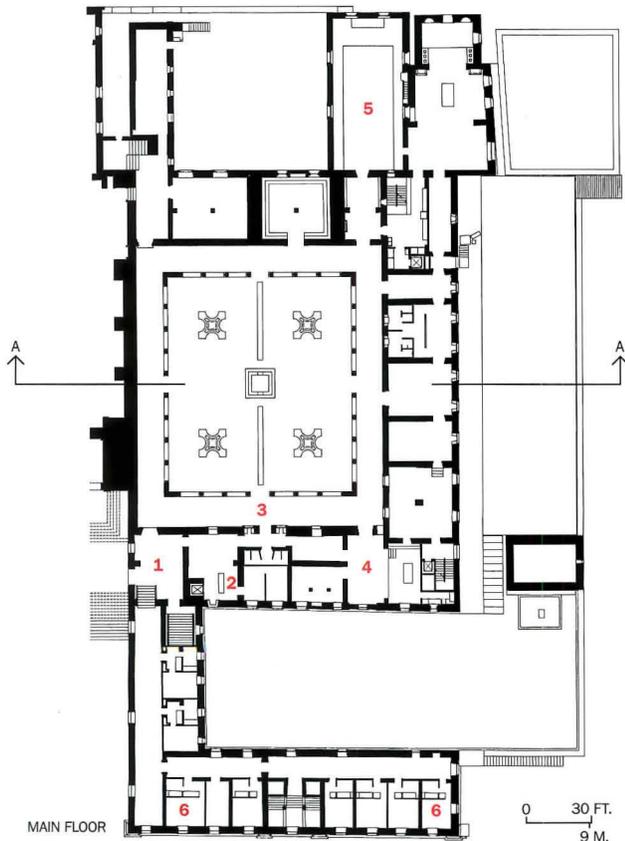


Throughout, old meets new in subtle but surprising ways; here, a metal door frame is set into the 18th-century stone wall (far left).

One level above the open courtyard is the arcade (left), which was left as a free-standing ruin, cleaned up but not restored.



SECTION A-A



MAIN FLOOR

0 30 FT.
9 M.

- 1. Entry
- 2. Administration
- 3. Cloister
- 4. Bar
- 5. Restaurant
- 6. Guest rooms

habitable, using modern means but with great respect for the remains. To Souto, this approach is consistent with the monastery's history over the last eight centuries. "Historic buildings have always evolved to serve new functions, to be manipulated and transformed, without any moral implications," he maintains. "What charms us about the historic city is this layering of different voices."

Souto introduced a series of minimal, carefully detailed elements into the reconstructed monastery. To stabilize the walls laterally, lost wood beams and joists were replaced by an exposed Cor-ten steel deck of the architect's design. A frame of horizontally laid I-beams was anchored to the walls and topped with steel plate, concrete, and wide-plank wood flooring. The building's missing pitched roofs were replaced with green roofs—flat decks covered with soil and planted with ground cover. Souto also designed custom hardware for the pousada, including the brass window frames, which are virtually invisible from the exterior. They drain via an internal channel and an exterior weep, and are set on the inside of window openings without sills, so as not to interrupt the thick stone walls.

Blurring new and old masonry
Souto initially planned to distinguish

new masonry from old, but he abandoned what he calls "this Manichean idea" during construction. He used blocks of stone recovered from the site and traditional sand-and-lime mortar in order to match the color and texture of existing walls; the main floor boasts well-trimmed blocks and Baroque window openings, while the upper floor has more irregular stone, with corners and windows neatly framed. The new service wing is dressed in a rustic grain of large, irregular blocks with more open joints, closer to the rough stonework of retaining walls and rural stone fences than to the fine masonry of the monastery.

Inside, the lack of existing floors made the introduction of elevators, pipes, and other services relatively easy. Souto had more problems with the air conditioning, which he explains is "obligatory for a five-star hotel but against the nature of a centuries-old building." Large ducts under the main floor deliver air via discreet perimeter grilles. In the guest rooms, air-conditioning units supplied with chilled or hot water from the roof are hidden above the bathrooms. Minibars, a difficult requirement for the small guest rooms, are recessed in the walls.

Souto's intention with these details was to make the resolution of the design problems of fitting



The pousada's interiors reflect the building's monastic history; guest rooms are light and minimally furnished, and the public spaces are ascetic but welcoming.

modern lodgings into an older, spartan structure seem natural and effortless. Low labor costs and surviving regional craft traditions permitted a quality of work that would be difficult to match in the United States, although Souto attributes this difference to questions of "tradition and culture" more than expense.

This monastic retreat seems to rise from its site like a prehistoric monument, a man-made artifact that was once almost lost to nature. Souto's reconstruction is full of echoes of its former abandon: the flat roofs overhung with bits of vegetation, the roofless cloister, the window openings, some with their sky-blue curtains drawn as if bits of sky could still be seen through the structure. It comes as something of a shock to find a brightly colored beach towel hung out to dry in one of the windows, or to watch a pair of children scampering down a cold stone staircase to the pool—signs of a magnificent ruin come to life. ■

Sources

Steel doors and windows: *Cor-ten*

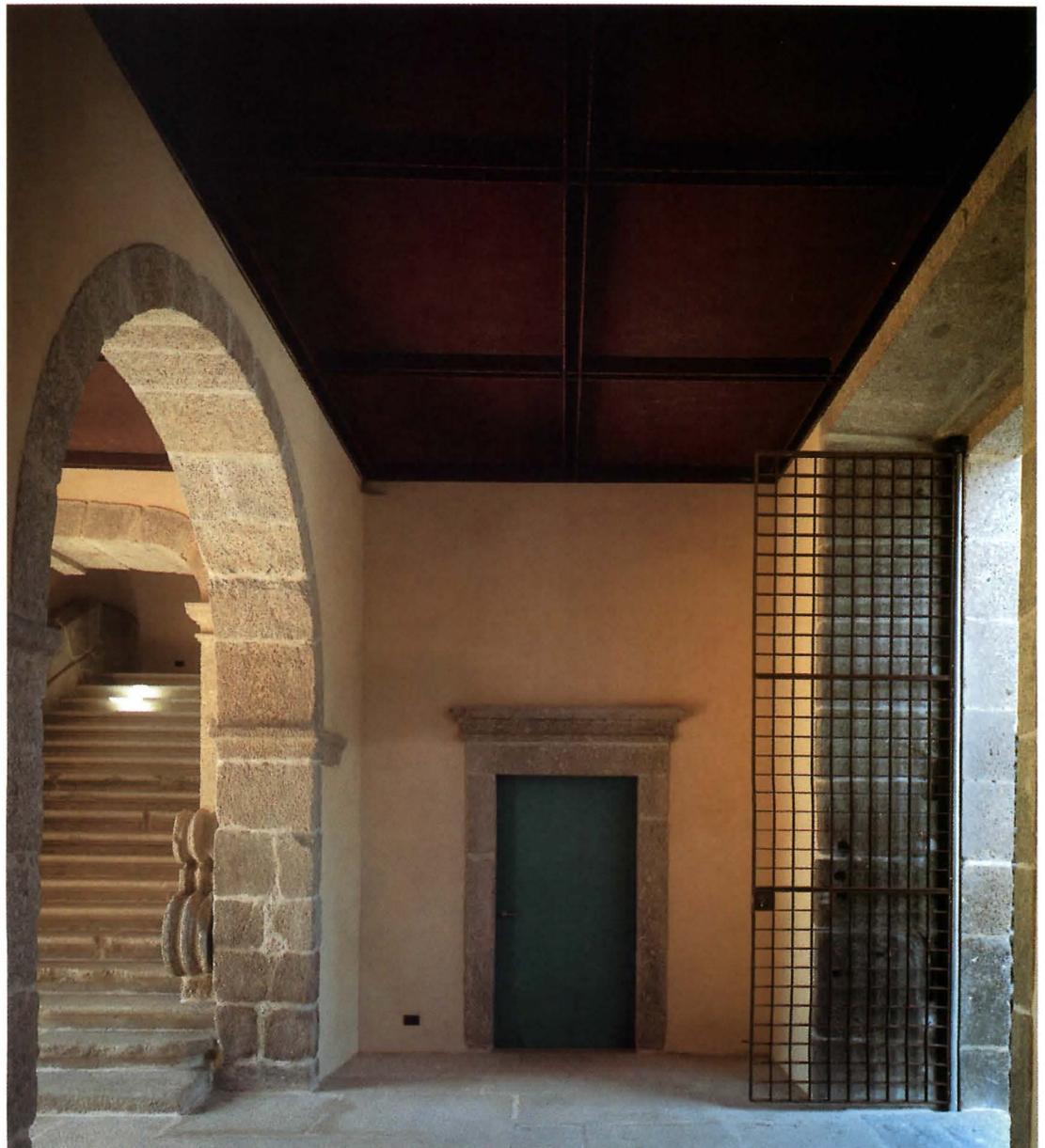
Elevators: *Grupmor*

Bathroom fixtures: *Designed by Souto de Moura and Humberto Viera*

Chairs: *Size Veira, Thonet, Jacobsen*

Tables: *Designed by Souto de Moura and Alvaro Siza*

Wall coverings: *Naturally pigmented plaster*



4 Four Seasons Resort at Sayan Bali, Indonesia

IN A LUSH VALLEY, A FULL-SERVICE RESORT STEPS DOWN THE TERRACED SLOPES, ITS GUESTS SETTLING AT A POOL AT RIVER'S EDGE.

by Tony Stanton

Project: *Four Seasons Resort at Sayan, Bali, Indonesia*

Owner: *Hotel Properties Limited*

Architects: *Heah & Company—John Heah, principal; Ben Smart, architect-in-charge; Tom Cary, Gary Fell, Stefan Kueppers, James McCosh, Victoria Pike, design team; Jamie Macpherson, interior designer-in-charge; Louise Brooker, John Heah, Steven Maxwell, Victoria Pike, Ben Smart, Allison Thomas, interior design team*

Associate Architect: *HST Architects*

Engineers: *Trigram (structural); Harris & Sutherland (civil/structural); Beca Carter Hollings & Ferner (mechanical/electrical)*

Consultants: *Design Flow Solutions (environmental design); SCI (landscape); STO Design Group (hydraulics)*

Contractors: *Tunas-Jaya Sanur; Multiplex*

Cost: *\$30 million*

Given a dramatic site above the curving Ayung River in central Bali, architect John Heah could have played it safe and modeled his new Four Seasons resort on the upscale, neo-vernacular hotels that have proven so successful in other parts of the Indonesian island. But instead of designing wood-framed structures reminiscent of traditional Balinese pavilions and private enclaves with head-high walls that echo those of local family compounds, the Malaysian-born, London-based architect created a decidedly modern hotel, where local materials and craft are combined with inventive design, geometric forms, and lots of concrete.

The resort's size and nontradi-

tional design, as well as the amount of concrete in its foundations and walls, made this a controversial project. Located just 10 minutes from Ubud, the island's artistic hub, the hotel drew the attention of many Balinese and expatriates concerned about unsympathetic development in the area. Letters of protest to the *Jakarta Post* and invective from nearby property owners greeted the project when it began in the mid-1990s. Its elliptical central building (topped with a silvery lotus pond) prompted inevitable comparisons to a spaceship landing in the pristine valley.

While the architect set out to design a contemporary resort, he thought of it as one that comple-



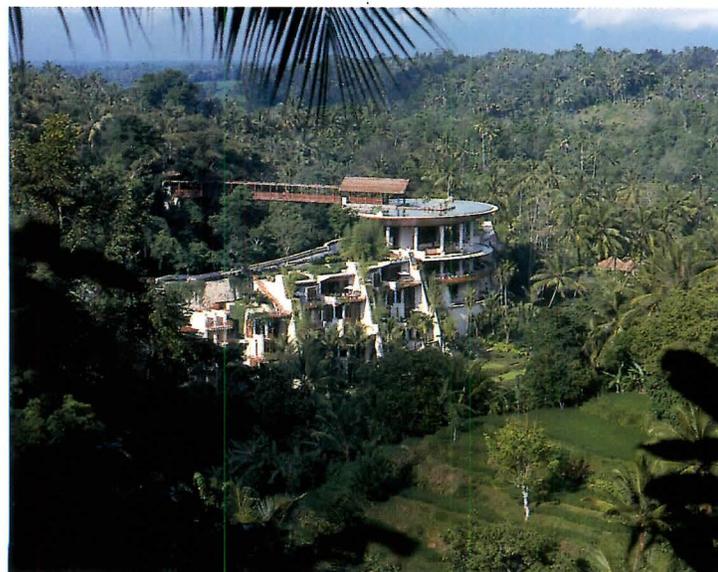
mented, not injured, the landscape. "When I saw the site, I decided to nestle the hotel along the side of the ridge, rather than build on top of it," explains Heah. "I wanted it to melt into the landscape."

Now that it's completed, the Four Seasons Resort at Sayan has won over many of its critics and shown itself to be more sensitive to its site than people first imagined.

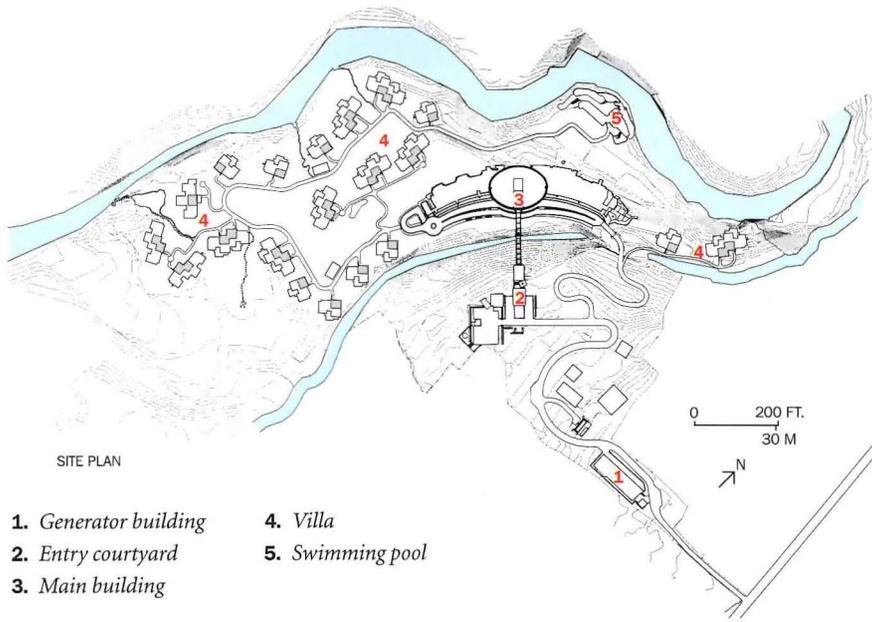
Circulation from above

Building on the slopes of a ravine leading down to the river, Heah realized there was an opportunity to enter the hotel from the top. The result is a dramatic experience for hotel guests, who arrive by car at a small reception area, then walk 180 feet across a steel-and-teak bridge suspended 65 feet above the ravine. On the other side is a

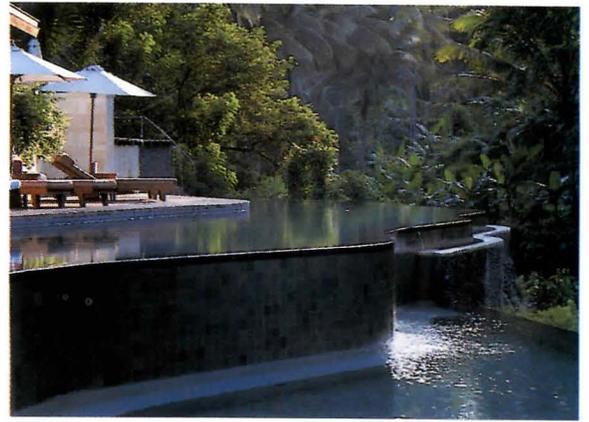
Arriving guests enter by crossing a 180-foot-long bridge (above). The resort fits into the slope of a ravine leading down to a river (left).



Tony Stanton is a writer based in Bali and Singapore.

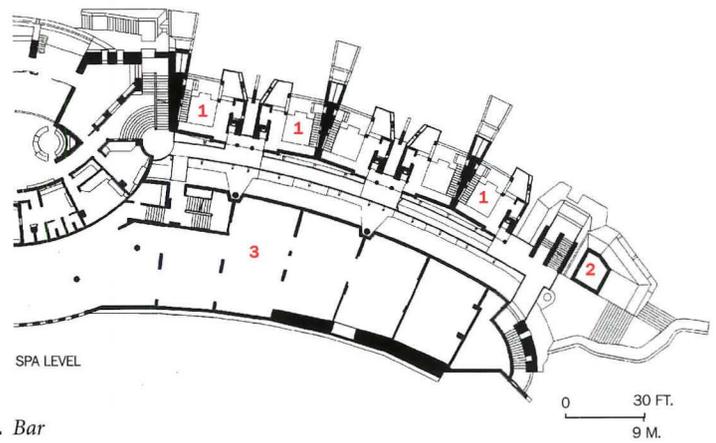
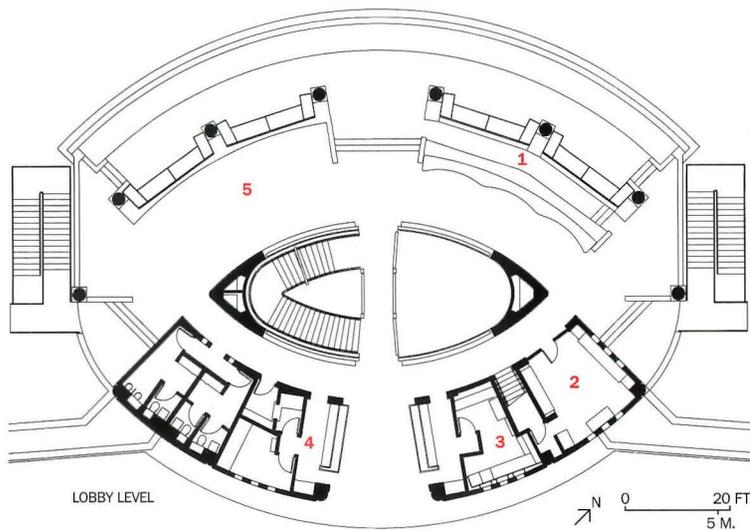


- 1. Generator building
- 2. Entry courtyard
- 3. Main building
- 4. Villa
- 5. Swimming pool



Each villa has its own plunge pool. The riverside terraced pool (above) serves the entire resort. The main building's facilities include a restaurant, bar, and gym (below).





1. Bar
2. Shop
3. Concierge
4. Front desk
5. Seating

1. Duplex suite
2. Conference
3. Mechanical



modest pavilion at the edge of a large elliptical lotus pond that seems to hover above the surrounding terraced rice fields. A flight of stairs under the pavilion's thatched roof takes guests down to the lobby level, where a curving terrace lounge offers panoramic views of the valley. Down another level is the restaurant and below that, the spa.

Two curving wings with nine guest rooms each flank the pavilion. Thirteen of the rooms are duplexes, with living rooms, dining rooms, kitchenettes, and terraces on both levels. Above them are five large single-level suites. Outdoor walkways and bridges provide access to the suites from behind, allowing all of the rooms to have views of the river valley and rice paddies.

The most luxurious accommodations are the 28 villas carved into the hillside and virtually hidden by jungle. From the main building the only signs of them are small pyramidal roofs that shelter open sitting decks and stairs. Like the main building, the villas are entered from above. Each has its own patio, plunge pool, and private gardens. As with many parts of the resort, the villas do an excellent job of bringing the outside in. "We tried to infuse

The entry bridge hangs 65 feet in the air (top). Massive concrete walls overhung with plants help create textured passageways (bottom).

the interior with the exterior with no real physical barrier," says Heah.

Privacy, protection, water

Throughout the project, Heah used level changes and the sloping site to create a sense of privacy and of procession. Whether walking from one of the terrace suites to the restaurant or from the main building to the pool at the river's edge, guests find themselves winding around and down the site, discovering new things at each turn.

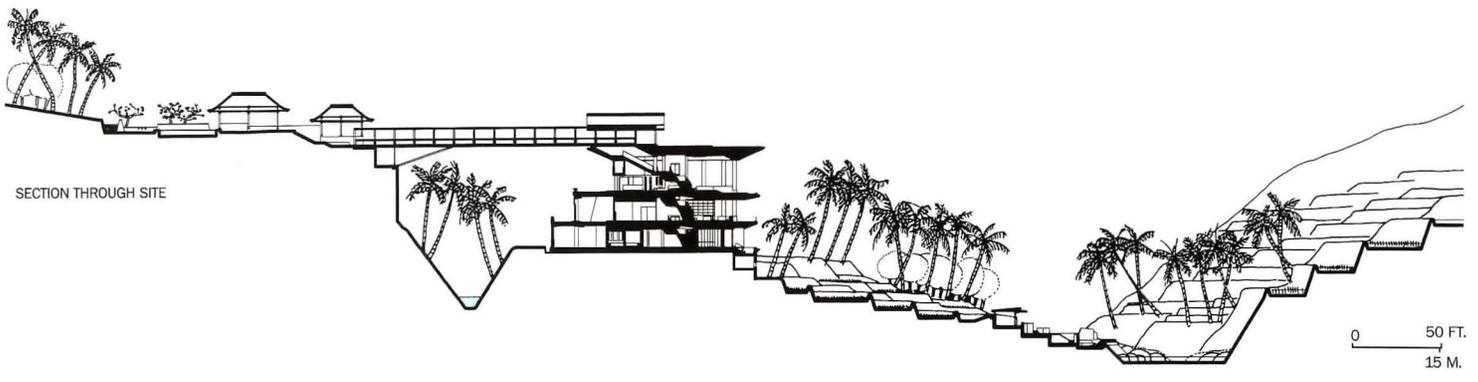
Water too runs through the property, cascading down moss-covered walls, into offering bowls, and finally, one assumes, into the river: an architectural evocation of *subak*, Bali's traditional irrigation cooperatives, which manage the water that runs through the island's terraced rice paddies.

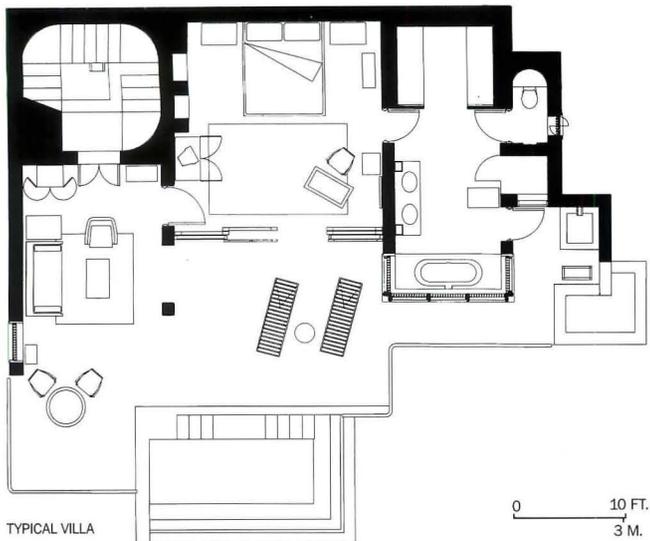
"The building is contemporary in thinking," says Heah, "but we always felt that it embodies the essence of the land and cultural influences.... It is a conscious effort to develop a contemporary response to the spiritual and cultural influences of the Ubud area."

The smallest property in the Four Seasons chain, the resort also represents a change in approach from the company's first property at Jimbaran, in the southern part of Bali. "The Four Seasons at Jimbaran was a big success, but we wanted to give guests a diversity of

As the resort follows the ravine's contours (below), it mimics the forms of nearby rice paddies. The top level

of the main building (bottom) includes a bar and lounge that commands a panoramic view of the river valley.





Individual villas are often visible only because of their pyramidal thatched roofs (above). Much of the furniture was designed by the architect (left).

21-foot-tall wood doors for the villas, and metalsmiths to fabricate flashing and metal details. Heah designed much of the furniture in the hotel; like the buildings, it was informed by traditional forms, and some of it was made on the island.

At times, there were up to 2,500 people working on the resort. "Wives and daughters did the finishing work," Heah recalls, "while sons and fathers did the main structures and carpentry." As is common in much of Asia, most of the workers lived on site. Amid the chaos of construction the architect was impressed by the quality of work from the Balinese laborers. "The local workers weren't accustomed to such high-quality concrete. But they were willing to learn and ended up doing a great job," says Heah.

Hotel guests also seem to appreciate the craftsmanship. Lyn Middlehurst, editor and publisher of the *Gallivanter's Guide*, a travel newsletter, gave it the highest rating of all the new resorts in Bali. ■

experiences in Bali," explains Christopher Norton, general manager of the two Four Seasons hotels on the island. "We didn't want to just replicate the Jimbaran hotel."

Although modern in design, the resort was built using a combination

of modern and traditional technologies. To ensure a water-tight structure and reduce the thickness of walls, the contractor used high-quality concrete, which was mixed on-site. But because of the site's difficult slope, the contractor mini-

mized the use of heavy (and expensive) equipment and relied more on inexpensive hand labor.

Heah also took full advantage of Bali's famed artisans, employing skilled woodworkers to carve decorative panels, carpenters to make

Sources

Hardware: *D-line, Hafele*
Bathroom fixtures: *Kohler, Toto*
Electrical dimmers: *Lutron*
Textiles: *Mirah Burman*

Restoring a Nebraska Landmark

CREATING A DATABASE THAT MAPS OUT EACH STONE ON THE FACADE MAKES IT POSSIBLE TO CHART AND DIAGNOSE FLAWS IN THE CAPITOL BUILDING.



by Stephen J. Kelley, AIA, and Dan Worth, AIA



The Nebraska State Capitol rises 400 feet above the mostly low buildings of Lincoln and the surrounding agricultural fields. Lee Lawrie's statue *The Sower* balances atop its dome, reminding viewers that this is a state founded on farming, a place where the land is often more important than the buildings on it. An exception to this is the capitol itself, a significant example of American art, landscape design, and civic architecture.

The Nebraska capitol is the result of a national design competition in 1920 that attracted some of the nation's best architectural firms. Each of the entrants remained loyal to the neoclassical traditions of the Beaux-Arts, submitting designs that were de rigueur for state capitols in those days. The exception was Bertram Grosvenor Goodhue. This vigorous New York designer, who was never formally trained as an architect, came up with a building that set an example for civic structures throughout the nation; it's a distinctly American building from a period when styles were almost always adapted from European examples.

Goodhue's plan achieved great beauty without resorting to all the traditional elements of Classical design that characterized most state capitols. The archetypal gold dome is still there, but it's perched on brilliant blue tile necking at the top of the high-rise office tower. The tower is an example of another evolving American form: the skyscraper. According to historic documents, it symbolizes the hopes and aspirations of the state, while the two-story base, which also stretches 400 feet, but on a horizontal plane, signifies the broad expanse of the Nebraska plains.

Stephen J. Kelley, AIA, is an engineer and a senior consultant in the Chicago office of Wiss, Janney, Elstner Associates. He specializes in the investigation and restoration of historic buildings. Dan Worth, AIA, is the managing principal of the Lincoln office of Bahr Vermeer & Haecker. He specializes in historic preservation.

Goodhue was among the first to incorporate an iconographic program into a capitol, using indigenous elements as architectural and decorative ornamentation. There are buffalo, pioneer, and corn motifs, as well as Native American references, all of which were sculpted after the stone blocks were in place, the sculptors working from scaffolding.

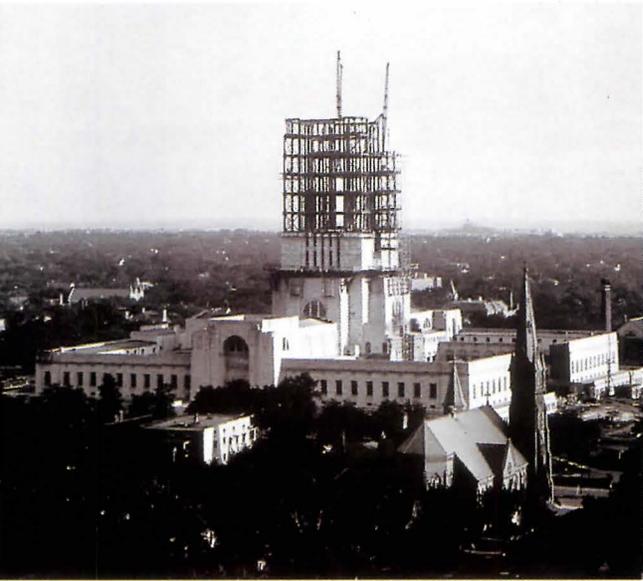
The building was the third capitol erected on the site; the first two structures were poorly built and had to be demolished. It was thus an essential part of the program that this rendition be built to last. To that end, Goodhue specified what he perceived to be the best construction materials available and was fastidious in how they were assembled. The stone coursing is different on all four sides of the tower, a detail that made construction more difficult and provided almost no aesthetic or structural improvement. The real impact was philosophical; Goodhue wanted a building that would endure.

But even before the new capitol was completed, in 1932, eight years after Goodhue's death, a light web of cracks became apparent on the tower facade. As early as 1929, an Omaha architect reported, "Cracks in

Continuing Education Use the following learning objectives to focus your study while reading this month's ARCHITECTURAL RECORD/AIA Continuing Education article. To receive credit, turn to page 192 and follow the instructions.

Learning Objectives After reading this article, you should be able to:

1. Identify the significance of this building in American civic architecture.
2. Describe the flaws found in the exterior facade of the capitol.
3. Explain what caused the problems with the exterior facade.
4. Describe how the site survey and condition report were collected.
5. Explain how computer technology was used to document and design the work on the capitol.



THE CAPITOL'S 437-FOOT TOWER RISES
high above the low surrounding buildings and flat prairie of Lincoln. The two-story base echoes and symbolizes the landscape.

the capitol are due to weather and no defects in construction will be found." This was the first of many reports of the cracking, spalling, delamination, efflorescence, stone displacement, cracked mortar, and algae growth that were to become common on the exterior walls, though the seriousness of the distress was discounted at the time.

SKYSCRAPERS WERE A RECENT INNOVATION IN THE 1920S AND THE DESIGN AND ENGINEERING BEHIND THEM WAS SOMETIMES DICEY.

Photographic records indicate that the first remedial intervention took place in the decade following World War II, though specifics of the treatment remain sketchy. The capitol was repaired again in the 1960s when, among other things, organic growth was removed from the facade by pressurized water spray. In 1973, a major facade campaign included sandblasting, tuckpointing, and sealing cracks with epoxy. Each restoration attempt addressed the effects rather than the causes of the stone distress.

Despite these repairs, the cracks continued to form—often right alongside the places where epoxy repairs had been made. Finally, in the summer of 1995, the Capitol Environs Committee, set up by the state of Nebraska to take care of the capitol, hired Bahr Vermeer & Haecker Architects (BVH) of Lincoln, together with Wiss, Janney, Elstner Associates (WJE) of Chicago, as consultants for the Nebraska State Capitol Masonry Restoration Project. Their goal was to preserve the building's original



This buffalo is one of many iconographic elements on the building.

fabric wherever possible; it had been designated a National Historic Landmark in 1976. That meant hiring an architect with preservation experience and knowledge of local construction practices and materials.

BVH's proximity to the capitol allowed the firm to offer prompt service. The committee was also impressed with BVH's grasp of computer technology. One committee member tells of visiting the firm's offices in 1995 "and not seeing a single drafting table." With its technological expertise, BVH was able to create a database to map flaws on the building's exterior. Such a database could guide restorationists in the repair process.

The committee looked to WJE because of its building diagnostics and laboratory capabilities, as well as its experience in restoring early skyscrapers; the firm's recent projects included the Woolworth Building in New York City and the Tribune and Reliance Buildings in Chicago. That expertise would help diagnose the problems with the capitol.

Building pathology

The team's first step was to conduct a site survey and prepare a condition report for the building. Like physicians, project directors Steve Kelley for WJE and Dan Worth for BVH, as well as other members of the team, became well acquainted with the patient, analyzed all the symptoms, and developed a diagnosis before embarking on restorative treatments.

The analysis of the exterior facade began with a review of the Capitol Collections archive, which contains about 200,000 papers related to the building, including correspondence, specifications, product samples, photographs, and, most important, 3,000 drawings, which range from Goodhue's original and priceless ink-on-linen working drawings to detailed shop drawings. The latter, which include numbered references to every stone on the building, became the basis of the inspection work and were used to prepare survey sheets on which WJE's field personnel took notes and recorded the various types of stone distress.

The capitol sits on a series of poured-concrete pilings, which rest sturdily on bedrock 30 feet below grade. Large reinforced-concrete grade beams, poured between these pilings, provide continuous support for the perimeter quadrangular masonry bearing wall. The tower is similarly supported on bedrock by a system of reinforced-concrete caissons on which the structural steel frame bears the tower. Settlement, therefore, was not a source of building distress.

WJE next conducted a site survey to generate a condition report. This would do the following: document, in written and graphic form, the condition of the various components of the building envelope; prioritize the restoration work required; develop construction cost estimates; and provide information to create a computerized database that would record distress on the facade.

Perched on rolling scaffolding and using binoculars, workers spent the fall of 1995 investigating the base portion of the building. The



THE STONE IS SPALLED AT SOME JOINTS where ties bind the expanding masonry to the shrinking steel frame (above). Test panels were cleaned using nondestructive methods (right).



exterior surface of the tower was inspected from a swing-stage that was suspended from the 14th-floor observation deck. The dome and drum above the deck were examined by engineers who rappelled like mountaineers from lines attached to *The Sower*. Inspection openings, carefully conducted to cause a minimum of disruption to the building, uncovered hidden conditions. Building samples, including stone, brick, mortar, concrete, and sealant, were carefully removed and taken to the WJE laboratory for petrographic and chemical examination.

What went wrong?

Skyscrapers were a recent innovation in the 1920s and the design and engineering behind them was sometimes dicey. Goodhue conferred with H. G. Balcom, later the engineer for the Empire State Building, though he used an in-house engineer to do the work. Balcom and Goodhue both realized that the interplay between the envelope and frame of the tower and, to a lesser extent, the base could be, as Balcom said, “problematic,” but they never realized how extensive the problems would be.

The Nebraska State Capitol is clad in buff-colored Indiana limestone—the same used on the Chrysler and Empire State Buildings—the stone par excellence for building construction at that time and still popular today. Goodhue selected it for its durability, despite opposition from politicians who wanted him to specify a locally quarried sandstone. (It turns out that the sandstone, used on other buildings in the region, is soft and has a tendency to separate into its bedding plains.) The stone company from which the limestone was purchased set aside portions of its quarry for the exclusive use of the capitol project, resulting in an especially homogeneous color across the building. The stone ranges from four to 12 inches in thickness.

Beneath the stone is a layer of brickwork. The masonry rests on steel shelving, part of the sophisticated steel framing. An extremely cement-rich mortar, composed of one part white Portland cement and two parts sand tempered with hydrated lime, bonds the masonry, while galvanized-metal anchors tie the stone and brick. There is also a cavity wall made of brick and plaster.

Goodhue and Balcom knew the steel frame would contract with the building's weight and the masonry would expand and move as it took on moisture. Pressure-relieving joints, inserted horizontally into the stone joints at each floor, were designed to allow the masonry and steel to accommodate these conflicting forces. Made of a kind of corrugated lead,

the joints were designed to crush in order to absorb movement and building stress.

The first of many problems is that these relief joints penetrate the stone, but not the brick. With no room to move, enormous compressive forces quickly mounted within the masonry walls, causing them to crack. Because of the strength and tenacity of the mortar, the stone and brick act as a single unit. The situation is exacerbated by the ties between the masonry; as the frame compresses, the masonry is pulled, causing stones to spall and crack. In addition, the mortar between the stone and brick joints is harder than the surrounding masonry, so there is no give, causing related cracks in the stone.

While the cracking is worst on the tower—approximately 25 percent of these stones are damaged—there are cracks on the lower part of the building as well. These are the result of wind-driven water entering the brick substrate and causing it to expand. The stone units, larger on this portion of the building, don't expand when exposed to moisture. The

GLOSSARY

Spall A fragment or flake broken from the surface of the stone.

Hairline crack An extremely thin crack.

Medium crack A crack about 1/32 inch wide.

Wide crack A crack more than 1/32 inch wide.

Pointed crack A crack that has been ground out and filled with mortar.

Sealed crack A crack filled with sealant or epoxy.

Delamination A separation of part of the stone along a plane roughly parallel to the surface.

Stain Visible surface contaminants on the stone.

Organic growth Living biological contaminants such as algae, mold, or mildew.

Dutchman A previous stone panel repair which entails removing a portion of the stone panel and replacing it with a closely matched new stone.

Sealed mortar A mortar joint filled with sealant or epoxy.

Pointed mortar joint A mortar joint that has been ground out and repointed after completion of initial construction.

Efflorescence Water-soluble salts on the surface of the stone that originated within the stone, mortar, or other material within the wall and migrated to the surface.



RAPPELLING FROM THE SOWER, A STATUE atop the capitol dome (left), field inspectors performed visual inspections and applied nondestructive testing methods to examine cracks in the dome (far left) and assess the tower's condition.

bricks, however, expand significantly, resulting in pressure on, and ultimately fractures in, the stone.

Based on the high proportion of cracks that occurred after the 1973 renovation, WJE and BVH realized that unless steps were taken to alleviate the stress, the building was in danger of cracking apart. Meanwhile, water, leaking into the walls from the cracks, was creating more insidious problems.

Technology meets masonry

While WJE conducted its fieldwork, BVH was transforming the original shop drawings for the stone into CAD drawings. The originals contained different drawing styles, which indicates various draftsmen in the stone fabricator's office were involved in their preparation. After working with the drawings for some time, BVH recognized that one draftsman was noticeably inaccurate. The discovery meant the architects had to take extra care in interpreting the plans. But it also reinforced the need for accuracy and thoroughness as vital components of the new, computerized database, if only to make future restoration efforts easier.

For historical purposes, consistency, and future reference, the original naming conventions established in the shop drawings were used to create the CAD drawings. By using the features of a relational database, each drawing could be identified by many different names and still tied to its original designation.

When examining the existing documents and considering the size of the building, it was evident that there would be a substantial amount of data. A computer with adequate "horsepower" was required to complete the job. In 1995, the optimum model for the job was a Pentium 133 with 32 megabytes of RAM and a one-gigabyte hard disk. All of the machines used on the project were part of BVH's office network, which allowed several staff members to work on the project simultaneously.

The software packages used in 1995 are somewhat dated today. However, updated versions of these would still be appropriate. The CAD software that created the computer drawings was Microstation 95. Microsoft Access 7.0 was the main database software, while Microsoft Visual FoxPro 3.0, another database software package, was used early in the design of the database tables. Realistic images of the capitol were created and enhanced from the CAD data with Adobe

The database allowed the architects to generate tables that quantified all instances of stone distress.

Photoshop 3.0. All of the software used has been upgraded and revised, but each package was chosen to enable the data contained to withstand the test of time.

With the vast quantity of data, it was necessary to create several new software tools to help ease the burden of some of the repetitive tasks, such as drawing each stone on the building facade. Microsoft Visual Basic 4.0, a simple programming language, was used to create several of the custom tools. Because of the large quantity of stones to input (35,861), it was critical to maintain consistency. Software was written to create the graphics for the stone, coordinate the stone mark number, assign the proper layers for the CAD drawing, and choose the proper screen colors.

Once a baseline CAD drawing was finished, the stone distress data from the field survey sheets was overlaid. From those composite

STONE DISTRESS SUMMARY TABLE

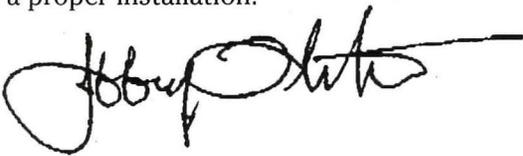
DISTRESS TYPE	NUMBER OF STONES	PERCENT OF STONES
DISPLACEMENT	3	0%
DUTCHMAN	4	0%
FACE DISTRESS		
DELAMINATED	2	0%
PATCHED SPALL	797	2.02%
SPALL	402	1.12%
TOTAL	1,201	3.35%
MORTAR CRACK		
MORTAR CRACK	575	552.08
MORTAR SEALED	120	87.46
PREVIOUSLY POINTED	862	.601.77
TOTAL	1,557	1,241.31
STAINS		
EFFLORESCENCE	49	0.13%
ORGANIC GROWTH	1	0%
STAIN	523	1.45%
TOTAL	573	1.58%
CRACKS		
CRACK HAIRLINE	763	480.46
CRACK MEDIUM	224	167.56
CRACK POINTED	97	83.94
CRACK SEALED	1,571	1,526.89
CRACK WIDE	32	36.90
NOT ORIGINAL JOINT	3,641	9,259.60
TOTAL	6,328	11,555.35

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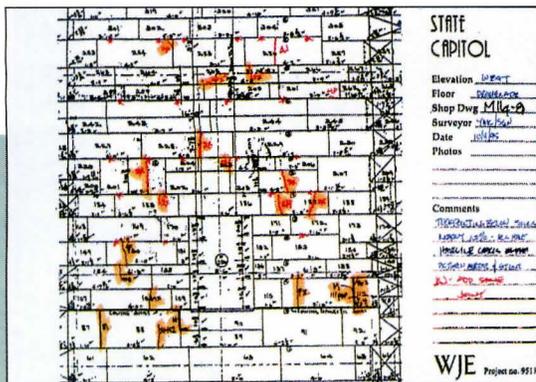
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CIRCLE 57 ON INQUIRY CARD



DAMAGE DONE BY SANDBLASTING encouraged organic growth (right). Maps of stone stress on the tower (left) and facade (above).

CAD drawings, the relational database, which allows the linking of several tables of different data, was created. It consists of a full list of the CAD drawings, which is linked to a full list of each stone on those drawings, which in turn is linked to a list of all stone distress discovered during the exterior survey of the building. The linking allows data to be joined in a one-to-many relationship without having to duplicate data each time.

Ultimately, the real convenience of such a database was in accessing and organizing the information. This helped the team to quickly study, comprehend, and diagnose the problems with the capitol. Large-scale plots with overlays of cracks and the estimated date of occurrence helped reveal many of the building's basic problems.

The computerized information and software, created and stored in standard formats, will be available to the state so that it can be used for future phases in the project. The CAD drawings and the relational database form a strong beginning for the design development phase of the project and the contract documents required to complete the work. In addition, many conclusions from the database are being used to secure funding of the project.

Tables were generated describing the size, shape, and number of each stone in the building facade.

Making repairs

In June 1996, WJE and BVH generated the condition report, based on field research and computer analysis, which details distress and decay with the capitol facade, diagnoses the causes of distress, and offers suggestions for treatment. These include:

Modifying the relief joints to make the overall behavior of the tower more like a steel skyscraper. This will involve temporarily removing some stone and redesigning the brick behind it.

Repairing the stone masonry on the facade and ornamentation by carefully disassembling and repairing the damaged elements. Lime-

THE DATABASE ALLOWED THE TEAM TO QUICKLY STUDY AND COMPREHEND THE PROBLEMS WITH THE CAPITOL.

stone blocks will be conserved and reused when possible to retain the homogeneous color of the facade.

Selecting an appropriate cleaning technology to remove organic growth from the facade. Cleaning of the building base may be necessary every 10 to 15 years, while cleaning of the tower may be needed only every 30 to 40 years.

Tuckpointing as necessary, using the least destructive method of removing mortar from the existing joints. The texture and color of any new mortar will closely match the original. However, this time a softer mortar is proposed.

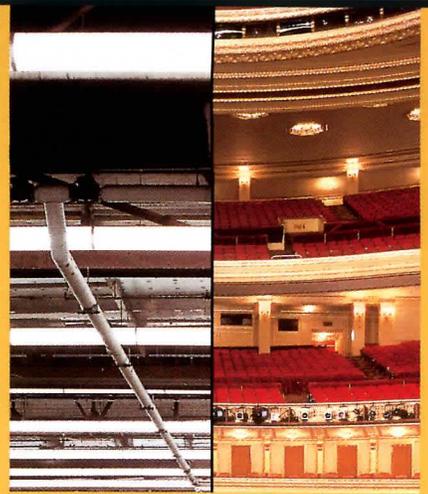
The building is scheduled to be wrapped in scaffolding this fall, weather permitting, so contractors can begin work on the turrets and walls of the promenade and Memorial Room on the 14th floor, an area that includes an observation deck open to the public. Repairs to this area were identified as top priority because of safety concerns—there is a possibility that a section of stone could fall. Also, because this level is open and exposed to the weather on all sides, it is among the most deteriorated sections.

The work, which is likely to continue over nine years, will progress down the tower and, finally, encompass the base. The state has taken a long-term view toward building preservation, assuming that the Nebraska State Capitol is to have a useful life span well into the next millennium. It also plans to inaugurate an ongoing program of building conservation. ■

STONE DISTRESS TABLE EXCERPT	
DATABASE FIELD	DESCRIPTION
DGNMK	DRAWING NAME AND STONE MARK NUMBER ARE COMBINED TO JOIN THE DATABASE TABLES. THIS IS A UNIQUE FIELD THAT IS NOT REPEATED WITHIN THE DATABASE.
DGN	THIS IS THE CAD FILE NAME.
MK	THIS IS THE STONE MARK NUMBER FROM THE ORIGINAL STONE-SHOP DRAWING. WHEN THERE ARE DUPLICATE NUMBERS, A NEW SUFFIX IS USED.
LEVEL	THE CAD LEVEL ON WHICH THE DISTRESS IS LOCATED. ALSO USED FOR QUALITY REVIEW.
DISTRESS TYPE	THE TYPE OF DISTRESS AS IDENTIFIED FROM A LIST OF 17 DISTRESS TYPES, INCLUDING SPALL, DELAMINATION, AND STAIN.
LINEAL FEET	THE LINEAL DIMENSION OF THE DISTRESS. IN THE CASE OF AN AREA, SUCH AS A STAIN, THIS IS THE HORIZONTAL DIMENSION.
AREA	THE AREA OF THE DISTRESS, SUCH AS A STAIN OR A SPALL.
PERCENT	THE PERCENTAGE OF THE STONE THAT IS DISTRESSED.
HEAD/BED JOINT	IN CASE OF DISTRESS WITH A MORTAR JOINT, THIS IDENTIFIES WHETHER IT IS IN A HEAD OR BED JOINT.

SOURCE: COURTESY BAHR VERMEER & HAECKER

LIGHTING...



In their use of technology, two projects in this month's Lighting section—the restoration of the War Memorial Opera House in San Francisco and the lighting of an aircraft maintenance facility at Hill Air Force Base, near Ogden, Utah—could not be more different.

Most of the opera house's new lighting uses tried-and-true incandescent and halogen lamps, where electricity is passed through filaments that give off light when they are heated. The maintenance building, on the other hand, uses a relatively new technology: a magnetron that bombards a spinning glass sphere filled with sulfur and argon gas to produce extremely bright, warm-colored light.

These two projects' differences go far beyond the technical. More control is needed in lighting fixtures used in the theater than perhaps anywhere else. They must be dimmable on demand, able to produce white light that can be gelled to create any color, and capable of being focused or diffused by the lighting designer. They must be compact, reasonably lightweight, and durable, to withstand being taken down and reinstalled hundreds of times over their lifetime. Although the demands may sound extreme, those who know theatrical lighting don't see them as mysterious.

The sulfur lamp, by contrast, is a new creation, not many steps away from the workbench. The color of the light provided by the lamp is good, the output is very high, and it has no filaments or electrodes to burn out. But the fixtures themselves are big and still quite costly. In addition, the light is so intense that it may be challenging for the lighting designer to control: to distribute it evenly, to put it where it is needed, to keep it from being overpowering. But that intense light is also

what makes the sulfur lamp perfect for use in a high-bay aircraft maintenance facility.

The wonderful thing about technology in the current era is that the cost of a product tends to drop rapidly as soon as the idea takes off. And when something becomes truly successful, there is always someone who wants to make it smaller. When I started writing about lighting, the 250W metal-halide lamp was relatively new. Within a couple of years 100W, then 70W, then 35W metal-halide lamps were on the market. MR16 lamps that were fairly small to start with were followed by tiny MR11s. Compact fluorescents that were at first too large to screw into table lamps soon assumed several ingenious shapes that allowed them to fit, without sacrificing light output.

All of this makes me believe that it won't be long before the sulfur lamp becomes more affordable and begins to shrink. Today's long-lasting sulfur lamp may be no different from the vacuum tube that was later superseded by the transistor and, after that, by the microchip. Maybe one day it will become so small that it will be found in all sorts of applications not dreamed of today, even the theater. Wouldn't it be wonderful if that big spotlight focused on Placido Domingo didn't suddenly burn out during an aria in Act II? Hope for the best, dear reader, and think small. —Charles Linn, AIA

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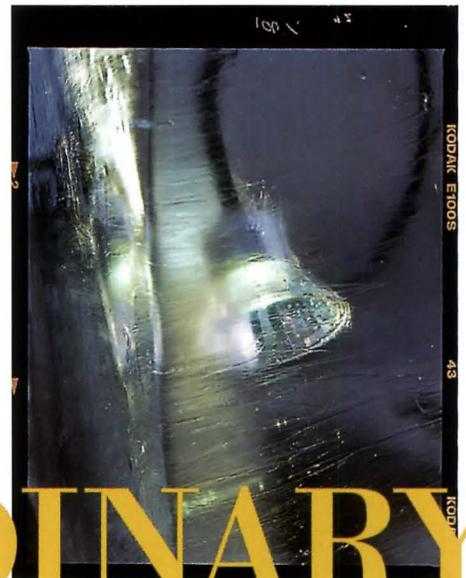
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CIRCLE 61 ON INQUIRY CARD

CREATIVE USES



FABRIC DIFFUSERS OFFER UNUSUAL LIGHTING FOR SPECIFIC SITES

Koryn Rolstad's work lies in a gray area. "It is somewhere between architecture and industrial design," says Rolstad, whose Seattle-based firm, Koryn Rolstad Studios/Bannerworks, Inc., designs, engineers, and manufactures fabric structures for architectural projects. Rolstad, who has a background in architecture as well as the fine arts, counts lighting, acoustics, and the visual enhancement of large spaces among her areas of expertise.

Industrial design usually implies design of a product, such as a light fixture, which is then produced and marketed. Rolstad works differently, producing site-specific pieces for individual architectural projects. Her custom light diffusers have been used on projects as varied as restaurants, museums, lobbies, and sports stadiums.

Stir Crazy, a pan-Asian restaurant located in an upscale shopping mall in Northbrook, Illinois, is a large, 5,000-square-foot space centered around an open kitchen, where chefs stir-fry dishes to order. The design, by the Chicago firm Lieber Cooper Associates, is a creative collage of natural materials such as wood, glass, and bamboo and beautifully crafted details such as copper cladding for pillars and a glass mural.

The high ceiling in the restaurant called for a creative lighting solution. Inspired by Chinese lamps of handmade paper, the designers decided to use light diffusers. Using a hoop to stretch the diffusing fabric was suggested by the craft of embroidery, which Rolstad learned while growing up in a convent in Southeast Asia.

Her large, cloudlike diffusers serve three purposes in the restau-

rant. First, they diffuse the light of the ceiling-mounted track lighting, creating a warm glow that enhances the honey- and maple-color palette of the restaurant. Installed around the central kitchen, they help to orient the visitor in the large space, which is broken up into separate areas. And, finally, they work as environmental sculpture.

The circular, three-dimensional units are eight feet in diameter at their widest. The spiral hoop frames are constructed of aluminum bar held together with off-the-shelf bolts and acorn nuts. The hanging system consists of four stainless-steel cables tied by quick-links at the top, allowing the diffuser to hang from one point.

In creating her diffusers, Rolstad used commercial-grade, fire-retardant polyester fabric, which is dense but translucent. Although they are quite large, the diffusers are lightweight and can be broken down into smaller elements for shipping. They were assembled on site and the fabric, which has an elastic edge, was then snapped on.

In the Odyssey Maritime Dis-



covery Center, Rolstad's diffusers serve a similar purpose. The museum, a shiplike structure built on the Seattle waterfront, is an interactive center, designed primarily for children, that explores the past and present life of the Northwest coast.

Rolstad's diffusers have been installed in a narrow, 60-foot-long passageway between two galleries. The space was dark and unattractive, with a number of pipes running below the passage's low, seven-and-a-half-foot ceiling. Although dropping the ceiling was considered, the designers ultimately decided to invest in light diffusers.

Rolstad's solution took the form of trapezoidal fabric panels curved both in plan and elevation to create an image of sails billowing in the wind. The panels were inserted into an aluminum frame and installed at different angles. Back-lit with ceiling-mounted spots, the diffusers serve as a sculpture that leads the visitor from one gallery "deck" to the next.

The eight-foot panels, mounted close to the ceiling, are also lit from below. The lighting designers for the project, C. E. Marquardt Lighting Design, have used the diffusers as a fabric screen. Incandescent halogen lights with color gels, controlled by a portable dimmer, project a changing array of colors on the panels.

In both the restaurant and the museum, the diffusers were an economical choice compared to the cost of installing a new ceiling, and they offered a sophisticated lighting design that used basic, off-the-shelf lamps and fittings. *Nayana Currimbhoy*



Koryn Rolstad's custom light diffusers were used at the Odyssey

Maritime Discovery Center in Seattle (top left), and at Stir Crazy,

a restaurant in Northbrook, Illinois (above and top right).



A FINE BOUQUET OF LIGHTS FOR THE FAR NIENTE WINERY

Visitors drive up a dark path for half a mile before arriving at the ornate iron gate of the Far Niente Winery. Framed in light, the gate is dimly illuminated, to give the eyes time to adjust. In the background, a shrub sculpted in light stands in relief against the darkness. The message to the visitor is clear: a mysterious wonderland of light and shadow awaits inside.

The Far Niente Winery, in northern California's Napa Valley, was built in the late 19th century and later abandoned during Prohibition. It was purchased in 1987 by Gil and Beth Nickel, who began to restore the winery building and the eight-acre grounds around it.

The landscape lighting was

designed by Michael Hooker and Janet Lennox Moyer, partners in MSH Visual Planners. The main areas of focus are the winery building and two gardens—the Chardonnay Garden and the Cabernet Terrace—where private parties, benefits, and auctions are held.

“The philosophy behind the lighting design was to sculpt the two gardens out of the darkness and then to create a low level of lighting to get people from one area to the next,” says Moyer, who also teaches at the Lighting Research Center at the Rensselaer Polytechnic Institute in Troy, New York.

The winery building itself is lit with clear, 70W high-pressure sodium (hps) lamps; 50W hps light-

ing on the stone retaining walls anchors the view. Quartz halogens illuminate a row of olive trees in the foreground to create contrast and depth. The winery, which is always lit at night, is visible from the highway, providing a strong marketing statement for the company.

Lighting for the rest of the gardens, which is turned on only for special events, is primarily tree-mounted. Putting the fixtures in the trees makes them easier to aim and maintain and minimizes the number of fixtures needed.

In the Chardonnay Garden, the lighting is focused on the food bar and the wine bar. Miniature lamps graze the bars' stone counters, drawing guests' attention to the food and wine. Downlighting in the trees provides the caterers with task and general lighting. MR11 and MR16 lamps comprise the bridge, lawn, gazebo, and tree-canopy downlighting for these areas.

Accessories such as linear-spread lenses and screens provide multiple effects while using the same lamp. The light on the dance floor between the bars, dappled through the trees, is dimmer.

In the Cabernet Terrace, the food and wine counter is again the focus of the lighting, which consists of 35W MR11 luminaires mounted in an umbrella over the counter. Downlighting provides the task light-

ing, while uplighting gives the umbrella a surreal glow. Trellis-mounted downlights wash the lawn and provide fill lighting between focal areas. Large oak trees are illuminated from above and below to add background and depth around the garden.

In lighting a large area like this one, cost and maintenance are primary considerations. Rather than providing spotty lighting throughout the estate, the designers opted for mini-compositions of light that accentuate special features, provide a visual connection from one area to another, and serve to direct visitors' movements.

Except for the winery, the entire project was lit with MR11 and MR16 lamps in 20W and 35W, which simplifies maintenance. Areas of the project are relamped as a group, rather than individual lamps being replaced one by one as they burn out. Running costs are also kept to a minimum with the use of low-wattage lamps. Since the site is mostly dark, it requires lower light levels, because the eye adjusts to the dim light. Using low-wattage lamps reduces the electrical bills, and slight undervolting and infrequent use results in multiyear lamp life.

The installation documents were quite novel. “We needed visual documentation of the trees,” says Moyer. So she took Polaroid photographs of each of the trees to be lit, and indicated on the photos where the lamps would be positioned, and what the wattage of each lamp would be. This visual record has also proven helpful for maintenance. N.C.

Guests enter the Far Niente Winery through a dimly lit gate (far left, top) before coming upon the winery building lit with clear hps lamps (above). In the Cabernet Terrace (far left, bottom), the umbrella conceals downlights for the serving counter, and uplights make the umbrella glow. In the Chardonnay Garden (left), MR11 and MR16 downlights graze the stone food and beverage counters.



War Memorial Opera Restoration Gives Building a Second Chance To Sing

by William Weathersby Jr.

When André Previn's opera adaptation of *A Streetcar Named Desire* by Tennessee Williams premiered recently at the War Memorial Opera House in San Francisco, it signaled that the venerable theater was back on track as a world-class performing arts venue. But the drama experienced by theatergoers is not limited to the stage: after years of neglect, an \$86.5 million restoration, completed last year, has returned the Beaux-Arts theater to its former glory while completely upgrading its infrastructure and technical systems. Providing the final grace note is restored architectural lighting by San Francisco-based consultants Auerbach + Glasow.

While opera had been part of San Francisco's culture since shortly after the Gold Rush, it was not until 1918, when plans for a memorial to honor servicemen returning home from World War I were drawn up, that the city finally determined it would have an opera palace. When completed in 1932, the War Memorial consisted of two nearly identical structures sitting side by side, anchoring the Civic Center: the opera house and the veterans building, both designed by architect Arthur Brown, who also designed City Hall across the street. Architect G. Albert Lansburgh orchestrated the opera auditorium's lavish interiors.

The opera house was acclaimed as the largest and best-equipped facility of its day. *Time* magazine wrote that it was "easily the most attractive and practical building of its kind in the U.S." As home to the San Francisco Opera, Ballet, and Symphony, until the latter moved to a newly constructed hall across the street in 1980, the theater charmed patrons for decades with its splendid acoustics, grand stage, and elegant auditorium. But as the technology of theater production advanced after World War II, the venue's theatrical systems grew outdated and its support spaces became overburdened. The hall's interior details also began to show their age.

As if on cue, fate intervened in 1989 with the Loma Prieta earthquake. Damage to the War Memorial was largely cosmetic—fallen plaster and cracked paint—yet when San Franciscans passed a bond measure to seismically upgrade a group of civic buildings, \$49.5 million was earmarked for the opera house. The privately funded Committee to Restore the Opera House (CROH) raised the balance of the restoration budget for technical and back-of-house improvements, with the War Memorial board adding another \$7 million to enhance public amenities.

The San Francisco Department of Public Works Bureau of Architecture was the architect of record for the 18-month restoration project, including the technical improvements. The San Francisco office of Skidmore, Owings & Merrill collaborated with theater consultant

William Weathersby Jr. is a freelance writer based in Westport, Connecticut. He has written about lighting, interior design, and architecture for many publications and is the author of the forthcoming book The Pierre: A Celebration of Landmark Style.



Auerbach + Associates on the design of the technical infrastructure and production systems, while Carey and Company of San Francisco served as preservation architect. Auerbach + Glasow, the architectural lighting design division of Auerbach + Associates, restored the existing lighting in the auditorium and lobby and overhauled the electrical and dimming systems throughout the building.

"When we prepared our initial report on the state of the theater, we discovered that a third of the original circuits weren't grounded," says principal lighting designer Larry French. "The first step of the project was to install a ground system for the original house circuits. We also

The relighting of the San Francisco War Memorial Opera House was a happy byproduct of a seismic upgrade.

Project: War Memorial Opera House, San Francisco

Owner/client: City of San Francisco; Committee to Restore the Opera House

Architect of record: City of San Francisco Department of Public Works Bureau of Architecture—Tara Lamont, project manager; Andrew Maloney, project architect

Consulting architect: Skidmore, Owings & Merrill

Preservation architect: Carey & Co.

Lighting designer: Auerbach + Glasow—S. Leonard Auerbach, principal; Larry French, project designer;

Diane Waschow, project manager

Consultants: Auerbach + Associates—S. Leonard Auerbach, Larry French, Diane Waschow, Darrell Haber, Michael McMackin, Adam Shalleck, Kyle Smith (theatrical); Paoletti Associates (acoustics)

San Francisco Opera project team: Robert Priest, project manager; Thomas Munn, director of lighting; Lynn McKee, master electrician

San Francisco Ballet project team: Michael Abramson, project manager; Lisa Pinkham, lighting designer; Dennis Hudson, master electrician



discovered an incredible tangle of wiring. Over the years technicians had poked holes through the proscenium wall for cable access. There were layers of loose cable lying atop each other, and some circuits had been abandoned. It was our job to completely rebuild the electrical and technical infrastructure.”

A centerpiece of the lighting project was restoring the auditorium’s grand chandelier. When the opera house opened, the *San Francisco Call* described how “a ceiling of solid blue, illuminated by hidden lights, clasped to its bosom the bright star-like jewel of a great chandelier.” By the 1990s, the once-beautiful fixture was dull and lifeless and the blue ceiling had faded to muted gray. When researching the fixture’s original design in city archives, the project team discovered that lamps inside the chandelier were intended to uplight the ceiling though they had not functioned for decades. A photometric simulation revealed that the uplighting had once provided about 80 percent of the general lighting in the theater. As a result, light levels in the auditorium had deteriorated significantly. “The main floor was down to about half a footcandle, while the original design criterion was somewhere just under 10,” French says.

Originally designed and installed by the Roberts Manufacturing Company of San Francisco, the six-tier chandelier measures 25 feet in diameter and is 14 feet deep. The starburst design features solid cast-aluminum vanes attached to a steel frame. During restoration, additional seismic cross-bracing was added to the core of the chandelier’s frame-

work, which is welded directly to the building’s structural-steel roof.

Sixty-five years of accumulated grime was cleaned from the exterior of the chandelier, restoring the luster of its polished aluminum surfaces and revealing the original amber-hued detailing along the chandelier’s edges. The chandelier’s bottom three tiers, which can be lowered to the floor for relamping, were removed and restored offsite. The rest of the fixture was cleaned and repaired in place. Scott Architectural Lighting/Taylor Stokes restored and rewired both parts of the chandelier and reinstalled the lower portion.

The company fitted the upper portion of the chandelier with new lift-out socket assemblies to make relamping easier. This work is accomplished by a lighting technician who crawls down an access ladder from the ceiling. The chandelier, which originally housed 540 standard A-lamps, now has 44 350W T4 lamps set in asymmetric throw uplights, 560 90W halogen A-lamps in the four upper tiers, and 21 50W halogen A-lamps in the lower two tiers. “The slightly whiter, crisper halogen A-lamps within the chandelier and dome pendants offset the warm glow of the traditional sconces, which are illuminated with incandescents,”

The restoration of the auditorium allowed lighting designers Auerbach + Glasow to create slots for lamps that uplight side arches and illuminate draperies and gilded plasterwork, and to install a new theatrical and architectural control system (above and opposite bottom).



The uplights in the chandelier were restored, raising light levels at the floor ninefold.

sockets for the first time in many years.

Restored architectural features in the auditorium were enhanced with special lighting. New slots were created in the bay arches along the side walls to accommodate front-of-house theatrical lighting positions. The slots allowed

French to restore the original lighting that had been missing from the side bays for nearly 50 years. Now MR16 striplights accent the gilded grillwork and draperies within the recessed arches.

PAR cans, fresnels, and ellipsoidal reflectors are employed as accent lights in the auditorium. Two new positions on either side of the stage were created to uplight the proscenium arch with PAR64 fixtures. Accent lights to spotlight the masks of comedy and tragedy on either side

French says. "The cooler color of the repainted blue ceiling also prompted us to specify the halogens." The restored fixture increases the overall lighting in the auditorium by nine times the previously existing level. The chandelier's circuits are connected to new architectural dimmers located in the same room as the theatrical dimmers, providing full voltage to the

of the stage, as well as the proscenium arch's frieze and cartouches, were added to the expanded front-of-house lighting position. The accent lighting comes from older theatrical fixtures that were in the opera's inventory. New slots in the ceiling accommodate theatrical followspots and house work lights. For lighting in the box seating areas, the original Tiffany glass covers for the pendants were cleaned and refitted.

The action onstage benefits from a completely revamped theatrical lighting system. New lighting consoles control more than 2,000 dimmer and power circuits linked by an Ethernet network. Eight new lighting bridges over the stage and the reworked front-of-house feature a complete array of theatrical luminaires. The new dimmer and transformer room was built at mid-level within the stage structure, economizing on wiring and providing acoustic isolation from the stage. The architectural and theatrical lighting controls are separate, although the theatrical control system can control any circuit in the house, since it's all networked.

The restoration of the War Memorial Opera House represents the completion of a special kind of circuit for lighting designer Larry French: he was a lighting assistant here in the late 1970s, near the very beginning of his career. ■

Sources

Original chandelier design: Roberts Manufacturing Co.

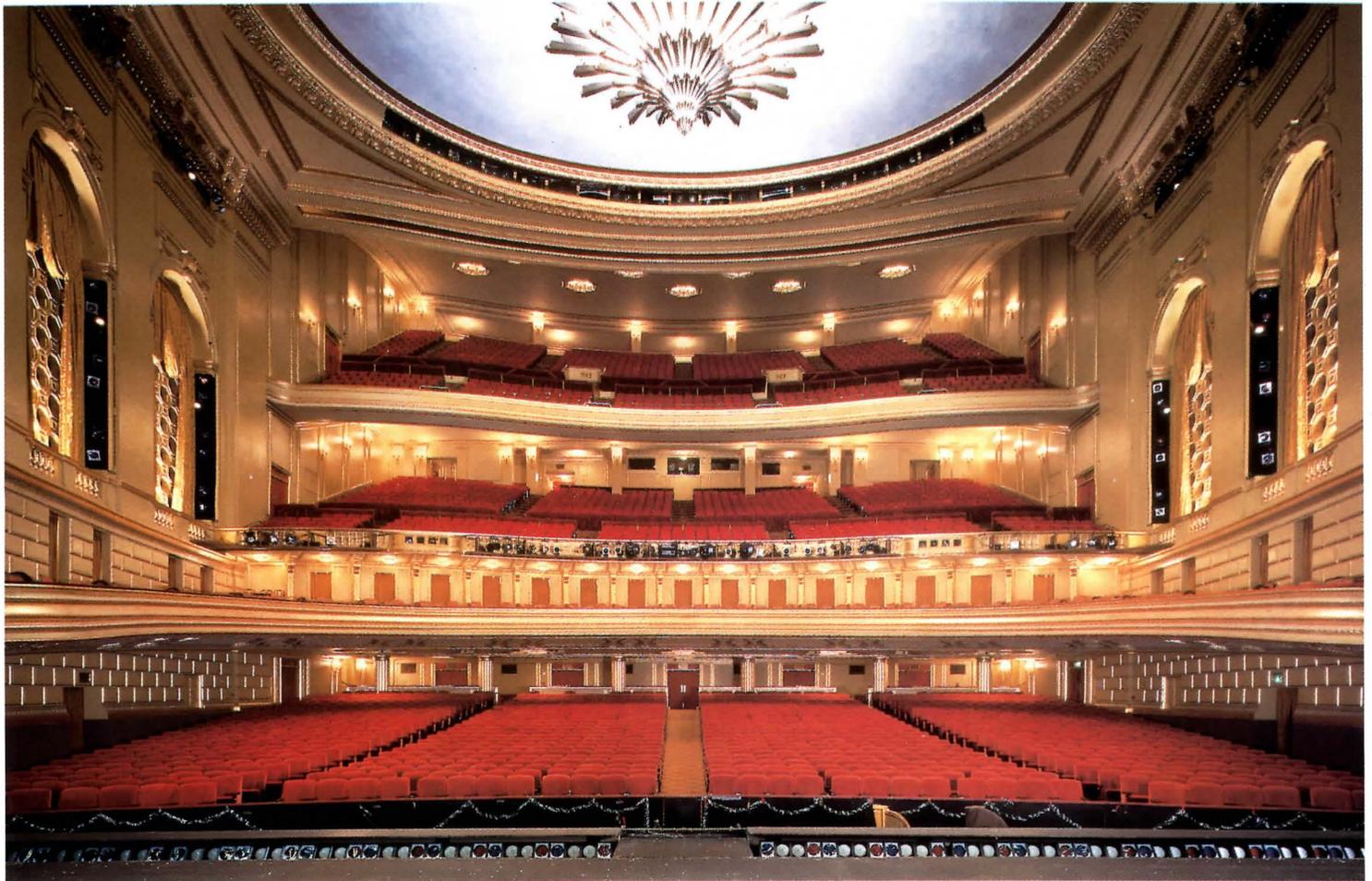
Chandelier restoration and installation: Scott Architectural Lighting/Taylor Stokes

Uplights in chandelier: Insight Lighting fixtures with GE lamps

All other lamps: Philips

Original sconces and pendants: Boyd Lighting

Architectural and theatrical lighting dimming systems: Strand Lighting

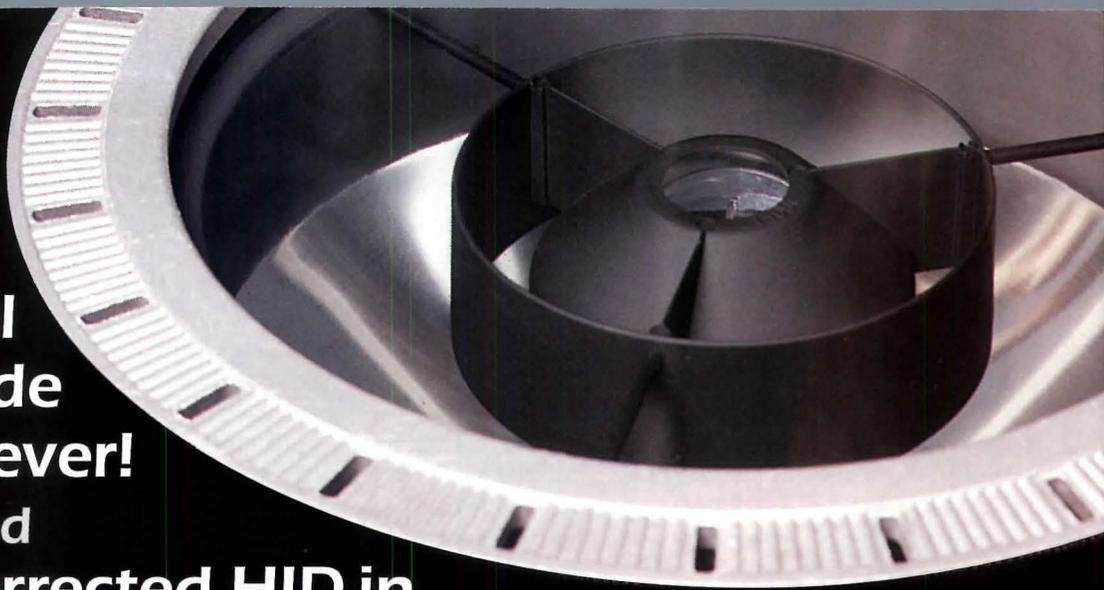


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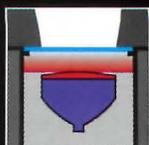


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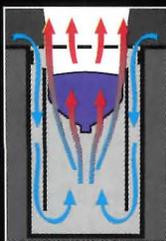
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Diners Discover Einstein's Mass-Energy Relationship Redefined at mc²



by William Weathersby Jr.



Stainless-steel pendants shaped like inverted take-out coffee cups light tables in

the main dining room at mc². Exterior columns are uplit by recessed MR16s.

With a name borrowed from Albert Einstein's formula for the relation of energy to mass—energy equals mass times the speed of light squared—the new San Francisco restaurant mc² creates its own dynamism by balancing refined materials with precise architectural lighting. Local architect Mark Cavagnero, AIA, who gained acclaim for his renovation of the city's California Palace of the Legion of Honor museum, designed a sleek Modernist interior within the shell of an 1870s Barbary Coast warehouse. Gutting a 7,000-square-foot ground-floor former law office to its structural walls, the architect has introduced linear forms and surfaces that stand up well against the robust brickwork envelope. With sycamore millwork, stainless-steel dowel dividers, limestone floors, leather banquettes, plaster walls, and a ceiling of hemlock slats, the interior emphasizes the integrity of unadorned surfaces and solid craftsmanship.

The element of illumination is as essential to mc² as it is to Einstein's equation. "Not only was the quality of light very important to the architect, but also the location and look of every light fixture," says principal lighting designer David Malman of San Francisco-based Architectural Lighting Design. "The restaurant's slatted wood ceiling, which masks the acoustical panels and air-conditioning ducts above, made this a challenging assignment. There was no ceiling surface available where we could employ conventional lighting." Collaborating with Cavagnero, Malman and his team translated the architect's aesthetic vision into a series of custom fixtures whose precise form and manufacture meld the energy of function and form.

A metal frame covered with scrim fabric undulates beneath an

existing light well, creating a sculptural focal point in the center of the main dining room. During the day the scrim filters natural light while sparing diners a view of the second-floor office windows that open onto the light well. (A glass panel inserted under the light well at the restaurant's ceiling level captures ambient noise and cooking odors.)

At night the fabric panel becomes a floating wave of light, illuminated by six uplights. Each of these counterweighted pendants, custom fabricated in brushed stainless steel, hangs from a five-foot stem and houses a 300W quartz lamp. Along the edge of the fabric canopy, a series of MR16 fixtures recessed into a ceiling beam spotlights floral arrangements atop a serving credenza.

To create general ambient lighting, Malman again had to come up with an unconventional approach. "Typically in a restaurant you use the reflectivity of the ceiling to cast a flattering glow of indirect light up onto the faces of patrons," he says. "Here we were working with a slatted wood ceiling that would not be as reflective. Yet we didn't want to add more harsh-looking lights by putting pinspots over every table."

Project: mc², San Francisco

Owners: Adi Dassler, Peter Puetzer

Architect: Mark Cavagnero

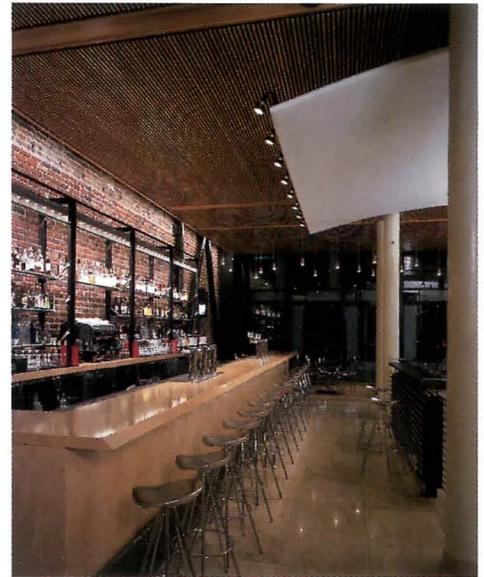
Associates—Mark Cavagnero, AIA, principal; Roslyn Cole, Karen Gibb, associates; Jeffrey McGrew, Susanne Brincker, Joyce Jackson, Brad Davidson, Kerstin Anderson, design team

Lighting designer: Architectural Lighting Design—David Malman, principal; Juanita Cox and Nathan Naversen, design team

Electrical engineer: Hansen & Slaughter

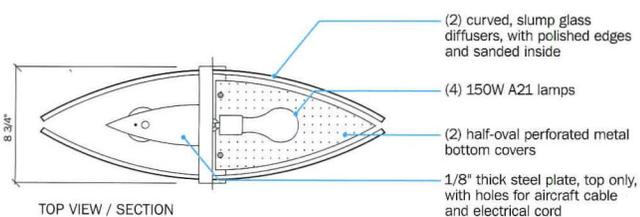
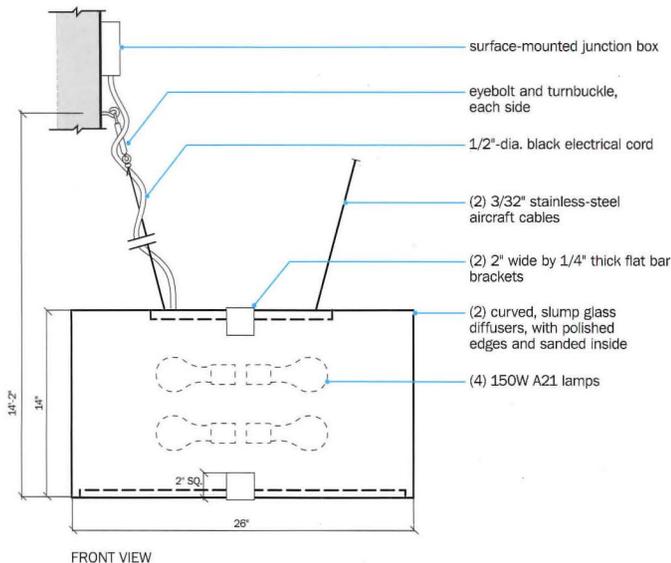
General contractor: Fine Line Group

Electrical subcontractor: Scott Electric



Stainless-steel pendants uplight a wave-shaped metal frame covered with scrim fabric. Twenty-watt

reflector lamps behind a perforated metal valence downlight the back bar, and a row of R14s light the bar face.



Furthermore, the architect didn't want to interrupt the ceiling plane with junction boxes. The solution: a sea of 115 petite conical downlights housing 40W PAR16 lamps. Inspired by the shape of a carry-out coffee cup contemplated during a design team meeting, the stainless-steel fixtures are fitted with glass collars to cast a soft downlight while also emitting a bit of glow up toward the ceiling. Custom junction boxes less than an inch wide fit between the slats in the ceiling.

Along the perimeter of the 144-seat restaurant, Malman set lampholders 12 inches apart in a wiring channel and fitted them with 35W PAR14 lamps to wash the walls and rake the brickwork with light. At one end of the main room, bottles on the back bar are lit by a row of 20W 12V reflector lamps placed six inches on-center above a perforated metal valence. The 32-foot-long bar is spotlighted with PAR20 fixtures anchored to the steel frame that supports the fabric wave.

The intimate rear dining room accommodates 15 tables for two within a narrow space that was once an alley between buildings. The room's bare brick walls reach 25 feet up toward a pitched skylight. Light from the main dining room spills through arched openings in one wall as if onto a courtyard. In this space, Cavagnero and Malman wanted to evoke the look and feel of a street in an Italian hillside village, with lanterns suspended from diagonal wires overhead. They therefore developed a custom suspended luminaire fitted with four 100W A-lamps that are set behind curved panels of glass. A series of MR16 spotlights mounted near structural beams draws attention to paintings by artist Robert Kelly along one wall.

Throughout mc^2 , Einstein's equation is altered in a contemporary way that he probably never imagined: the lighting is controlled by multiscene dimming. Here, total energy equals mass times the speed of light squared, minus the energy saved by the lighting controls. ■

Sources

Custom fixtures: *Shaper Lighting*
Downlights: *Prescolite*

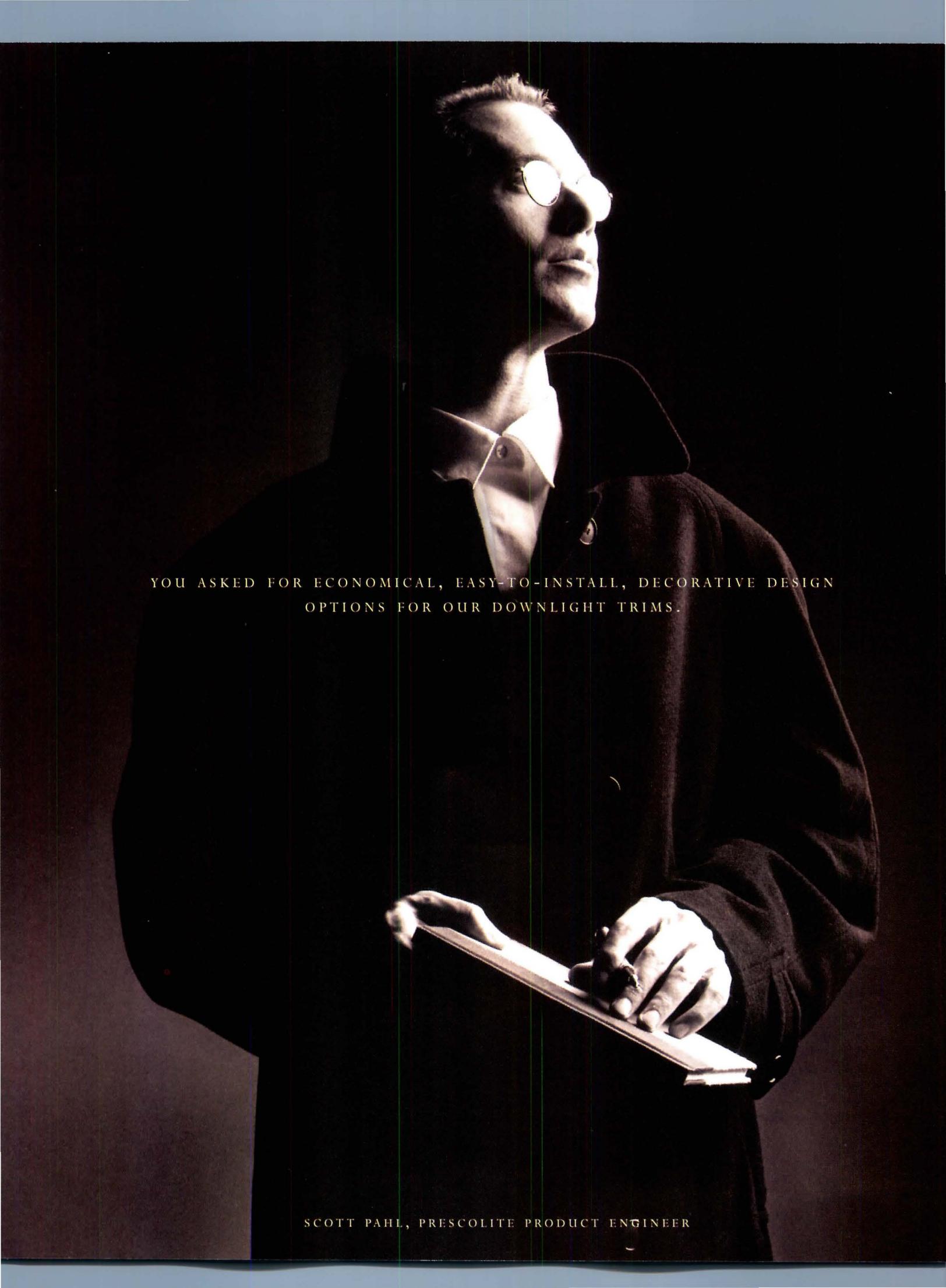
Socket strips: *Belfer*

Exterior uplights: *KIM Lighting*



Custom-made pendants hanging in what was once an alley are

intended to evoke the feel of an Italian street lit by lanterns.

A man in a dark coat and glasses is shown in profile, looking upwards and to the right. He is holding a clipboard and a pen. The lighting is dramatic, highlighting his face and the collar of his shirt against a dark background.

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Screw-in Dimmable Compact-Fluorescent Lamps: Finally a Reality

by Lindsay Audin

Three new dimmable screw-in compact fluorescent lamps have just hit the market. Now, any existing room equipped with an incandescent dimming system can be retrofit with compact fluorescent lamps (CFLs) by merely screwing these new lamps in. The possibilities for the new lamps are endless: conference rooms, residential dining rooms, and large auditoriums are all typically equipped with dimmers.

Until the debut of these products, the dimming of compact fluorescent lamps often required expensive fixtures and special dimmers. None of the screw-in CFLs could be dimmed; in fact, trying to dim them created a fire hazard. Today, Philips Lighting, Technical Consumer Products (TCP), and Lumatech all offer various kinds of CFLs that can be used with standard UL-approved incandescent dimmers. The CFLs themselves are somewhat different, however, so designers should familiarize themselves with the products' characteristics before specifying them.

Why change lamps?

Dimmable CFLs consume less than one-third the wattage of comparable incandescent lamps and last three to 10 times longer. This makes them an economical way to cut both operating expense and maintenance costs. And the shift to CFLs need not be permanent: they can always be replaced with incandescent lamps if for some reason the need arises. When dimmed, energy savings are about 75 percent compared to incandescent lights dimmed to the same level, even down to about 10 percent of full brightness.

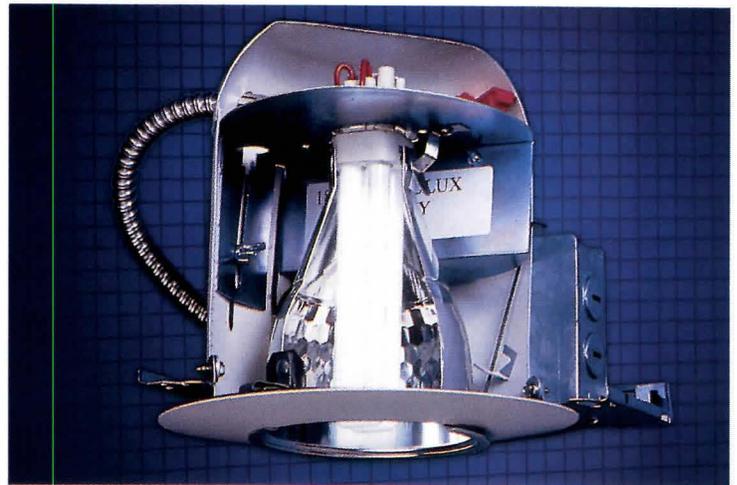


Early CFL dimming systems required special ballasts and dimmers, typically adding \$50 to \$80 to the cost of each recessed fixture on a project. Payback took too long for energy efficiency retrofits, making CFL dimming practical only when installed new. The new screw-in units cost only \$8 to \$20

more per socket and can be economical retrofits.

One-piece dimmable CFLs, regardless of the manufacturer, have built-in electronic ballasts with 10,000-hour lives. When they burn out, the entire unit is discarded. Two-piece units have separate lamp and ballast components, and the ballasts last 40,000 hours.

Lindsay Audin is president of Energywiz, Inc., an energy consulting firm, and lighting research consultant to E-Source, a Colorado-based energy consulting firm.



The Philips Earth Light Dimmable CFL is a one-piece 23W triple-twin tube model, roughly comparable to a 90W A-lamp, although at 6.6 inches it is slightly longer.

The TCP products are available in both one- and two-piece units and in a variety of wattages. The unit comparable to the Philips Earth Light is the one-piece 23W SpringLamp, which, with its tapering spiral-shaped tube, looks a bit like a soft ice cream cone. Smaller dimmable one-piece units are available in 11W, 15W, and 18W models. Glass reflector versions which have focused output are also available, as well as dimmable two-piece circle-style lamps in 22W, 30W, and 36W models.

The Lumatech Reflect-A-Star Plus is a two-piece model consisting of an 18W triple-twin tube lamp in a high-efficiency metal reflector, designed to fit into a six-inch or larger recessed can. Output is comparable to a 75W incandescent, while the lamp and ballast lifetimes are the same as the TCP two-piece units.

Dimming differences

The Philips and Lumatech products dim down to 10 percent of full output, while all TCP products can be dimmed to 20 percent. In either case, users should assess whether these minimums are acceptable before they purchase the lamp. In some situations, light levels need to be dimmed to 5 percent of full output, or even lower, to accommodate the visual needs of users. The pupil of the human eye opens widely when a space is darkened, and even 20 percent may appear to be quite bright once the eye adjusts.

The easiest way to determine whether a CFL will dim enough is

The Lumatech Reflect-A-Star Plus is an 18W triple-twin tube lamp in a high-efficiency metal reflector (above). The TCP SpringLamp fits into a table lamp (left).



The Philips triple-twin tube dimmable CFL is a one-piece 23W lamp. At 6.6 inches in length, it is slightly longer than a standard A-lamp.

to simulate it with existing incandescent lamps and a footcandle meter. Check the light level at full output, and then dim the lamp down to 20 or 10 percent of that level. Let your eyes adapt for two minutes each time you dim and then decide whether the space is dark enough. If a projected image, such as a slide or video projection, will be used during a presentation, try one during the simulation to see if the contrast of the image is sufficient. If not, try the simulation again, this time testing for a lower-wattage CFL. At this point the room may be dark enough, but remember that the lamp still must be bright enough when it is operated at full light output.

Color shifting and decrease in output

Presently, all dimmable CFLs come in one color: 2700K with a color rendering index of 80 to 84. Users may also want to check for color shifting as CFLs are dimmed. All fluorescent lamps tend toward blue-purple when they are dimmed. People generally prefer a color shift toward red when light levels are lowered. A shift toward blue-purple may affect the ambience of a room.

When CFLs are inserted into fixtures that were formerly lamped

with incandescents, the fixture's light output often drops, even when CFL lamp lumens may match incandescent lumens. In essence, a fixture designed for an incandescent source, which emits light from a concentrated point, may have a lower photometric efficiency when it is used with the more diffuse output of a CFL. This should be considered wherever peak fixture output is important, such as in a lecture hall.

While dimmable CFL manufacturers claim that their units will work on any UL-approved incandescent dimmer, a few tests are needed to verify compatibility. Check for *flicker* at the lowest level; *starting* at the lowest level; a *buzz* or *hum* from either lamps or dimmers; *dimmer heatup* at full and dimmed levels; and *how much time* it takes lamps to reach the desired output at either full or dimmed levels.

Note also that the power factor may be lower when the lamp is dimmed (.5 for the Philips lamp), and harmonic distortion is 24 percent higher for the dimmable CFLs. Also, note that there is no long-term track record yet for whether the dimmable CFLs will operate perfectly with every kind of dimmer. Should problems arise, the worst-case scenario may simply be that a cheap dimmer will have to be replaced with a better, more expensive one.

Product sources

Information for the products discussed above is available from the manufacturers at the following Web sites and phone numbers:

Philips: <http://www.lighting.philips.com/nam/feature/earthlight/elight.shtml>;
800/555-0050

Technical Consumer Products: http://www.springlamp.com/bulb_kits.html;
800/324-1496

Lumatech: <http://www.lumatech.com>; 510/654-4300. ■

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An Air Force Lighting Installation Shows How Sulfur Lamps Can Succeed

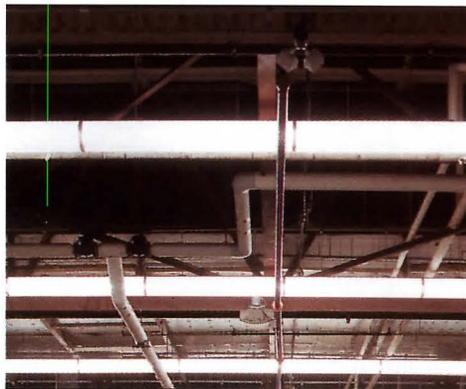
by David Simon Morton



A recent sulfur lamp retrofit at Building 225, a maintenance hangar at Hill Air Force Base, near Ogden, Utah, shows how sulfur technology, even with its high initial cost, can succeed in the marketplace. When sulfur lamps, or S-lamps, are coupled to light pipes—a natural fit, it turns out—the number of luminaires required for a given space can be drastically reduced. At Hill, this type of installation has proved more energy efficient and cheaper to operate than a metal-halide or mercury-vapor lamp installation that generates the same light levels.

There are qualitative advantages as well. Inside each sulfur lamp unit is a magnetron, such as those found in microwave ovens, that pelts with microwaves a spinning bulb filled with argon and sulfur gas. This bulb then emits a full spectrum of visible light, which is warmer than that produced by clear metal-halide lamps (5,700K versus approximately 4,000K), provides better color rendering (79 CRI versus 65 CRI), and won't degrade in output or experience color shifting over time. Because the lamps have no filaments or electrodes, they have a longer life span than metal-halide or mercury-vapor lamps, and since they contain no mercury, they can be disposed of easily. For the lighting of very large spaces, such as stadiums and factory floors, S-lamps show great promise.

In Building 225's low bay areas, where F-16 planes are maintained and repaired, only 88 1,425W Fusion LightDrive 1000 lamps were needed to replace an array of 448 400W metal-halide downlights, a system that, despite its size, did not provide adequate light. There are now 44 104-foot-long light pipes in the low bays, suspended 26 feet above the ground, with an S-lamp coupled to each end. As a result of the new installation, illumination at work surfaces in the low bays jumped to about 60 foot-candles, an average increase of 50 percent over metal-halide downlights.



Light pipes work well with sulfur lamps because of the lamps' small bulb and high lumen output. Only two sulfur lamps are needed to illuminate each of these 104-foot-long pipes.

A single S-lamp unit in the low bay is not much more energy efficient than a single 400W metal-halide unit (95 lumens/watt versus an initial 90 lumens/watt for the metal halide), but it is much more powerful (135,000 lumens versus an initial 36,000 lumens). This makes S-lamps

Project: Sulfur lamp installation, Building 225, Hill Air Force Base, Utah
Lighting design: CES/Way, Fusion Lighting, Cooper Lighting, 3M Lighting
Installation and testing: CES/Way
Facilities managers: Hill Air Force Base—Craig Priest, utility and energy manager; Kent Nomura, energy manager; Steve Hutton, contracting officer
Lighting-quality verification: U.S. De-

partment of Energy Pacific Northwest National Laboratory—Carol C. Jones, senior research scientist; E. E. Richman; J. H. Heerwagen; J. B. Hollomon

Sources

Sulfur lamps: Fusion Lighting
Downlight reflectors: Cooper Lighting
Light pipes and prismatic film: 3M Lighting

In the high bays, every metal-halide downlight was replaced by a sulfur lamp fixture, more than doubling the illuminance at work surfaces.



ideally suited for use with the 10-inch-diameter light pipes. The pipes work best with a small, high-lumen light source, like the golf-ball-sized S-lamp bulb, which, with a reflector, can produce a beam that is narrow enough and powerful enough to get a significant amount of output from the tube. The prismatic film of the pipes efficiently directs and evenly distributes this light. With a weaker lamp, the light system components would have to be repeated too often to be economical.

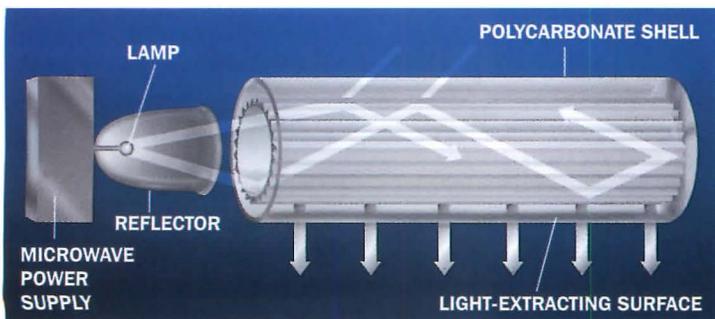
The light pipes give the workspaces much better horizontal lighting coverage, even under the wings of closely bunched F-16s, curtailing the need for task lighting. Shadows have virtually disappeared. Workers are better able to make out lettering on control panels and the colors of wiring, due

The prismatic film that wraps the light pipes ensures even, high-efficiency distribution.

not only to higher light levels, but also to the excellent color rendering.

The energy savings from the low bay areas is more than enough to cover a net energy loss from the high bay installations, where both F-16 fighter planes and huge C-130 cargo planes are repaired. The Air Force did not allow the contractors to change the existing fixture placement in the high bays; the 42 1,000W metal-halide downlights in each bay were replaced by 42 S-lamps placed inside Cooper downlight reflectors, suspended at a height of 45 feet. Unfortunately there is no energy savings in these areas—new 1,000W metal halides produce 110 lumens/watt—only higher light levels. The new system provides more than 70 footcandles in most locations, and tops 100 footcandles in some places, a light that is uneven and in some areas excessive. The former metal-halide system provided approximately 30 footcandles at work surfaces here.

An installation like this isn't cheap enough to entice building operators who are hesitant to spend significantly more up front on what is still a new technology. Almost all current sulfur lamp installations are prototypes that use specially developed reflectors and light guides. But the creative partnership engineered by the energy services company (ESCO) that made possible the project at Hill may encourage a more rapid adoption of the technology. The ESCo installed the new system and will own and maintain it for the length of an 18-year contract with the base. It will reap most of the monetary savings from lowering the base's energy costs. The base, meanwhile, received the largest application of sulfur technology to date, at no cost to itself. ■



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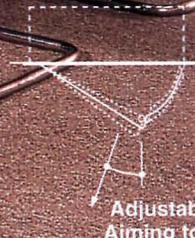
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LIGHTING BRIEFS



▲ Pendant fixture

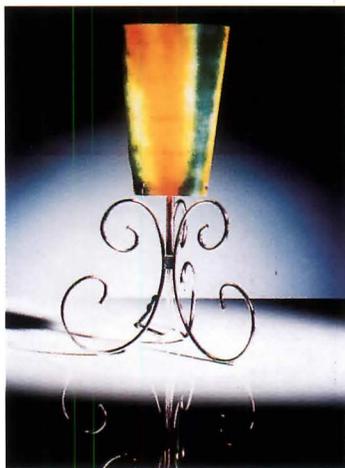
The newly created company Davis/Muller Lighting has produced a collection of pendant fixtures called the 2150 series, which is available in numerous sizes, lamping options, and finishes. The fixtures have been designed to be used in combination with a complementary line of sconces and surface mounts. All of the fixtures are made of solid brass and are available with acrylic, natural alabaster, or cast-glass diffusers. 888/328-6855. Davis/Muller, Pawtucket, R.I.

CIRCLE 200

▼ On a bold track

Zumtobel Staff's Dancer track line includes an MR16 accent light, an MR16 framing projector (which accepts gobos for pattern projecting), and a T3 halogen wallwasher. The Dancer line, which made its debut at Lightfair as an accent light, is fully adjustable and rotatable. 800/448-4131. Zumtobel Staff, Highland, N.Y.

CIRCLE 201



◀ Art in lighting

The Montreal-based company Artefice includes a group of designers, architects, and craftsmen who produce lighting for commercial and residential applications. The Volute lamp (left), designed by Robert Lepage as part of Artefice's Lueurs d'Orient collection of more than 100 lighting fixtures, is made of colored plastic and nickel-plated brass. Described by the designer as a piece of "integrated sculpture," the Volute lamp measures 11 by 17 inches. 514/527-6393. Artefice, Montreal.

CIRCLE 202

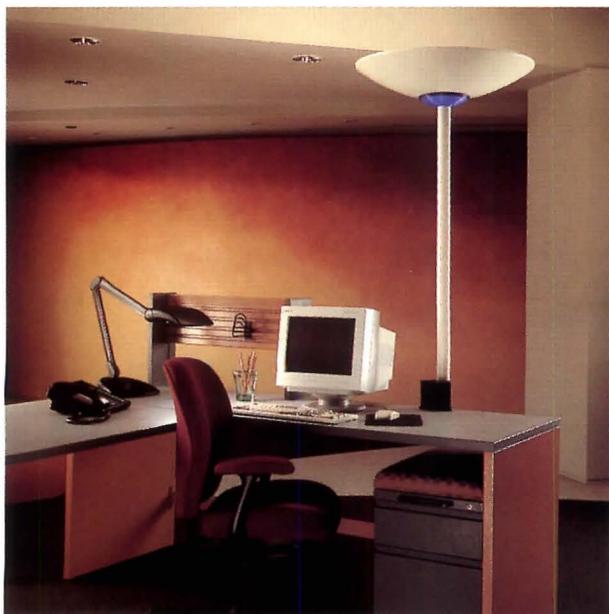
► Surf's up

Designed by Neil Poulton, the Surf modular lighting system from Artemide is available in either a suspension or wall version with T5 fluorescent tubing. Surf is made from extruded aluminum with a white or metallic gray embossed, polyester, powder-coated finish. Standard module sizes of 48 or 60 inches are available. 516/694-9292. Artemide, Farmingdale, N.Y. **CIRCLE 203**



For more information, circle item numbers on Reader Service Card

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LIGHTING BRIEFS



▲ Exterior illumination

The exterior lighting for the new 46-story Banco Colpatria Tower in Bogotá, Colombia, uses 36 Set Ireos 3,000W and 4,000W fixtures from Space Cannon Illumination to dramatic effect. For the opening of the building, Space Cannon president Bruno Bairdi and engineer Christian Perrotti had each fixture's dichroic lenses specially coated to create a colorful light show on the structure's facade. 888/705-1028. Space Cannon Illumination, Edmonton, Alta., Can.

CIRCLE 204

▼ Circle in the square

Prescolite Moldcast's Signos SQ series has a square foundation and is available in metal, glass, or acrylic with lattice decorative trim. A glass cone, acrylic dome, or acrylic disk trims may also be specified. 510/562-3500. Prescolite Moldcast, San Leandro, Calif. CIRCLE 205



◀ Industrial high bay

Lumark Lighting, a Cooper Lighting brand, has introduced the Steeler SG, a prismatic borosilicate reflector with three light-distribution patterns (medium, wide, and narrow) and a 16- or 18-inch reflector. The UL-listed and CSA-certified Steeler SG is formed with a heavy-duty steel housing and has a dark bronze polyester powder-coated finish. The ballast has class H insulation. 847/956-8400. Cooper Lighting, Elk Grove Village, Ill. CIRCLE 206



◀ Rock 'n' roll picture show

The backdrop and scrim for the band Chicago's recent tour were designed by UV/FX to look different under various lighting conditions. Lighting designer Ian Peacock used Studio Color fixtures and Cyber Lights, from High End, to create the patterned look. 310/392-6817. UV/FX, Santa Monica, Calif. CIRCLE 207 512/836-2242. High End, Austin, Tex. CIRCLE 208

For more information, circle item numbers on Reader Service Card

RON REZEK

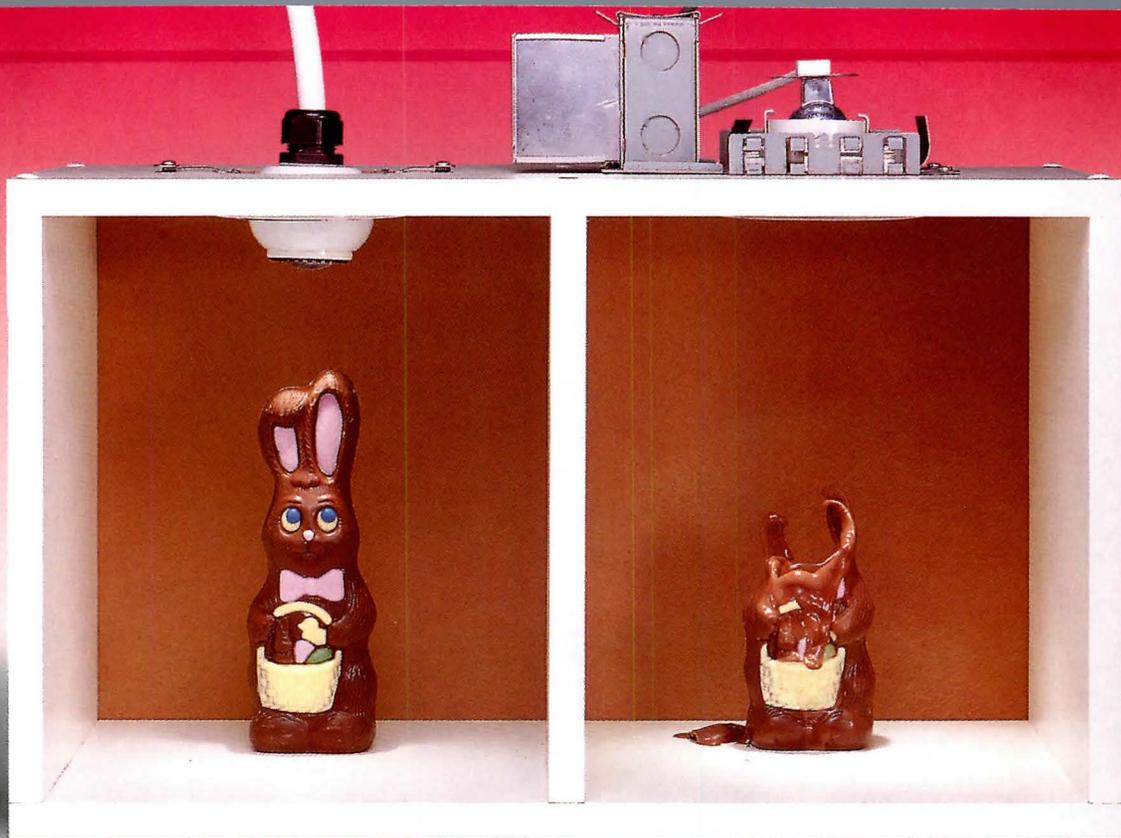
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In the example photographed here, the chocolate bunny on the right was lit with a standard halogen lamp (EXN type). The other was lit with a Unison Fiber Optic Lighting System to the same light level. After just two hours, the difference was obvious.

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LIGHTING BRIEFS

▼ **Expanded sconce collection**

Flos's collection of sconces by Marcello Ziliani now includes Spike and Marci (below). The new sconces fit on the same

base as the four earlier designs. Marci has a parabola-shaped glass diffuser on an aluminum base. Available in silver, gold, gray, and black. 516/549-2745. Flos, Huntington Station, N.Y. **CIRCLE 209**



► **Traditional table lamps**

Inspired by the fragile paper lanterns used in harvest festivals during his childhood, designer Toshimitsu Sasaki utilized a traditional Japanese paper called washi to create the WAB table lamp for Yamagiwa. Made from mulberry bark and then laminated for strength and durability, washi is resistant to yellowing and crumbling. 818/879-8611. Yamagiwa Corporation, Westlake Village, Calif.



CIRCLE 210

▼ **Material-efficient fixtures**

Frankie Goes Fluorescent, a dimmable compact series of lights made from recycled glass and Environ (a bicomposite of recycled and sustainable materials), is available as a ceiling fixture (below), a wall sconce, and a table lamp. 212/475-3106. Fire & Water Lighting/David Bergman Architects, New York City. **CIRCLE 211**



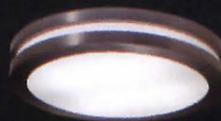
▲ **Grand Teton**

B-K's Teton fixture can be used for indirect uplighting or direct downlighting. Made of machined aluminum, the light's body can be finished in any one of eight polyester powder-coated finishes or three brass finishes. The fixture is completely sealed and wet-location-listed for indoors and outdoors. 209/438-5800. B-K Lighting, Fresno, Calif. **CIRCLE 212**



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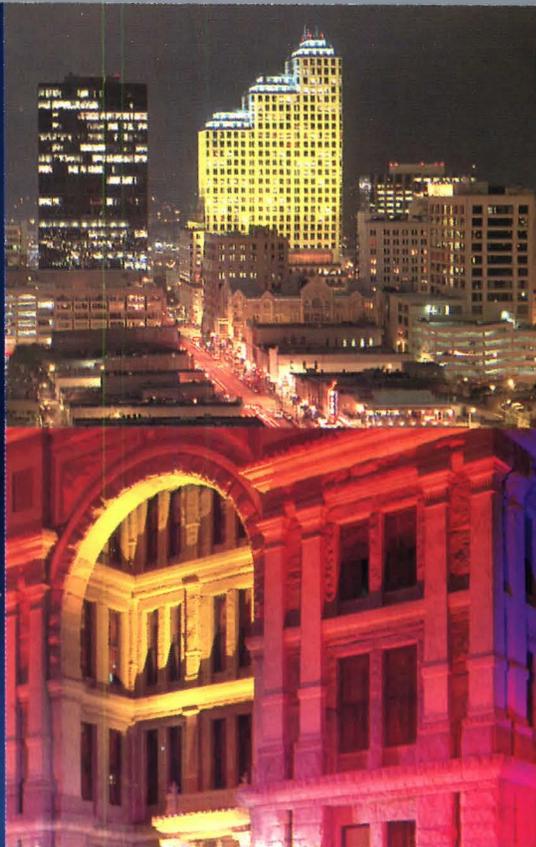
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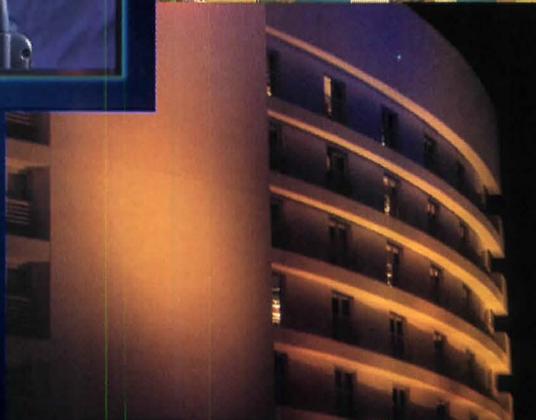
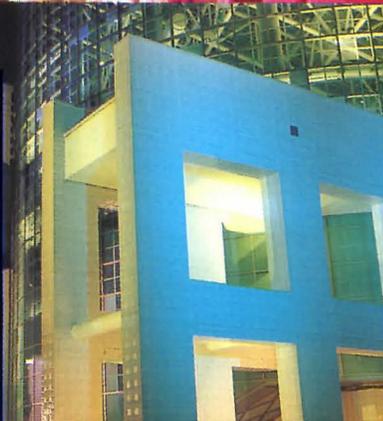
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LIGHTING BRIEFS

► **Triangular wall sconce**

Advent Lighting's new triangular exterior wall sconce (AE7050) measures 30 inches high and 13½ inches wide. The fixture is made of .063-inch-thick aluminum noncorrosive housing and ½-inch-thick opal polycarbonate lenses, with top and bottom lenses made of tempered glass. The housing is also available in custom colors, textured paint, brushed aluminum, antiqued brass, chrome, and textured metals, and the lenses can be constructed of faux alabaster. 800/739-9144. Advent Lighting, Greenville, Wis. **CIRCLE 213**



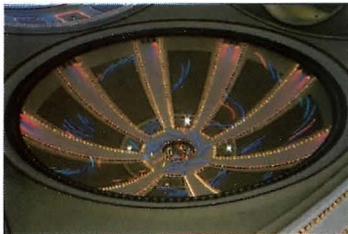
▼ **Simply Swedish**

Luxo's Designer series includes 24 models of wall sconces and ceiling pendants, all inspired by Swedish architectural designs reminiscent of the Machine Age. The lights, which have plated or painted metal bodies with a clear or opal acrylic light diffuser, distribute light from a range of low-wattage incandescent or compact fluorescents. 914/937-4433. Luxo, Port Chester, N.Y. **CIRCLE 214**



▲ **An open-and-shut case**

Vista's Lumiform 7200 series, intended for use over patient beds in hospital rooms, is available in Colonial or contemporary Convex styles in two-, three-, and four-foot lengths. A hinged door panel locks in an open position for easy maintenance. The light utilizes a T8 or T5 fluorescent lamp or Biax compact fluorescent. 800/576-2135. Vista, Girard, Pa. **CIRCLE 216**



◀ **Lite lines**

The Tivoli Lite-Bar, an incandescent system for interior or exterior canopies, facades, and building perimeters, consists of straight or curved two-piece channels that snap together. Made of extruded aluminum, the system can be specified in lengths of up to 12 feet per section. 800/854-3288. Tivoli, Santa Ana, Calif. **CIRCLE 215**

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WITH PLAY STRUCTURES, FUN FOLLOWS SAFETY AND A CHILD'S DEVELOPMENT



Two years ago, when the New York-based firm Garrison Siegel built Recycled Ground, a playground for a school in the South Bronx, principal Robert Siegel specified components of play systems from various manufacturers rather than one company's total kit. He ordered a slide and a balance from a catalog, for example, but had most of the rest of the structure custom made. Why? "[Most systems had] little architectural intention," says Siegel. "They didn't make a form that meant anything, even though they were intelligently designed from an educational point of view."

Playground equipment manufacturers have begun to take Siegel's point, which is shared by many other architects, into consideration when creating new designs. Today, recreation kits are aesthetically pleasing *and* educational. One company in particular, PentesPlay, is concerned with both aspects of the play experience. For example, the three systems

shown here are educational—they encourage children to play within the intricate system, stimulating the imagination much more than if they were simply playing on top of it—and attractive.

Another industry insider, Eric Strickland of Grounds For Play, emphasizes fun and education, but he also wants to help fulfill children's developmental needs. Strickland's credentials are impressive: he earned a doctorate in early childhood education, taught in the Head Start program, and consulted for churches and schools that wanted to build playgrounds. He then started Grounds For Play, which designs, manufactures, and installs play structures—a trio of services offered by other industry players.

Strickland says that, although he can sell a client one component or another, he feels his customers are best served when he can do a complete evaluation of the children's needs and then design a

This month, editor David Simon Morton takes a look at various playground packages and recreational surfaces that are available in the marketplace, from faux ice and grass to intricate playground structures. Manufacturers of recreational equipment have always been concerned with fun and safety. Today, these same designers want to promote children's educational and developmental needs as well as aesthetics. These new selling points are good news for architects, who can now promote a more well-rounded playing field.

—Elana H. Frankel, Products Editor

A play structure with themed elements assembled from several PentesPlay packages (right).

playground to meet them.

For children ages two to five, Strickland suggests elements that promote "socio-dramatic play," that is, activity that encourages children to play imagined roles. He suggests such play pieces as domed skylights, steering wheels, porthole windows, and rocket nose cones that allow kids to imagine they are piloting a spaceship or a submarine.

Older kids like chase games with tricky paths and obstacles, such as ball pits and climbing nets. It's important, says Strickland, to keep younger kids safely out of the way of the older kids scrambling over the equipment. He also makes room for shared space, so children of disparate ages can play together.

Safety is obviously paramount, and manufacturers take great pains to establish their reputations in this regard. Siegel believes that the industry's wide acceptance of liability is one reason for its continued success. For further emphasis, the International Play Equipment

Manufacturers Association (IPEMA) certifies man-

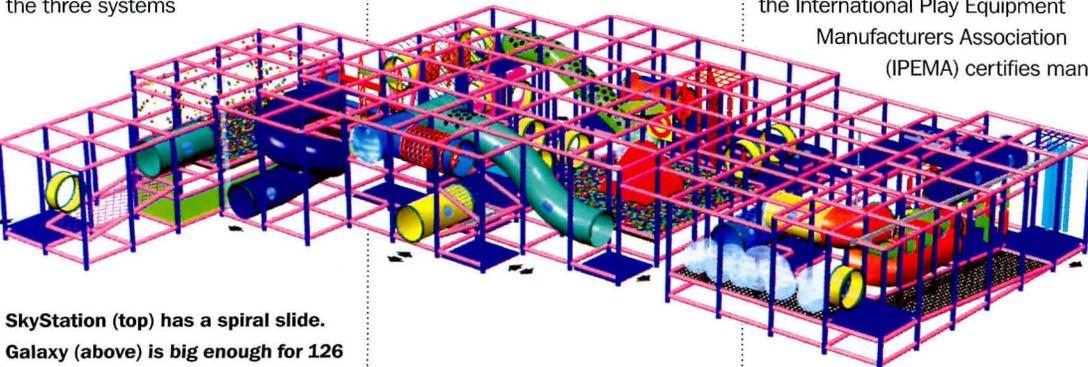


ufacturers that conform to safety guidelines covering playground equipment.

However, standards don't always ensure that a given installation is safe. According to consultant Butch DeFillippo of New Mexico-based PlaySafe, small companies are not as likely to be aware of all the safety issues as larger ones.

DeFillippo also notes that 70 percent of playground accidents are due to falls, raising the question of what surfaces are appropriate for use with play equipment. Asphalt, the old playground standard, has given way to artificial wood fibers, sand, pea gravel, and rubber tiling, some of which meet ADA requirements. Several of these new products are profiled on the next page. *David Simon Morton*

- BCI Burke, Fond du Lac, Wis. 800/356-2070 **CIRCLE 217**
- Delta Play, Delta, B.C. 800/361-7529 **CIRCLE 218**
- GameTime, Fort Payne, Ala. 800/235-2440 **CIRCLE 219**
- Grounds For Play, Arlington, Tex. 800/552-7529 **CIRCLE 220**
- Miracle, Monett, Mo. 800/523-4202 **CIRCLE 221**
- PentesPlay, Charlotte, N.C. 800/617-2158 **CIRCLE 222**



SkyStation (top) has a spiral slide. **Galaxy (above)** is big enough for 126 kids. Both are made by PentesPlay.

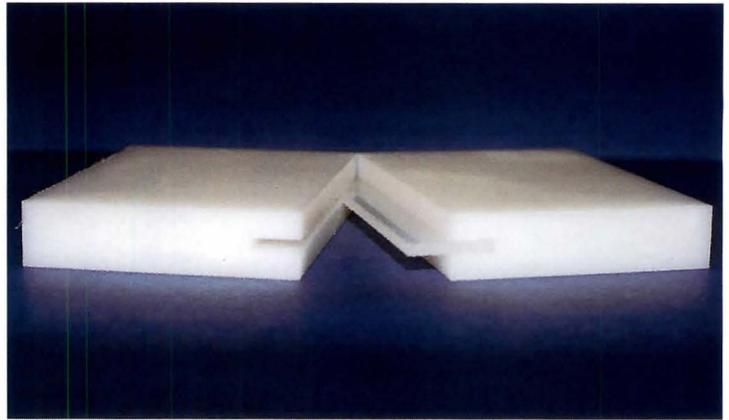
SURFACES MAKE PLAY CHEAPER AND SAFER

When kids in Florida want to play outdoor ice hockey and children in desert states want to play soccer, artificial surfaces that perfectly mimic the qualities of their real counterparts are often the best (and usually the cheapest) choices. As for playground surfaces all over the country, it was determined long ago that children rebound much better from rubber than asphalt. *D.S.M.*

► Ice hockey under the sun

SuperIce has all the playing qualities of the cold stuff, but this synthetic surface of double-sided polyolefin panels doesn't need freezing temperatures or a Zamboni to keep it in good condition. Skaters can still do hockey-stops and, just as with the real thing, kick up shavings. When the surface has worn down, the panels can be flipped over and the reverse side used. 323/939-8200. American Ice Enterprises, Los Angeles.

CIRCLE 223



▲ Up on the roof

City dwellers can put a playground on the roof without having to worry about asphalt's summer stickiness. Playbound rooftop tiles feature composite construction. For durability, the top layer has a

high polyurethane content. The bottom layer has less polyurethane for shock absorbency. Each tile is on small stilts to allow grit to flow under. 800/999-0555. Surface America, Williamsville, N.Y.

CIRCLE 224

▼ Tile style

Health clubs can now install designer rubber tile flooring. Because Pawling's Dec-O-Loks 24-inch-square hard rubber tiles are interlocking, no glue is necessary to keep them in place. They feature flecked mosaic-style patterns that are usually found only on glue-down systems. 800/431-3456. Pawling, Wassail, N.Y. **CIRCLE 225**



▲ Bounce back

The shredded remains of recycled rubber tires make up SofCrete, a pour-in-place resilient surface that can be molded into three dimensions. 800/263-2363. SofSurfaces, Sarnia, Ont. **CIRCLE 226**



▲ Built to stay...and move

What you see is a maple strip basketball court, but underneath it is Bio-Channel, a system of cushions and anchors. The system ensures that the playing surface meets the main standard necessary for play: the court shouldn't move, but it

should give a little. Steel channels anchored to the concrete subfloor keep the court in place; sleepers suspended over cushions in the channels allow the court vertical movement. 800/543-1913. Robbins Sports Surfaces, Cincinnati.

CIRCLE 227

► Keep the ball rolling

Designed for both indoor and outdoor soccer, AstroPlay feels like grass to running feet and bouncing balls. Rubber crumbs and a sand mix are layered among green fibers of polyolefin to achieve grasslike realism. Nylon fibers below the layers of rubber and sand, an area called the Thatch Zone, give the turf better drainage. A bottom layer of rubber granules pro-

vides more resilience. 800/580-8873. AstroPlay Sports Surfaces, Leander, Tex. **CIRCLE 228**



PRODUCT BRIEFS



▲ Teak seat

Andrée Putman's exclusive collection for the new Manhattan showroom Furniture Company includes a chair, three benches (one of which is shown here), and two side tables, all in teak. Other designers represented in the showroom include founder David Schaeffer, Bill Katz, and Alison Berger. 212/691-0700. Furniture Company, New York City. **CIRCLE 229**

▼ Stackable shape

Created in Denmark by Komplot Design, Krug's stackable beechwood and steel Can Can chair is available with a wood seat and back (and 10 finish options) or an upholstered seat. Matching tables are also available. 888/578-KRUG. Krug, Kitchener, Ont. **CIRCLE 230**



▼ Form, function, tea, or coffee?

Krups recently introduced the Frank Lloyd Wright Guggenheim Collection of

porcelain coffee and tea accessories, including 2.5-ounce espresso and cappuccino cups and matching saucers, 10-ounce coffee and tea mugs, and a 38-ounce teapot. As distinctive as the museum itself, the entire collection is available in white and is dishwasher and microwave safe. 800/526-5377. Krups, Closter, N.J. **CIRCLE 232**



▼ Luster underfoot

Shaw's MetAllure collection includes Simone (left), which has a subtle metallic accent. Its GlassMaker collection (right) includes Theo, a striped pattern, and

Marcel, which plays on geometric tones and textures to evoke stained glass. All are suitable for heavy-duty commercial use. 706/278-3812. Shaw, Dalton, Ga. **CIRCLE 234**



▲ Glass mosaic tiles

The collaborative relationship between Italian architect Alessandro Mendini and Bisazza was established when Mendini used the company's glass mosaic tiles to create a signature spiral staircase for the Gröningen Museum in Holland (above). So it was no surprise when Bisazza once

again called on Mendini to apply his unique style to its New York City space, the first company-owned showroom in the United States. Based on the original Casa Bisazza, the company's flagship space in Milan, the Manhattan showroom opens this fall. 305/597-4099. Bisazza, Miami. **CIRCLE 231**



▼ Woven trades

Conrad has introduced two new hand-woven window coverings to its Original Sunshade collection of more than 30 coverings made of natural grasses, reeds, and fibers. Shown below are Grasslands (weave #248), made of natural hemp (top); and Stephen E. Earls (weave #1460), made from a weave of arrowroot fibers to resemble creamy white-colored raw silk (bottom). 415/626-3303. Conrad, San Francisco. **CIRCLE 233**



▲ New tile style

Tulikivi's nontoxic, nonabsorbent, soapstone tile is quarried in Finland and can be used for floor and wall applications. The dove gray soapstone with white veining is offered in a smooth or rough-cut finish. Tiles are 11¹³/₁₆-inch square with a thickness of either 3/8 inch or 1/2 inch. 804/977-5500. Tulikivi, Charlottesville, Va. **CIRCLE 235**

PRODUCT BRIEFS

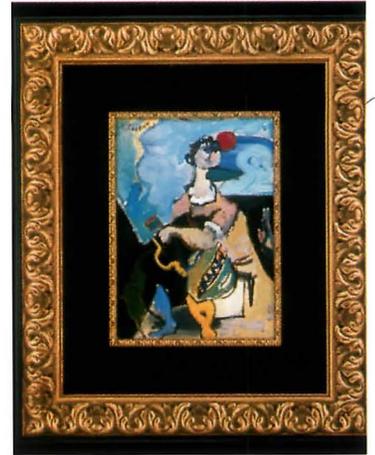
► **Skylight improvements**

The Philadelphia Airport's B/C terminal improvement project included CPI's Pentawall polycarbonate glazed panels in the expanded US Airways ticketing area (hipped-ridge skylights and a warped-plane lean-to skylight); a connector concourse with moving sidewalks between previously separated terminals (two sloped-roof skylights); and new mall and baggage-claim areas. 847/816-1060. CPI, Lake Forest, Ill. **CIRCLE 236**



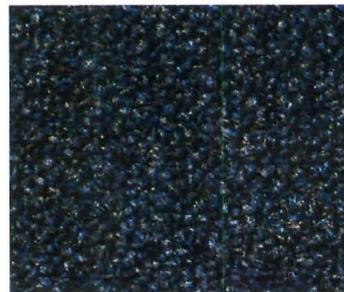
► **Framed remembrances**

The two new series of frames from Larson-Juhl's Craig Ponzio Signature collection are Vermeer and El Greco (right). Inspired by the Dutch master, Vermeer is a series of simple, sleek gold- and silver-finished frames. El Greco is a more bold and expressionistic collection, inspired by the passionate style of the Spanish artist. Black embossed patterns in burnished gold are handcrafted by Spanish artisans using the traditional gilding method. 770/279-5200. Larson-Juhl, Norcross, Ga. **CIRCLE 237**



▼ **Digital TV, a European import**

The German electronics company Loewe recently partnered with Arizona-based Sensory Science (formerly Go-Video) to market 11 varieties of digital color televisions in the United States. Shown here is the 32-inch Calida model, which is available with either an arctic silver or matte black finish. Loewe televisions, which have HDTV-compatible connections to accommodate future technologies, can be connected to most PCs. 877-LOEWETV. Sensory Science, Scottsdale, Ariz. **CIRCLE 239**



▲ **Static-free environments**

The Manhattan-based flooring company Associated/ACC now carries the full line of electrostatic discharge (ESD) control flooring from VPI in its showroom. 212/633-0250. Associated/ACC, New York City. **CIRCLE 240**



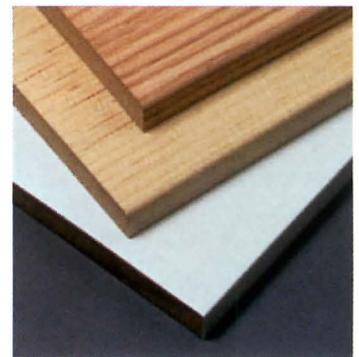
◀ **Save water...**

Compared to conventional toilets, which can use as many as seven gallons of water per flush, the power-assisted Ultra-Flush from Gerber uses only 1.6 gallons per flush. The toilet's water seal and trapway systems exceed the three- and two-inch minimums respectively. One-piece standard models are available, as are two-piece models with either elongated or round-front profiles. 847/675-6570. Gerber, Chicago.

CIRCLE 238

► **Wheat jambs**

Windsor Window has introduced pine-veneer, oak-veneer, and white vinyl extension jambs made of WheatBoard, an engineered composite board made from wheat plants. The wheat stalks are milled into fine particles and then compressed. The extension jambs are available with the Next Dimension line of vinyl windows. 515/223-6660. Windsor Window, West Des Moines. **CIRCLE 241**



► **LaserJet printer for CAD**

Hewlett-Packard's new laser jet 8500 printer uses AutoCAD drivers (supporting AutoCAD releases 10-14 for DOS, Microsoft Windows 3.1, 95, and NT) to produce B-size color plots. The driver bypasses Windows to interface directly with AutoCAD's ADI format. The printer can create CAD files and overlay them on imported photographs. The system also doubles as an office printer for color presentations on a variety of paper sizes. 800/LASERJET. Hewlett-Packard, Palo Alto, Calif. **CIRCLE 242**



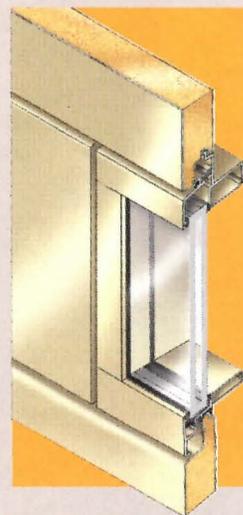
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PRODUCT BRIEFS

► Seating style

Lobby, designed by Hansulrich Benz for the Walter Knoll Furniture Company (Walter K.) and distributed by M2L, is available as a chair, a two-seater, a 2½-seater, and a three-seater sofa (shown). The steel frame is available in matte chrome; armrests in natural wood are also available. Upholstery options include ultra-suede, leather, and fabric. Matching square or rectangular tables in clear or satinized glass are also offered. 800/319-8222. M2L, New York City.

CIRCLE 243



▼ Seasonal accents

The new Bob Timberlake collection from Epro includes four series of tiles: spring, summer, winter, and fall. Each line features reliefs, decos, and liner tiles. Available in a variety of colors, the tiles can be used as accents on floors, walls, countertops, or other applications. 800/550-6694. Epro, Westerville, Ohio.

CIRCLE 244



► Fountain series

Haws's ADA-compliant 1000MS drinking fountain (right) is made of stainless steel with a gold finish and matching bracket, bubbler, waste strainer, and push-button valve. The 1001 model has a satin-finish bowl and bracket and chrome-plated bubbler, push-button valve, and waste strainer. The freeze-resistant 1001FR is made of 18-gauge, satin-finish stainless steel. 510/525-5801. Haws, Berkeley, Calif. CIRCLE 245



▼ Energy-efficient flooring

Schluter's Bekotec floor-covering system includes a heat and sound insulation layer, which is installed over a load-bearing substrate (typically, reinforced concrete); insulating strips, which are placed on the perimeters; a PE-foil insulation cover; and a polystyrene panel, which is installed over the entire area. The system is then covered with a mortar or poured-anhydride (gypsum-based) screed. 800/472-4588. Schluter Systems, Plattsburgh, N.Y. CIRCLE 247



▼ High-security hinge

McKinney Products, a subsidiary of Assa Abloy/Essex, manufactures a cast institutional hinge with nonremovable, concealed, stainless-steel pins to prevent tampering. Three hinges can hold a door as big as three by seven feet and weighing up to 300 pounds. 203/624-5225. McKinney Products, New Haven, Conn. CIRCLE 248



◀ Toilet revival

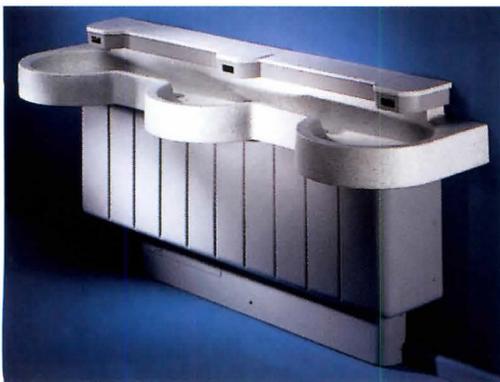
A new fill valve for tanked toilets is part of the Smart Valve 2000 and Smartparts repair parts kit from American Standard. Also included is an aquameter water-control feature with an antisiphon design. 800/524-9797. American Standard, Piscataway, N.J. CIRCLE 246



► Lavatory line

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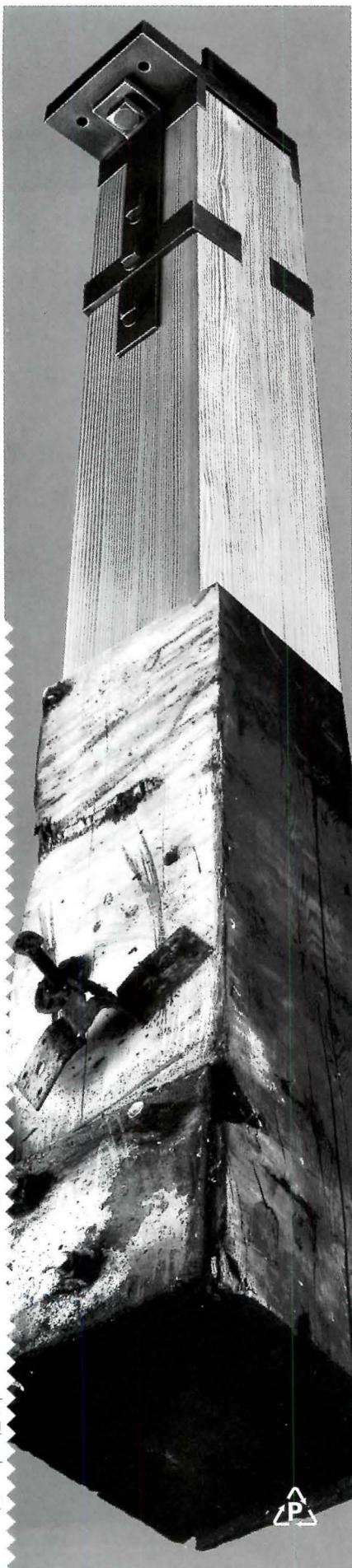
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PRODUCT LITERATURE

Door parts

L. E. Johnson's new catalog includes information on sliding, folding, and pocket door hardware. 800/837-5664. L. E. Johnson, Elkhart, Ind. **CIRCLE 251**

Service hardware

New products in the Custom Service Hardware catalog include T moldings and halogen lights. 800/882-0009. Custom Service Hardware, Cedarburg, Wis. **CIRCLE 252**

Steel shingles

MetalWorks has new steel shingle sample kits for the AstonWood and Stone Crest lines. 800/320-0101. MetalWorks, Moon Township, Pa. **CIRCLE 253**

Garage doors

Amarr recently introduced its new residential garage door sales literature. 800/503-DOOR. Amarr, Winston-Salem, N.C. **CIRCLE 254**

Chemical product database

The Euclid Chemical Company database

on disk includes information on concrete products. 800/321-7628. Euclid Chemical, Cleveland. **CIRCLE 255**

Undercabinet lighting

Starfire's Tru-Lux brochure shows cove lighting and wall luminaires. 800/443-8823. Starfire, Jersey City, N.J. **CIRCLE 256**

Exit devices

DORMA's new brochure details the 6000 series of fire and panic exit devices. 800/523-8483. DORMA, Reamstown, Pa. **CIRCLE 257**

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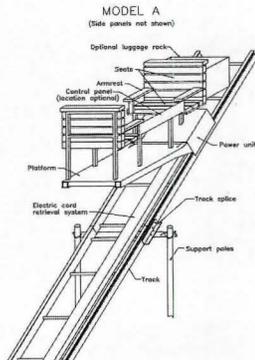
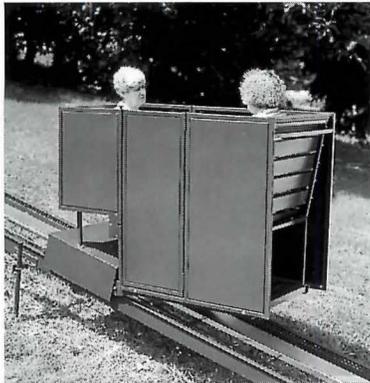
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Autumn teak

Smith & Hawken's fall trade catalog includes the eight-foot teak Governy bench, shown on the cover. 415/389-8300. Smith & Hawken, Mill Valley, Calif. **CIRCLE 259**

Resilient flooring

Domco's Azrock brand of commercial flooring has introduced its new catalog for resilient commercial flooring, including information on vinyl tiles, Roman Stone, and Madras Slate, as well as PVC flooring for cleanrooms and laboratories. 800/921-1717. Domco, Florence, Ala. **CIRCLE 260**

Simple lights

The Arroyo Craftsman company manufactures ceiling pendants, wall sconces,

floor lamps, and outdoor fixtures, all inspired by the Arts and Crafts movement. 626/960-9411. Arroyo Craftsman, Baldwin Park, Calif. **CIRCLE 261**

Grout colors

Laticrete manufactures ceramic tile and stone installation systems. The cover of its new architectural binder features the 27 grout colors in the Renaissance palette. 800/359-3297. Laticrete, Bethany, Conn. **CIRCLE 262**

Linear lighting

RSA Lighting's new brochure highlights recessed, retail/display, track, architectural linear, theatrical/stage, and decorative linear lighting. 818/349-3030. RSA Lighting, Chatsworth, Calif. **CIRCLE 263**

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CONTINUING EDUCATION


AGA KHAN *continued from page 73*

people's physical environments, developed in different societies, different parts of the world, different climatic conditions, different material conditions. The object has not at all been to impose a philosophy; on the contrary, it has been simply to say to people you have a choice."

But if the awards program has achieved its original goals, how can it remain important? It's obviously not for me to say, but I'll give three reasons anyway why the program will continue to be relevant.

One, it deals, more than any other major award, with what will probably be the great political issue of the next generation: the survival

**IT DEALS, MORE THAN ANY
OTHER MAJOR AWARD, WITH
THE GREAT POLITICAL ISSUES
OF THE NEXT GENERATION.**

of the planet. Degradation of the natural environment, depletion of resources, overpopulation: these issues are more critical in much of the Muslim world than they are—as yet—in the West. The awards tend to be about sustainable environment because in the so-called Third World, there usually isn't the accumulation of excess capital that allows rich countries to afford architecture that demeans the environment.

Two, it addresses the issue of cultural identity. We live in a paradoxical world where everyone is becoming more alike (drinking Coke,

watching CNN) and, at the same time, trying to become more different, as formerly unified nations split up into ethnic enclaves—not only in Russia and Yugoslavia, but perhaps soon in Quebec and Scotland as well. Architecture is one of the most powerful expressions of both halves of the local-global paradox. It can speak of membership in a world culture, and it can speak of ethnic identity.

Three, it is one of the few bridges between the world of Islam and the world of Europe and the West. The recent bombing of American embassies by what are described as Muslim terrorists is only the latest event in a deepening misunderstanding. As the commencement speaker at Brown University in 1996, the Aga Khan addressed this problem head on: "The Muslim world is noted in the West, North America and Europe, more for the violence of certain minorities than for the peacefulness of its faith and the vast majority of its people. The words 'Muslim' and 'Islam' have themselves come to conjure the image of anger and lawlessness in the collective consciousness of most Western cultures. And the Muslim world has, consequently, become something that the West may not want to think about, does not understand, and will associate with only when it is inevitable."

The Aga Khan Award, through its many programs, brings together scholars and designers from all over the world to talk and think together. They discuss mostly architecture, but that's not a bad start. It's a reminder of the gulf of misunderstanding between the West and Islam that here in the United States, amazingly little is known, even among architects, about this enormously ambitious award program. Which tells us something we need to know about our own provincialism. ■

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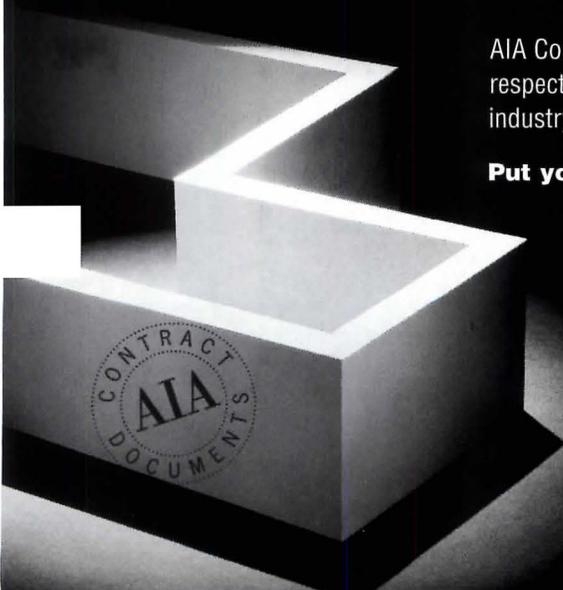
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ROYCE HALL *continued from page 91*

compelling when McKay realized that by creating terra-cotta units that would protrude from the stripes, he could increase the number of reflective surfaces and thus further enhance the sonic brilliance of the hall.

The striping becomes narrower and lighter in color in the upper parts of the wall, as in the Italian buildings that inspired Royce's design. The large square openings to the acoustical galleries, unlike anything that could have been built in the 12th century, presented a particular challenge. Phelps eventually decided to place a slim column, capped by his interpretation of a Romanesque-style corbel pulvin, at the center of each opening. Such precariously skinny columns with weighty caps are characteristic of Lombard Romanesque and, in this case, of Royce Hall.

The bumpiness of the striped walls of the lower auditorium is, however, unlike anything found in Lombardy. Indeed, the stripes might almost be seen as an allusion to the popping bricks of Royce Hall's walls following the earthquake. Nevertheless, the feeling is not of deconstruction but of an almost overwhelming mass and solidity that both expresses what has been done to the building and matches its architectural style.

"I've had people tell me they've always loved the brickwork of the auditorium," Phelps says, with a note of irritation. The walls were always plaster; the architect would like people to be aware of how dramatically the brick has transformed the hall's interior.

At the end of 1996, the final piece of the project fell into place when UCLA's administration decided that the other major rooms of the building should be confiscated from their individual departments and converted into conference rooms, a library, and a lecture hall, to be used by all the humanities departments in the building. This happened, in part,

because the rebuilding project had called attention to spaces that had, for years, gone unnoticed by university officials.

For example, the room behind the three arched windows on the front had long been accessible only to members of the German department. One professor told of working in the building for decades before he realized there was a room in this location. Within weeks of its reopening, students realized that this room, and especially the balcony outside it, was the best place on campus to stage a protest and hang banners. Design has consequences; this long-forgotten space is now a hot spot for students and the administration.

Looking at the building now, picturesquely collegiate on the outside, radically changed on the inside, it's difficult to imagine that it could have emerged from crisis. Buildings of symbolic importance are always subject to reinterpretation and change, however odd that idea might seem in Southern California, where the impulse is often to tear down and start over. Royce Hall will probably have several more lives, though if the engineers' work is sound, future changes won't be forced by the danger of collapse.

Royce Hall was not preserved in the conventional sense. It has, rather, been saved and transformed. Phelps says his goal all along was to make Royce Hall what it would have been if David Allison, its original designer, had known what is known today about how to help buildings survive earthquakes, and if he'd had a more generous budget for interior embellishments. That's why, even though Phelps immersed himself in study of the Lombard Romanesque while working on the design, he bristles if you call it a historic preservation project. "It's not preservation, it's architecture," he says. Oakley agrees: "On campus, everything is always changing. But the good buildings have many lives." ■



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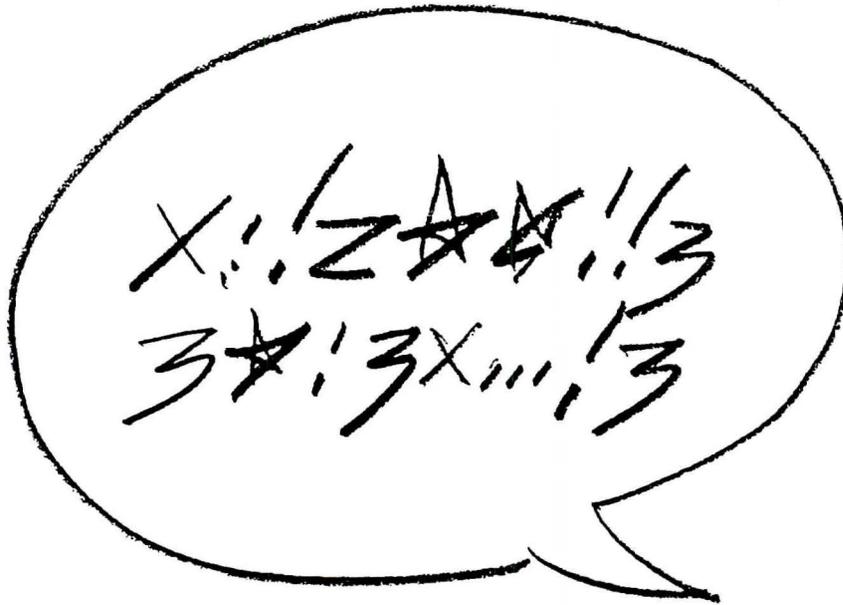
The award winning, *Back from the Brink: Saving America's Cities By Design*, continues to be used to galvanize community action. *Becoming Good Neighbors: Enriching America's Communities By Design*, the next Accent on Architecture documentary, will be released in 1999. For more information, please fax (202) 626-7420.

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CIRCLE 92 ON INQUIRY CARD

QAR11

MEGAHOUSES *continued from page 78*

Laurinda Spear of Miami's Arquitectonica says her firm doesn't create "one big block of mass. We try to break down the volumes. Often in South America we build high, dilapidated-looking walls around the periphery so you can't see the houses at all."

Says Lee Skolnick: "I studied music before I studied architecture, so I know you have to use 12 tones to compose a fugue or a sonata. The way I deal with scale is by manipulating the site. Like Italian hill towns, I have pieces that meander around the land. I do different spaces for the owner to go to at different times of the day."

"I am more courtyard- and cluster-oriented," says Ned Forrest, "so my houses have the scale of a farm or village. Like Frank Lloyd Wright, I want to be of the land, not on the land."

Yves Ghiai of Heydar Ghiai & Sons in San Francisco is designing a 15,000-square-foot house there on the principles of Persian palaces. "I've kept it horizontal, with lots of courtyards like the ones at the Alhambra Palace, with water effects," he says. "I've layered the facade with porches, balconies, and layers of glass."

Financial matters

Considering the deep pockets of their clients, one might assume that megahouse architects are pulling in fairly sizeable fees. But while many have made a substantial living designing massively budgeted homes, this is not always the case.

"The clients are very demanding in terms of service, and very few will pay you by the hour," says Lee Skolnick. "We are not as good at negotiating as our successful business clients, so our fees go way down. We feel we can't let someone else underbid us, because the house com-

missions lead to other jobs. Our clients are on the boards of institutions and museums that we like to work for—and do work for."

Bart Voorsanger, on the other hand, says he would never do corporate work for his residential clients. "I treat house clients in a different way," he says. "I never bridge over, because the issues get confused. I want my relationship to be unique."

The right architects?

Another question is whether wealthy clients are choosing America's better architects to design their modern megahouses. It seems that, on the whole, they're not. According to the *Palm Beach Post*, there are 19 new homes ranging from 23,000 to 84,000 square feet on the Florida coast between Palm Beach and Jupiter Island. The number of enormous houses there is unrivaled anywhere in America. But Stanley Tigerman is the only big-name architect hired to work on any of these pricey projects.

Perhaps architects should think about how to better reach the kinds of clients who are willing to spend \$5 million to \$20 million on a house, so that these clients don't go to developers and decorators instead.

They might start with Samuel G. White's new book, *The Houses of McKim, Mead & White*, and continue with monographs on Addison Mizner, Carrère & Hastings, Delano & Aldrich, and Harrie T. Lindberg—the great house architects of the early 20th century who, as it turns out, were also highly adept at navigating the upper circles of society.

Architects today are as educated as brain surgeons. They are up-to-date about technology, materials, cost controls. But how to communicate with the super rich isn't taught in architecture school—though more designers might want to take a crash course if they want to be involved in creating today's castles. ■

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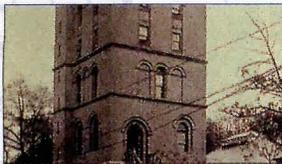
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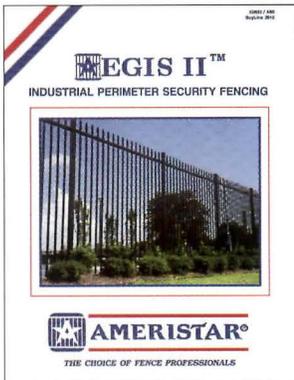
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Ameristar

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The Openings® Solution**

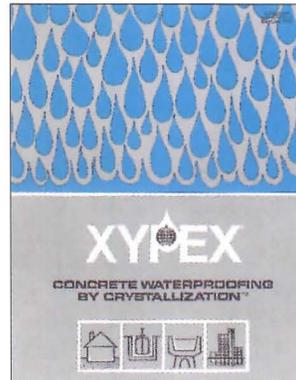


Total Door® is a fire rated door assembly that includes all hardware. Pairs do not require coordinators, vertical rods, astragals, flush bolts, or floor strikes. Will retrofit to any frame. Meets all codes and ADA. Wood and metal faces available to 3 hours. Lifetime limited warranty on locks and panics. For more information call 1-800-852-6660.

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by Crystallization**



Applied as a slurry coating Xypex is a chemical treatment that waterproofs by penetrating the concrete with a crystalline formation that "plugs" the pores of the structure preventing water seepage. Xypex is ideal for use on the "inside" of wet underground structures.

Xypex Chemical Co.

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The La Corte Porcelain tile series was specifically designed and fabricated for commercial, high volume, applications (including malls, retail chain stores and hotels). Resembling rich & warm French limestone, this product does not stain or scratch, is consistent in color range and is maintenance free. "The most natural looking porcelain tile series available". Large inventory. For more information call 1-800-62-Stone. The La Corte Series is a product of IMT Italia.

Innovative Marble & Tile Inc.

CIRCLE 153 ON INQUIRY CARD

**Accessible Lavatory
Insulation**



A full color catalog will explain the different Handy-Shield safety covers offered for the new or retrofit projects that need to comply with the American Disabilities Act. The specific use, sample specifications, drawings and color choice are all summarized in this easy to understand catalog. (800) 475-8629.

Plumberex

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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

CIRCLE 155 ON INQUIRY CARD

Mortar Net Weep Vents

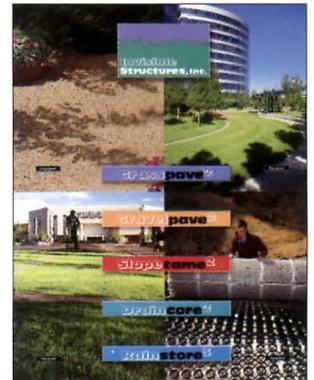


are inexpensive and easily installed in weep holes to insure masonry cavity walls breath, drain and dry quickly. Made from 100% recycled polyester with a 90% open mesh in 2.5" x 4" x .5, they are available in white, tan, almond, gray, and brown. Weep Vents add to the beauty of the wall by duplicating the texture and color of mortar, thus eliminating open holes and dark shadows while restricting entry to insects. Call (800) 664-6638 for more information.

Mortar Net

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Roll Out**



3 new invisible products have been added to the family of Grasspave² & Gravelpave² - Slopetame², Draincore², & Rainstore². 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.

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Tnemece explores the world of high performance coatings, for exposed steel & masonry in this easy-to-use binder. Complete with brochures, data sheets, systems guides, surface preparation and application guides, and a color selector, this binder is a must have for any architectural firm. For more information, call 1-800-TNEMEC1.

Tnemece Company, Inc.

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When building or renovating a clubhouse choose resilient athletic surfacing by Tuflex Rubber Flooring. Tuflex exceeds OSHA and ADA standards for excellent traction. Tuflex flooring has an anti-slip surface and has a finished edge that makes entrances handicap-accessible. Tuflex resists damage from golf spikes, is easy to maintain and available in 21 colors. 1-800-543-0390.

Tuflex Rubber Flooring

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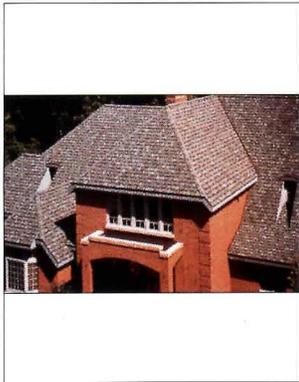


Superbly crafted mosaics of Murano glass, polished or tumbled marble are available from Sicis Italy. They will also manufacture your exclusive designs. Suitable for hotel lobbies, spas, decorative murals or as wall veneer. Mosaics are premounted for simple installation. For information and free catalogs Fax 516-627-0583.

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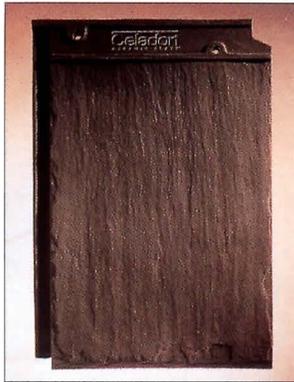


CertainTeed's Grand Manor Shingle® is a super heavy-weight shingle built on two full-size one-piece shingles with random 8" tabs applied on top. Patented shadow lines and a unique color palette give Grand Manor the look and depth of natural slate and wood. UL Class A. 40-year limited, transferable warranty on commercial applications. Algae-resistant. Meets ASTM D 3462—Tear Strength.

CertainTeed Corporation

CIRCLE 163 ON INQUIRY CARD

Celadon™ Ceramic Slate™



A kiln-fired, interlocking clay roof tile designed to look like thick slate with a breaking strength greater than 300 pounds; impervious to freeze-thaw degradation with less than 1% moisture absorption; color will not fade, flake, or effloresce—offered in slate gray, slate red, montpelier green, plumstone, and brunswick black. Sixty-year limited, transferable warranty. 1-800-699-9988.

CertainTeed Corporation

CIRCLE 164 ON INQUIRY CARD

**NCA's
Universal Design '98**

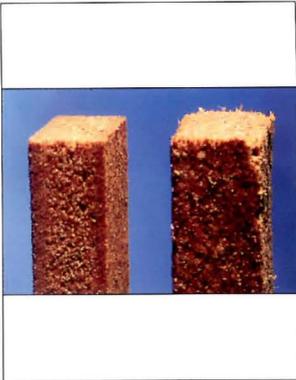


The National Center on Accessibility will host Universal Design '98: Methods to include the Widest Spectrum of Users, People with Disabilities & Older Adults in Parks, Recreation & Interpretive Environments December 7-11, 1998 in Houston, TX. See the NCA Homepage or call for training course details: NCA, 5020 State Road 67 North, Martinsville, IN 46151. E-mail: nca@indiana.edu F: (765) 342-6658 or T: (765) 349-9240. www.indiana.edu/~nca

NCA

CIRCLE 165 ON INQUIRY CARD

Moisture-Resistant Particleboard

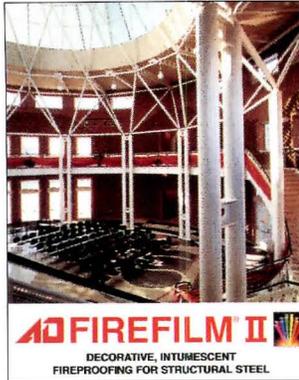


Duraflake MR moisture-resistant particleboard absorbs less moisture & exhibits minimal thickness swell compared to standard particleboard. For interior applications where exposure to high humidity & intermittent contact with water is common. It has a fine surface for laminating & exceptional strength. Applications include bathroom & kitchen cabinets & counters, casework, display fixtures, entryways & other moisture-prone areas. To request information call 1-800-887-0748 ext. 300.

Duraflake

CIRCLE 166 ON INQUIRY CARD

Decorative, Thin-Film Intumescent Fireproofing

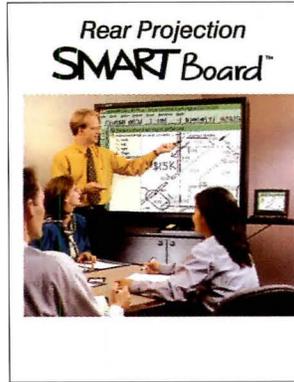


Improved spray characteristics and ratings up to 3 hours! A/D FIREFILM®II permits designers to use the appearance of exposed steel with the steel protected from fire. The product is applied as a thin-film coating 0.4 to 3.3 mm (16 to 130 mils) thick. When exposed to fire it expands to form a meringue-like insulating layer up to 4 in. thick. A/D COLORCOAT topcoat is available in a wide range of colours. Call 1-800-263-4087 or 416-263-4087. Internet: www.adfire.com

A/D Fire Protection

CIRCLE 167 ON INQUIRY CARD

Interactive Whiteboard



The Rear Projection SMART Board™ is an interactive whiteboard that allows you to control projected Windows® or Macintosh® applications and other multimedia by pressing on the Board's large, touch-sensitive surface. Write over top of applications and your notes are saved for future reference and distribution. Architects and facility designers can request the SMART Product Kit by calling 1.888.42.SMART or by visiting www.smarttech.com/productkit.

SMART Technologies Inc.

CIRCLE 168 ON INQUIRY CARD

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Unicel

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Structural Steel An Architect's Guide



Designing with Structural Steel, A Guide for Architects provides the needed information to design everything from manufacturing facilities to high-rise buildings. Over 300 pages & 100 illustrations, the manual covers design ideas, systems, details, material & a list of industry resources & standards. Published by the American Institute of Steel Construction, Inc., (AISC), & written for architects by practicing architects & engineers. To order call AISC Publications: 800-644-2400 or at: www.aisc.org.

AISC, Inc.

CIRCLE 170 ON INQUIRY CARD

Kolbe's Interactive Design System



Kolbe & Kolbe has developed an interactive design system on CD-ROM (KIDS) to save architects time when selecting windows & doors for construction projects. KIDS presents on-screen options & sizes for each window style without having to page through architectural manuals or catalogs. KIDS also offers a multimedia presentation about Kolbe & Kolbe including a plant tour, company history, architectural achievements & product info & specs. Call 1-800-955-8177.

Kolbe & Kolbe

CIRCLE 171 ON INQUIRY CARD

New Rainwear From Petersen Aluminum

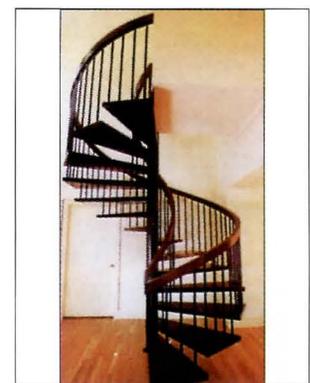


Announcing the addition of a complete line of gutters, downspouts & accessories. Gutters feature the standard ogee profile. Downspouts are available as square or rectangular in a variety of widths. These products feature their PAC-CLAD Kynar 500 finish and can be manufactured in .032 aluminum, 24 & 26 gauge steel in colors to match their full line of metal roofing products. For info about this new product line, call 1-800-344-1400 or visit their website at www.pac-clad.com

Petersen Aluminum Corp.

CIRCLE 172 ON INQUIRY CARD

Spiral Stairways & Custom Stairs



Delivering beauty, quality & economy in a fully fabricated unit. Fabricated all under one roof, providing architects & designers with the engineering, design & technical skill for demanding projects. Experience over the years has elevated the company to national recognition as a leader in design & manufacturing of spiral & custom stairs with the highest quality & craftsmanship at the lowest cost. Stairways, Inc., 4166 Pinemont, Houston, TX 77018-1106. T: 800-231-0793, F: 713-680-2571.

Stairways Inc.

CIRCLE 173 ON INQUIRY CARD

**Ultra-Violet
Scenic Effects**

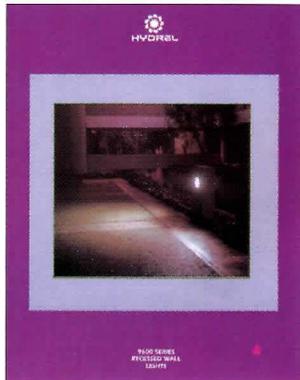


UV/FX are considered the world experts in Ultra-Violet scenic effects design and UV scenic painting. This effect is a proven crowd pleaser! Painted on almost any substrate, in any style from classical to fantasy, from single images to complete invisible treatments, dual images, 3D scenic painting and more.

UV/FX Scenic Productions

CIRCLE 174 ON INQUIRY CARD

**Avoid Annoying Glare
10 to 1 MH spacing**

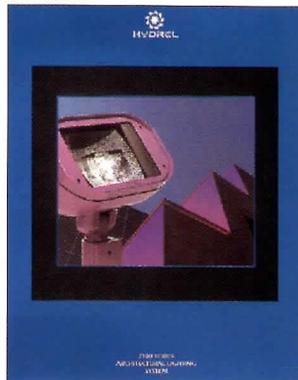


Hydrel's new 9600 Series Recessed Wall-Step Lights with improved beam patterns and unique internal glare control achieves remarkable 10 to 1 mounting height to spacing ratio. Patented sealing technology and modular construction provide air cooling for reduced size and simple installation/maintenance. Up to 100 watts HID. Hydrel, Sylmar, California.

Hydrel

CIRCLE 175 ON INQUIRY CARD

**High Performance with
Uniformity and Control**



Hydrel's 7100 Series Architectural Lighting System provides high performance with maximum uniformity and control. Eight standard light distributions. Standard internal glare control. Multiple mounting capabilities. Contemporary styling to complement any architectural statement. Up to 175 watts HID.

Hydrel

CIRCLE 176 ON INQUIRY CARD

Cast Aluminum Lighting



Sun Valley Lighting manufactures an extensive line of Standard & Custom cast aluminum lighting poles & fixtures in all period styles. Our 50 years of design & manufacturing experience provides you with unexcelled product quality. Our staff of designers, engineers, and tool makers are here to assist you. Our in-house foundry assures quality and prompt delivery at competitive costs.

Sun Valley Lighting

CIRCLE 177 ON INQUIRY CARD

The New Saturn

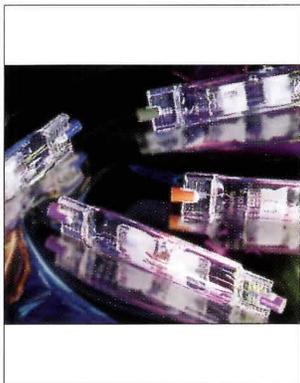


The newly expanded Saturn series offers a wide variety of contemporary and classic finishes coupled with three diffuser materials. Shown here is the SNC-277D-4DP1 which couples a Brushed Brass finish and cable hanging system with a White Acrylic diffuser. This fixture will accommodate four 26W quad fluorescent lamps. The Original Cast Lighting Inc. 6120 Delmar Blvd., St. Louis, MO 63112, 314-863-1895, fax 863-3278, www.theOCL.com.

The Original Cast Lighting

CIRCLE 178 ON INQUIRY CARD

**Ushio's Ultraline™ 10,000
hour MR-16**



Ushio's Ultraline™ 10,000 hour MR-16 lamps are rated at more than twice the life of any MR-16 lamp on the market. The Ultraline™ series maintains consistent color throughout the life of the lamp & the halogen capsule protects ultra-violet sensitive objects by eliminating 90% of the harmful UV emissions. Available in medium, wide & soon to be released spot beam spreads. Ushio America is located at 10550 Camden Drive, Cypress, CA 90630. Call (800) 218-7446. www.Ushio.com

Ushio Specialty Lighting

CIRCLE 179 ON INQUIRY CARD

PERFOS Wall Sconce



PERFOS Wall Sconce features a perforated metal shield with luminescent acrylic liner in a curvilinear shape. Solid end sections enclosed with white acrylic panels form an elegant appearance. ADA compliant sconce uses compact fluorescent lamps up to 36 watts. Mounts vertical or horizontal. Other PERFOS styles, including Pendants, available. EXCELITE Inc., 4500 6th Ave., Altoona, PA 16602. T: 814-943-1155, F: 814-946-1057.

EXCELITE Inc.

CIRCLE 180 ON INQUIRY CARD

Flexible Rope of Light

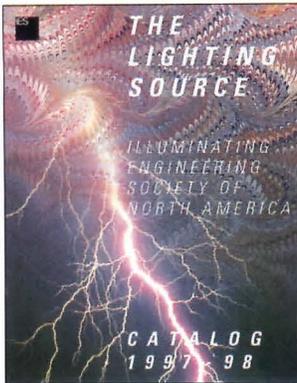


Priced as low as 99¢/ft, Outwater Plastics' UL Listed Flexilight Decorative Rope Lighting allows you to install & create illumination wherever ambient lighting is required. Available in 8 different colors in 30' or 150', 1/2" or 3/8" diameter impact & water-resistant PVC coils, Flexilight can be cut in increments. Stocked mounting hardware & accessories enable all types of interior/exterior applications. Call 1.888.OUTWATER / Fax: 1.800.888.3315; Web: http://www.outwater.com/flexilight.htm

Outwater Plastics Industries

CIRCLE 181 ON INQUIRY CARD

Illuminating Engineering Society of North America



The LIGHTING SOURCE by the IESNA offers a vast selection of standards and publications for the lighting professional. The IESNA has 10,000 members and offers many benefits. If you wish to receive a complimentary copy of the catalog, please call Albert Suen at T: (212) 248-5000, F: (212) 248-5017, or e-mail bethbay@aol.com.

IESNA

CIRCLE 182 ON INQUIRY CARD

Snakelight

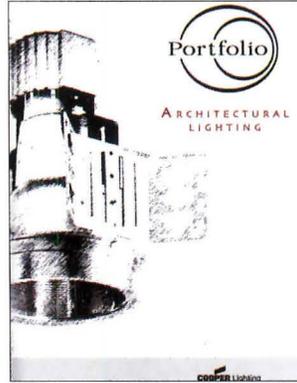


The flexibility of the Snakelight solves a multitude of lighting problems. Subtle accent lighting or part of a bold design statement, Snakelights are a quick, affordable & elegant solution for both residential & contract installations. Snakelights come in a variety of mountings, sizes & colors with custom options available. Call or write for a free brochure. MD Enterprises, Inc., Snakelight, P.O. Box 2554, Vashon Island, WA 98070. Phone (206) 463-9272 or Fax (206) 463-6717.

MD Enterprises, Inc.

CIRCLE 183 ON INQUIRY CARD

Cooper Lighting Expands Portfolio

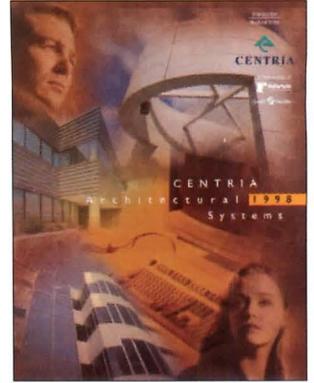


Cooper Lighting's Portfolio brand of architectural-grade recessed downlights has expanded to include over 130 luminaires accepting compact fluorescent, incandescent and H.I.D. lamp sources. Portfolio downlights feature matching apertures for consistent visual appearance, and equal cutoff to lamp and lamp image for glare-free illumination in all optical distributions.

Cooper Lighting

CIRCLE 184 ON INQUIRY CARD

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CENTRIA manufactures a full line of insulated and uninsulated metal wall and roof systems, including factory foamed panel systems - Formawall® 1000 architectural panels, Versawall®, Versapanel® industrial panels and Integrity™ roof panels. A complete line of field assembled wall and roof systems is available including a comprehensive line of architectural and structural standing seam roof panel systems. See CENTRIA's website at www.centria.com.

CENTRIA

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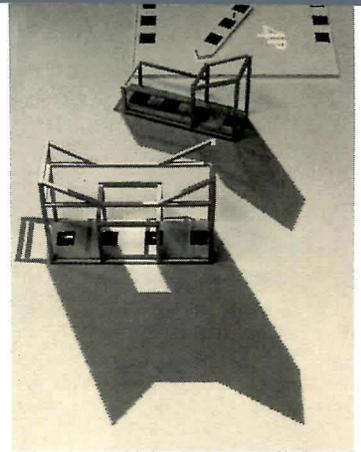
Photo: The Columbus Center, Baltimore, MD.
Architect: Zeidler Roberts Partnership • Engineer: Peter Sheffield and Associates

CIRCLE 93 ON INQUIRY CARD

THE FUTURE I/O bulbs? Urp?

Luminous rooms? All buzzwords for a possible urban planning package.

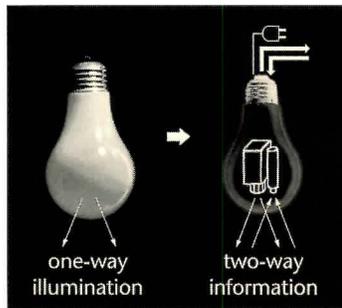
BY CHARLES LINN, AIA



An ordinary light bulb, proposes Ph.D. candidate John Underkoffler, functions somewhat like a projector connected to a computer's video output. Both are capable of presenting us with information, but with completely different levels of resolution. The light bulb produces a single pixel of "information" (on or off) that is spread across an entire room. The projector can produce images at a much higher resolution, say 1,024 by 768 pixels. But either at low or high resolution, both devices are for output only.

While developing his thesis, Underkoffler, who works with Hiroshi Ishii's Tangible Media Group at the Massachusetts Institute of Technology's Media Laboratory, built a prototype "bulb" that is capable of projecting information at a high resolution, but with an additional property. Tucked inside the envelope of Underkoffler's I/O (input/output) Bulb is a video camera that gathers information at the same time an integral projector outputs it. The I/O Bulb sends the video input to a computer for calculations, then outputs the results through the projector.

One of the applications Underkoffler developed for his bulb is Urp, for "urban planning" system, which uses a tabletop to represent and accommodate sites, physical models of buildings, and roads. With Urp, designers can visualize such things as how buildings will shade one another at different times of day, or how reflections off the glazing of buildings might impair the vision of drivers on a nearby road. It can even demonstrate how wind



currents will flow between buildings.

Though a good computer modeling system can do similar things, there is a significant difference in watching Urp work. Although the properties of the physical model are entered in numerical form on a keyboard much as they are with conventional computer simulation programs, with Urp the designer can view a simulation of shadows, reflections, or wind currents while moving three-dimensional models of the building around the site—in real time. Urp uses the video camera inside an I/O Bulb to locate the three-dimensional models and to track their positions as they are moved. The computer processes this information and uses the video output to project a representation of the phenomenon being tested onto the site. So while one would have to rotate a two-dimensional representation shown on a computer screen

With the help of a video camera, Underkoffler's I/O Bulb sends information two ways, compared to a regular light bulb's one-way illumination (above). His urban planning package system, Urp, can show wind currents (right) as well as shadows on a tabletop model (top).

in order to view other perspectives, (the computer must create a new view each time the representation is rotated), the Urp's model is three-dimensional, tactile, and instantaneous.

The tools used to indicate variables such as time, sun, and wind direction couldn't be simpler. Time is indicated by the moving hands of a clock on the tabletop; sun and wind directions are indicated by arrow-shaped pointers. Other properties that may be added to Urp in the future would allow shadow manipulation for specifying latitude and season, automatic zoning criteria that could warn a designer when height or proximity guidelines are being violated, and the capacity for two designers to collaborate jointly from different locations.

A logical extension of the I/O Bulb is what Underkoffler calls the Luminous Room—a space where a number of I/O Bulbs would be networked and the gathering and

outputting of information would cover every surface.

The I/O Bulb and Luminous Room hold enormous potential for future applications beyond the modeling of architectural or urban spaces. Already the technology has been applied to mock up and prepare equipment layouts for the production of holographic images, and to simulate the flow of fluids around objects.

But Underkoffler plays down the use of the Luminous Room for some of the more obvious applications, such as a virtual-reality-based environment that could be shared by more than one person without the use of cumbersome headsets. "Why compete with reality?" he asks. Still, Underkoffler has found that nearly everyone who experiences the Luminous Room is engaged by it. Playing with the technology, he says, invariably delights people, regardless of the task at hand. ■

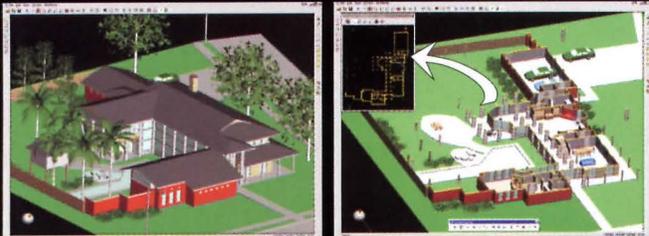


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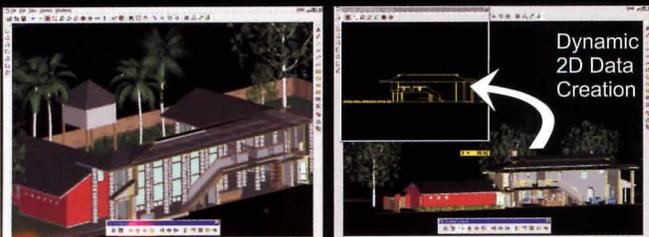
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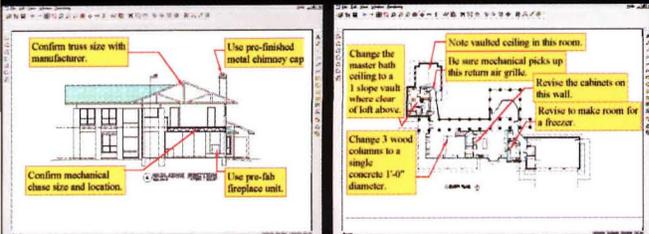
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