A|L
architectural | lighting

AL 20 YEARS 1986-2006

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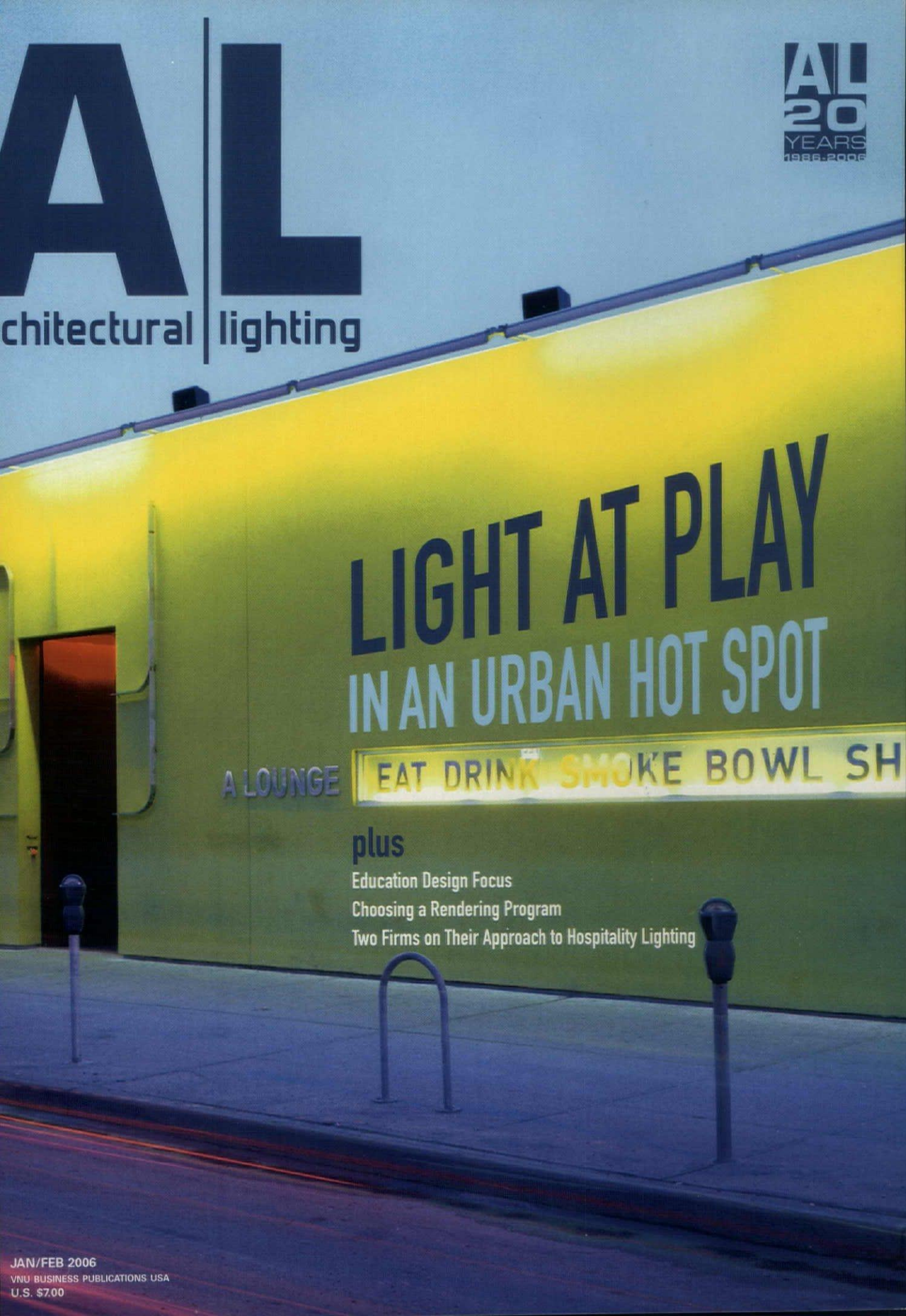
IN AN URBAN HOT SPOT



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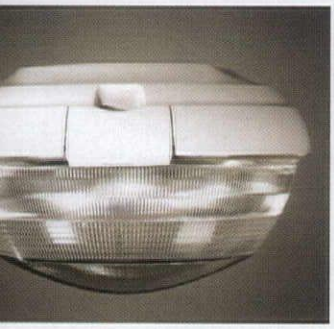

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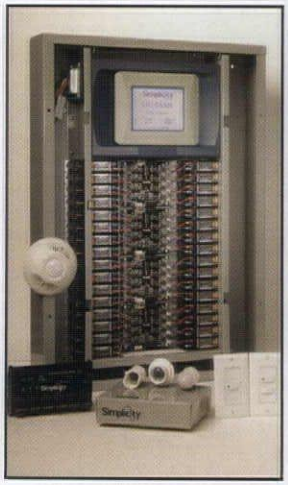

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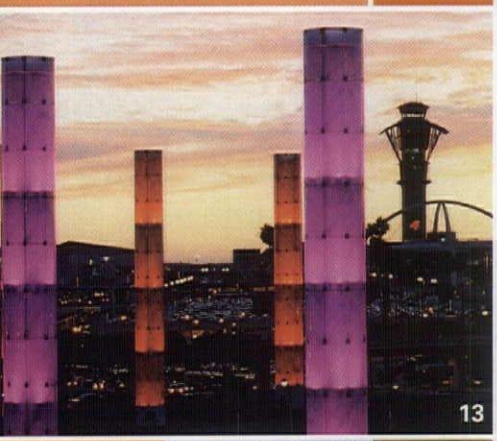

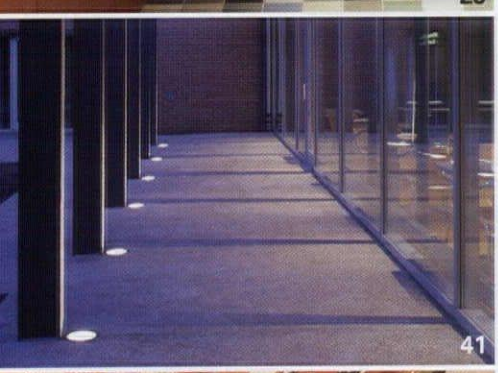

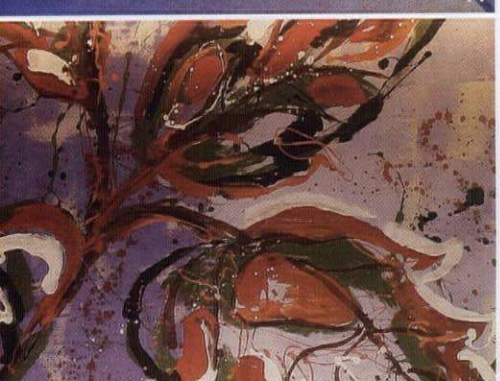

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Cover: Play's concrete façade reads like a gigantic billboard, illuminated with fixtures cantilevered from the roof line. A window with the words "eat drink smoke bowl shoot" is backlit from inside by fluorescent strips. PHOTO: SCOTT FRANCES

This page: Light installation at the Los Angeles airport; Eleventh-floor design by Javier Mariscal and Fernando Salas at Hotel Puerta America, Madrid; Courtyard at Mellon Hall, Annapolis, Maryland; Custom artwork in the fifth-floor rooms, designed by Victorio & Lucchino, at Hotel Puerta America.

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JAN/FEB | 06
VOL 20 | NO 1

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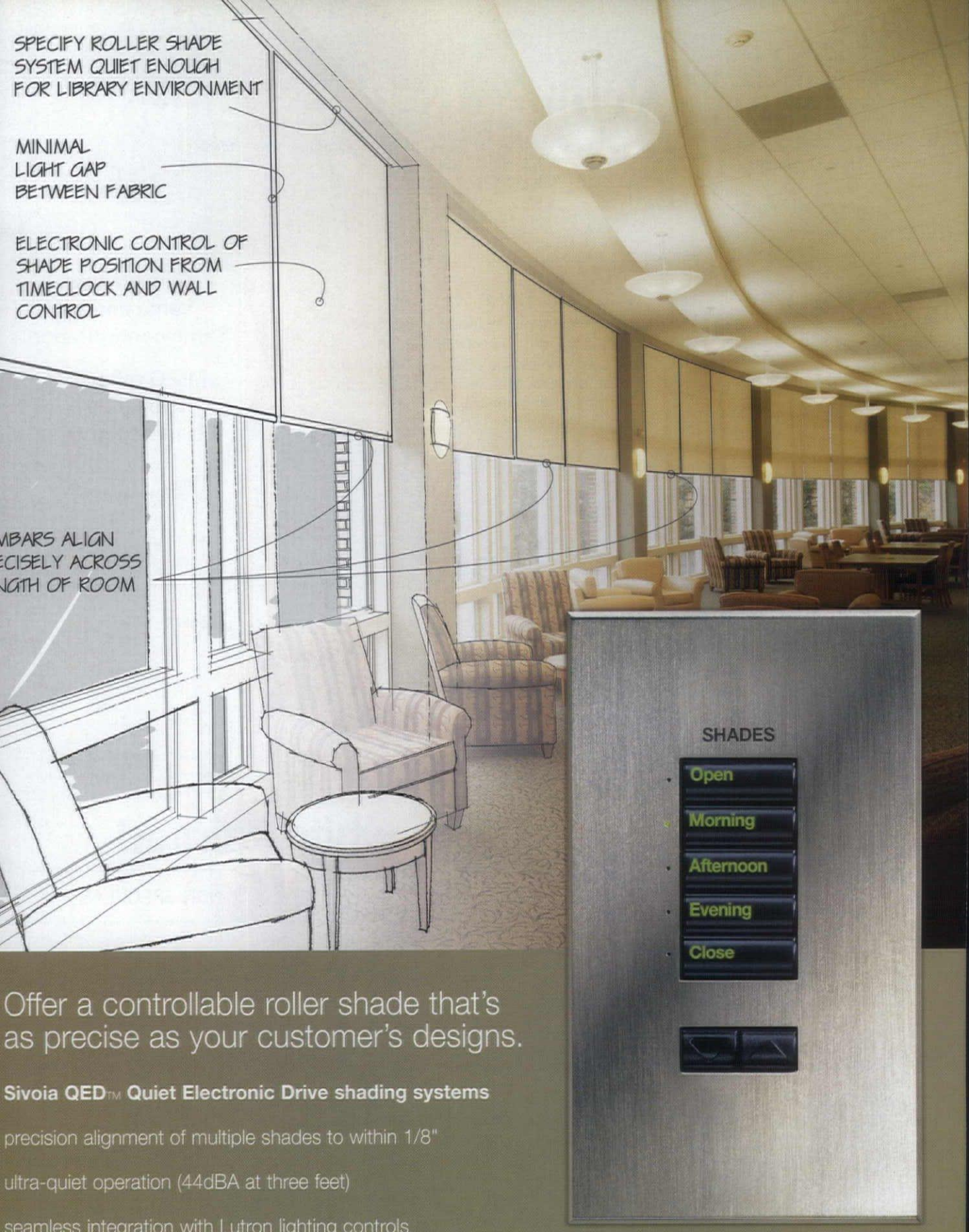
A|L architectural lighting (Vol. 20, No. 1 USPS 000-846, ISSN 0894-0436) is published seven times per year (bi ly, except monthly in March and June) by VNU Business Media, Inc., 770 Broadway, New York, NY 10003-95 is distributed free of charge to individuals or firms engaged in the specification of lighting products in the US a ritories. Per year, all other subscriptions in the US and territories: $48; Canada, payable in US dollars, $60; and f $96. Canada Post Publications Mail Agreement No. 40031729. Return undeliverable Canadian address Deutsche Post Global Mail, 4960-2 Walker Road, Windsor, ON N9A 6J3. Periodicals Postage Paid at New NY and additional mailing offices. Printed in the USA. For address changes, single-copy sales ($7 in the US, $7 + p outside the US, payable in advance) and subscription inquiries, write to Architectural Lighting, PO Box 1061, Sk 60076-8061 or call Customer Service at (847) 647-7987 outside the US. POSTMASTER: Send changes of add Architectural Lighting, PO Box 1061, Skokie, IL 60076-8061.



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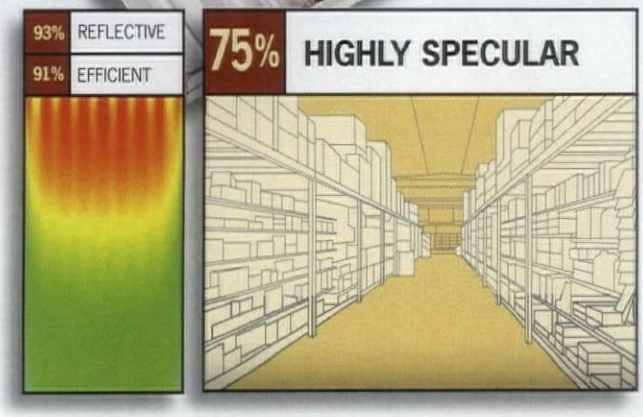

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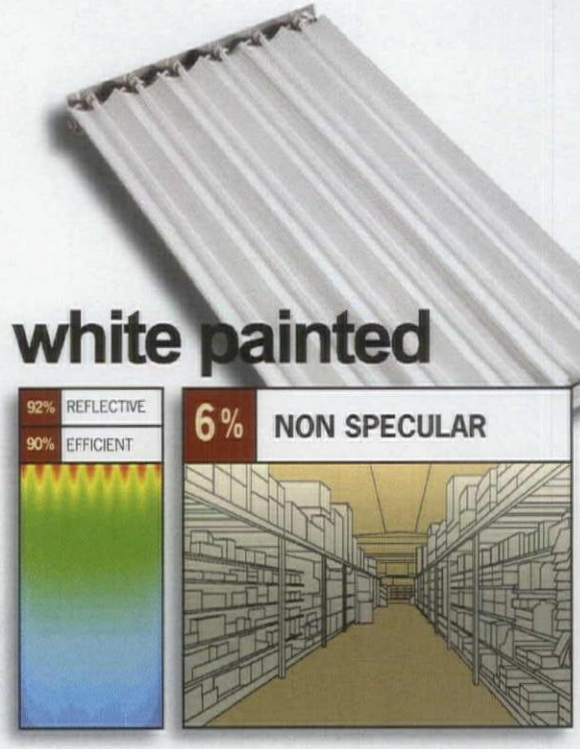

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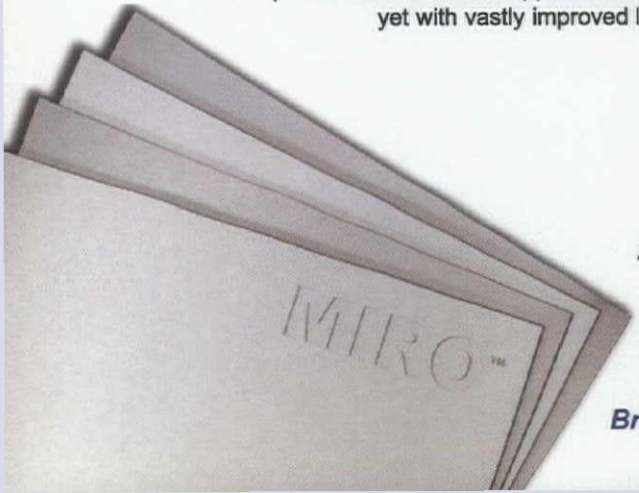

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Volume 20, Number 1

IS 20 YEARS A LONG TIME? IN THE SHADOW of the IESNA's 100th anniversary, which the organization celebrated in January (see "IESNA Centennial Celebration Recap," page 13), not really. But it is a convenient and identifiable signpost, indicating a moment to stop for breath, to consider what's behind and what's to come. As *Architectural Lighting* enters its 20th year, and the projects to which the magazine lends its name multiply, it is an opportunity to pat ourselves and the industry on the back, as well as to challenge us all to achieve new heights.

Toward the cause of celebration, we have added a page to this and several other 2006 issues, on which we will commemorate important events in the life of lighting design. (This month, we've taken the liberty of honoring A|L—see page 10—but we promise not to hog the spotlight.) The Exchange column will also pose questions that query the industry's past and future, such as the Jan/Feb topic "Landmarks in Lighting" on page 56.

In the course of researching our trajectory, I've enjoyed browsing back issues, revisiting, for example, the issue I joined A|L as an intern, April/May 1996, which incidentally was the magazine's 10th anniversary year. Or tracking the course of the IALD Awards, which sent me on a journey through the issues in which they were featured—between 1995 to 2002—all the way back to Charles Linn's January 1987 editorial for Volume 1, Number 1. (This was actually the second issue of the magazine; the first, Volume 1, Number 0, launched in November 1986.) They were mentioned, as Charles had recently returned from the awards presentation in Dallas. He had also just come back from the International Daylighting Conference.

Here, I stop—or should I say start—in my search for a challenge. Charles' impression of the two groups following attendance at their meetings was that "for the most part, they have little in common with each other except for a keen interest in the subject of light. Many daylighting designs appear devoid of almost anything electric other than bare bones lighting and photocontrols. On the other hand, among this year's IALD award winners, there is but one design that emphasizes light that comes directly from the sun: the addition of a lighting system to an existing conservatory."

Our appreciation for daylight in architecture has grown, thanks in large part to LEED and a looming energy crisis. I am surprised, however, that, since Charles Linn's original observation in 1987, unifying electric light and daylight in the built environment has not become more routine. Martin Moeck, assistant professor at Pennsylvania State University, in the Exchange column even suggests there has been "no progress in daylight systems development and application" (page 56). I would not go that far—there are a growing number of interesting solar control products and the Daylighting Institute at Lightfair is also a positive step—but I do think that the effective incorporation of daylight in a building should not be the novelty it remains 20 years later. On this topic, the industry does indeed have higher heights to reach.

Magazines don't age in the same way organic, or even inorganic, things do. Unlike people, appliances, and buildings, to choose a few random examples, they are easily adaptable, tangibly reborn with each new month. They are a vessel for the energies and ideas of their editorial staff and readers—whatever and whoever that may be at any given time. With this issue, toward the end of keeping the magazine vibrant and spirited, we've made a few subtle changes—likely indiscernible to the casual reader, but we feel compelled to clarify: We spiced up the Design Focus products page with a fluid layout. The Internet icon indicates more specifically the content found on the web. The improvements are not just reserved for the print product: at archlighting.com, we have greatly expanded our product coverage, from 20 to 165 new listings, searchable by category and updated weekly. And from time to time, starting next month, senior editor Elizabeth Donoff will grace this page with her thoughts.

They are little things, but meant to keep A|L looking good. We're growing older, but doing it gracefully.

EMILIE W. SOMMERHOFF
EDITOR-IN-CHIEF

MARCH 2006 EXCHANGE QUESTION

Following on the theme of education discussed at the January IESNA Conference (see page 13), what is the state of lighting research in the United States today? For that matter, what is the state of building science technologies research?

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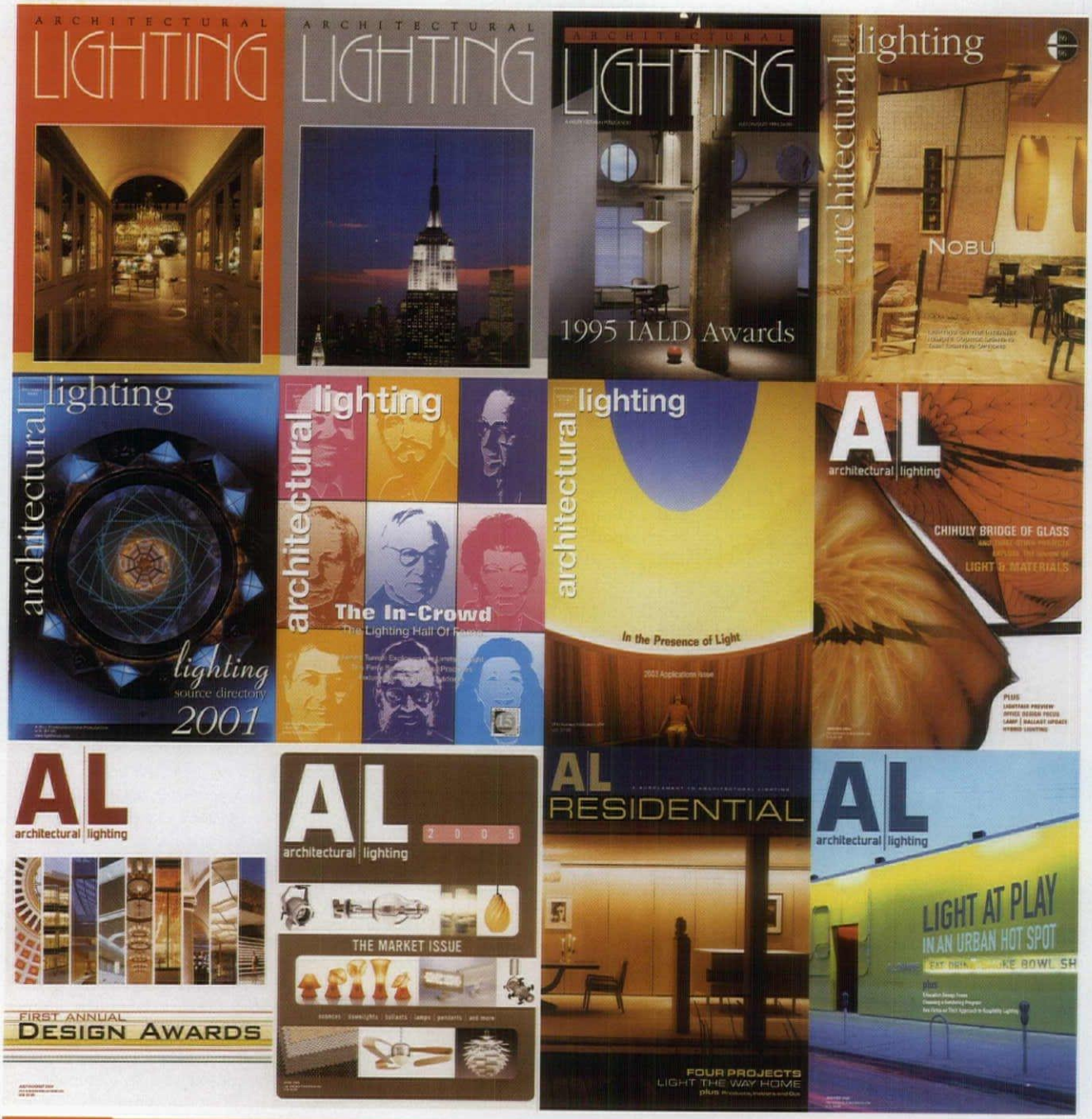

A|L 20 YEARS 1986-2006

A CORE MISSION STILL TRIED AND TRUE

STYLES AND LOGOS MAY COME AND GO, BUT IN 20 YEARS, THE CORE MISSION OF *Architectural Lighting* has not changed. The publication's goal—to provide a "regular source of practical information and ideas devoted solely to the subject of lighting for architecture"—is still as relevant today as it was when the magazine launched in November 1986, maybe even more so, as the business and practice of design becomes increasingly complex. A|L has continuously sought to be a forum for all design practitioners interested in lighting, and the topics covered in past years are still being discussed today: design techniques, products and technology advancements, energy codes, and daylighting, to mention a few.

It is no longer enough just to produce a publication; programming must evolve beyond print pages. As the covers above show, A|L has evolved with the times, responding to industry demands. It has provided coverage for important sectors, such as the Market Issue product guide and *A|L Residential*; created new forums for the discussion of lighting, as with the creation of the A|L Light & Architecture Design Awards; and embraced new mediums, such as the Internet. It is certainly an industry effort, but A|L believes it has done its part in the past two decades to elevate lighting to a place of import in the design of architectural spaces. Here's to another 20 years, at least. **A|L**

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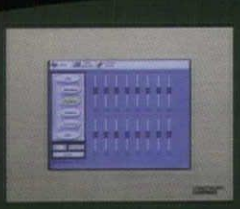

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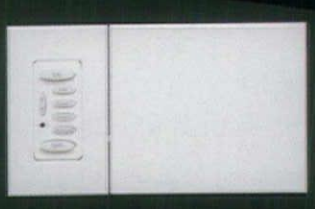

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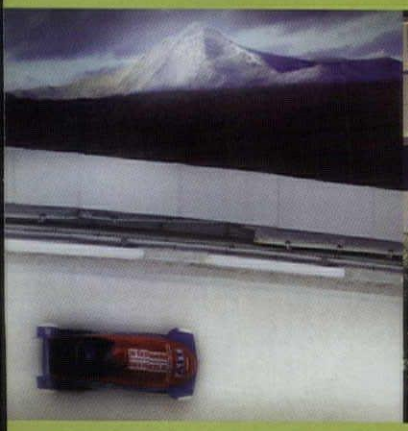
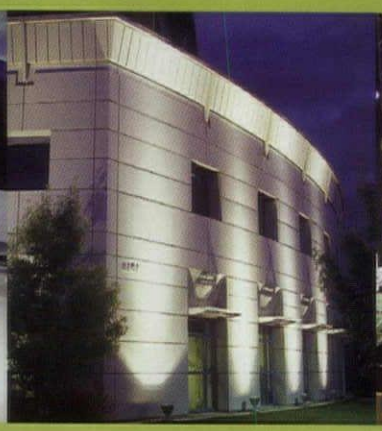



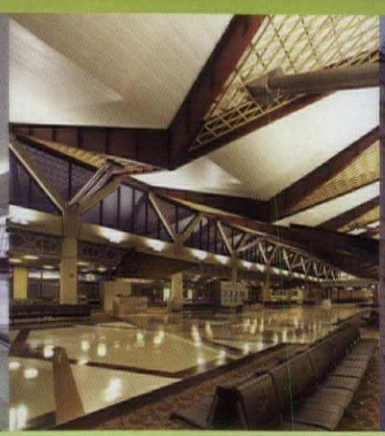

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IESNA CENTENNIAL CELEBRATION RECAP

A SIGNIFICANT MILESTONE MARKED THE COMMENCEMENT OF 2006 WITH THE Illuminating Engineering Society of North America's (IESNA) centennial anniversary. The four-day event, filled with seminars and celebratory gatherings, assembled an international group of lighting designers, educators, researchers, and manufacturers. Throughout the conference, themes of purpose, power, and the meaning of light were addressed. Lighting designer David DiLaura presented the opening keynote speech and discussed the history of the IESNA and lighting, while reflecting on the accomplishments of, and lessons learned from, the last 100 years.

In addition to technical papers presented on topics such as human factors research, daylighting, light and human health, and photometry and calculations, another of the overriding themes of the conference was education. Dr. Peter Boyce delivered a keynote entitled "The Symbiosis of Education, Research, and Design," which examined the often-divided worlds of the researcher, educator, and designer and how each might, through education, better communicate with one another. Education at the university level was discussed in a panel moderated by Dr. Kevin Houser from the University of Nebraska, who argued that lighting education is in crisis, with one remedial step being more financial support for terminal degrees to ensure that there is a next generation of lighting educators.

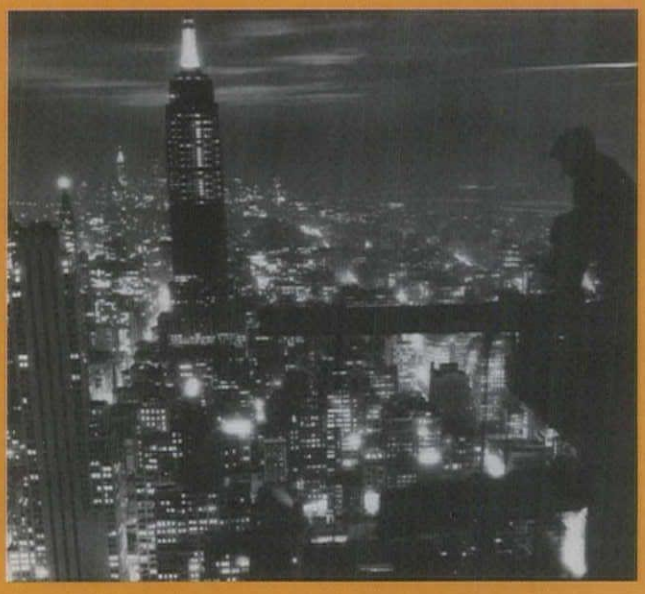
But if there was one presentation that asked the IESNA to take a position on critical issues facing the lighting industry, it was James Benya's seminar "Lighting for a Sustainable Future." In response to the demands of society and commerce, Benya asked if sustainability could become one of the IESNA's main tenants. By answering his call, the IESNA could lead the way for another 100 productive years. **A|L**

THE RADIANT CITY

"TRANSFORMED BY LIGHT: THE NEW YORK NIGHT," MUSEUM OF THE CITY OF NEW YORK, THROUGH MAY 7, 2006

WHEN WE LOOK AT THE NEW YORK CITY SKYLINE AFTER DARK, WE SEE AN URBAN landscape particular to modernity, one in which the significance of each building is designated not by form or position, but by light. "Transformed by Light: The New York Night," an exhibition coinciding with the centenary of the IESNA (see "IESNA Centennial" above), celebrates this particularly American vision of the city. The show's subject is especially fitting since, as historian Dietrich Neumann notes in *Architecture of the Night: The Illuminated Building* (Prestel Publishing, 2003), it was lighting engineers who encouraged architects to experiment with electric light at an urban scale in the early years of the twentieth century. Prior to the 1930s, architects seldom imagined their work illuminated at night. Only after architects like Raymond Hood picked up on the research of engineers, such as Walter D'Arcy Ryan, did the nighttime skyscraper skyline attain its iconic status.

The exhibition juxtaposes canonic images of New York City at night with demonstrations of the lighting technologies that made them possible. Without distinguishing between light's public, commercial, and artistic uses, the show concentrates on it as an environmental condition. Organized by the Museum of the City of New York, and developed and curated by Chicken & Egg Public Projects, the exhibit enlisted the expertise of prominent lighting design firms, as well as in-kind donations and equipment loans from over 30 lighting manufacturers and distributors. The exhibit consists of a series of thematic lighting environments built around artifacts and images, all designed to explore "the definitive role of light in creating the myths and realities of New York." These themes include Power, Work, Street Life, Desire, Security, Celebration, Wonder, Show, View, Escape, and Identity. Some of the installations are evocative: One of the most successful recreates a nineteenth-century parlor, simulating the different levels and quality of lighting produced by candles, gas lamps, and incandescent light. Another demonstrates different forms of street lighting, all hanging from a central set of lampposts. The more compelling artifacts include films of early amusement parks, lights from the 2005 Rockefeller Christmas tree, and the large



neon letter "i" from the Biography sign at Columbus Circle.

Combining historical information and objects with separate installations by lighting designers, however, leads to a confusing aspect of the exhibition, which would have been aided by a more uniform design presentation. Additionally, both "showing" and "telling," especially when the subject itself is illuminated, sometimes leaves the lighting installations in conflict with the legibility of the photographs, objects, and texts. Nevertheless, the show's central argument—that lighting engineers had a formative role in the design and subsequent experience of the modern city—is one worth making. The decision to treat the subject thematically rather than chronologically is an interesting one, acknowledging as it does the huge changes electric lighting has effected across all areas of daily life. **JOANNA MERWOOD-SALISBURY**

Joanna Merwood-Salisbury is the associate chair of the Department of Architecture, Interior Design and Lighting at Parsons The New School for Design. She received her Ph.D. in architectural history from Princeton University in 2003.

LAX PYLONS UNDERGO MAKEOVER

IN AUGUST 2000, THE GATEWAY LAX ENHANCEMENT PROJECT WAS UNVEILED AND FIF-teen 100-foot-high pylons, 32-foot-high letters spelling out LAX, and fifteen smaller towers in varying heights were illuminated, creating a "gateway of light" leading guests into the Los Angeles International Airport. Part of a $112 million construction, signage, and landscaping program, the pylons greet visitors with a vivid color-changing spectacle. (See "Dusk 'Til Dawn," Jan/Feb 2001.) Or so they did, until their high-maintenance system began to fail and the towers were turned off on January 2, 2006.

But LAX won't be without them for long. Los Angeles World Airports (LAWA), the airport's agency, is conducting a makeover in which all 30 pylons will be revamped by this summer. The old system, state-of-the-art at the time of installation, was based on a theatrical stage-lighting system with color filters; however, says Charles Sipple, chief of LAWA Construction & Maintenance, "it was anticipated at the time of installation that a major maintenance or upgrade would be required by 2005." Rather than maintaining the old system or replacing it entirely, alternatives were studied, and a $2.5 million upgrade to newer LED-based technology was proposed.

The new LED technology is expected to reduce the energy cost by 75 percent per year, with a significant reduction in maintenance expenses, equating to $7.5 million in savings over the ten-year life expectancy of the LEDs. While providing brighter intensity and more consistency in color tone throughout the pylons, the LED technology will be easier to program on an as-needed basis with a much wider range of potential—the pylons can become "Dodger blue," for example, should the Los Angeles team win a championship. With 16 million color possibilities in its palette, the combinations are endless. "While we do not intend to use all 16 million possibilities," Sipple says, "a tremendous range of colors is available to our programmers." **A|L**

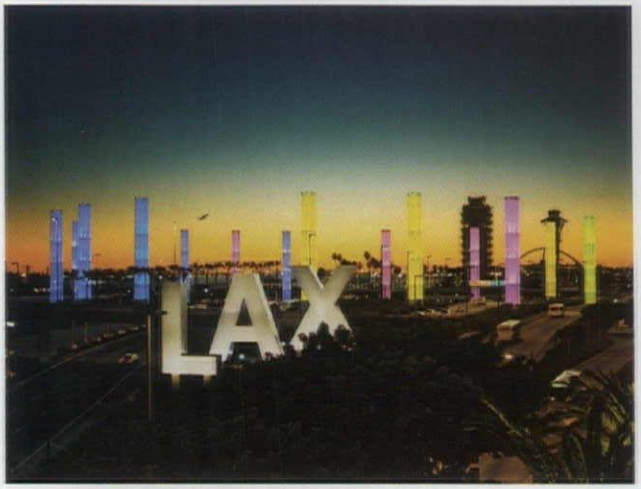


IMAGE COURTESY OF LOS ANGELES WORLD AIRPORTS

CITIES, LIGHT AND BEAUTIFUL

THE THIRD ANNUAL CITY-PEOPLE-LIGHT AWARDS, ESTABLISHED BY PHILIPS, WERE PRE-sented at the end of November to three cities—Cologne, Germany; Tampere, Finland; and Cannes, France—each exemplifying the award program's philosophy: that lighting can add value and give an area's cultural and architectural heritage a nocturnal identity, while respecting environmental considerations.

As citizens and municipalities continue to recognize the important role lighting can play beyond just utilitarian and security purposes, cities and towns are reclaiming their outdoor public spaces and transforming them into habitable nighttime environments. Lighting is becoming a vital element integral to city and town planning programs and an aid in creating civic, cultural, and visual identities.

The 2005 competition received 21 international submissions. Chaired by architect and lighting designer Gad Giladi, former ELDA president (2002-2005), the city of Cologne took the top prize of 5,000. Since 1993, Cologne has implemented a city-wide lighting effort to reduce the number of luminaire types, while providing better light quality and energy savings. The city's winning project submission (by a team of both city planners and lighting designers) illuminates several important historical landmarks, including the Hohenzollern and Deutzer Bridges, and the Hanentor city gate, using "effective but discreet illumination" with a color temperature range of white, warm-white, and yellow light.

The city of Tampere, Finland, received second place for its lighting scheme to enhance building façades and create a more uniform lighting vocabulary for three of its important city squares. Cannes, France, was awarded third prize for its master plan to improve its nightscape using non-polluting, recyclable, and energy-efficient products. **A|L**

The 2005 City-People-Light Award winning cities (below, from left to right): Cologne, Germany; Tampere, Finland; and Cannes, France.

IMAGES COURTESY OF PHILIPS

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LIGHT SHOW LINEUPS

TWO OF THE BIGGEST LIGHTING SHOWS OF THE YEAR ARE FAST APPROACHING, and with diverse conference lineups and booth-upon-booth of products, lighting professionals will have their calendars and tote bags full.

LIGHTFAIR INTERNATIONAL

FROM MAY 28 TO JUNE 1, THE LAS VEGAS CONVENTION Center will be overrun with lighting professionals taking advantage of the extensive Lightfair International 2006 lineup. In what is being touted as the largest and most diverse conference in the show's 17-year history, attendees will be able to pick and choose from 76 courses, totaling more than 240 hours of educational programming throughout the five-day show.

With topics addressing everything from lighting software to design innovation and product updates, courses will be led by lighting designers, educators, architects, engineers, and consultants representing the United States, Mexico, Japan, the United Kingdom, Finland, Canada, and Austria.

Participants may choose from Daylighting Institute and Lightfair Institute courses, workshops, and seminars. Newly available for 2006 is a Lighting Fundamentals course in Spanish and the opportunity to select from both the Daylighting and Lightfair Institute workshops for a highly individualized two-day curricula. For full conference information, visit www.lightfair.com.

light+building

IN ITS FOURTH YEAR, LIGHT + BUILDING WILL BE HELD FROM APRIL 23 TO 27 AT the Frankfurt Fair and Exhibition Center. The exhibition floor, which will represent four sectors (Light; Electrical and Electronic Engineering; Home and Building Automation; and Architecture-Related Systems) will boast some 1,940 exhibitors. In addition, an extensive program of related events will accompany the fair. They include:

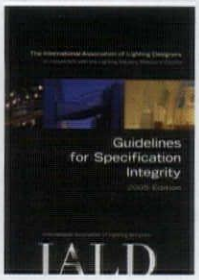
The Building Performance Conference (April 24 to 27) will feature four forums: Light Focus; Building Focus; ACS Focus, covering computer systems in the building sector; and IEECB (Improving Energy Efficiency in Commercial Buildings) Focus.

Luminale (April 23 to 27), a celebration of light, will demonstrate how the power of light contributes to a greater quality of life. Public spaces, museums, parks, and galleries throughout Frankfurt will serve as laboratories showcasing light and architecture installations.

The Daylight Forum (April 23 to 27), a series of workshops organized around the theme of "The Successful Use of Daylight: The Contribution Made by Innovative Technology and Architecture." Lectures will cover topics including architecture and technology for improved use of daylight; light and health; and better light with less electricity.

For more information about the conference and tradeshow, visit www.light-building.messefrankfurt.com. **A|L**

SPECIFICATION INSIGHTS



PRESENTED AT THE IALD'S FIFTH ANNUAL EDUCATION conference in Alexandria, Virginia, last October, and sent to IALD members in December, the 2005 Edition of *Guidelines for Specification Integrity*, a joint venture with the Lighting Industry Resource Council, is only the second time such a document has been produced by these organizations. A comprehensive resource that addresses the process of lighting specifications for all design professionals, the document serves as a reference guide, sequentially reviewing the issues that pertain to each phase throughout the design and construction process, from design development to punch list. In addition, the guide provides information on how to communicate with owners, clients, and manufacturers to ensure specification integrity leading to installation of quality lighting equipment. As Jean Sundin, of New York-based Office for Visual Interaction and co-author of the guide, explains, "it reveals the process for understanding the channels of how specifications work, who the players are, and how pricing works." Expanding on the materials in the 2000 edition, the 2005 document addresses the evolving issues of practice, Internet usage, technology advancements, obtaining budget pricing, substitutions, and a new section on international projects and working abroad. The document and up-to-date links are available on the IALD website at www.iald.org. **A|L**

CONGRESS ON LIGHT

LIGHTCONGRESS RETURNS THIS YEAR ON MARCH 7 AT THE GRAND HYATT, NEW York, but in a slightly different form. Established in 2003, the forum was initially created as a media precursor to the industry's main U.S. tradeshow, Lightfair, with the discussion mainly focused on lighting trends and products. Jeff Johnston, president and CEO of Greystone Partners, the media relations firm for the event, explains: "LIGHTCongress was more promotions oriented than it is now, primarily built around exhibitors at Lightfair. The content of the panels was relevant information, but relevant to the tradeshow itself." Since then, LIGHTCongress has evolved into a more content-driven event, this year offering four master panel discussions that, according to Johnston, "are at a higher level as far as relevance to the industry, architects, designers, and the media." While past discussion has tended to focus on "obvious areas," such as LEDs and sustainability, this year's panels will expand to other issues involving lighting. One new topic, light and health, is an issue that Johnston feels will "draw a lot of interest from consumer media."

The planning for this year's forum was overseen by an advisory board. Other new features include the availability of AIA continuing education credits for qualified participants and open attendance. *Architectural Lighting* is also supporting the program as a media sponsor. For more information, visit www.lightcongress.com. **A|L**

CORRECTION Our apologies: In the Nov/Dec 2005 issue, Zumtobel Staff was misspelled in the ACE.al Award Winners list.

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Uncle Sam Gives Back for Efficient Lighting

BY CRAIG DILOUIE

WHILE IT HAS SUFFERED ITS FAIR SHARE OF CRITICISM FOR favoring energy's supply side, the Energy Policy Act of 2005 (EPAct 2005), which was passed by Congress on July 29, 2005, and signed into law on August 8, offers a number of favorable demand-side incentives. One of particular importance to lighting industry professionals is the Energy Efficient Commercial Buildings Tax Deduction, or Section 1331, an accelerated tax deduction to reward more investment in efficient lighting and other building systems.

Under current law, the cost of investments in energy-efficient lighting must be capitalized and depreciated over time. EPAct's Section 1331 allows the full cost of interior lighting equipment, subject to a cap of $0.60 per square foot, to be deducted during the taxable year that the equipment is placed in service, as long as it is otherwise depreciable equipment and meets certain efficiency criteria. This provision applies to commercial buildings in the United States, including both new construction and retrofits, and for now, offers a window of opportunity from January 1, 2006, through December 31, 2007. (The National Electrical Manufacturers Association, or NEMA, which lobbied for the provision, originally wanted a larger window, but Congress was concerned about the cost of the law's implementation. NEMA will likely lobby Congress to expand the effective window.)

According to NEMA, the accelerated tax deduction provision will generate about $500 million in additional sales of lighting systems and products to specifiers and building owners who are anxious to take advantage of the incentive while it is in place. NEMA also estimates the provision will reduce national electric demand by about 312MW and carbon emissions by about 10 million metric tons.

LEVELS OF DEDUCTION

The lighting component is only one of three applicable areas for tax savings. The full deduction offers a sum for each of these systems, and consequently, the total available deduction is significantly more per square foot, as clarified below.

COMPLETE DEDUCTION The complete tax deduction is actually the lesser of $1.80 per square foot, or the cost of the energy-efficient property as part of a new construction or renovation project (within the scope of the ASHRAE/IES 90.1 Standard). EPAct 2005 defines "energy-efficient property" as building systems that are certified to reduce total annual energy and power costs to at least 50 percent less than a building satisfying the 90.1-2001 Standard. Qualifying systems include: (1) interior lighting; (2) heating, cooling, ventilation, and hot water; and (3) building envelope.

PARTIAL DEDUCTION As mentioned above, a partial deduction can be achieved just for lighting—that is, as soon as the rules are written. (Most were to be drafted by the Department of Energy in consultation with the Treasury Department by the end of January, but at this time, it is unclear when the Partial Deduction Rules will be ready.) EPAct 2005 instructs the Secretary of the Treasury to establish savings targets for the three types of qualifying systems (interior lighting; heating, cooling, ventilation, and hot water; and building envelope), with an accelerated tax deduction of $0.60 per square foot available for meeting each target respectively.

INTERIM LIGHTING RULES

Until the above rules are written, the Interim Rules for Lighting Systems apply. Here, lighting professionals should take special interest. These rules define the interior lighting efficiency target to be a lighting power density (LPD) that is 25 to 40 percent lower than the maximum values in ASHRAE/IES 90.1-2001's Table 9.3.1.1 (building area method) or Table 9.3.1.2

A new tax law under the 2005 Energy Policy Act allows efficient interior lighting, subject to a cap of $0.60 per square foot, to be deducted during the year that the lighting is placed in service.

TABLE 1. TAX DEDUCTION RELATED TO LIGHTING POWER DENSITY DEDUCTION

25%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%	PERCENT OF LPD REDUCTION BEYOND STANDARD 90.1-2001
$0.30	$0.32	$0.34	$0.36	$0.38	$0.40	$0.42	$0.44	$0.46	$0.48	$0.50	$0.52	$0.54	$0.56	$0.58	$0.60	AMOUNT OF ELIGIBLE TAX DEDUCTION PER SQUARE FOOT

EPAct 2005's Interim Rules for Lighting Systems provide an accelerated tax deduction of up to $0.30 to $0.60 per square foot to reward interior lighting systems that have a lighting power density (LPD) that is 25 to 40 percent lower than ASHRAE/IES 90.1-2001.

(space-by-space method). If the efficiency target is certified to have been met, the building owner can earn an accelerated tax deduction that equals the lesser of (1) $0.30 to $0.60 per square foot, or (2) the full cost of the efficient lighting (see Table 1). The exception is warehouses: The lighting system must reduce LPD by at least 50 percent of the maximum values in the Standard to earn a tax deduction of up to $0.60 per square foot. The Secretary of the Treasury is currently working on procedures for inspection and testing, and ways to calculate and verify energy and power costs.

TABLE 2. STANDARD 90.1'S BUILDING AREA METHOD FOR LIGHTING POWER DENSITY REQUIREMENTS

BUILDING AREA METHOD	LIGHTING POWER DENSITIES			
	1989	1999	2001	2004
AUTOMOTIVE FACILITY	0.96	1.5	1.5	0.9
CONVENTION CENTER	2.07	1.4	1.4	1.2
COURTHOUSE	1.44	1.4	1.4	1.2
DINING: BAR LOUNGE / LEISURE	1.37	1.5	1.5	1.3
DINING: CAFETERIA / FAST FOOD	1.37	1.8	1.8	1.4
DINING: FAMILY	1.37	1.9	1.9	1.6
DORMITORY	1.15	1.5	1.5	1.0
EXERCISE CENTER	2.07	1.4	1.4	1.0
GYMNASIUM	2.07	1.7	1.7	1.1
HEALTHCARE CLINIC	1.44	1.6	1.6	1.0
HOSPITAL	1.44	1.6	1.6	1.2
HOTEL	1.15	1.7	1.7	1.0
LIBRARY	1.29	1.5	1.5	1.3
MANUFACTURING FACILITY	0.96	2.2	2.2	1.3
MOTEL	1.15	2.0	2.0	1.0
MOTION PICTURE THEATER	2.07	1.6	1.6	1.2
MULTI-FAMILY	1.15	1.0	1.0	0.7
MUSEUM	2.07	1.6	1.6	1.1
OFFICE	1.26	1.3	1.3	1.0
PARKING GARAGE	1.03	0.3	0.3	0.3
PENITENTIARY	1.44	1.2	1.2	1.0
PERFORMING ARTS THEATRE	2.07	1.5	1.5	1.6
POLICE / FIRE STATION	1.44	1.3	1.3	1.0
POST OFFICE	1.44	1.6	1.6	1.1
RELIGIOUS BUILDING	2.07	2.2	2.2	1.3
RETAIL	2.25	1.9	1.9	1.5
SCHOOL / UNIVERSITY	1.29	1.5	1.5	1.2
SPORTS ARENA	2.07	1.5	1.5	1.1
TOWN HALL	1.44	1.4	1.4	1.1
TRANSPORTATION	2.07	1.2	1.2	1.0
WAREHOUSE	1.03	1.2	1.2	0.8
WORKSHOP	0.96	1.7	1.7	1.4

The tax deduction provision of EPAct 2005 is based on ASHRAE/IES Standard 90.1-2001, Energy Standards for Buildings Except Low-Rise Residential Buildings, which is virtually identical in terms of lighting power density to Standard 90.1-1999.

Many readers are now familiar with ASHRAE/IES 90.1-1999 or 2001, since a majority of states adopted Standard 1999 as the minimum requirements for their own energy codes in 2005, per a mandate from the Department of Energy. It is important to understand that the law recognizes the version of ASHRAE/IES 90.1-2001 without Addendum G, which means the listed LPD values are essentially the same LPD values as those listed in ASHRAE/IES 90.1-1999 (see Table 2).

Besides demonstrating a reduction in lighting power density beyond that demanded by Standard 90.1-2001, Section 1331 requires the following: All control provisions in the Standard must be met (e.g., automatic shut-off using control panels or occupancy sensors for buildings larger than 5,000 square feet, and tandem wiring required for magnetic ballasts); bi-level switching must be installed in all occupancies except hotel and motel guest rooms, store rooms, restrooms, and public lobbies; and the application must meet the minimum requirements for calculated light levels, as set forth in the ninth edition of the *IESNA Lighting Handbook*.

CLAIMING THE DEDUCTION

If the building is privately owned, the owner that paid for construction of lighting system can claim the deduction. However, if the building is publicly owned, such as a public school, hospital, or administration building, the tax deduction can be claimed by "the person primarily responsible for designing the property in lieu of the owner. ... Such person will be treated as the taxpayer for purposes of this deduction." While the specific regulations regarding public buildings have not been written yet, what the law says indicates that the primary designer of the efficient lighting system in a public building can claim the tax deduction him/herself.

Here are the rest of the particulars: The accelerated tax deduction is allowable in the year in which the lighting is placed in service. The lighting must be certified to meet its savings targets based on qualified software programs. (Rules, including applicable software programs, are currently being drafted.) At the time of writing, the Treasury Department was scheduled to modify its tax forms to implement the provision by the end of 2005. Lighting and building management professionals are encouraged to seek the consultation of a tax expert.

FIND OUT MORE

NEMA has assembled the Commercial Building Tax Deduction Coalition, including the IESNA, AIA, National Association of Electrical Distributors, and Building Owners and Managers Association, among many others, to make recommendations to the government regarding implementation of the provision, and also to help educate the public about the tax deduction. Its first initiative was to create a website at www.efficientbuildings.org as a clearinghouse for information about the provision.

Craig DiLouie, former editor and publisher of A|L, is principal of ZING Communications (www.zinginc.com), and a consultant, analyst, and reporter specializing in the lighting and electrical industries.

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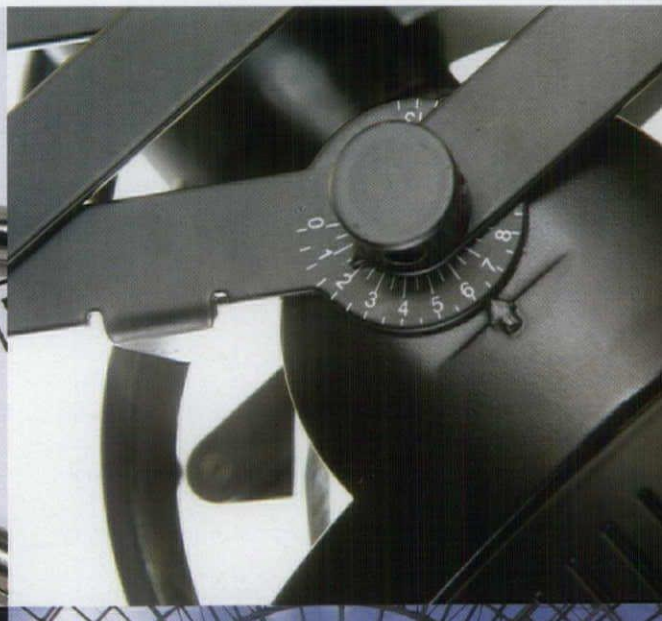
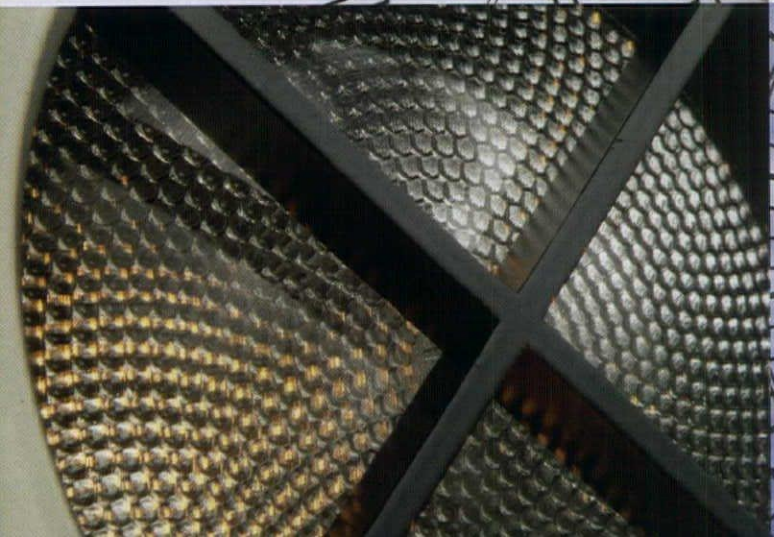
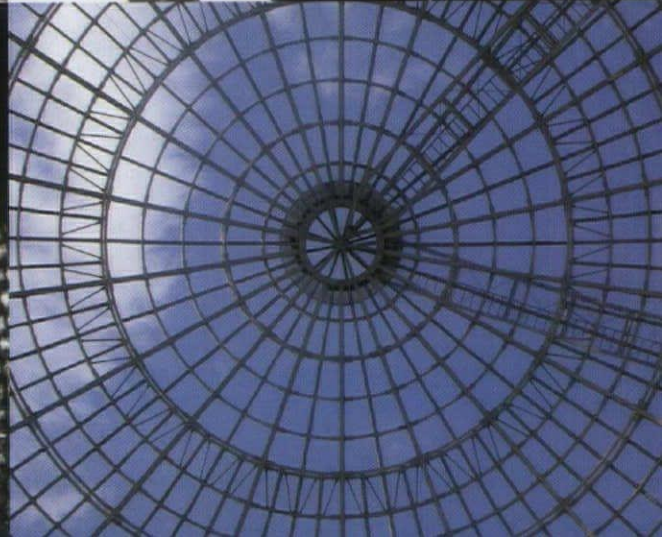






hotel puerta america

TOUTED AS ONE OF THE "IT" PROJECTS OF 2005, OWING TO ITS EXORBITANT COST AND cadre of notable designers, the Hotel Puerta America on the outskirts of Madrid simultaneously enthralls and confuses. Commissioned by Spanish company Silken Hotels, 19 prominent architects and designers, some working individually and others in pairs, were provided with an outlet to explore their creativity without budgetary constraints. (The final cost of the 342-room hotel was over $90 million.) The result is a series of elaborately designed spaces; so different in their styles that one design magazine referred to the hotel as an "interior-design theme park."

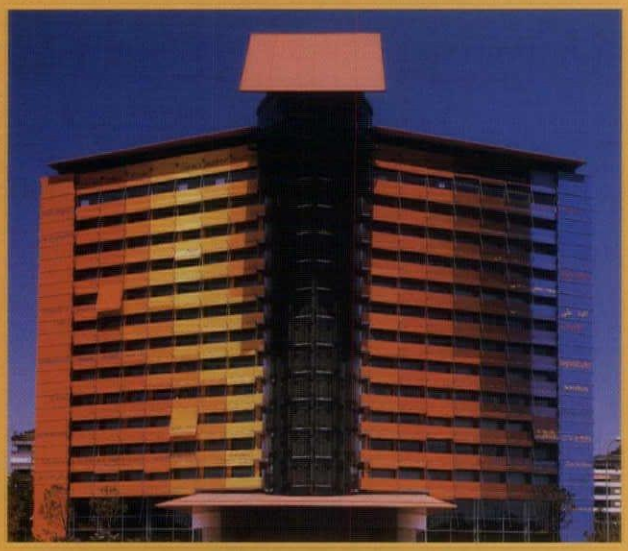
Any evaluation of the individual designs is clouded by larger, more serious issues raised by this project, everything from the selection of the location—a nondescript area of Madrid at the city's periphery, not its center—to the role of a hotel and the experience provided to its guests. The project concept was "to create a hotel that was unique, merging different ways of seeing architecture, design, and art." And in that sense, Puerta America is a success, creating an eclectic sensory experience both calming and disruptive as guests move between spaces and styles. The work of the architects, designers, and landscape architects involved in the project follows either a luxurious, modern aesthetic or a hi-tech futuristic design typology. In contrast, the lighting for these diverse spaces was the charge of a single firm, London-based Isometrix Lighting and Design, whose designers, Arnold Chan, Mark Elliott, and Gerardo Olvera, had the monumental task of coordinating the building's lighting scheme, while supporting the design concept of each architect and designer. The lighting throughout responds individually to each space—from the restaurant's custom pendants to cold cathode in the fourth-floor corridor to the LED installations used by several of the architects—the attention to detail and fluid incorporation of the lighting within the architecture are two of the few, if only, constants in the building. Isometrix's solutions "involved minimum visibility of the light sources, wherever possible," says Chan. "The primary elements are indirect coves, lighting slots, and lighting integral to the furniture elements." This integration of architectural form and lighting is apparent in the floors designed by Kathryn Findlay, Norman Foster, and Plasma Studio. It is particularly present on the floors by Zaha Hadid and Ron Arad, who used a material made by LG Electronics called Hi-Macs, a ductile Corian and fiberboard composite that allows fluid planar surfaces, creating furniture elements that amorphously emerge from the walls.

Taken in its entirety, one has to wonder what the diverse array of Puerta America's aesthetics says about hotel design and its role in creating hospitable environments. Rather than a welcoming respite for the weary traveler, each space within the hotel and on its grounds is a destination unto itself, devoid of any connection to the immediate site or Madrid.

Indeed, the message the Hotel Puerta America delivers is puzzling. A variety of aesthetic styles does not innovation make. If this project was really meant to challenge the experience of hotel accommodations, as some of the marketing materials would suggest, the project does not succeed beyond design acrobatics. At its core, these "design explorations" are still locked in the confines of a box—individual rooms in a 12-story building with double-loaded corridors and a central elevator lobby.

One of the more curious design choices is the text that adorns the façade in several languages: phrases from the poem "Liberté," written by lyrical poet and a founder of surrealism Paul Éluard. The poem, written during Word War II, speaks to the everyday struggles of man. It seems misplaced in its use as a decorative façade treatment for a five-star luxury hotel whose accommodations are intended for hardly an "everyday" clientele.

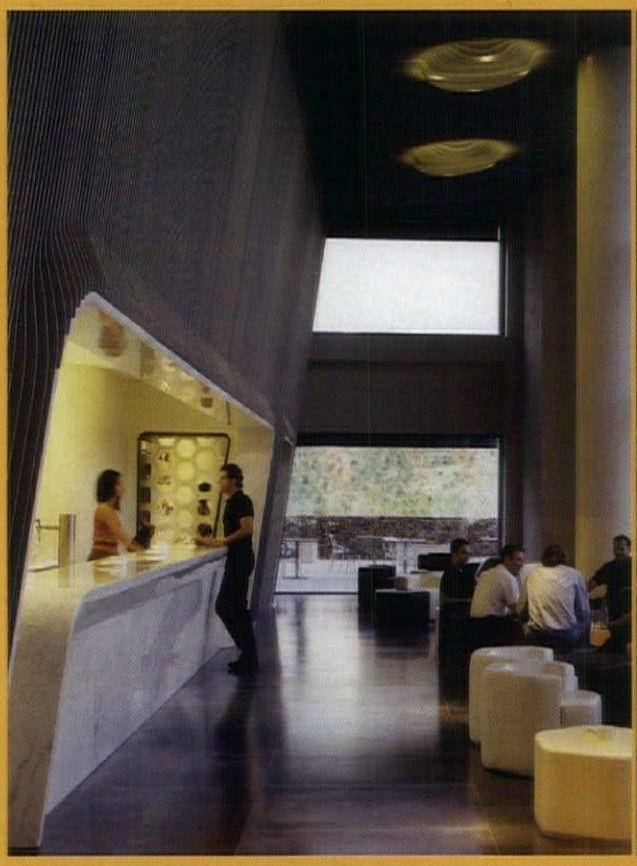
There is no doubt about the expert execution of these spaces. However, the array of design elements is dizzying, and rather than an engaging whole comprised of strong individual pieces, the result is chaotic. Moreover, the project does not support the important role avant-guard design and architecture can play, but rather reinforces the stereotype that design is the privilege and whimsy of a select few. **ELIZABETH DONOFF**



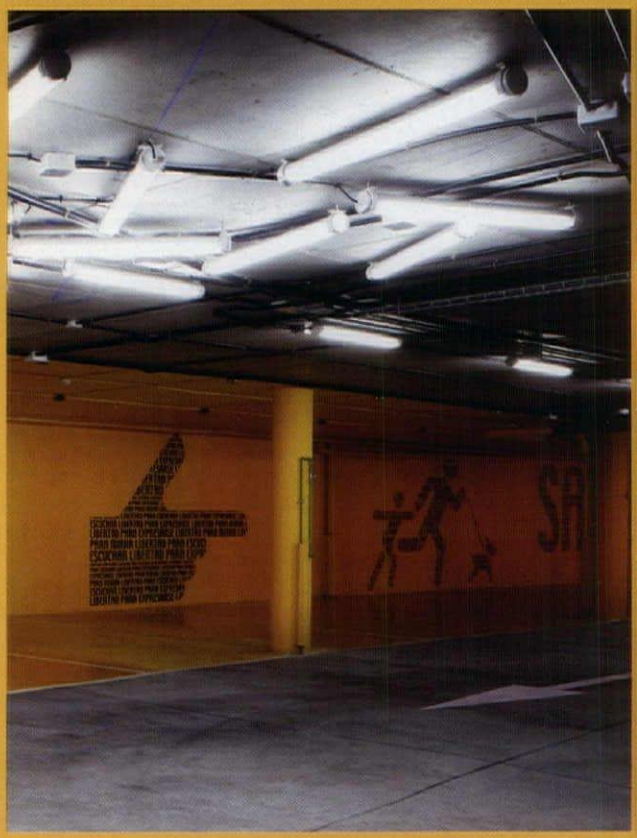
The hotel's bold multicolored façade is in contrast with the clean, modern aesthetic of the lobby designed by architect John Pawson.

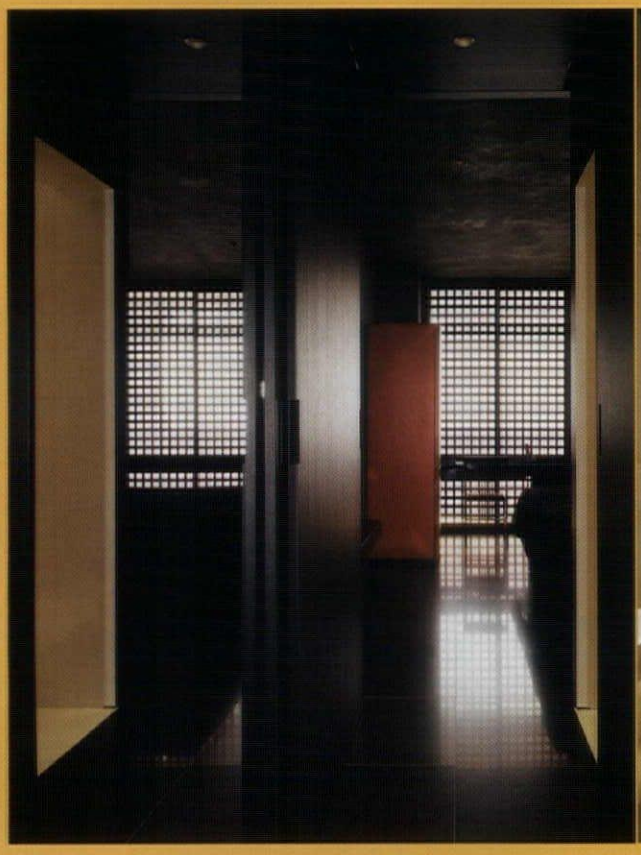
PROJECT: Hotel Puerta America **LOCATION:** Madrid **ARCHITECTS/DESIGNERS:** John Pawson (Lobby); Marc Newson (Marmo Bar and Floor 6); Christian Liaigre (Black Tears Restaurant); Zaha Hadid (Floor 1); Norman Foster (Floor 2); David Chipperfield (Floor 3); Plasma Studio (Floor 4), Victorio & Lucchino (Floor 5); Ron Arad (Floor 7); Kathryn Findlay and Jason Bruges (Floor 8); Richard Gluckman (Floor 9); Arata Isozaki (Floor 10); Javier Mariscal and Fernando Salas (Floor 11); Jean Nouvel (Floor 12, penthouse, and façade); Teresa Sapey (parking garage); B+B UK (landscaping); SGA Estudio (hotel structure) **LIGHTING DESIGNER:** Isometrix Lighting and Design, London **IMAGES:** Courtesy Silken Hotels

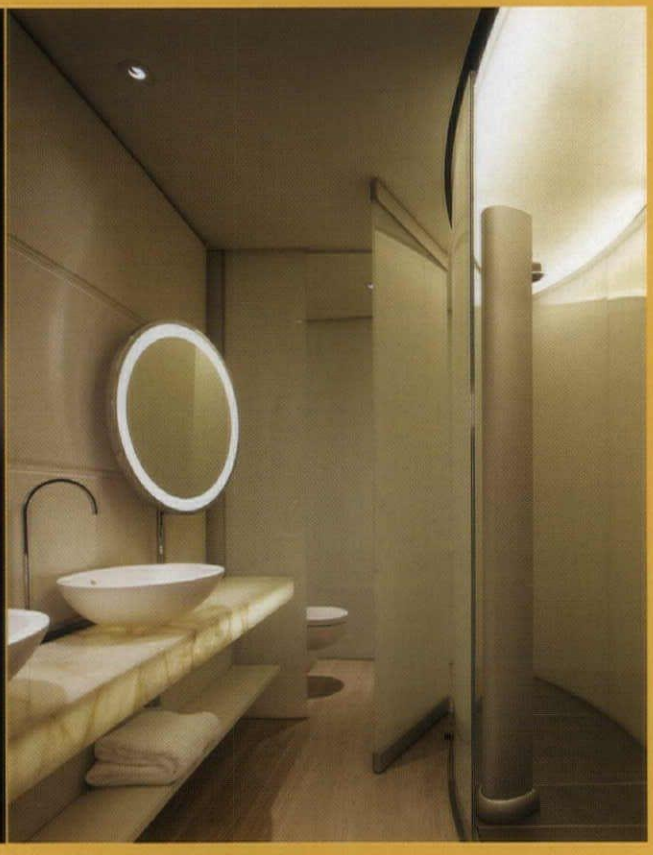
more **photos** at ARCHLIGHTING.COM



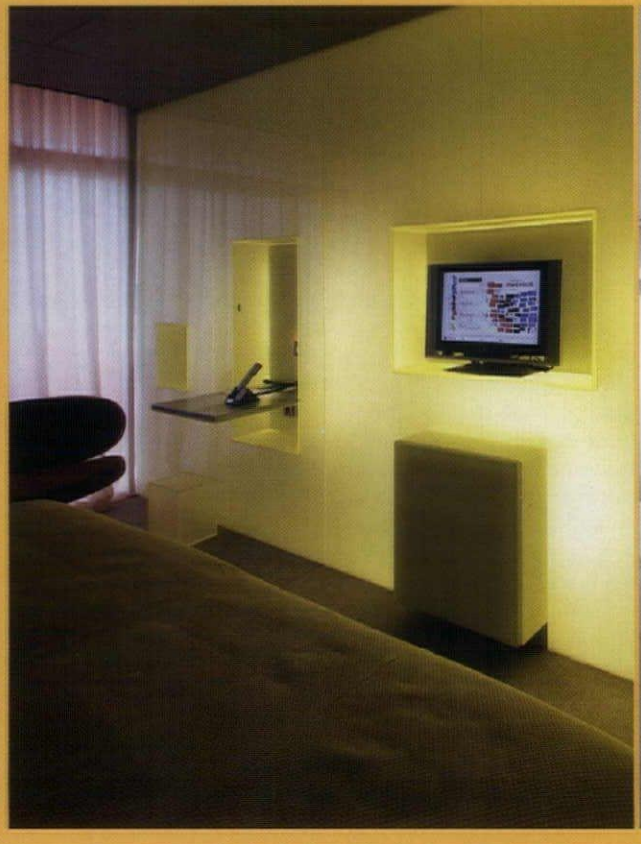
The drama is in the details at Hotel Puerta America. Laser-cut aluminum strips accent the hotel bar walls and ceilings (above left). LEDs illuminate Plasma Studio's fourth-floor kaleidoscope-like corridor of stainless-steel panels (above right). The parking garage is transformed with graphics and sculptural light clusters (below left). Cold cathode lines the sixth-floor corridor (below right).

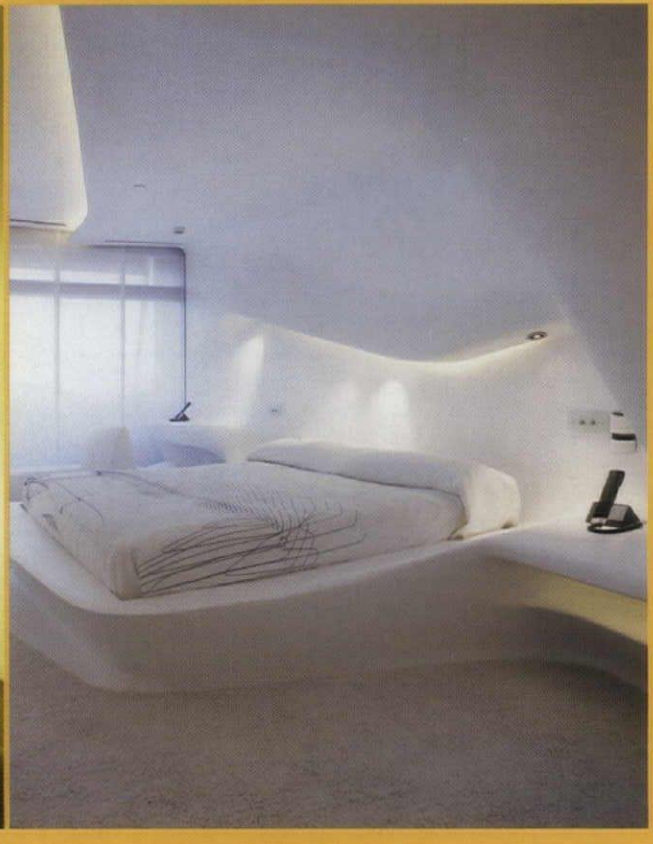






Each floor represents a diverse array of styles: Arata Isozaki's minimal east-meets-west approach (above left); Norman Foster's serene but hi-tech room with a backlit white onyx sink (above right); Richard Gluckman's luminous light box wall (below left); and Zaha Hadid's fluid design, where cold cathode sources knit together ceiling and wall planes as they dissolve into one another (below right).





FOCUS IN

"take, for instance, a sunset," says gregory. "it's beautiful and wonderful ... why shouldn't each part of a day be something like that?"

INTERNATIONALLY RECOGNIZED FOR ITS EXTENSIVE REPERTOIRE OF BOLD PROJECTS, including the Entel Tower in Santiago, Chile, and Town Restaurant and Toys R Us, both in New York City, Focus Lighting resides in a headquarters that emphasizes the firm's dramatic and distinctive flair. Situated on New York City's Upper West Side, the 26-person company is housed in two buildings on opposite sides of 101st Street, one of which is brightly clad in lavender. The podlike studios are tucked away throughout the two spaces, populated by design teams and a plethora of materials, images, and inspiration from glass samples to fixture prototypes. Founded by Paul Gregory in 1986, this architectural lighting design firm is about lighting design with one criterion: "It's not how big the project can be, but how well it can be done," stresses Gregory. And while the company boasts an impressive list of projects, from private residences to large-scale entertainment facilities, only so many assignments can be taken on at one time—the chosen ones are those that create an exciting visual experience.

Gregory's enthusiasm for lighting is contagious, a vivacious quality that is expressed through the dynamic, youthful designers he has enlisted, as well as in their projects. Lighting design, he says, "can support projects and craft them into a series of little visual events. Visiting these spaces should make you feel special, but at the same time the room should feel pleasant." Considering each project the way an artist contemplates a canvas, Focus Lighting "paints pictures with light"—a phrase often used by Gregory to describe his method. Inspired in part by his early training in stage lighting, Gregory encourages a theatrical approach to projects, where a layering of effects creates a special, and most importantly, memorable space. While hospitality, an industry Gregory enjoys for its direct contact with the owner, makes up about a third of the firm's projects, it allows the opportunity for the theatrical panache that his designers so love to create.

Gregory points out that "reflected light is all that the viewer will see"—it is not the materials used in the space that are seen, but the light that bounces off them. Influenced by this approach, Focus Lighting dedicates considerable time to investigating how light affects the materials specified for a project, and therefore the mood of the space. Critical surfaces are analyzed to discover what will and will not be lit. Designer Michael Cummings says, "I feel that we are the guardians of the visual and visceral experience walking into the space." With the majority of projects being collaborative efforts, Focus Lighting employs a method that Gregory calls "the Common Vision." He explains: "It's getting the architect, interior designer, and owner communicating the emotion and feeling of a project as one, and painting the important images together. If we can accomplish that, the chances of success are much better."

Aligning the entire design team to be on the same page is a high priority in Focus Lighting's approach. Through detailed hand-drawn sections and renderings, each space is explored and analyzed to ensure that the important surfaces are illuminated, creating a "roadmap that everyone can refer to throughout the process, including the owner." Gregory believes that "placing the white pencil on black paper is an effective tool to analyze the placement of light on a building." Used as presentation tools to "walk" clients through a project, the drawings are also employed to educate the contractor about what the lighting designers are trying to achieve. "We're very intense about putting the design intent in our drawings. For every fixture, we explain what it is and what it is doing." The idea being that if everyone knows exactly what is to be achieved with the lighting, they can make educated decisions, ensuring that the design will be a success.

For Gregory, the design process is all about the people working alongside him. "My staff are very creative, interesting, exciting, and kind. The type of people you want to invite over for dinner." And they would not have to travel far. Just up the staircase to Gregory's home. **SALLIE MOFFAT**

Some of Focus Lighting's noted projects include (clockwise from top left): The Tribeca Grand Hotel in New York City (photo: Michael Kleinberg); the Semiramis Hotel in Athens, Greece (photos: Jennifer Alexander/Focus Lighting); the Carlos Miele Store in New York City (photo: Paul Warchol); and the Morimoto Restaurant in Philadelphia (photo: Karim Rashid).

The color-changing LED headboard in the bedroom of the Westin Renewal Suite (above) can be altered according to guests' moods with a color dial by the bedside, while decorative pendants and a wall with dimmable LED flicker candles provide a soothing backdrop for the living area (below).

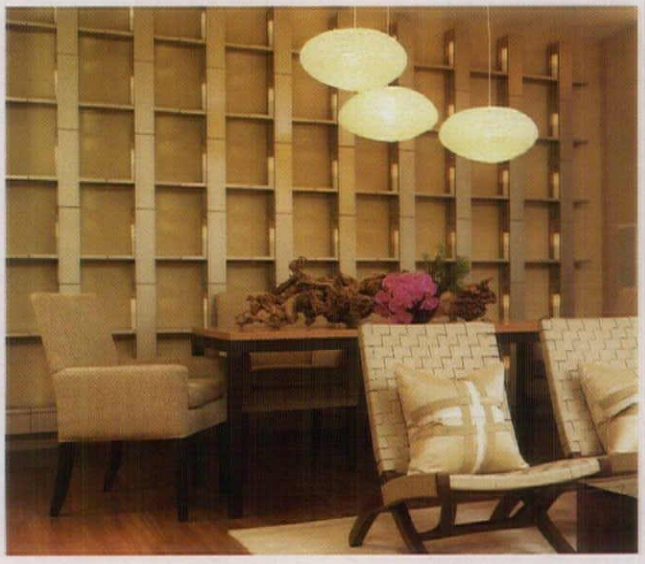
westin renewal suite, new york

Situated on the 44th floor of the Westin New York in Times Square, the Renewal Suite, created to reflect the hotel's new brand positioning around organic well-being for its guests, offers sweeping views of the Hudson River. Drawing on the popularity of day spas, the hotel has transformed an 1,100-square-foot-space into a personal oasis, where travel-weary guests can rejuvenate.

Working with the established interior design, Focus Lighting chose indirect sources for a soft and comfortable light; one that would embody the suite's therapeutic atmosphere. As always, a few theatrical elements were included to ensure a memorable stay.

Entering through a decompression chamber, guests emerge into the suite, which contains a living area, Zen gym, bedroom, and spa. In the living area, recessed low-voltage strips are concealed in ceiling coves for a soft ambient glow throughout the space. A custom decorative wall with dimmable LED flicker candles, partly obscured by a wooden frame, provides a soothing alternative to the flat-screen television hanging on an adjacent wall.

In the spa, the majority of light is provided by low-voltage strips placed behind frosted glass around the perimeter of the ceiling. The theatrics begin with the color-changing chromatherapeutic bathtub and its four underwater three-color LED fixtures. Taking this concept into the bedroom, the design team recessed a color-changing headboard into the wall, which allows guests to create soothing color combinations. With the LED controls integrated into the main lighting control system, the headboard can be turned on and off with the room lighting, and a bedside color dial can be used to change the color of the headboard. As with the rest of the lighting, the option to customize the suite's atmosphere is simple. A decal was developed to describe the various functions and effects that can be achieved with the color dial. "I love the idea of creating interactive spaces where the users can take ownership of their environment," Cummings explains; however, "we also wanted to create a serene atmosphere with a good balance of lighting," he says. And balance is key to good ying and yang. ■



In Bar Americain's main dining room, illumination is provided by two sets of four oversized custom pendants and amber wall sconces that line the perimeter of the space (above). The bar (below) is the visual anchor of the space, and is bordered with backlit frosted glass.

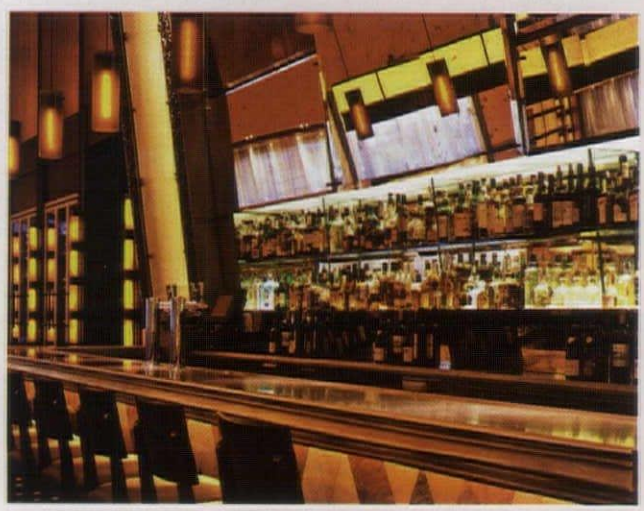
bar americain, new york

A collaboration between celebrity chef Bobby Flay and partner Laurence Kretchmer, the Bar Americain restaurant in Midtown Manhattan was redesigned from a preexisting space by the Rockwell Group. In order to create intimacy in the 36-foot-by-88-foot restaurant (the highest point of the ceiling measures 23 1/2 feet), the lighting team created focal points, then added layers of decorative fixtures for an inviting glow.

While the semi-open kitchen and adjoining shellfish bar are saturated with light to achieve sparkle, elongating the space and denoting it as a major focal point, the visual anchor of the restaurant is the bar, which is bordered with frosted glass and backlit with 25W A15 lamps. Contained within the backlit frame is a multilevel, multifaceted mirror. "When it's crowded," says Focus Lighting designer Christine Hope, "you get a great reflection of kinetic energy. The zinc and frosted glass borders evoke the feeling of a dramatic proscenium arch, where the clientele, reflected in the mirrors, is onstage." PAR30 strips uplight the Venetian plaster walls around the perimeter of the room, "framing the action and creating a visually unifying wrapper. One that draws attention to the cavernous space," Hope explains.

A series of decorative fixtures, designed with the Rockwell Group, create an amber luminosity in the space. This is achieved with two sets of four oversized custom pendants stemming from an illuminated vertical column, which fill the restaurant's giant volume and serve a dual purpose: four 100W A-lamps provide a soft internal illumination, while 50W MR16 adjustable accents highlight the tables below and wash the ceiling above. Amber wall sconces, comprised of frosted glass tubes lined with amber sleeves, are arranged vertically around the perimeter of the room and fitted with an incandescent tube lamp for a warm glow. This effect is extended to the banquettes, where amber-gelled fluorescents backlight art glass panels to create a cozy envelope of light from each side.

Compared to the glow of a campfire, the restaurant's soft tawny hue is a particular hit with the clientele. As Gregory says, "Everyone loves to be in a space where they look wonderful." ■



Two main elements of the Koi Restaurant are its overarching fiberglass trellis (above), illuminated with MR16 fixtures to highlight its texture and three-dimensionality, and custom-designed chandeliers (below). The two effects create a warm glow in the space, as well as a focal point, for an intimate, candlelit feel.

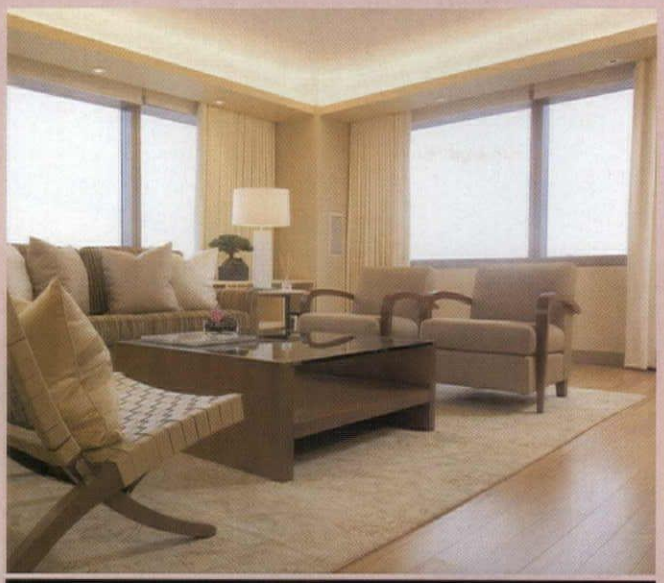
koi restaurant, new york

Designed in collaboration with ICRAVE Design Studio, this Japanese-inspired restaurant is located inside New York's Bryant Park Hotel. The design team applied "individual elements to the overall architectural premise so as to limit the amount of renovation work in the existing space," explains Cummings. At the owner's request, the lighting design team worked toward a minimal lighting scheme for a dim and sexy candlelit environment.

In keeping with the sensual atmosphere, a limited number of downlights were used. Instead, selectively chosen focal points are accented throughout the space—the tables, for instance, are lit with pinspot downlights hidden in the structure above. Incorporating both large and small events into the design, the team constructed a feature wall made up of half-cut tree trunks holding candles in front of one-way mirrors for an enchanting effect.

Two significant features of Koi are its immense overarching netlike structure and custom-designed chandeliers. Used to unify individual seating areas, separated for intimacy by uplit slat walls or bamboo, the enormous fiberglass trellis decreases the volume of the space, drawing the eye in, and elongating the dining area. Surface-mounted, multi-head MR16 fixtures streak light across the structure, highlighting the contrasts in its texture and three-dimensionality. "The trellis material has a really soft quality," says Cummings, "and the color reflected light well, which provided a soft, ambient source for the entire space."

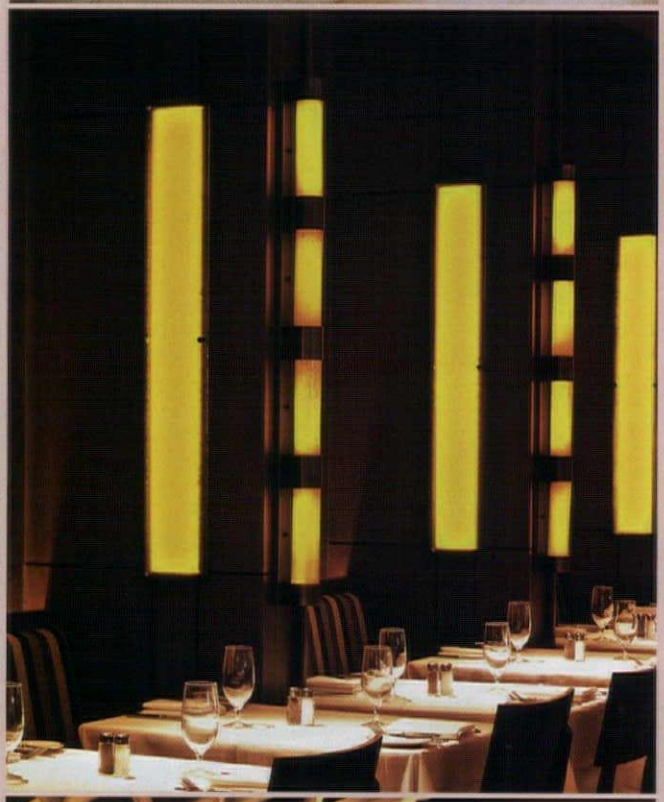
Inspiration for the chandeliers came from the Japanese Koi fish. Rectangular pieces of orange glass (signifying the scales) are arranged around a black steel frame enveloping a center-lit acrylic shroud containing strings of LEDs (signifying the roe). Similar to the glow provided by an "irregular" candle, the light created is "a little bit orange, white, and pink," explains Cummings. To accent the glass "scales," four MR16 fixtures angle in on the chandelier, highlighting it from the outside. "The chandeliers provide the space with a warm glow, as well as a beautiful focal point," says Cummings. "All the other illuminated elements take on a support role in creating the intimate, candlelit feel." ■



DETAILS

PROJECT Westin Renewal Suite, New York
ARCHITECT Harman Jablin Architects, New York
LIGHTING DESIGNER Focus Lighting, New York
INTERIOR DESIGNER Starwood Resorts, White Plains, New York
DESIGN, DECOR, AND EVENT PRODUCTION Geoff Howell Studio, New York
PROJECT SIZE 1,100 square feet
PHOTOGRAPHER Westin New York

MANUFACTURERS	APPLICATIONS
Color Kinetics	Color-changing headboard
CSL	Recessed pinspots for general lighting in suite entry, spa, restroom, and shower; lighting at living area windows; recessed wallwasher on water wall and resin panel in living area
Juno	Undercabinet lighting in decompression chamber
Lucifer	Low-voltage striplights for spa perimeter and coves in living area
Lutron	Controls
Osram Sylvania	Lamps



PROJECT Bar Americain, New York
ARCHITECT The Rockwell Group, New York
LIGHTING DESIGNER Focus Lighting, New York
PROJECT SIZE 5,600 square feet
PHOTOGRAPHER Eric Laignel, New York

MANUFACTURERS	APPLICATIONS
B-K Lighting	In-ground fixtures uplighting wooden screen
CSL	Recessed adjustable wallwasher at service stations to accent glassware
Kirlin	Recessed fresnel lens downlights in kitchen
Legion Lighting	Mini-strip, surface-mounted fluorescents in back bar shelves, restrooms, and behind decorative glass at banquettes
Lightolier	MR16 track heads to accent sheer drapes
Litelab	Socket strips uplighting niche walls and end wall
Lucifer	Linear low-voltage striplights at entry sign, under bar, and behind banquette seating
Lumid	Decorative light trees in main dining area
Lumiere	Well light at exterior walkway
Osram Sylvania	Lamps
RSA Lighting	Combo lights for table accents
Savoy Glass	Used for custom glass sconces and decorative pendants over bar
Strand Environ II	Dimming system

PROJECT Koi Restaurant, New York
ARCHITECT AND INTERIOR DESIGNER ICRAVE Design Studio, New York
LIGHTING DESIGNER Focus Lighting, New York
PROJECT SIZE 3,200 square feet
PHOTOGRAPHER Frank Oudeman, New York

MANUFACTURERS	APPLICATIONS
CSL	Ceiling-recessed pinspots on tables
Edison Price	Adjustable downlights for table accents, sushi bar graphic wallwash
Lumiere	Three-head MR16 accents for uplight/ceiling glow
Lutron	Controls
Nulux	Recessed wallwashers on back wall graphic
Osram Sylvania	Lamps

more **photos|drawings** at **ARCHLIGHTING.COM**

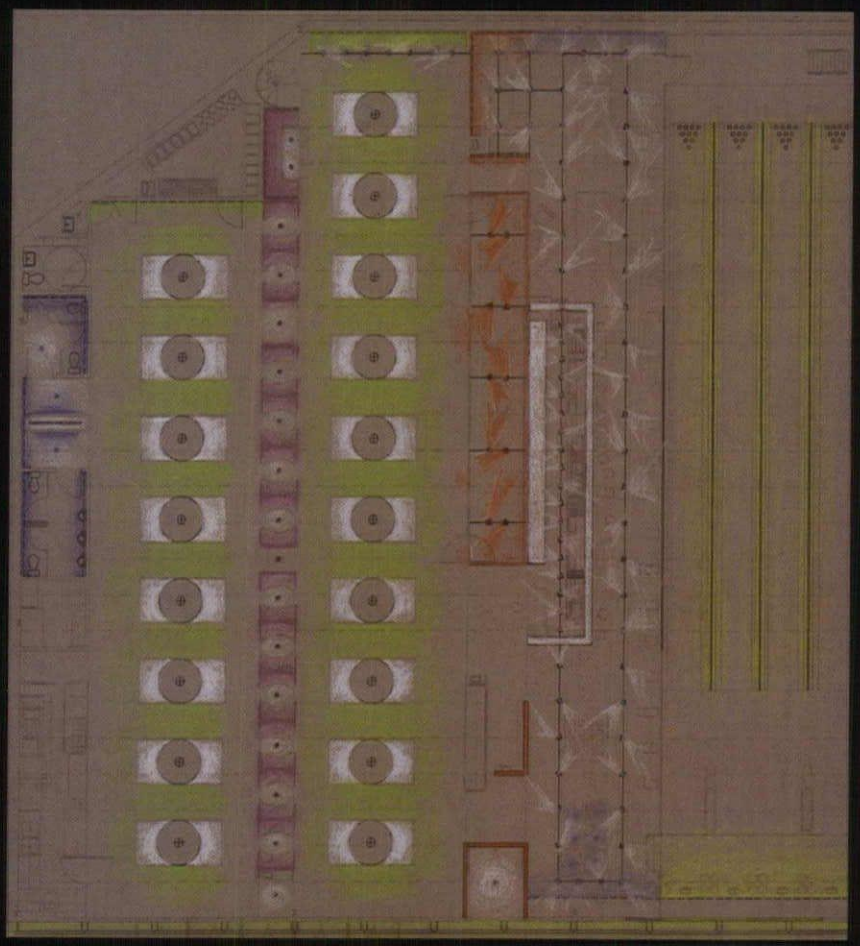
NIGHT LIFE

An award-winning design by Steven Harris Architects, along with an inventive lighting scheme by Filament33, turns Play into one of the most stylish nighttime entertainment venues in Queens.

IT IS NOT ALWAYS EASY TO STAND OUT IN A CROWD, especially when the focal point in question is a nondescript one-story concrete box of a building amid a motley mix of neon-spiked delicatessens, burger joints, and strip clubs on a busy boulevard in Queens. But thanks to an award-winning design by New York-based Steven Harris Architects, that is exactly what a 10,000-square-foot multipurpose entertainment venue called Play manages to do.

Simplicity is the key to the design team's accomplishment, easiest to see at night when the street comes to life with animated lights and carnival-like signage. The architects, along with lighting designer Marianne Maloney, principal of Brooklyn-based lighting firm Filament33, created the perfect antidote to the sensory overload. By painting the building's façade a chic chartreuse and the front door lipstick red, then illuminating the building from above with a cantilevered band of 32W T8 guarded fluorescent lamps, they transformed the venue's streetfront into a gigantic graphic billboard. Laced with a ribbon of shiny metal spelling out the lounge's name, Play, "the front of the concrete box becomes glowing signage in and of itself," says John Woell, the lead architect on the project. "You can see it from two blocks away," says Maloney.

The hand-in-glove integration of light and form on the exterior also extends inside. As its name suggests, Play is a place where you can kick back and have a good time—in this case by eating, drinking, shooting some pool, watching movies, or bowling. To accentuate Play's array of diversions, the architects used color and materials to clearly divide the space into distinct zones dedicated to specific activities. "Basically, we treated the interior as if it were a vibrantly



Lighting Designer Marianne Maloney envisioned stripes of light to designate Play's "zones," seen in her rendering above. The bar reads like a band of platinum between the colored light of the bowling alley and the kitchen and bathroom areas. Beyond, lime-green light signifies the pool table sections, which sandwich a layer of plum-colored light around the dining tables and banquettes.

ed piece of fabric, with each color oted to a different use," says Woell, chose to layer the venue with a tte of mostly ultra-vivid hues. "We wed through with the program by g surface materials and texture to ch the 3D aspect of the various ces." Maloney further enhanced each by illuminating them with corre-nding colored light. "The light makes zones really pop," says Woell.

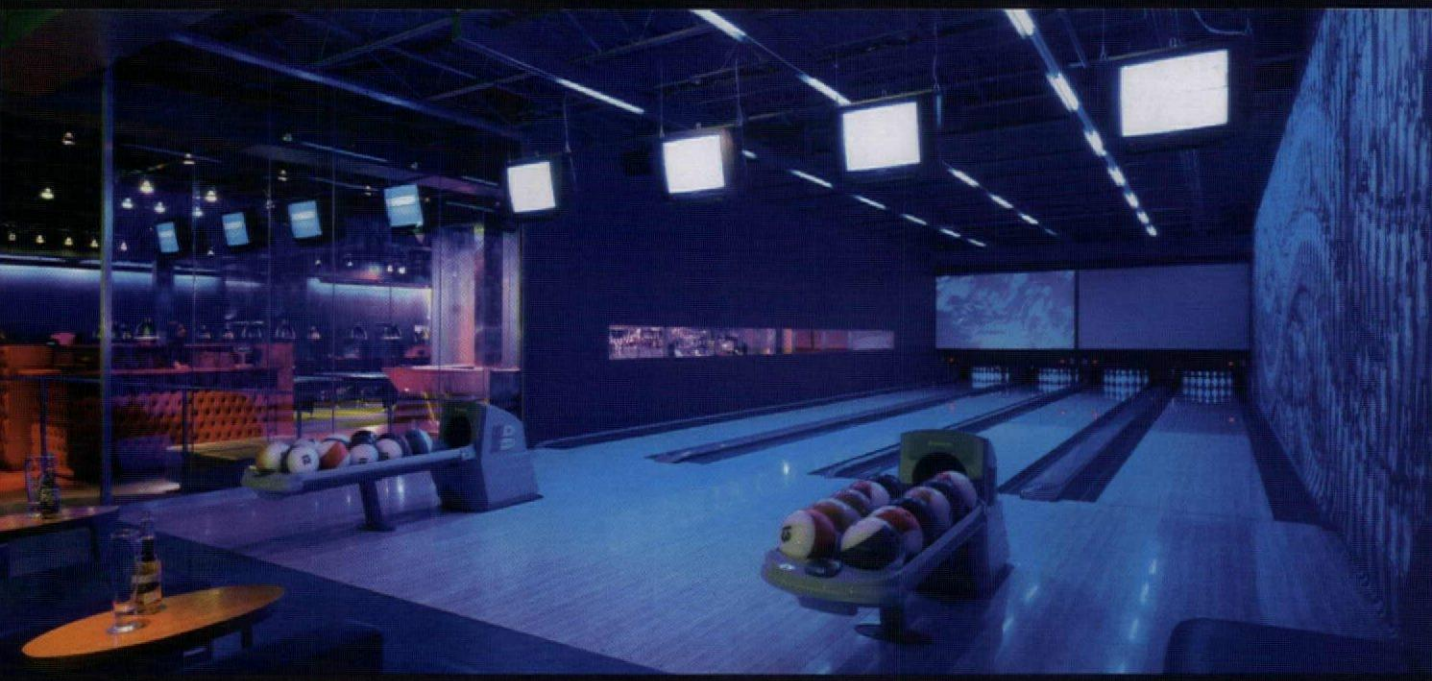
The overall design strategy is clear minute you step inside the entrance , which, like the exterior door, is ed in sultry red light. Adjacent, the area—featuring a stainless-steel bar ed by a frosted glass wall—stands he only neutral section in the space. ads like a band of platinum between indigo-infused light of the bowling on one side and the blue-tinged of the kitchen and bathroom areas he other. Beyond the kitchen, lime-n light filters through two sections aining pool tables, which, like layers ruit in a produce stall, sandwich n-colored light around a row of dining

mounted to the bottom of open trusswork near the 15-foot-high exposed ceiling. She also covered the fluorescents with gels, which she selected on site so as to precisely match the hues of the materials in each section. "The light makes the color of each zone supersaturated, as if the air is dyed red or green or blue," says Maloney. "The challenge," says Woell, "was to create a stripe of light that would be the exact same color of the carpet, vinyl, or linoleum of any given area." In addition to the energy-efficient fluorescents, which Maloney chose for their long life and ease of maintenance, a series of 90W PAR38 HIR track lamps, mounted from the overhead truss and covered with colored glass filters, run parallel along the length of each zone. "The aim here was to create a light level that was appropriate for a clubby atmosphere with sources that would enhance certain objects or furnishage xenon lights, for example, illuminates a shelf supporting a row of liquor bottles along the back of the bar. Black lights in the bowling lanes highlight the balls and pins, as well as wallpaper motifs. And a series of low-cost, off-the-shelf pendants, which "the owner purchased for $30 a pop," says Maloney, illuminate each pool table. The variety of light sources were also chosen with an eye toward the bottom line, falling within the $500,000 construction budget and keeping long-term operating and maintenance costs to a minimum.

"This job was a collaborative process, and it was obvious right away what the lighting approach should be," says Maloney. "The architecture and the lighting fold together, drawing attention to the beautiful space, illuminated in the best way possible, rather than to the lighting itself." The fact that Play recently earned a

A tufted red vinyl reception desk adds function and character to the entrance zone, which is bathed in red light (top, left) and separates the bla bowling lanes (top, right) and the pool tables, illuminated from above by off-the-shelf pendants, while a lime-green light is created below from gel- ered compact fluorescents (top, left). Beyond the entrance, the bar area is the only neutral zone in the color-saturated venue. T5 fluorescent tubes cealed in niches illuminate the footrests and, housed beneath a sheet of acrylic, additional T5s transform the bartop into a glowing lightbox (above, A series of tables and banquettes, sandwiched between the pool areas, are illuminated from above with dimmable 130V 90W PAR38 fixtures cov with plum-colored filters (above, right). Maloney chose the 130V rate, rather than standard 120V for a heartier source in which voltage fluctuations not deteriorate the lamps as readily.

PREVIOUS SPREAD: Play's chartreuse-colored concrete façade reads like a gigantic billboard, illuminated with a band of T8 fluorescent fixtures tilevered from the roof line. A long rectangular window housing the words "eat drink smoke bowl shoot" looks into the bowling lanes, and is ba



DETAILS

PROJECT Play, Queens, New York
ARCHITECT Steven Harris Architects, New York
LIGHTING DESIGNER Filament33, Brooklyn, New York
PHOTOGRAPHER Scott Frances, New York
TOTAL SQUARE FOOTAGE 10,000 square feet
WATTS Approximately 2 per square foot

MANUFACTURERS	APPLICATIONS
Abrisa	Dichroic glass
Columbia Lighting	Façade lighting
Cooper	Wallwashing in restrooms
Engineered Lighting Products	Wallwashing from behind banquettes
Legion	Bar footrest, under pool tables, wallwashing at restroom stripe, lightbox behind banquette, bartop, bowling alley lighting, bowling alley blacklights, vanity
Lightolier	General recessed downlights, accent lights
Osram Sylvania	Lamps
Philips	Lamps
Rosco	Gels
Starfire	Backbar
Stonco by Genlyte Thomas	Broom closet lighting, exterior monopoint

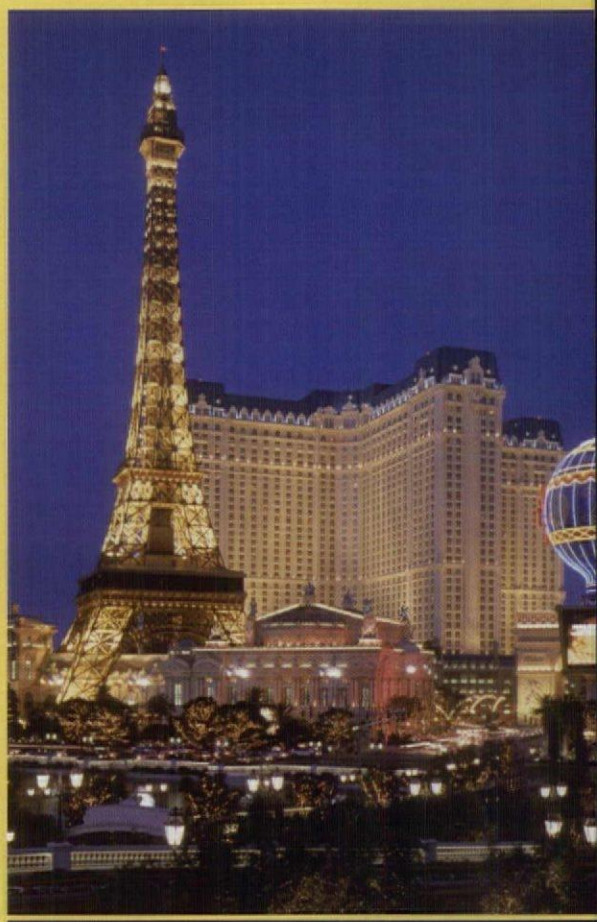
THE STANDARD SETTERS

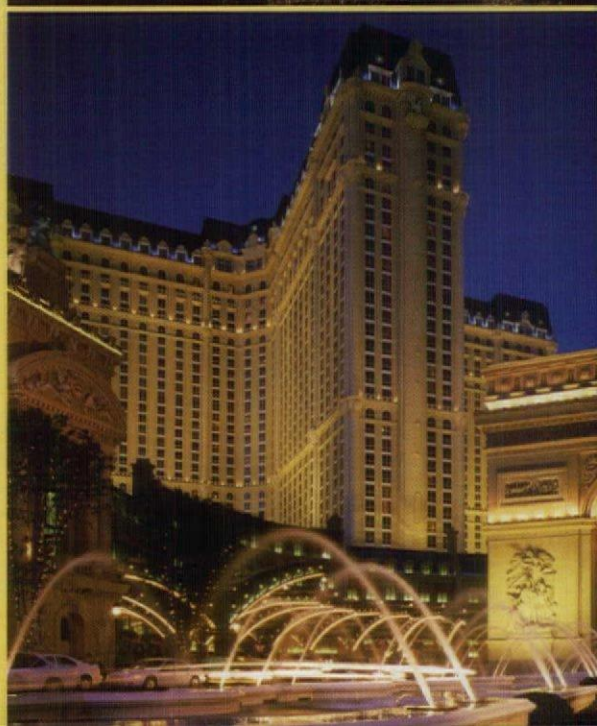
KAPLAN GEHRING MCCARROLL NAVIGATES THE FAST-PACED WORLD OF LAS VEGAS CASINO AND HOSPITALITY DESIGN.

OVER THE PAST DECADE, WHILE WORKING ON PROJECTS OF NEARLY EVERY BUILDING TYPE, and for a range of clients, from Disney to Ernst & Young, Los Angeles-based Kaplan Gehring McCarroll (KGM) Architectural Lighting has emerged as one of the lighting industry's leading design firms. Its rigorous, client-centric approach to developing solutions and mentoring staff has enabled KGM to thrive in the high-pressure, fast-paced exclusive world of casino and hospitality design, with involvement in such top-level casino projects as Las Vegas's Palms, Bellagio, and Paris.

KGM expanded into casino design via a residential assignment for casino owner Jon Jerde. Joe Kaplan, a Texas native, began his career lighting shows for Jefferson Airplane, the Rolling Stones, Led Zeppelin, and Jimi Hendrix. In 1985 he opened an office in his hometown of San Antonio, designing lighting for banking industry offices and upscale residences. In 1989, he relocated the firm to Los Angeles when he received the commission to light the St. James Hotel, the storied Sunset Strip establishment now dubbed the Argyle Club. In taking on two architects as partners, Michael Gehring in 1994 and David McCarroll in 1995, Kaplan fortified his then-two-person firm with the skills and experience it needed to expand its portfolio beyond high-end residential work and into the world of casino design. It was a world that by 1994, says Gehring, was departing from the thematic glitz defining mid-twentieth-century Vegas, and emerging as a haven for luxurious, elegant, and sophisticated lodging and dining experiences.

Gehring and McCarroll joined Kaplan because they wanted to expand beyond traditional architectural practice, and because both men loved lighting and wanted opportunities to impact major projects. Successfully lighting a project, McCarroll explains, requires a designer who understands the architectural concept, the architect's approach to design, and the function of architectural lighting. Accomplishing this, says Gehring, involves working with each project's architect to develop lighting solutions that accentuate the architecture and enhance the user's experience of the building's function. With an understanding of the architectural idea, KGM can contribute valuable information about lighting the structural and architectural elements, and using light to transition people through space and to enhance, enliven, and balance



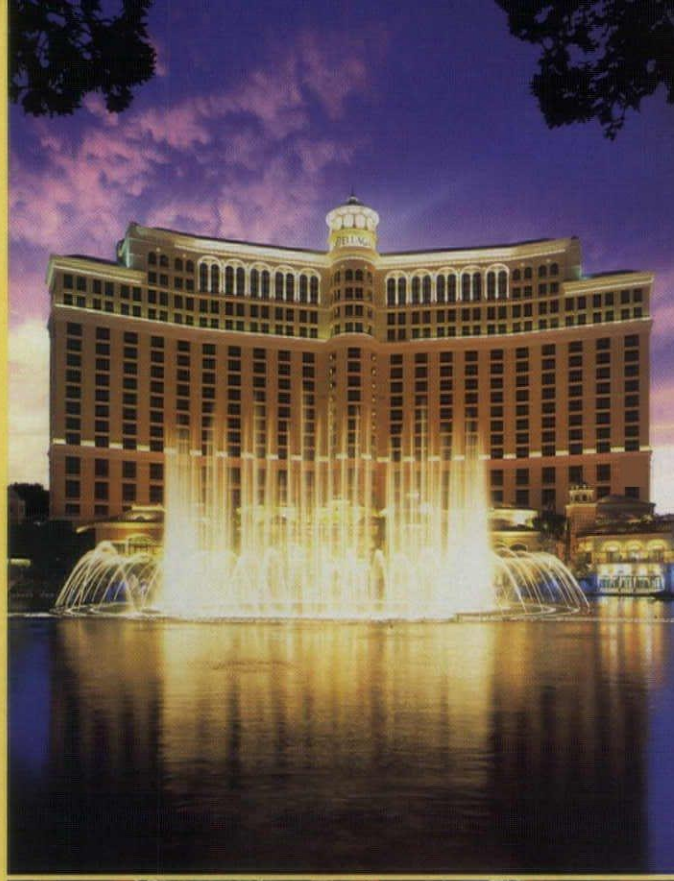


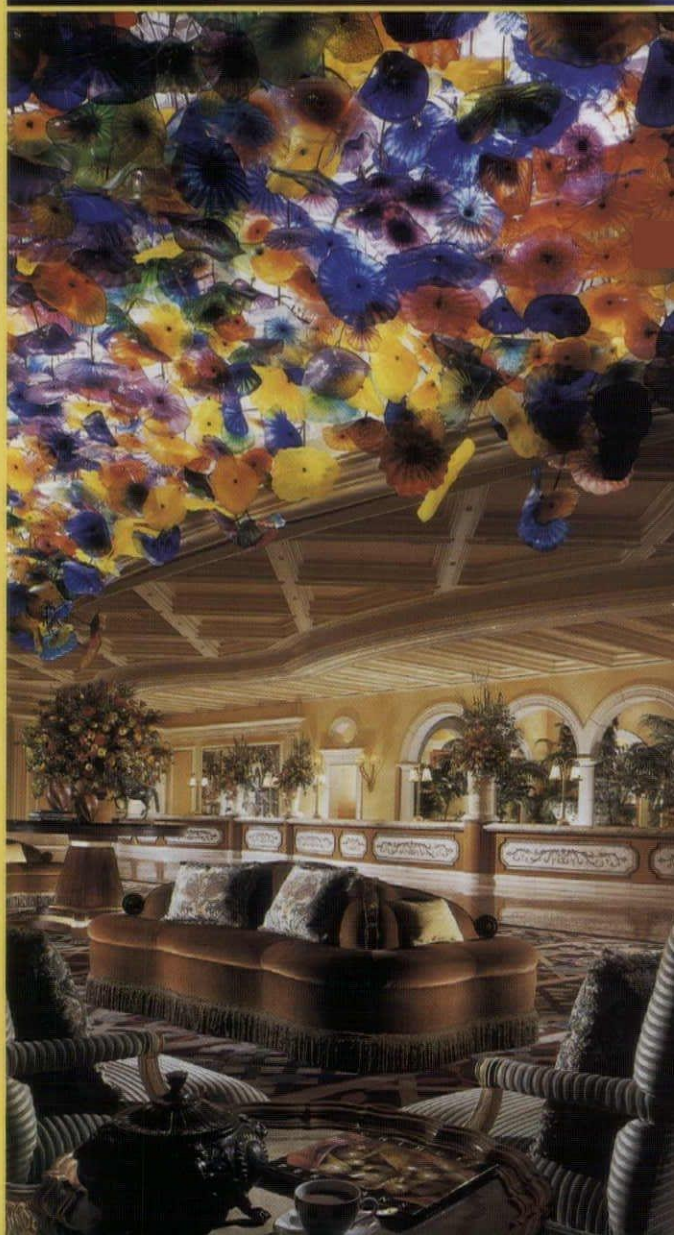
Identifiable by its thematic translations of the Eiffel Tower, the Paris Opera House, and the Arch of Triumph, the Paris is the casino, says KGM founder Joe Kaplan, that appears most often in Las Vegas advertising campaigns (top). KGM's solution mixes authenticity with show-power. "When doing a project like this," he says, "the atmospheric effect is incredibly important. The perception outweighs the reality." To capture the spirit of the original structures, KGM used flood, accent, and below-grade lighting techniques with HID, fiber optic and incandescent sources to illuminate statues, cornices, and roofs (bottom). The biggest challenges involved lighting the Eiffel Tower from within and illuminating the numerous interior sky-ceilings to recreate the look and feel of Paris at twilight.

environments, all of which impact the final product.

"Project success is more than how a solution looks or lights," says Gehring. "It's how people perform, how we perform, and how we help the people who maintain the building perform." Their client-centric, post-delivery design focus is ingrained in every KGM designer via the firm's informal yet entrepreneurial-minded culture, one where the principals actively groom each of KGM's 20 designers to one day run the firm. Accomplishing this involves much collaboration with each member—from recent graduate to experienced project manager—to help them understand both the business of design (contracts, fees, profitability) and the practice of design (taking projects from start to finish). Informal impromptu project meetings and firm-wide e-mails are the preferred tools for openly sharing firm information and lessons learned that the principals believe will help each designer resolve project problems, nurture client relationships, and assume ownership of, and responsibility for, their projects and their solutions. "We want them to come up with the ideas first," says Gehring.

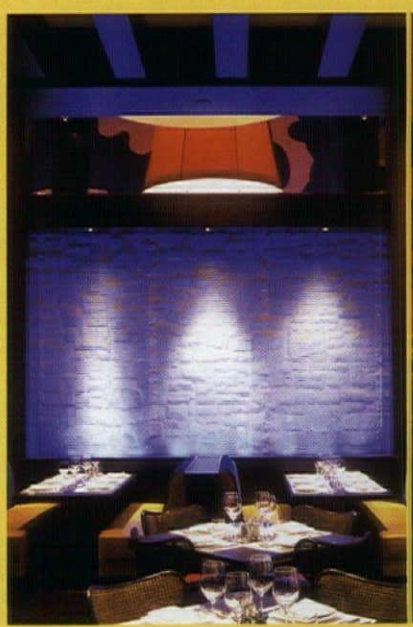
This mentoring also involves the principals inviting KGM designers to client meetings and delegating project responsibilities in the presence of clients. The idea is that any team member can, at any time, help any client if the client's primary contact is unavailable. McCarroll calls this approach the key to KGM's success. It is their proven technique for winning the trust and favor of numerous clients and owners, particularly those working in the extraordinarily fast-paced and high-pressure world of casino design, where the owner's project representatives push designers to complete projects nearly faster than humanly possible. "Everyday the casino is not open," McCarroll explains, "is money the casino is losing." Because of this overriding principle of developing casino projects, and especially because of an owner's desire to reduce all potential project risks, most casinos are designed by a core group of firms that have already proven their ability to deliver this building type. KGM's Las Vegas portfolio alone is evidence of its design approach, commitment to a firm culture of education and encouragement, and business success. **JOSEPH DENNIS KELLY II**

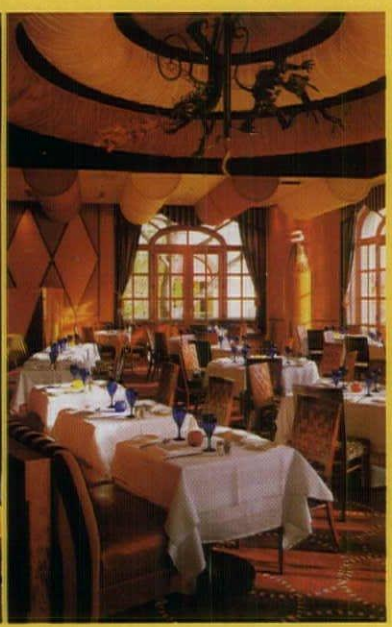




Across the strip from the Paris, the luxurious and ornate Bellagio (top) is the 4-million-square-foot crème of the Las Vegas casino crop. Here, KGM used small and subtle luminaires to accentuate a space designed to provide the best of everything. "The idea is a grand mansion," says partner Michael Gehring, who supervised this project. "The lighting is a backdrop to how people feel with all of the elements in the space." Home to a Dale Chihuly art glass installation suspended from the ceiling in the main lobby (bottom), the Bellagio features 20,000 low-voltage recessed fixtures with 50W MR16 lamps, to create an unobtrusive ceiling plane. To light the space appropriately, KGM focused on beam spreads, aims, and fixture location.

One is hard pressed to find a casino/hotel property in Las Vegas to which KGM has not added its lighting expertise. The MGM Grand is yet another example: KGM designed the lighting for restaurants Sea Blue (below left), with interiors by New York-based firm Tihany Design; and Fiamma Trattoria (above), by Toronto-based Yabu Pushelberg. KGM's work at the Bellagio extends to many of the restaurants that surround the main casino. One example is Circo (below right). The lighting complements the interiors designed by Adam Tihany, a playful decor that recalls the feeling of the "Big Top."





DETAILS

SELECTED LAS VEGAS PROJECT PORTFOLIO

Aladdin Hotel & Casino Façade; Bellagio Resort; Bellagio Spa Tower; China Spice and Sushi + Sake at Green Valley Ranch; Circo, Fix, Olives, Picasso, and Prime Steakhouse restaurants at the Bellagio; Fiamma Trattoria and Sea Blue restaurants at the MGM Grand; Green Valley Ranch II, Hard Rock Hotel & Casino; Harley-Davidson Cafe; Madame Ching's at Treasure Island; the hotel at Mandalay Bay; MGM Grand; Palms Hotel & Casino; Paris Resort; Ritz-Carlton Hotel Spa & Casino; and Treasure Island.

LIGHTING DESIGNER

Kaplan Gehring McCarroll, Los Angeles

IMAGES

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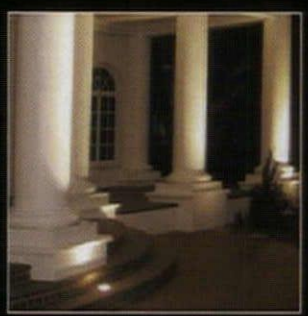


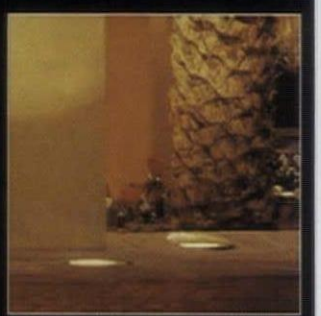

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ST. JOHN'S COLLEGE, ANNAPOLIS, MARYLAND

CHALLENGE How do you tackle a renovation project when it is one of only a handful of buildings east of the Mississippi by noted International Style architect, Richard Neutra? That was the task facing Baltimore-based Ziger/Snead Architects in its quest to provide "restoration and modernization" services to Mellon Hall on the Annapolis, Maryland, campus of liberal arts college St. John's.

ARCHITECTURAL AND LIGHTING SOLUTION Neutra discovered St. John's in 1954 when asked to lecture in conjunction with a book tour. The commission for Mellon Hall was a happy marriage between an architect looking for East Coast projects and a college president who saw the benefit of a famous architect designing a new campus building.

Neutra's original design for Mellon Hall included classrooms, offices, laboratories, and an auditorium. The front of the building featured a garden room with structural-steel beams extended from the interior to the exterior to form an overhang in the interior courtyard. Ziger/Snead utilized the exposed beams as the defining architectural element in its renovation, whose program called for a new café and addition to house classrooms, offices, and a seminar space called the Hodson Room. The café extends along the length of the building and full-height laminated glass panels form the front wall. Overhead, a tongue-in-groove wood deck stops short of the building's former external wall to form a clerestory. At the edge of the terrace, 75W halogen PAR30 inground uplights create a visual rhythm and accent the building's mid-twentieth-century modern aesthetic, something Ziger/Snead paid attention to in selecting a respectful material and luminaire palette.

The café is illuminated with track- and downlights that use 50W MR16 lamps. Low-maintenance 32W T8 fluorescent fixtures provide cove-lighting for the corridor wall. "The daytime visibility and nighttime appeal of the space has made it the social center on campus," says Glenn Shrum, Ziger/Snead's in-house lighting designer, who is also trained as an architect.

The Hodson Room is separated from a pre-function area by a dividing-wall that combines sandblasted laminated glass with custom-designed wood bookcases. Uplights at the top of the wall emphasize the geometry of the architectural glass detailing, and adjustable recessed accentlights highlight the patina of the mahogany.

"It's one of the primary meeting spaces on campus," Shrum explains. "The lighting was designed to meet the varied functions scheduled throughout the day." Seminars and discussions related to St. John's curriculum, based on 130 "Great Books," are held around the large square conference table. General lighting is supplied by recessed 150W PAR38 downlights with high cut-off reflectors, and lighting levels are controlled by a programmable system with presets.

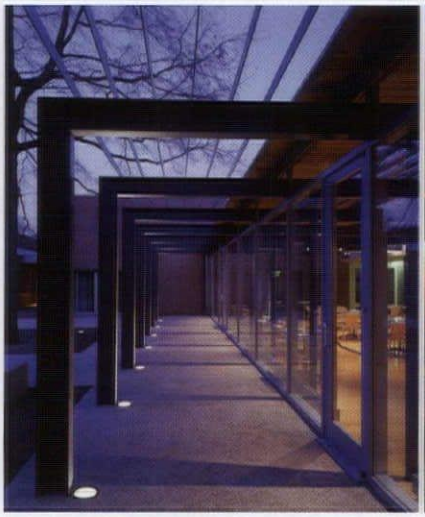
Mimicking the form of the seminar table, overhead horizontal mahogany planes, dropped 2 feet below the 12-foot-high ceiling, hides projectors needed for presentations and videoconferencing. Concealed 10W Xenon striplighting outlines the steel-framed wood panels. Dimmable tracklighting fitted with louvered 75W AR111 low-glare flood lamps provides additional focal illumination for presenters and videoconferencing participants.

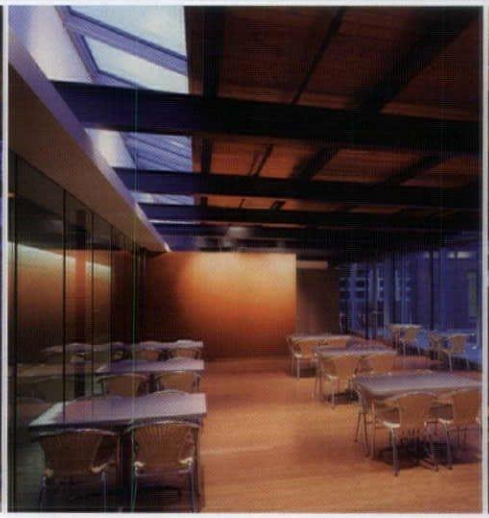
The scale, materials, and lighting of the new and renovated spaces gracefully complement the school's personalized approach to education and Neutra's elegant modernist legacy. **VILMA BARR**

DETAILS

PROJECT | Mellon Hall, St. John's College, Annapolis, Maryland
DESIGN TEAM | Ziger/Snead Architects, Baltimore (architecture and lighting)
PHOTOGRAPHER | Eric Salsbery, Utah
TOTAL SQUARE FOOTAGE | 70,000 square feet; café: 2,000 square feet; Hodson Room: 7,000 square feet
MANUFACTURERS | Ardee, Edison Price, Hydrel, Indy Lighting, Litelab, Lutron, National Lighting

Below, from left: courtyard portico; the cafe; and the Hodson Room. Above: addition exterior.





NORTH ANDOVER HIGH SCHOOL

DETAILS

PROJECT | North Andover High School, North Andover, Massachusetts

DESIGN TEAM | DiNisco Design Partnership, Boston (architecture); Lam Partners, Cambridge, Massachusetts (lighting)

PHOTOGRAPHER | Peter Vanderwarker, Newton, Massachusetts

MANUFACTURERS | Canlet, Celestial, Design Plan, Elliptipar, Exceline, Holcor, Hydrel, Lighting Services Inc, Lightolier, Litecontrol, Lithonia, Osram Sylvania, Rebelle, Selux, Visa, Zumtobel

CHALLENGE Located north of Boston, North Andover is a prosperous town whose appeal and population has steadily grown over the last four decades. When the existing 1970s open-plan high school could no longer accommodate the town's needs, rather than embark on a costly renovation, the municipality voted a resounding "yes" to constructing a new high school. The challenge was to create a multiuse building that would serve the expanded educational and extracurricular needs of 1,500 students in grades 9 through 12, with activity spaces that could be utilized after hours by the community.

ARCHITECTURAL AND LIGHTING SOLUTION The resulting 292,000-square-foot, $55 million high school emulates the community it serves in its youthful, spirited, and sophisticated aesthetic. Red brick covers the school's gently curved façade, punctuated with bands of large windows, subtle references to the warehouse and manufacturing buildings in the nearby towns of Haverhill and Lawrence. At night, the illuminated building and its central glass-and-brick-enclosed flagpole-topped tower is a readily identifiable landmark. The school is organized into two wings: an educational side, housing classrooms and offices; and a community area, containing the auditorium, cafeteria, and field house.

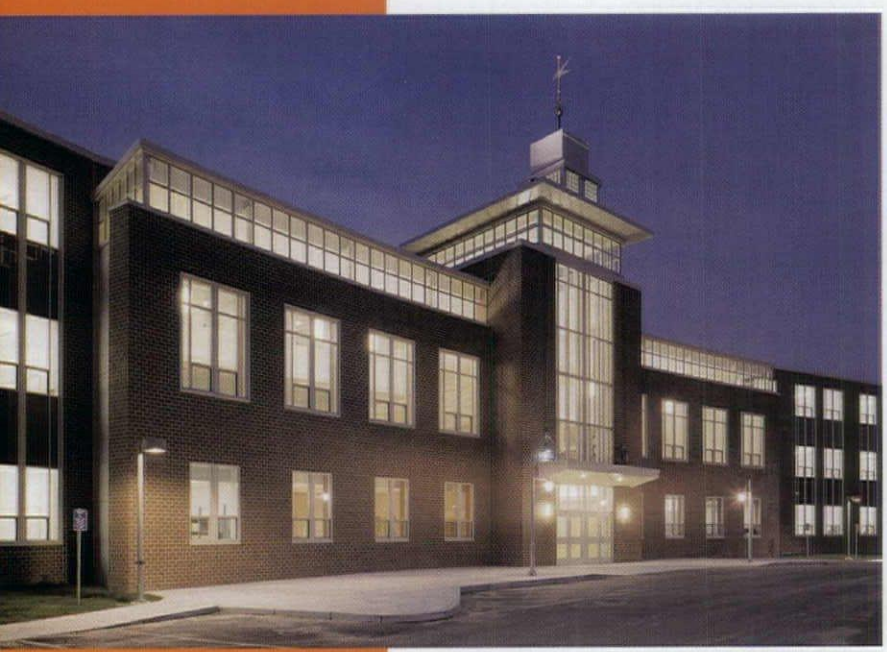
Lighting solutions had to comply with the 2001 energy conservation requirements of the Massachusetts State Building Code, which mandates a lighting power density of 1.5W per square foot for school and university buildings. "We limited the number of lamp types, not the fixtures, used in the school for ease of maintenance and lower operating expenses," says architect Kenneth DiNisco, who along with lighting designer Paul Zaferiou of Lam Partners, was responsible for the building's architectural and lighting design. The final overall energy use measurement was tallied at 1.2W per square foot.

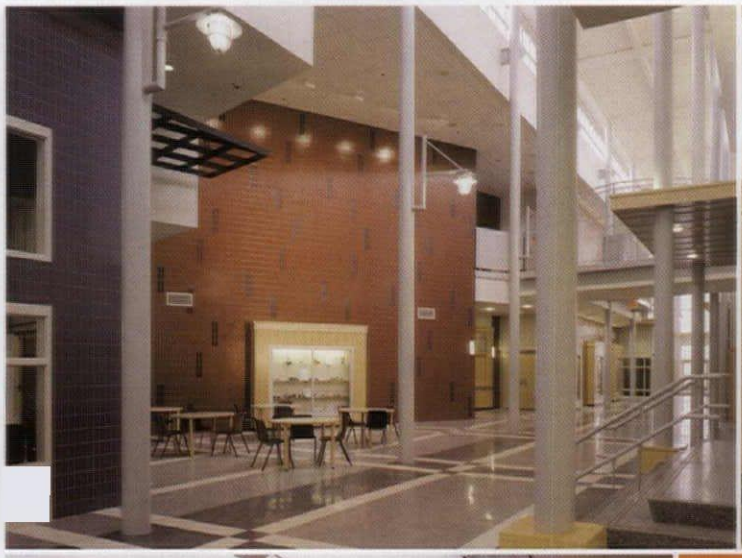
The interior-organizing element of the project is "Main Street," a double-height space measuring 36 feet at the highest point and 30 feet at the clerestory windows on each side, which introduce daylight into the space. "It's a metaphor of the school as a community," says Zaferiou. This intersection and social node is marked by geometric patterns found in the terrazzo flooring, and the colored tiled walls that highlight important communal spaces such as the cafeteria. Column-mounted exterior-grade decorative lanterns with 42W compact fluorescent lamps create a pedestrian scale and visual rhythm.

Throughout the project, emphasis is placed on maximizing visual comfort and responding to specific program requirements. In the cafeteria, indirect fluorescent coves and pendant uplights become spatial organizers: uplights over the food service area and for general dining, pendant uplights with 40W compact fluorescent lamps for ambient light, and compact 32W fluorescent downlights to provide sparkle on table surfaces. Layers of light also characterize the science labs. Three rows of indirect pendant fixtures cast a comfortable glare-free light level of 40 footcandles on the desks. Over the lab benches, 2-foot-square low-brightness parabolic downlights bring the light level up to the 80 to 90 footcandles needed for lab work.

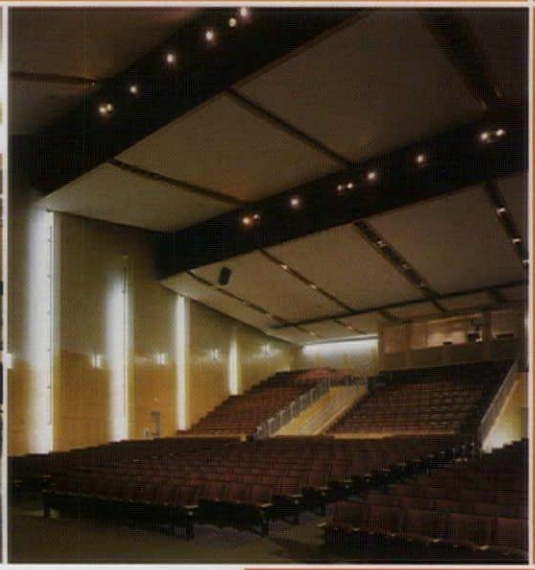
Lighting for the auditorium is integrated into the room's dramatic architecture and handsome materials and finishes. "This is a flexible multiuse theatrical facility for both the school and the community," Zaferiou notes. The panelized ceiling system conceals catwalks equipped with an array of stage lights plus supplemental "house" downlights. For general illumination, 250W and 100W PAR38 dimmable halogen downlights were installed above the wood slats. Dimmable 32W fluorescent strips behind vertical fins on the sidewalls provide a dramatic illuminated frame for the space. Recessed linear fluorescent wallwashers enliven the back wall.

After more than a decade of planning, the new North Andover High School's diverse user groups take full advantage of the facility. "The design is more collegiate than high school; it treats the students as adults, and they respond to it," says DiNisco. **VILMA BARR**





The school's glass and brick façade complements the local architectural vernacular (facing page). The building is organized around a central "Main Street." Daylight from clerestories is balanced with energy-efficient ceramic metal halide and compact fluorescent sources (above left). In the classroom corridors (above), a floating acoustical tile ceiling plane mirrors the flooring pattern, while concealed fluorescent cove fixtures above the lockers provide glare-free uplighting. In the science labs (left), low-brightness parabolic downlights provide increased light levels for lab work. Covelights and disc-shaped pendants with six 40W compact fluorescent lamps give the cafeteria a café feel (below left). In the auditorium, a paneled ceiling system hides catwalks and stage lights, while 32W dimmable fluorescent striplights are concealed in the vertical fins on the sidewalls (below).



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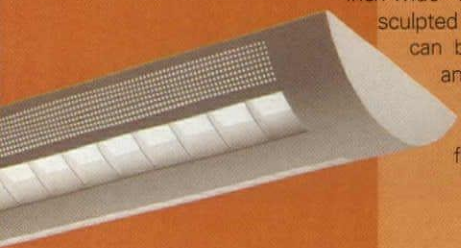
ELLIPTIPAR | 30-30 STACK LIGHT | ELLIPTIPAR.COM
Developed to meet the IESNA's recommended light levels for library stacks (30 vertical footcandles on books at 30 inches from the floor), as well as address the 1.5W-per-square-foot library stack requirement in California's Title 24 energy code, the 30-30 Stack Light uses a single 28W T5 lamp. The extruded high-purity aluminum fixture contains a clear anodized specular-finish reflector that directs light to the shelves and not onto the floor. The luminaire is available in three mounting options: ceiling, pendant stem, and cable. CIRCLE 203

PRUDENTIAL LIGHTING | WAL-APARIA | PRULITE.COM
This wall-mounted luminaire is constructed of extruded aluminum and is offered in two housing styles: Glow (which features a translucent acrylic or punched metal body) and Throw (which uses a reflector to direct light upward). Wall-mounting brackets are adjustable to 180 degrees. Available in five lengths, from 1 to 8 feet, and in a wide variety of finishes, Wal-Aparia can take T8, T5, or T5HO fluorescent lamps. CIRCLE 201

HUMANSCALE | DIFFRIENT WORK LIGHT | HUMANSCALE.COM
Designed by Niels Diffrient, this positionable task light has a conical shade to minimize glare. Constructed of aluminum, the luminaire is 90 percent recycled and recyclable, and uses a compact fluorescent lamp and high-efficiency inline ballast. It is available in a black or silver finish with single or double parallel arms. CIRCLE 204



PEERLESS | CERRA LIGHTVENT | PEERLESS-LIGHTING.COM
The crescent-shaped Cerra Lightvent has parallel baffle openings, perforated side walls, and an acrylic diffuser overlay to provide soft, even illumination. Available in 7- and 10-inch-wide versions with optional sculpted endcaps, configurations can be created from 4-, 8-, and 12-foot lengths. The fixture can be lamped with a T8, T5, or T5HO fluorescent. CIRCLE 202

LITECONTROL | LC-82 | LITECONTROL.COM
Offered in 4-, 8-, and 12-foot lengths, and suspended from an aircraft cable or a rigid stem, this direct/indirect pendant has an extruded-aluminum rectilinear housing design with optional sculpted endcaps. Three baffle types and light distribution options are available with the choice of a solid top or perforated reflector. CIRCLE 205

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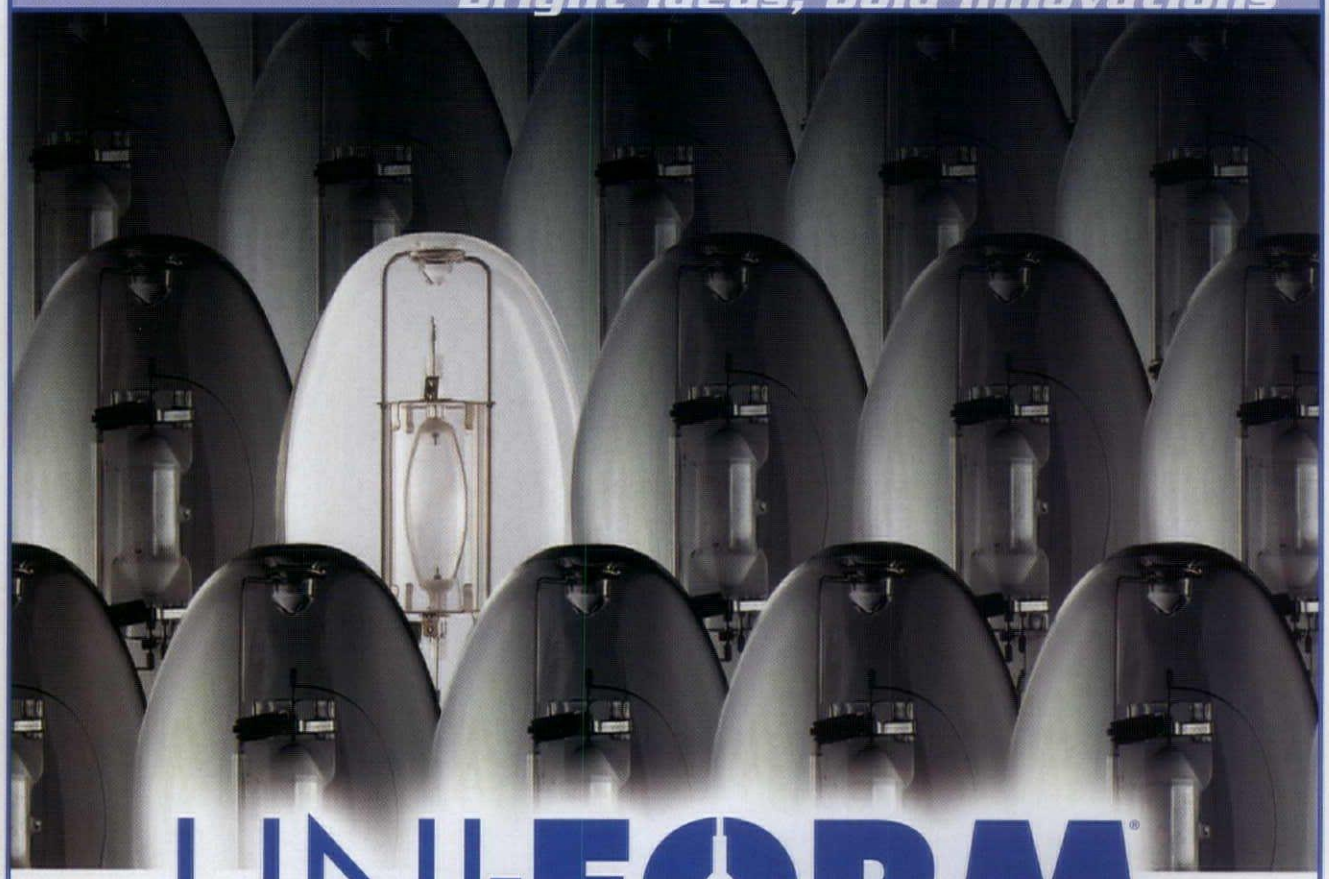

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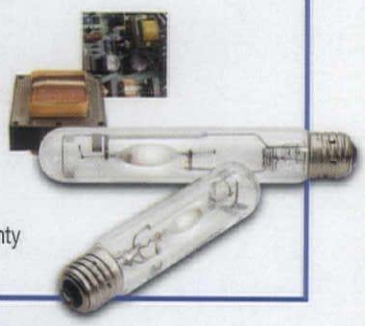

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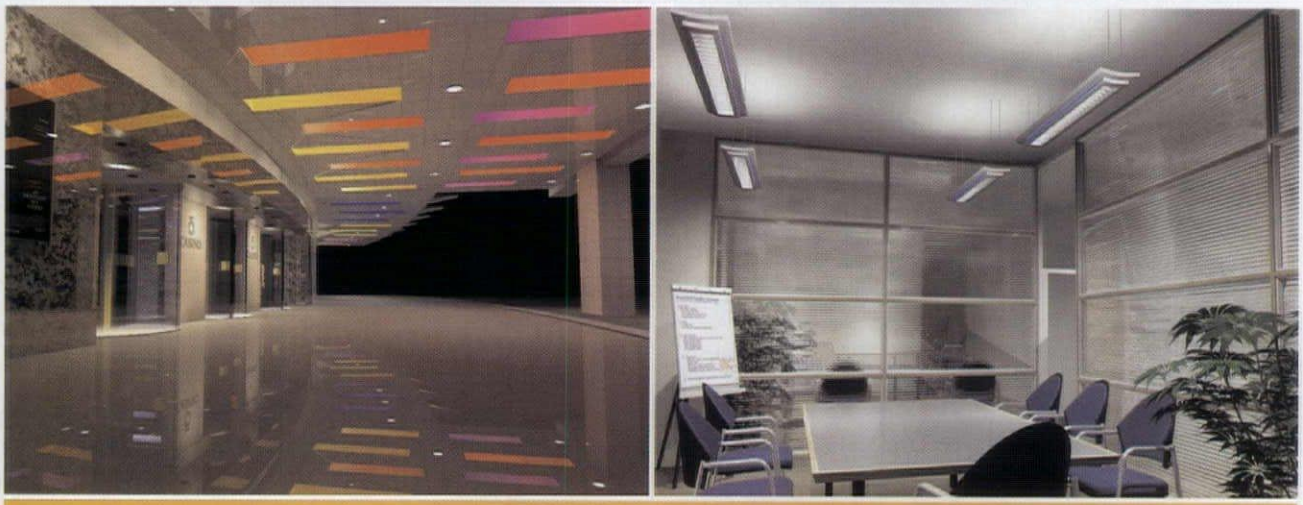
WHAT TO CONSIDER WHEN CHOOSING A RENDERING PROGRAM



Today's rendering programs offer photorealistic images helpful in "seeing" spaces before they are built. On the left, a project rendered using AGi32 from Lighting Analysts; and on the right, a space rendered using Radiance from Lawrence Berkeley National Laboratory.

"FORGET THE NUMBERS! WHAT WILL IT LOOK LIKE?" TWENTY YEARS AGO, THIS WAS A common refrain of architects struggling to decipher manually calculated horizontal footcandles and isolux tables. Unfortunately, there was no reasonable answer. The state-of-the-art in architectural visualization at the time was a hand-drawn charcoal sketch or watercolor rendering. Conveying the subtle nuances of a lighting design through these media was extremely difficult. There were full-scale mockups, of course, but often at unreasonable cost. Although hand-rendered charcoal or pencil drawings are still part of many lighting designers' presentation and design exploration processes, these types of drawings convey a different sensibility about the quality of light than today's highly sophisticated lighting design or architectural visualization programs that can "render light" with mathematical precision. These programs take a set of 3D CAD drawings, add photometric data files from lighting manufacturers, then calculate how light will behave in an equivalent physical environment. From them, you can generate photorealistic images that are difficult to distinguish from photographs, and produce photometric reports to quantify the design.

The question is: What program should you use? The answer depends on your needs as an architect or lighting designer. Lighting Analysts' AGi32 and Lighting Technologies' Lumen Designer are good choices for everyday work, although nothing equals Lawrence Berkeley's superlative Radiance for truly complex and daunting architectural designs. If you require realistic architectural renderings but not photometric analysis, there are a plethora of architectural visualization products from which to choose. Autodesk's VIZ is perhaps the most popular due to its close association with AutoCAD, but there are many more. Really, it boils down to one's project needs, the learning curve associated with a particular software package, and how that translates from a time/cost ratio.

FEATURE CHECKLIST

Choosing a lighting design program is not difficult, as most commercial products have the same set of basic capabilities. The most important thing is to decide what features are essential for your own design work. A checklist might include the following:

DXF AND DWG IMPORT FOR CAD FILES Autodesk's DXF and DWG file formats are the de facto industry standard for architectural design work. However, Autodesk updates these formats on a yearly basis, so it is important to ask whether the program supports the version of AutoCAD you are using (or plan to use) in your own work. (This also applies to other CAD programs that generate DXF and DWG files.)

PHOTOMETRIC DATA FILE MANAGEMENT Photometric data file management is a headache, particularly if you work with products from multiple manufacturers and in different file formats, such as the three primary industry standards: IESNA LM-63, EULUMDAT, and CIBSE TM14. The recently published IESNA LM-74, Standard File Format for the Electronic Transfer of Luminaire Data, will only compound this problem. Whereas current formats include only photometric data, LM-74 files include nearly everything needed to characterize a luminaire, from photometric data to mechanical details and CAD drawings. An integrated database management tool is essential for efficient application of photometric information.

MATERIALS AND OBJECTS LIBRARIES In order to calculate the flow of light, the program needs to know the properties of each surface material, including color, reflectance, transmittance, specularity, and texture. A materials library allows you to choose predefined surface materials or create your own, and to manage the bitmapped images that are used to texture selected surfaces. Similarly, an objects library allows you to save and reuse furniture

and other objects that you have imported or created.

ELECTRIC AND DAYLIGHT CALCULATIONS Do you need to consider daylighting design issues beyond the LEED-mandated daylight factors? This is an area in which lighting design programs are still evolving, as are the International Lighting Commission (CIE) standards upon which they rely. To be useful, however, the program should allow you to specify the time, date, and geographical location of the project, and also the IESNA or CIE sky condition. It might further provide animated sequences of images or movies for daylight studies that show shadow paths over multiple hours or days.

INTERACTIVE 3D WALKTHROUGHS Interactive 3D walkthroughs offer an overview of the project from any perspective in real time. This is useful both to visually evaluate the lighting design and to select viewpoints for presentation-quality images. They can also be used for client presentations, although their lack of textured surfaces and specular highlights make them less realistic.

RAY-TRACED IMAGES Ray-traced images—images that are generated by calculating the paths of tens of millions of light rays traveling between light sources and the observer—are essential if you want to show the client what the lighting design will really look like. Depending on the time and effort spent in modeling the project, a ray-traced image can be difficult to distinguish from a digital photograph. (The danger, of course, is that you may spend time discussing interior decorating issues with the client, rather than your lighting design.)

CALCULATION TOOLS There are many calculation tools from which to choose. Horizontal footcandles on workplanes and isolux plots are only the beginning: you can now calculate glare metrics such as CIE Unified Glare Rating and IESNA Visual Comfort Probability, roadway veiling luminance and Small Target Visibility, point illuminance and luminance values, lighting power density, daylight factors, and more with unparalleled detail and accuracy.

But are all these features necessary? Again, it is a question of initial cost, training time, and productivity. It is not simply a case of which program is "better," but which one best suits your specific needs. You must decide what features are important for your work, how much time you are willing to spend learning the software, and purchase accordingly. For instance, while Radiance is an open-source platform, meaning it is available in a free exchange, it is also the most complex in its capabilities, requiring a high level of proficiency. "Free" in this equation does not necessarily mean it will save time and money.

SOFTWARE SOURCES

ACCURENDER | ROBERT MCNEEL & ASSOCIATES | ACCURENDER.COM

AGI32 | LIGHTING ANALYSTS | AGI32.COM

ARCHICAD | GRAPHISOFT | GRAPHISOFT.COM

ENVISIONEER | CADSOFT | CADSOFT.COM

EOVIA | CARRARA | EOVIA.COM

LUMEN DESIGNER | LIGHTING TECHNOLOGIES | LIGHTING-TECHNOLOGIES.COM

MICROSTATION | BENTLEY | BENTLEY.COM

RADIANCE | LAWRENCE BERKELEY NATIONAL LABORATORY | RADIANCE-ONLINE.ORG

SHADE | E FRONTIER | E-FRONTIER.COM

VIZ | AUTODESK | AUTODESK.COM

ARCHITECTURAL VISUALIZATION

Choosing an architectural visualization program is more problematic. VIZ, ArchiCAD, Microstation, Shade, Envisioneer, AccuRender, Carrara ... the list is endless. However, not all of these programs can "render light" in the sense of modeling how light truly behaves in an equivalent physical environment. Without this capability, they offer little more than hand-drawn charcoal sketches or watercolor renderings for illustrating lighting designs.

There are a few features that can help identify those programs capable of accurately rendering light. For example, the software should support "physical light sources" by importing IESNA LM-63 and possibly EULUMDAT photometric data files. Similarly, if they support daylighting, they will allow you to specify the time, date, and geographic location of the project. The ability to specify the IESNA or CIE sky condition is a bonus, but not essential.

Another telltale sign a program will meet your needs, is the phrase "global illumination," which encompasses computer graphic rendering techniques such as radiosity, photon mapping, and stochastic ray tracing. While the ray-traced images may not be as physically accurate as those produced by lighting design programs, they will likely be close enough for the needs of architectural visualization. As with lighting design programs, the same issues of initial cost versus training time and productivity apply. Know your needs before making a purchase decision.

LOOKING TO THE FUTURE

The future of lighting design and architectural visualization programs is not in software, but in hardware. The latest buzz concerns graphics cards with integrated "hardware shaders." These specialized computers-on-a-chip allow programs to display advanced lighting effects such as glossy surface reflections in real time. With them, we will be able to interactively explore 3D virtual lighting designs with the realism of ray-traced images. These effects are already in use by computer game consoles, and are beginning to appear in games for personal computers.

Other hardware to watch for will be the next generation of computer displays. LCD and CRT monitors both have limited dynamic ranges (contrast ratios) and color gamuts. The next generation of LCD monitors will feature backlighting using multicolor LEDs rather than fluorescent lamps. These monitors will offer much wider color gamuts (especially greens and purples) and higher dynamic ranges that result in much darker shadows and brighter highlights.

Future versions of lighting design and architectural visualization programs will take advantage of these hardware advances. The goal, as always, is to answer the architect's question, "What will it look like?" with the best possible answer: photorealistic images that truly "render light."

Ian Ashdown, president of byHeart Consultants, has 30 years of experience in lighting design, research and development, and software engineering. He is vice chair of the IESNA Computer Committee, a CIE/CNC Advisory Member, and editor of chapter nine of the IESNA Lighting Handbook. *He is also a senior software engineer for Lighting Analysts, and member of the AGi32 development team.*

A|L LIGHT & ARCHITECTURE DESIGN AWARDS

DEADLINE: TUESDAY, MAY 2, 2006

Architectural Lighting announces the THIRD ANNUAL A|L LIGHT & ARCHITECTURE DESIGN AWARDS honoring outstanding and innovative projects in the field of architectural lighting. The A|L DESIGN AWARDS recognize and reward excellent lighting within the specific criteria relevant to each category. To acknowledge topics of notable importance in today's practice of lighting design, A|L will award the A|L VIRTUOUS ACHIEVEMENT (ALVA) AWARDS, which recognize projects that achieve the Best Use of Color; the Best Incorporation of Daylight; and the Best Lighting Design on a Budget. All winning projects will be published in the July/August 2006 issue of A|L, and will be featured on archlighting.com for three months.

A|L DESIGN AWARDS CATEGORIES

- RESIDENTIAL
- INTERIOR LIGHTING (PROJECTS UNDER 10,000 SQ. FT.)
- INTERIOR LIGHTING (PROJECTS OVER 10,000 SQ. FT.)
- EXTERIOR LIGHTING (PROJECTS UNDER 10,000 SQ. FT)
- EXTERIOR LIGHTING (PROJECTS OVER 10,000 SQ. FT.)

A|L VIRTUOUS ACHIEVEMENT AWARDS

- BEST USE OF COLOR
- BEST INCORPORATION OF DAYLIGHT
- BEST LIGHTING DESIGN ON A BUDGET

A|L LIGHT & ARCHITECTURE

Categories for the **A|L Light & Architecture Design Awards** *(must check one)*:

- ☐ Residential
- ☐ Interior Lighting (projects under 10,000 sq. ft.)
- ☐ Interior Lighting (projects over 10,000 sq. ft.)
- ☐ Exterior Lighting (projects under 10,000 sq. ft)
- ☐ Exterior Lighting (projects over 10,000 sq. ft.)

Projects may also be submitted for the **A|L Virtuous Achievement Awards** *(check all for which you would like this project considered)*:

- ☐ Best Use of Color
- ☐ Best Incorporation of Daylight
- ☐ Best Lighting Design on a Budget

ENTRY INFORMATION

Project Name _____

_____

Project Location _____

Client _____

Architect/Interior Designer/Engineer _____

_____

Lighting Designer _____

_____

Photographer(s) _____

_____

Entrant's Name _____

Name of Firm/Company _____

_____

Address _____

City, State, Zip _____

_____

Phone Number _____

E-mail _____

Fee $130 *(first entry)* $_____

$95 *(each subsequent entry and each ALVA submission)* $_____

(Make checks payable to *Architectural Lighting*)

Total $_____

Questions? Call 646.654.4482

I certify that the parties credited executed the submitted project and that it meets all eligibility requirements. I understand that *Architectural Lighting* magazine may disqualify any entry that fails to meet submission requirements. (Signer must be authorized to represent those credited.)

Name *(print)* _____

Signature _____

Date _____

Send entries to:
A|L Light & Architecture Design Awards
770 Broadway, 4th Floor, New York, NY 10003

A|L reserves the right to reject any entry and to terminate the competition at any time. Any disputes relating to the competition shall be resolved exclusively by A|L and the panel of judges. This contest is governed by New York laws without regard to its conflict of laws principles. All entrants and clients submit themselves to the exclusive jurisdiction of courts in the southern district of New York.

ELIGIBILITY

1. The competition is open to all design professionals worldwide.

2. Projects must be completed after July 2004.

SUBMISSION REQUIREMENTS

3. All entry materials must be contained in one large envelope per project, with the submitting firm and project name printed on the outside of the envelope. Include one photocopied set of all entry materials, as well as printouts of the digital images. (Photocopies and printouts may be black and white.)

4. Each submission must be accompanied by a signed entry form and a check covering the entry fee (see Entry Fees below). The form may be photocopied. Both the form and check should be included in the project envelope.

5. A project fact sheet must also be contained in each envelope. It should include (a) the project name, location and date of completion; (b) the entry category, and whether the submission should be considered for any number of the three ALVA Awards (see categories below); (c) project size in square feet; (d) watts per square foot; (e) lighting installation cost; and (f) manufacturer list including luminaire and lamp type.

Include a second page with a brief written description (no more than 600 words) of the client's goals, the challenges posed by the project and the design solutions applied. Submissions being considered for any of the three ALVA Awards should include an explanation (no more than 350 words) per ALVA category of why it excels in this/these category(ies). The digital image files should be numbered and keyed to the 600-word and/or 350-word description(s) to clarify what is depicted.

6. Images must be in digital format. Additional image submission requirements: (a) one CD per project; (b) either TIF or EPS file format; (c) 300 dots-per-inch resolution; (d) dimensions of 1200x1200 pixels (either the height or width should be a minimum of 1200 pixels). Please include no fewer than 7 and no more than 12 images. Label the image files using a consistent titling protocol, including the project name and numbers that correspond to the written descriptions. Use no more than 12 characters.

7. Please avoid the use of fill light when photographing the project; if its use is unavoidable, identify which shots include fill light.

8. To maintain anonymity during the judging process, no names of entrants or collaborating parties may appear on any part of the submission except on the signed entry form and on the project envelope.

CATEGORIES

9. Identify each submission on its entry form and on the project fact sheet as one of the following categories. (AIL reserves the right to change the category of a submission.)

RESIDENTIAL

INTERIOR LIGHTING (PROJECTS UNDER 10,000 SQ. FT.)

INTERIOR LIGHTING (PROJECTS OVER 10,000 SQ. FT.)

EXTERIOR LIGHTING (PROJECTS UNDER 10,000 SQ. FT)

EXTERIOR LIGHTING (PROJECTS OVER 10,000 SQ. FT.)

(Projects will not be judged against each other, but rather as superior examples of a lighting design solution within their category. Therefore, each category may have more than one winner or no winner at all; likewise, the number of entrants within the category will not impact whether there is a winner or how many.)

10. Appropriate submissions may also be considered for any of the three AIL Virtuous Achievement (ALVA) Awards. Entrants must indicate that a project should be considered for these awards on the entry form and on the project fact sheet. These awards require the following additional information:

BEST USE OF COLOR

Entrants must include an explanation (no more than 350 words) clarifying the use of color in the project. "Use of Color" may be interpreted liberally; however, judges will be asked to consider the complexity of the design.

BEST INCORPORATION OF DAYLIGHT

Entrants must include an explanation (no more than 350 words) clarifying how the project integrates daylighting with electric lighting. In addition, entrants must include ASHRAE 90.1 or LEED documentation indicating that daylighting provides persistent on-peak energy savings.

BEST LIGHTING DESIGN ON A BUDGET

Entrants must include an explanation (no more than 350 words) clarifying why theirs is a budget project; in addition, they must include project construction costs, lighting materials costs, and lighting and electrical subcontractor costs (preferably on a per-square-foot basis). Judges understand costs are relative to project type; however, they reserve the right to determine whether it is truly a budget project.

JUDGING

11. An independent panel of judges will award prizes to projects at their sole discretion, based on the complexity of the project program and the lighting solutions applied.

12. Judging will take place in June 2006. Winning entrants will be notified in late June 2006, and their projects will appear in the July/August 2006 issue of AIL.

PUBLICATION

13. Winners of the AIL Design Awards agree to have their projects and names published in AIL, on AIL's website, and in any other media, and must provide further information and publication-worthy graphic materials as needed by AIL. Winners also agree to secure permission for publication from clients and photographers prior to entry. (Photographer(s) will receive proper citation credit, but will not receive payment for images published as part of the editorial design awards coverage in both print and online.)

14. Winners will be required to sign and return within a specified time a Publicity Release. Winners will also be required to sign a document stating that the entry is the original work of the winner and does not infringe on any proprietary right, including but not limited to copyright, trademark, and the rights of publicity and privacy of any party, and grants AIL the right to use the entry in print and electronic medium.

ENTRY FEES

15. Each submission must be accompanied by a check covering the entry fee ($130 for the first entry; $95 for each subsequent entry and each ALVA entry). Make check payable to *Architectural Lighting*. (International entrants, send drafts in U.S. dollars.)

DEADLINE

16. Entries must be received by 5p.m. (EST), Tuesday May 2, 2006.

RETURN OF ENTRIES

17. AIL will ONLY return entries that provide a self-addressed stamped envelope with proper postage. AIL shall not have liability for damaged or misplaced entries.

Enhanced Materials for Light Dispersion

BY JAMES BENYA

LUMINAIRE DESIGN IS GOVERNED BY PHYSICS. PERHAPS THE MOST IMPORTANT principle is reflection, which allows for directional redistribution of light. Sometimes light distribution is further affected by refraction, the bending of light rays exhibited by a lens; or by diffusion, the purposeful scattering of light through a translucent material. These effects have been a predictable piece of the lighting design puzzle.

Over the years, however, incremental advances in materials science have evolved to such an extent, it is as if the governing laws of physics had been rewritten. Luminaires are now capable of feats designers once thought an R&D pipe dream, owing to the contributions of, for example, high-reflectivity paint and metal, and thin-layer lenses. Many of these enhancements have also contributed to a new generation of energy efficiency in luminaire design.

ULTRA-REFLECTIVITY

Inside a luminaire, reflecting surfaces gather the light and redistribute it in useful directions. Other reflecting surfaces, such as louvers, further shape and redirect the light as it leaves the fixture. The reflectivity of a luminaire's interior surfaces is critical to the fixture's efficiency because a small amount of light is absorbed, and hence lost, as each light ray "bounces." The fewer number of bounces, or the lower the loss per bounce, the more efficient the fixture.

There are several types of reflection: Specular reflection redirects light in the opposite direction of incidence, like a mirror. Diffuse sends light in all directions within the hemisphere of the side of the surface. Almost every material has both diffuse and specular, with its total reflection being the sum of the two. A third type, called spread, accounts for the diffusing effect of light on an uneven specular plane, such as hammered or corrugated surfaces.

There are two major areas of improvement in reflectance:

PAINT Modern "powder-coat" white paints, now used for most basic lighting products, offer more than 90 percent total reflectivity. Most new paint products provide primarily diffuse reflection, but the gloss of the paint offers some specular reflectivity as well. Compared to the 80 percent total reflectivity of earlier paints and porcelain finishes, this simple advance makes almost all current fixtures more efficient than older ones. Some recently developed paints have amazing characteristics: At least one lighting manufacturer now offers products painted with 96 percent gloss white paint that, while expensive, is easy to apply and use in normal manufacturing. Another new paint produces over 96 percent totally diffuse reflectivity, without any gloss; this, while harder to apply and much more fragile, engages the principle of constructive occlusion. (For more on this, see "Multi-Bounce Reflecting Systems," below.)

FINISHED METAL New aluminum roll metal also provides a range of reflectance options. High-purity aluminum products achieve 94 to 95 percent total reflectance. Moreover, compared to last-generation materials, these products exhibit no spectral shift or iridescence. In addition to highly specular finishes (95 percent total reflectivity, with less than a 5 percent diffuse component), there are also semi-specular (94 percent total, 40 to 58 percent diffuse) and diffuse and matte (94 percent total, 80 to 90 percent diffuse). A hammered specular product exists that achieves 95 percent total reflectivity and an amazing 94 percent spread. High-performance metals have improved overall efficiency by 10 percent or more compared to conventional fixtures. Moreover, with specular materials, there is the option of refined directional reflectors, which in addition to efficiency, enhances the candlepower distribution pattern.

UNCONVENTIONAL REFRACTORS

Among the oldest products incorporated in luminaire construction, lenses and other refracting or diffuse transmitting materials are used to shape and redirect light, generally as the light rays exit the luminaire. Conventional plastic and glass sheets provide more than

1 Appropriate for low-ceiling applications, Twelve from Focal Point uses a special filter to disperse and redirect the light, achieving a 115-degree beam spread. CIRCLE 206 2 Used in light pipes to transmit sunlight, Alanod's aluminum coil product Miro-Silver offers a total reflectivity of 98 percent, and a solar reflection of 95 percent. CIRCLE 207 3 Series 15 from Finelite employs constructive occlusion technology, bouncing rays against highly reflective surfaces until they exit. CIRCLE 208

90 percent clear transmission, and injection-molded plastic and glass lenses, more than 80 percent transmission. But when the lens is designed to hide the lamp or shape the light beam, efficiency drops. For example, common white translucent sheet material exhibits transmission of 20 to 70 percent depending on its thickness and density.

Enter a new generation of products that employ "thin-layer" technologies. Applied to substrates of high-transmission materials like glass and plastic, very thin layers of polymer and other materials can be used to modify beam spread, spectrum, and other aspects of light. For several years, designers have employed dichroics, thin-film coatings that make possible infrared reflecting lamps, low-E window glazing, and colored lenses. Recently, manufacturers have devised thin-film options to alter beam spread and shape. While performing the work historically assigned to lenses, thin-film optics are more transmittive, resulting in dramatically increased efficiency.

WAVE GUIDES

The term "wave guide" is more readily associated with microwaves and radio waves, but the concept is also applicable to optics. The size of the vessel and its entry and exit apertures are related to the wavelengths being managed, and thus, the vessel can accept or reject certain waves. In lighting, a related principle is used with the same effect, called "total internal reflectance." When light travels within a material that is denser than air, such as plastic or glass, rays of light cannot escape unless they strike the surface within a range of nearly perpendicular angles. Otherwise, the light ricochets along the inside surface all the way to the end of the material. If all light entering the material is collimated, then in theory, all of it will be transmitted to the end, and from the side, the object will appear dark, even if it is glass or plastic. This principle makes fiber optics possible.

One basic variation of the wave guide is a "light pipe." Introduced into a tunnel of air surrounded by highly reflective material, light can be "piped" from space to space. Products were developed in the 1970s and 1980s using plastic extrusions and films. Recently, highly reflective and specular metals are being employed.

PRODUCT ADVANCEMENTS

These materials advances have enabled innovative products. Here are a few key examples.

ULTRA-HIGH-EFFICIENCY LUMINAIRES The combined use of high-reflectance and high-transmission materials has dramatically improved luminaire performance. For instance, in new-generation T5 troffers, high-efficiency semi-specular reflectors are used around the lamp, while a latest-technology lens hides the lamp image and creates the basic candlepower shape, and an additional diffuse reflector beyond the lens provides shielding.

Ledalite's MesoOptics innovation speaks to advances in "thin-layer" lens technology. Tiny microstructures, 5 microns in size, are adhered to a substrate such as acrylic, polycarbonate, or glass (above). This helps remove striations and hot spots, as well as control the beam pattern (middle) or redirect the light into desired angles (top). CIRCLE 208

MULTI-BOUNCE REFLECTING SYSTEMS Conventional luminaire design assumed 10 to 20 percent light loss per reflection, so last-generation reflecting systems allowed a ray "one bounce and out." Now, using 96 percent white paint or specular aluminum, a ray can bounce four or five times and still maintain the efficiency of older designs.

One example is low-ceiling indirect lighting, where most candlepower must be concentrated into the 95- to 120-degree zone, a range lower and narrower than typical indirect lighting. Highly reflective gloss white paint allows each ray to bounce an average of 3 to 4 times before exiting.

In a "constructive occlusion" luminaire, the lamp chamber, which incorporates small apertures, is painted with 98 percent reflective white matte paint. Light literally keeps bouncing and diffusing until it exits through one of the small apertures, permitting a beam spread and efficiency difficult to achieve with conventional technology.

INTERESTING LENSES Recent lenses feature a thin-film optic on at least one surface that helps emulate prismatic and other distribution effects. Light enters the lens from the side, and the thin-film optic permits some of the light to be emitted, making the large sides of the lens luminous.

HIGH-PERFORMANCE SKYLIGHTS The light pipe is a natural adjunct to a small-aperture skylight, ensuring high efficiency in transferring light from the roof into interior spaces. The use of high-efficiency specular and silver-coated aluminum materials has made tubular skylights almost twice as efficient as products of 10 years ago.

WINDOW SHADES Architects often employ "light shelves" to reflect light onto the ceiling for indirect lighting. More recently, high-performance aluminum shades have been developed to control glare while creating a light-shelf effect. Each blade of the shade is shaped to reflect the useful daylight at the proper angle.

Too often we look to the light source itself to make luminaires perform better and be more efficient. The optics of luminaire design, however, are just as critical, and advances in materials science have enabled a new level of performance, raising the importance of optics yet another notch.

James Benya is a professional lighting designer and principal of Benya Lighting Design in Tigard, Oregon. He serves on the editorial advisory board of A|L.

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Landmark Moments in Lighting

As A|L enters its 20th anniversary year, we'd like to know what you consider landmark moments in the architectural lighting profession. Is it a technical advancement, a specific project, the design of a luminaire, or the formation of a professional organization?

more responses available at ARCHLIGHTING.COM

CRISIS, ASSOCIATIONS, AND QUALIFICATIONS

HOWARD BRANDSTON, FOUNDING PARTNER | **BRANDSTON PARTNERSHIP**

There are three landmark moments that affected the architectural lighting profession: The first was the energy crisis. It changed the perspective of everyone working in lighting as to what responsible, good lighting was. It brought lighting into focus and encouraged the development of lighting's portion of the energy code in Standard 90.1. Unfortunately, it also probably did more to promote mediocre lighting than any other development. The second was the formation of the IALD and ELDA, which brought an awareness to lighting that hadn't been seen before. Finally, the NCQLP was also a significant step because it made people, and the government, realize that the designers they hire should have certain qualifications.

LIGHTING AS A FIELD OF INQUIRY

MARK REA, DIRECTOR | **LIGHTING RESEARCH CENTER**

Over the last 20 years, lighting has struggled to become its own profession, to become more than support for the professions of architecture and engineering. Specialized knowledge is at the core of any profession, and clearly lighting requires special technical training. But professionals should also exhibit wisdom, attained through the cornerstones of education and science. The lighting profession can only evolve through a commitment to understanding the physical and biological sciences. Experience is simply not enough.

The establishment of the Lighting Research Center in 1988 is one of many milestones in the growth of lighting as a profession over the past 20 years. This establishment is perhaps unique because of its commitment to establishing lighting as a legitimate field of intellectual inquiry, not just a derivative of architecture or engineering. As lighting becomes a field through education and science, lighting will, we believe, become a profession.

A MAGAZINE FOR THE PROFESSION

CRAIG DILOUIE, PRINCIPAL (AND FORMER EDITOR AND PUBLISHER OF A|L) | **ZING COMMUNICATIONS**

Given that this year is *Architectural Lighting's* 20th Anniversary, it's only suitable to notice that the magazine's launch by Charles Linn in 1986 was undeniably a landmark moment in the architectural lighting profession. The magazine helped recognize the leadership and value of the profession, and contributed to its values and development. In addition, it provided a forum for lighting designers, architects, manufacturers, and other professionals to connect about lighting that is driven by quality, performance, aesthetics, and architectural integration.

COLOR-CHANGING

PAUL GREGORY, PRESIDENT AND PRINCIPAL DESIGNER | **FOCUS LIGHTING**

The Empire State building paved the way in 1977 with its manually color-changing exterior lighting displays by Douglas Leigh; and the Entel Tower in Santiago, Chile, [designed by Focus Lighting] was the first automated color-changing exterior lighting display in the world. The 40-story tower opened in October 1994 with a computer control system that was the most advanced of its kind.

CROSS-FERTILIZATION

LENI SCHWENDINGER, LIGHTING DESIGNER | **LIGHT PROJECTS**

Key developments include: The acceptance of hybrid approaches and roles and the cross-fertilization between disciplines such as film, media, and architecture ■ The elevation of our profession: IALD's "Why Hire a Lighting Designer," ELDA's multilevel workshops in tandem with urban-planning conferences, and this year's IES Centennial Community Projects ■ The Parsons lighting design program: future lighting designers will have an expanded purview, as lighting artists are surfacing ■ International lighting strategies: municipalities all over the world have begun to value and shape the urban night ■ And finally, the best use of lighting for 2005: AntWorks Space Age Ant Habitat, combining wildlife and lighting indoors for study.

TECHNOLOGY AND TERMINOLOGY

MARTIN MOECK, ASST. PROFESSOR | **PENNSYLVANIA STATE UNIVERSITY**

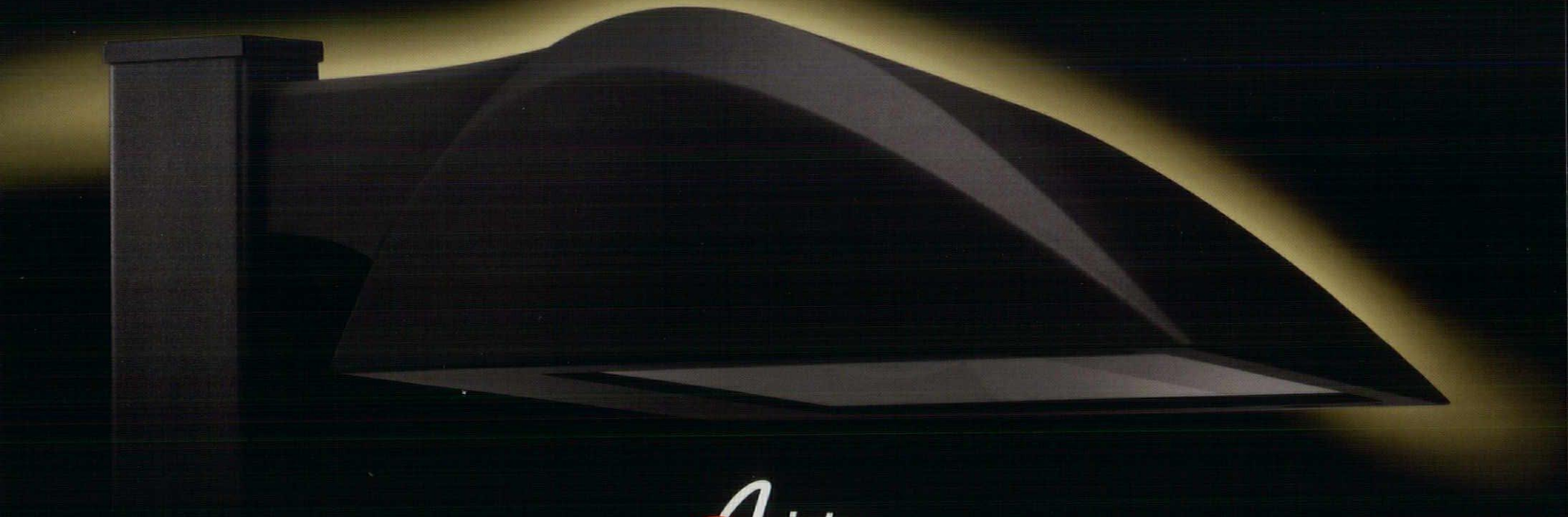
POSITIVE LANDMARKS: The fluorescent lamp ■ The development of the lighting design profession and the IALD ■ The LEED Green Building Rating System ■ Raytracing software for lighting simulations ■ Combined lighting, heating, and cooling simulations for the determination of total energy performance ■ California's Title 24 ■ Relighting of the Statue of Liberty by Howard Brandston in 1987 ■ The architecture of Guarino Guarini and Bernini, who used daylight as a design tool.

NEGATIVE LANDMARKS: The NCQLP Lighting Certification exam (anybody can pass this exam and erode the lighting design profession by offering "lighting-certified" designs) ■ The unaltered use of the incandescent lamp ■ No progress in daylight systems development and applications ■ The use of the word "sustainability" (electric lighting is not sustainable unless it is produced by alternative energy sources) ■ The invention of lighting terminology that is misleading, such as "color-rendering indices" and "correlated color temperature" ■ Lighting terminology that cannot be defined, such as "lighting quality" ■ The use of inefficient colored light sources (if architects need color, they can paint architectural surfaces instead) ■ No agreement on lighting effects such as sparkle ■ No complete computer-based vision models that explain how people see ■ A significant erosion of support for funded lighting research and the reduction in the number of lighting scientists ■ More lighting research done by other societies such as ASHRAE, the Society of Automotive Engineers (SAE), the Institute of Electrical and Electronics Engineers (IEEE), and the International Society for Optical Engineering (SPIE) ■ Financial support for schools that have no lighting education tradition ■ Lighting controls that do not work well with total building management ■ The decoupling of lighting from building services engineering.

PROFESSIONAL ASSOCIATION

SONNY SONNENFELD, PRESIDENT | **CREATIVE STUDIO DESIGN**

One of the most important moments was when the architectural lighting design community realized that lighting design was truly a "profession" and should be organized as such. They then formed the IALD.



Aviator

AIRFOIL INSPIRATION

Where does inspiration come from?
Sometimes it is simply a new way of looking at the world around us.

The new Aviator Series from Beta Lighting is exhilarating in its dayform, versatile in its function and exceptional in its performance.

While the Aviator's engaging aesthetics complement and blend with virtually any environment, it is the uncompromising performance and unique engineering for easy installation and maintenance that warrant your interest.

For more detailed information, call us or visit the Beta Lighting website.

designed by

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beta lighting®