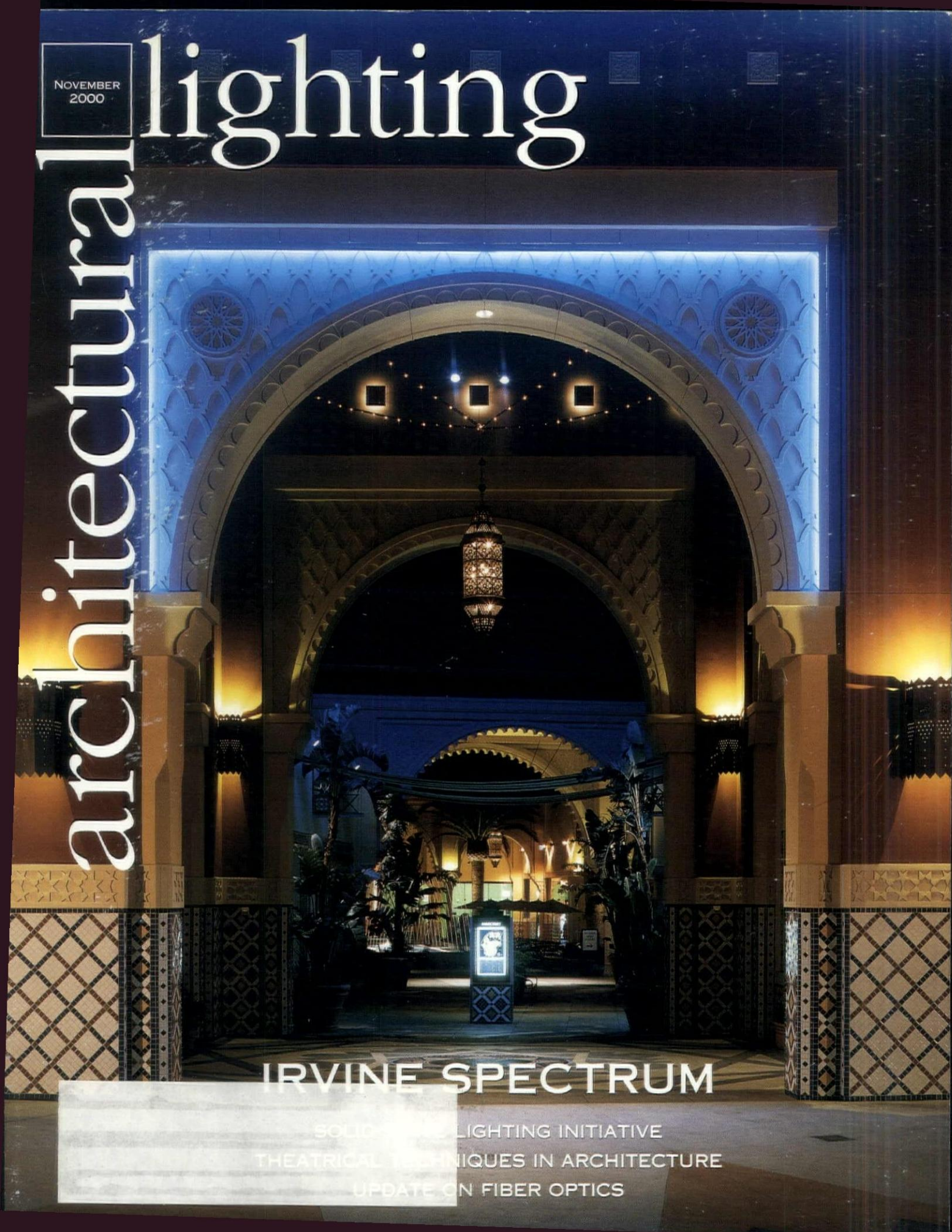
NOVEMBER
2000

architectural lighting



IRVINE SPECTRUM

SOLID[illegible] LIGHTING INITIATIVE

THEATRICAL[illegible]NIQUES IN ARCHITECTURE

UPDATE ON FIBER OPTICS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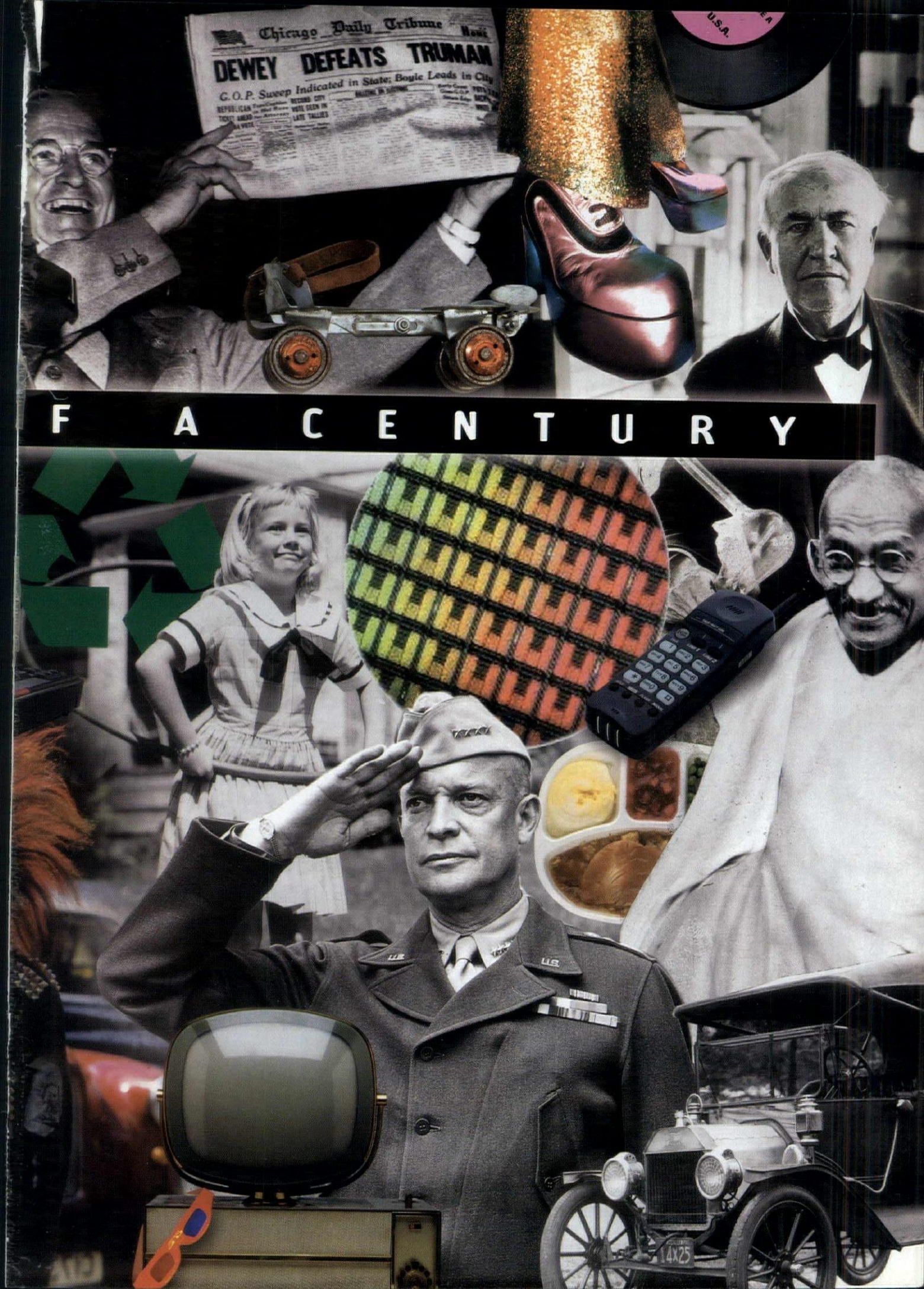
Chicago Daily Tribune
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F A CENTURY

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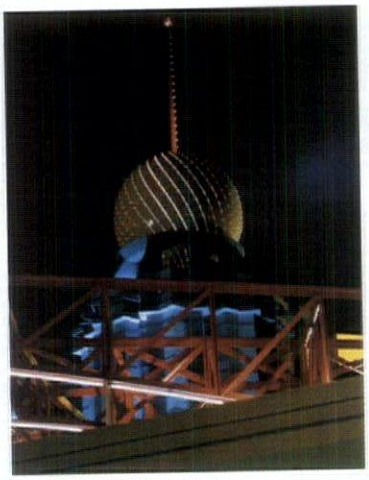

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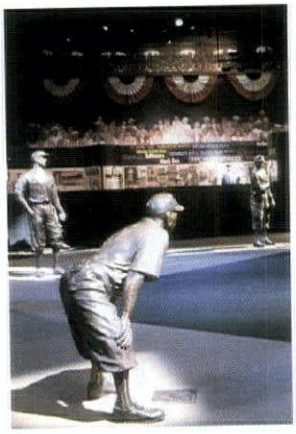

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editorial

IT'S HIP TO BE SQUARE

While 2001—which some consider to be the "true" millennium year—seems to still be looming in the not-too-distant future, it's actually approaching fast. And if you're like me, just the realization of that fact—and the realization that there's so much yet to accomplish before the end of *this* year—is enough to make you scream "Stop!" At least just long enough to catch your breath. At least to try to enjoy the holiday season. A time for family, friends, festivity. (Remember, there is more to your life than work?) Well, at Architectural Lighting Magazine, we're gearing up for 2001 in a very special way. And I just want to take this opportunity now to whet your appetites—and hopefully make you just as thrilled as we are.

A fresh start. A new beginning. These are often the thoughts that signal the approach of a new year. And we're taking them literally. When you receive your first issue of *Architectural Lighting* in 2001, what you'll see is something comfortably familiar, yet stunningly fresh. What you'll read is the same editorial quality, yet slightly edgier. And all in a larger, square-shaped format.

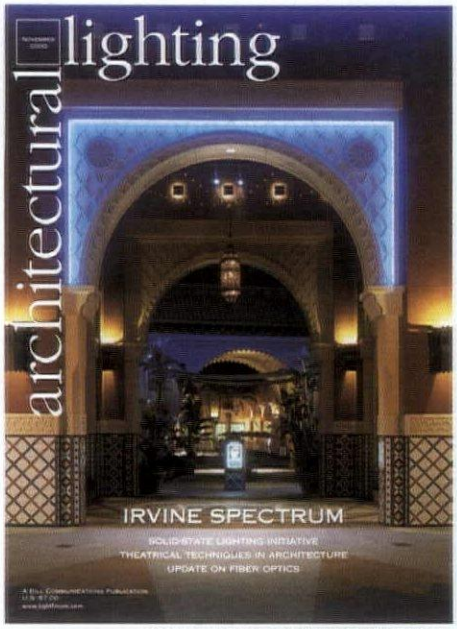
Yes, we are redesigning the magazine.

In 2001, *Architectural Lighting* will be celebrating its 15th anniversary. What better way to mark the occasion than with the positive message and bold perspective that we think the new design will deliver. After all, a lot has happened since 1986. In looking back at some of the topics covered in the mid to late '80s—such as Lighting World, the drive for smaller lamps and housings and the push to heighten the position of the lighting designer in the architectural market—it's truly amazing to see just how much the industry, from both a technological and professional approach, has grown.

PHOTO BY CHRIS LAMB

CHRISTINA TRAUTHWEIN, EDITOR-IN-CHIEF

And a lot has happened since 1996, the year of our last redesign. All of us are affected by the general climate of this New Economy, where terms like "fast pace," "cutting edge" and "high impact," are no longer ideas for the progressive, but a matter of course. There is a trend to streamline just about everything for more targeted impact. Including, of course, magazines.

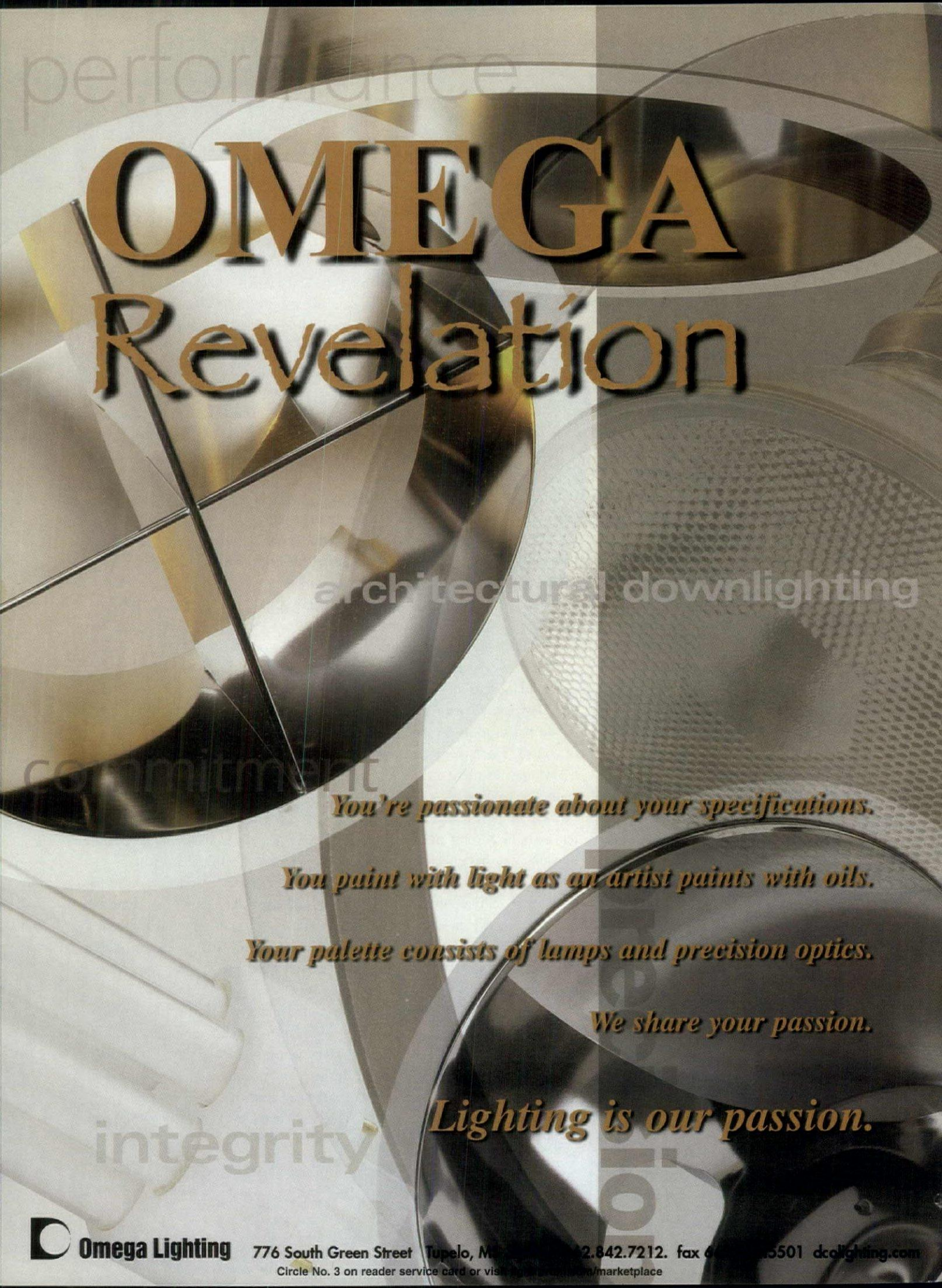


COVER PHOTO: © ANTHONY PERES

And while it is extremely important to the staff of *Architectural Lighting* that both the content and visual presentation of the magazine retain many of the qualities that have solidified our identity in the industry, it is our hope that through this "new look," we convey what my art director, Jonathan, who has done an incredible job of defining in physical terms the editors' concepts and visions, calls the "pulse and beat" of the times. It is our intention that this new image reflects the energy of a dynamic profession that is experiencing tremendous momentum. And that we, as a publication, reaffirm our commitment to design.

We believe that the presentation of our publication in a square format—typical of many European magazines—will create immediate impact, enabling both projects and advertisements to have even more visual power. Our fonts and color schemes, in combination with sexier cover lines and fresher department heads, aim to produce maximum effect, providing a media vehicle that is crisper and sharper than ever before.

Are you excited? We definitely are. So look for our annual Lighting Source Directory, which will reach your offices mid-December, and then get ready...there are great things to come. ■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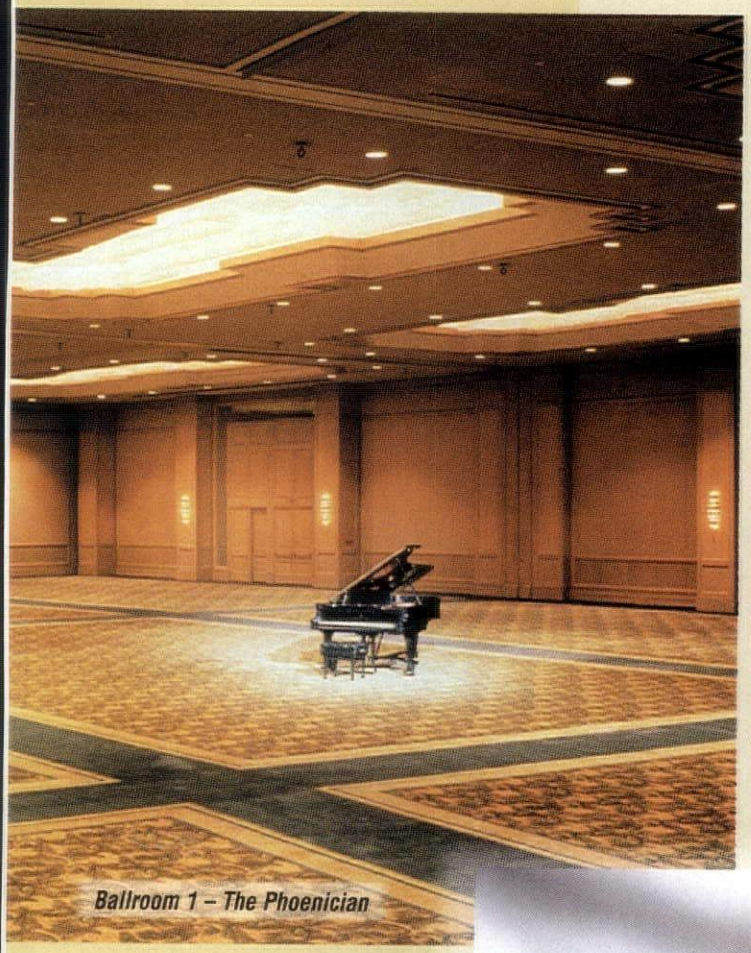
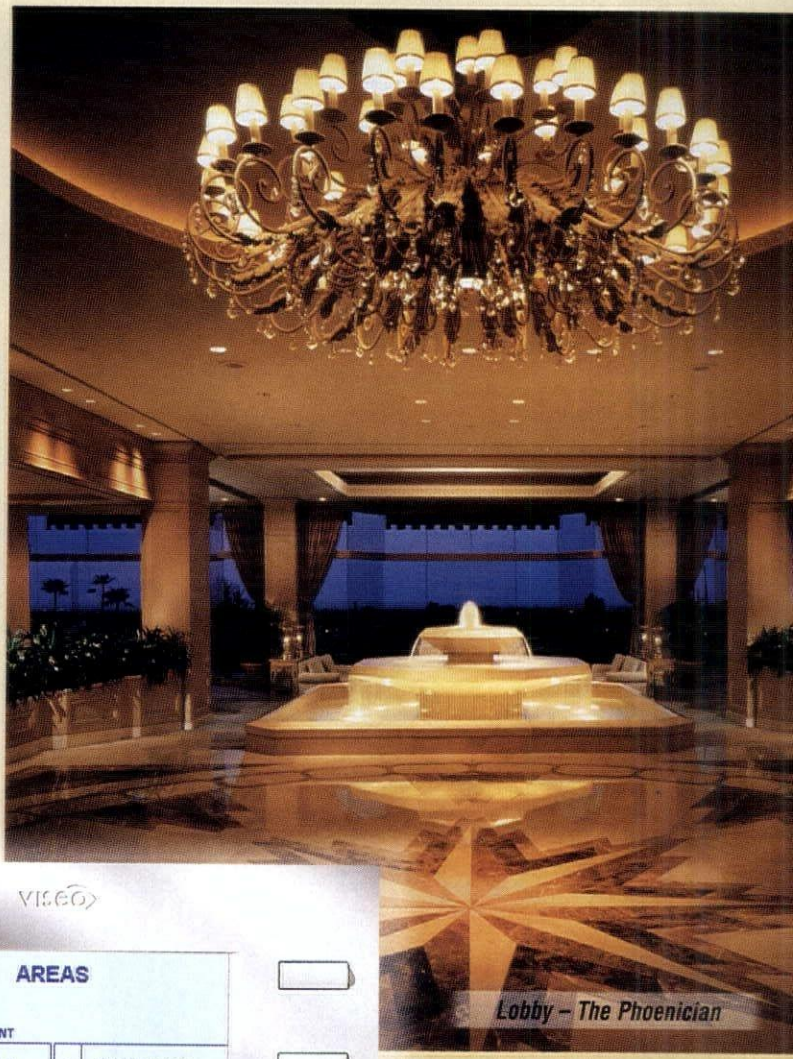
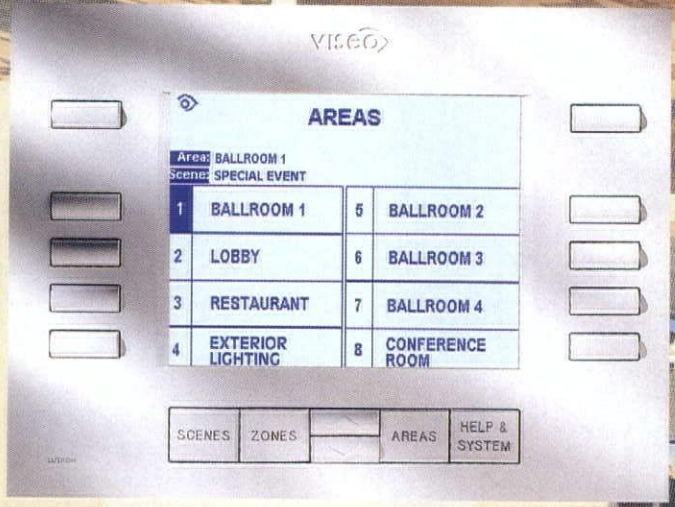
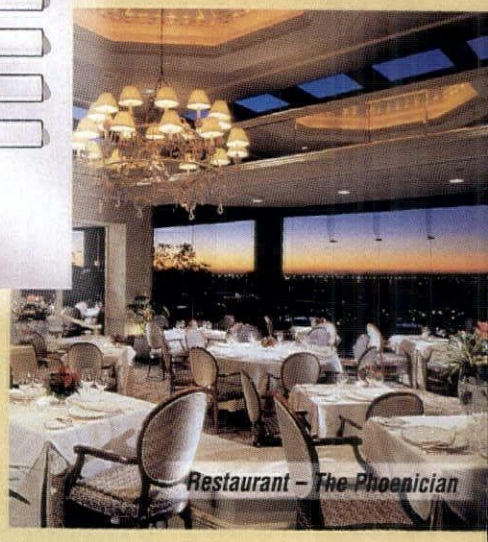


Ballroom 1 – The Phoenician



Lobby – The Phoenician





Restaurant – The Phoenician

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Photos courtesy of the Phoenician in Scottsdale, Arizona. Hotels like the Phoenician are typical examples of where Viseo can simplify the operation of a total building lighting control system.

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letters

To the Editor:

Having met David Mintz early in both of our careers, I found your interview in the June/July issue very interesting. Reading David's comment that "packaging" is the industry issue that he would like to see change did not surprise me. The majority of lighting designers would like to see the end of the "package era." An ideal system would allow the conglomerates to compete on the commodity fixtures (perhaps 75 percent of a typical job) while giving the designer freedom to select and predetermine affordability of special-application or special-look fixtures. As innovative independent manufacturers realize that they are hopelessly buried in the mega-rep's 50 to 100 line offering, things will start to change. The money they save on commissions can be put into websites and a few lighting professionals who can present samples as needed anywhere. Their net prices and necessary specification data will be on the Internet and can be accessed by anyone. If this price is determined to be affordable in the design phase, the specifier can support a one-name specification with no fear of being blindsided at bid time. This will encourage meaningful lighting fixture design in the USA, which has been sadly lacking in recent years.

Warren G. Meltzer
Lake Creek Associates
Prescott, AZ

To the Editor:

A recent article published about Digital Addressable Lighting ("Lightfair 2000: New & Noteworthy," June/July 2000) has generated positive response from the lighting community. The article articulated several facts regarding Tridonic's introduction of the DALI (Digital Addressable Lighting Interface) into the USA market. We would like to clarify a few points, which we feel were misinterpreted.

The statement, "companies employing the standard in their products must pay royalty to Tridonic…" is not correct. The DALI protocol is currently administered by the DALI AG association.

USA ballast and control manufacturers can develop DALI-compatible products without paying patent royalties to Tridonic or other companies. Ballast manufacturers are required to join and participate in the DALI AG association for a nominal yearly fee. Although control manufacturers are not required to join, it is recommended. Association proceeds go toward protocol administrative, marketing communication and support expenses.

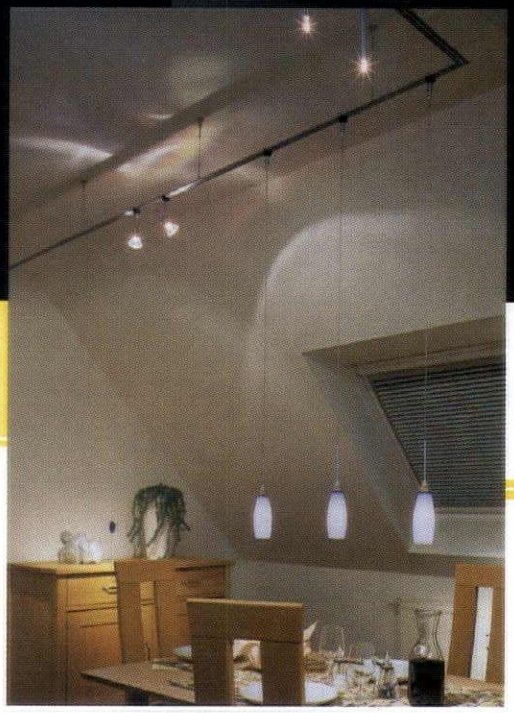
Later in the article, reference was made to the possibility that "emerging wireless radio frequency networking technology may leapfrog hardwired communications…." DALI's protocol is transparent to hardware medium used and can be applied using various communication hardware techniques. We anticipate DALI-compatible RF- and IR-communication products available in the near future from various control manufacturers.

Digital communications technology used in lighting applications will replace current analog systems in the same way digital technology has transformed other industries. As the use of digital addressable lighting systems increases within the USA, the benefits of reduced operating costs, increased office space flexibility and reduced life-cycle cost will become widely understood by individuals in the commercial business sector.

Steven J. Purdy, *sales & marketing*
Tridonic Inc.
Norcross, GA

BRUCK

LIGHTING SYSTEMS



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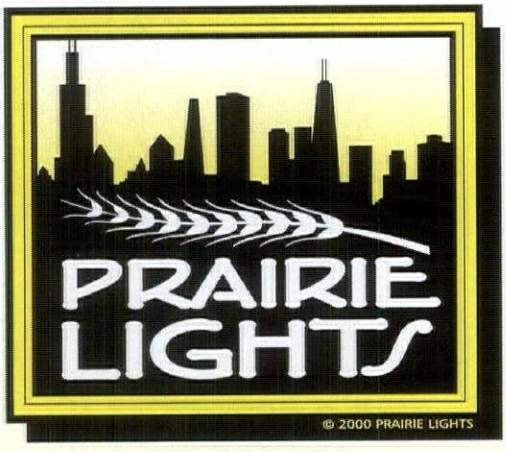
PRAIRIE LIGHTS 2001



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5 Educational Seminars and Panel Discussion on Hot Topics

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Admission to the Exhibit Hall is $20 for both days and includes lunches.
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24 Hour Registration and Show Information
Call **888-426-7060** or visit our website at **www.prairielights2001.com**

RICHARD KELLY GRANT RECOGNIZES TWO WINNERS

This year, the Richard Kelly Grant has been awarded to two winners, **Brad Koerner** and **Carlos Inclan**. Both will receive financial grants to continue their work in exploring different mediums with light.

Koerner's submission examines the use of electroluminescent and phosphorescent materials and their integration into standard building materials, such as concrete, wood, glass, etc. Koerner's project also explores the aesthetic implications of flexible, stacked organic light-emitting diodes (SOLEDs) and their use as flexible, cloth-like luminous display panels.

Inclan's project for Colorwheel, a computer graphics firm, involved working with the architect and client to turn one wall of each elevator cab into a special, corporate identity-defining element with light. Each cab was fitted with dichroic filters in one of three primary colors and the dichro-ports were illuminated with fiber optics to save space. The combination of viewing angle and dichroic coating accounts for an ever-changing color shift.

The judges were Addison Kelly, Linnaea Tillett, Richard Shaver, James Conti, Diane Naiztat and Clara Powell.

IESNA CHICAGO ANNOUNCES PRAIRIE LIGHTS 2001 DATES

The Chicago section of the Illuminating Engineering Society has announced the 2nd annual Prairie Lights Conference and Show to be held February 22-23, 2001 at the Hyatt Regency in downtown Chicago. The 2001 show will add 25 new exhibitors, bringing the total of lighting manufacturers to 75, offer six seminars and present awards for the top three booth designs. For more information, call the Prairie Lights information and registration line at (888) 426-7060 or visit www.prairielights2001.com.

BLMC OFFERS NCQLP LIGHTING EDUCATION UNITS

BLMC2000 has been approved as an authorized provider of the Lighting Education Unit (LEU) under the auspices of the National Council on Qualifications for the Lighting Professions (NCQLP). Lighting designers can use up to 22 LEU credits earned by attending BLMC (Broadway Lighting Master Classes) towards re-certification for the NCQLP's "LC" designation. For more information, contact the BLMC at (212) 229-2965 ext. 829.

CALL FOR ENTRIES

The Rotch Travelling Scholarship is accepting submissions for 2001. A stipend of $35,000 is awarded to the winner of a two-stage design competition for eight months of travel throughout the world. A second prize of $15,000 will also be offered this year.

The scholarship program is open to U.S. citizens under 35 years old on January 1, 2001 who have either (1) earned a degree from an accredited school of architecture and worked for at least a year in a Massachusetts architectural firm by January 1, 2001 or (2) earned a degree from an accredited Massachusetts school of architecture and worked for at least a year in any U.S. architectural firm by January 1, 2001. For more information, visit the website at www.rotchscholarship.org.

CORRECTIONS ...

In the article, "Home Remedies—Residential Design," which appeared in *Architectural Lighting*'s August/September 2000 issue, the recommended task illuminance level for home office/den spaces is not 50-100 lux, but 500-1000 lux (or 50-100 fc). For home theaters, recommended ambient light levels should fall between 50-300 lux (5-30 fc) instead of 5-30 lux.

Susannah Zweighaft, LC has joined AKF Engineers to head up a new Lighting Design Group.

Terry R. Bell, IES, LC has joined The Lighting Practice as associate.

Panasonic has appointed **Gary M. John** to Northeast regional sales manager.

Dr. Peter Shackle has been named VP of Engineering at Robertson Worldwide.

Edwin F. Sierra, AIA, ISP has joined WalkerGroup/CNI as VP and design director of the Los Angeles office.

Strong Entertainment Lighting has appointed **Jerry Ross** VP, sales and marketing.

HOK has promoted **Tom Kaczkowski, AIA** to VP, St. Louis, MO office.

Three new shareholders have been added to **Horton Lees Brogden Lighting Design**, formerly Horton•Lees Lighting Design. The three new owners are **Teal Brogden**, senior principal and director of design, **Mark Harris**, principal and **Angela McDonald**, principal.

Robert Young Associates has named **David Cassidy**, **Paul Chappell**, **Robert Coker**, **Bill Plaisance**, **Chris Roberts** and **Jim Simon** associate principal. **Claudene Anderson**, **Hallie Galloway**, **Jeff Henderson**, **Frank McMillin**, **Mike Schroeder** and **John Von Mohr** have been promoted to senior associate.

Michael Sorrentino has been named CEO for designonlineinc.com.

Kristina K. Martin, PE, LC has been named principal at the Engineering Enterprise.

Sandi K. Boone has been promoted to VP of operations at Magnaray International.

Hubbell Lighting has named **Glenn M. Grunewald** executive VP and COO of the company.

Charles Harris has been appointed president of Progress Lighting.

Cesar Pelli & Associates Architects has named **William E. Butler, AIA**, **Mitchell A. Hirsch, AIA**, **Gregg E. Jones, AIA**, **Mariko Masuoka, AIA**, **Lawrence S. Ng, AIA** and **Mark R. Shoemaker, AIA** associate principal. **Phillip G. Bernstein, FAIA** has been named adjunct associate principal.

calendar
UPDATES

2000 SCHEDULED EVENTS

December 6 Lighting Design Lab Annual Open House, Lighting Design Lab, Seattle, WA; jan@northwestlighting.com, www.northwestlighting.com.

December 7-8 AEE seminar: "Fundamentals of Energy Management," Grosvenor Hotel, Orlando, FL; (770) 447-5083, www.aeecenter.org.

December 6-10 8th Annual Broadway Lighting Master Class, New York; (212) 229-2965, ext. 829, blmc@intertec.com, www.etec-nyc.net.

December 11-15 Elec 2000, Paris-Nord Villepinte, Paris, France; (33) (0)1 53 23 99 99, fax (33) (0)1 53 23 99 70, www.elec.fr.

2001 SCHEDULED EVENTS

January 8 "Lighting Jeopardy—How the Lighting Game is Played," Designers Lighting Forum, Los Angeles; (310) 535-0105, www.DLFLA.org.

January 15-17 Restoration & Renovation, Washington Hilton & Towers, Washington, D.C.; (800) 982-6247, fax (978) 664-5822.

February 5 "The Venetian: What it Takes to Win an 'Edison,'" Designers Lighting Forum, Los Angeles; (310) 535-0105, www.DLFLA.org.

February 8-9 2nd Annual Strategies in Light Conference, Hyatt Regency Hotel, Burlingame, CA; (650) 941-3438, info@strategies-u.com.

February 21 "Light for Life," Designers Lighting Forum, New York; (212) 613-1599.

February 22-23 Prairie Lights 2001, Hyatt Regency Chicago, Chicago; (888) 426-7060, www.prairielights2001.com.

March 5 "Better Than CRI—Lighting and Color," Designers Lighting Forum, Los Angeles; (310) 535-0105, www.DLFLA.org.

March 21 "Hoop Dreams," Designers Lighting Forum, New York; (212) 613-1599.

March 25-27 Enlightening America 2001, Philadelphia; Lynn M. Russo at (609) 799-4900, email: lrusso@eela.com.

April 2 "Quick Fixes—Lighting Solutions," Designers Lighting Forum, Los Angeles; (310) 535-0105, www.DLFLA.org.

April 4-9 Euroluce 2001, Milan Fairgrounds, Milan, Italy; (39) 02725941, fax (39) 0289011563, www.isaloni.it.

April 22-25 Lightstyle: International Trade Fair for Domestic Lighting, Messe Frankfurt, Frankfurt, Germany; (49) 69 75 75 56 87, (49) 69 75 75 60 58.

May 30-June 1 Lightfair International, Las Vegas Convention Center, Las Vegas, NV; (404) 220-2221.

insights

In this issue, Architectural Lighting *interviews Paul Gregory, president of Focus Lighting in New York City. Gregory was trained in theatrical lighting at the Goodman Theatre School of the Art Institute of Chicago and in architectural lighting design at the Parsons School of Design in Manhattan. Although he began his career as a theatrical lighting designer, in 1975, Gregory founded the Litelab Corporation, where he was responsible for design projects, including museums, restaurants, theaters and entertainment facilities. In 1985, Gregory launched Focus Lighting, which allowed him to pursue architectural lighting design full time. Focus' portfolio includes the recently completed Tribeca Grand Hotel (look for our cover story in the January/February 2001 issue of* Architectural Lighting*) and Loews Theaters E-Walk in Times Square; the Mohegan Sun Casino in Connecticut and the Entel Tower in Santiago, Chile. The firm has also designed showrooms and stores for H& M, Armani, Ultimo and Knoll International. An IES member since 1982, Gregory has received multiple Lumen Awards, IALD Awards, Waterbury Awards and ASID Awards.*

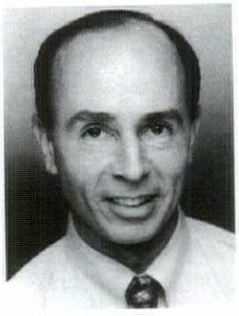
—Christina Trauthwein

AL: *How did you become interested in lighting?*
Gregory: In high school, I was fortunate to be involved in theater and witnessed firsthand the excitement and passion of belonging to a creative team—director, designers, actors and choreographers—where each individual brought a unique perspective to the productions. Jim Cavanaugh, a really inspiring professor and a director, suggested I attend the Goodman Theatre School, which is part of the Art Institute of Chicago. Goodman was affiliated with a professional theater company, so I learned from professionals in a working environment. Through this program, I was able to design the lighting for about 100 shows in just three years. The educational experiences provided by this facility extended outside the classroom, offering its students tremendous opportunity and valuable lessons.

AL: *And your interest in architectural lighting design?*
Gregory: In theater, your best work is wiped out in 12 weeks; architecture is permanent. But this permanence, while rewarding, can also entail more difficulty. The ability to change or move a fixture that is afforded you in theatrical lighting is lost in architecture, where flexibility isn't always possible. You really have to do it right once. And that's often a challenge.

AL: *Are you motivated by challenge?*
Gregory: Yes, the challenge to create something wonderful. When I first got into this business years ago, I had a conversation with Jim Nuckolls and inquired about the expectations of being a lighting designer. I remember him simply stating, "Every project is a new challenge. There's something exciting in each project." And to discover, define and solve that "something," whether it be selecting the right color temperature or source to best complement a space, creating unity among buildings in an urban landscape, or even making budget, continuously motivates me and keeps my job fresh.

AL: *How did your theatrical background prepare you for lighting architecture?*
Gregory: Theatrical lighting is normally taught on a proscenium theater—a stage with a proscenium arch that separates the audience from the actors. The designers sit in the audience and view the production from the perspective of an onlooker. In order to develop this sense of perspective, the students at Goodman were instructed to look at paintings in a museum and study the composition of the pieces and how the subjects in them are lighted. When I'm working on an architectural project, I'm



basically painting a picture. As a lighting designer, I am one of the visual artists who ties together the architect's vision, the interior designer's work and the owner's needs to compose a complete image that the patron views. Done effectively, a "painting" is comprised of a focus, a foreground, a background and a frame—a balanced composition that's pleasing to view. Interestingly, architects are trained to feel the space from the inside—the volume and the proportions of the space—and approach their work in that manner. The lighting designer is taught to get back outside of the space and look in. The combination of these approaches—both in an effort to create that incredible first impression and to evoke emotion—makes for a successful team and a memorable lighting design.

AL: *What are some other things one can do to prepare for a career in lighting design?*
Gregory: Experience is the key and any lighting experience you can get—whether in theater or photography—is essential. We, as lighting designers, are paid not only for our knowledge but also for our experience. And if you haven't done it—even if you've read the information—it's guesswork. The other thing that is absolutely critical to being a successful lighting designer is to be able to communicate your ideas with hand-drawn images. A computer can perform many functions, but when you're sitting across from the architect or the client, you must be able to pick up a pen and sketch and detail your concepts—ones that you, and consequently the architect, can take pride in. And this skill is something students might have to pick up on their own. Now, more than ever, there is an abundance of information for students to learn. In many ways, the architect has become a team leader to all the consultants and the student has the whole package to learn, not just lighting. But when there is such an overwhelming load to absorb and limited time and capacity, invariably, some things get pushed aside. Visual communication can not be one of them.

AL: *What's your "wish list," as it applies to product/technology?*
Gregory: Absolutely, longer-life lamps. We put a great deal of effort into our designs. Often, they're complex with multiple effects and intricate nuances, which can make them a bit challenging to maintain. If the lamps last only about 2,000 hours, somebody has to replace those three times a year and refocus them. And getting it just right, the precise angles, is often left to luck. In a similar vein, intelligent lighting systems need to be more reliable. As you walk down the street, about a third of the intelligent lights in store windows has something wrong with them. That's not right. And, of course, the lamp life in these systems is very limited. As these types of fixtures are used less in theaters, where there are technicians on-hand, and more in restaurants and retail, it becomes even more necessary to make these improvements reality.

AL: *Is there a Paul Gregory signature?*
Gregory: Possibly the use color, if used in a sensitive way with respect for nature. Think about the last time you saw someone and their face against a red/amber sunset and a fire lighting them from the other side. They looked just beautiful. Why shouldn't that be the way a dress is lighted in a retail space or a patron is lighted while dining? Color, if used properly, can be ultimately flattering. ■

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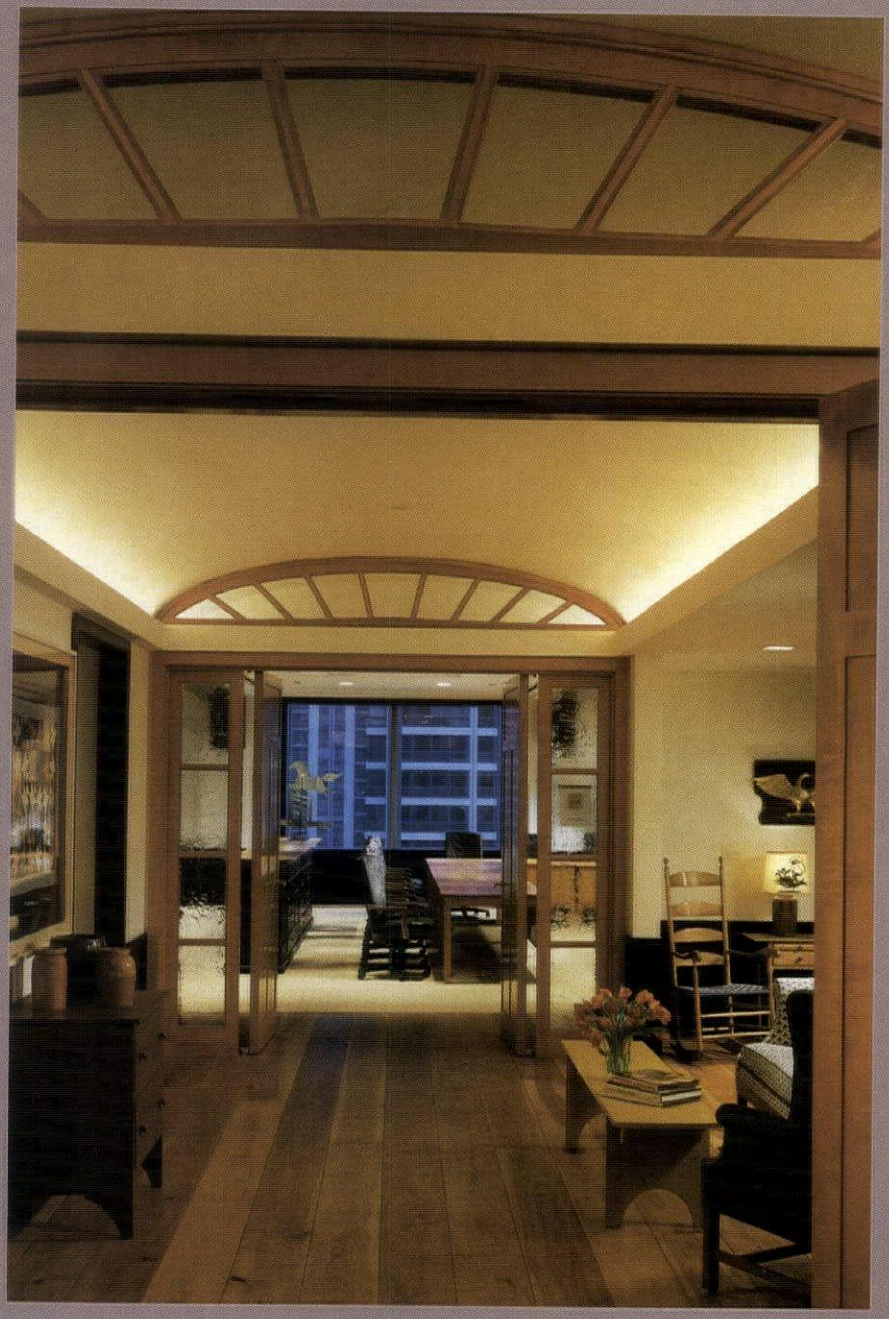

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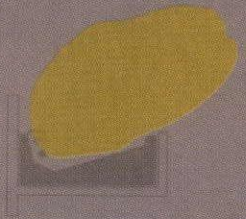

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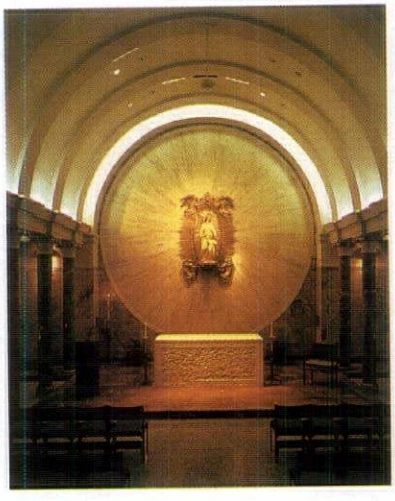
SHRINE OF THE TIMES

The new lighting design of this chapel brings modern technology to a historic building

BY CHRISTINA TRAUTHWEIN, EDITOR-IN-CHIEF

CHALLENGE The Carmelite Friars at Holy Hill, a highly revered and frequently visited sanctuary situated atop one of the highest points in Wisconsin, wanted the quality of the new lighting in the Shrine of Mary to reveal the architectural beauty, spiritual power and religious significance of this historic place, which dates back to the 1920s. According to lighting designer Michael White, the lighting concept was to fill the chapel, which was added in the '50s, with warm abundant light and to reveal a sacred statue of Mary as the focal point of what is believed to be a "healing shrine." Practical considerations included ease of use and flexibility necessary to meet the varying needs of the advanced age of the community. No energy concerns were expressed, no specific budget constraints were given and no changes were made to the original architecture, only additions.

METHOD The primary source used in the space is an asymmetric fluorescent uplight fitted with two 40W compact fluorescent lamps mounted in-line. "This fixture was chosen for the performance of its hammertone reflector, which produces maximum candlepower at 135 degrees with a smooth gradient of light throughout its distribution," explained White. A new valence was added to the architrave to conceal the fixtures, which reveal the architectural detail of the vault while creating an uplifting spiritual quality. "Placing the uplights between the ceiling ribs reinforces the architecture, since the darker ribs contrast with the lighted portion of the ceiling, and articulates the vault," said White.



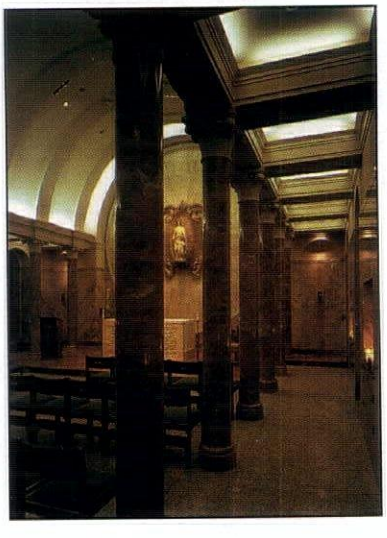
"The statue has deep religious significance for the members of the Carmelite community and the many faithful who visit the Shrine," White noted. As a result, color and angle were carefully planned to reveal the form of the statue, distinguish it from the background and strengthen its spiritual quality. "The intent was to create a glowing aura emanating from the statue," he added. Low-voltage halogen lamps with aluminum reflectors were chosen for their color and tight beamspreads. Each fixture includes four lamps with adjustable, lockable lampholders. Some of the side sources illuminating the statue feature a green dichroic filter to provide color depth to the gold leaf.

At the statue wall, a semi-circular cove with deep, angled sides defines the outline of the circular marble background. Reflected light from the angled interior of the cove creates a halo effect around the statue wall and adds visual impact and the illusion of depth. By using low-profile fluorescent striplights and orienting them away from the room, the effect was created without the use of staggered strips or reflectors, which would not fit in the existing space. "The original 1955 plans for the space show fluorescent fixtures in the cove," explained White. "However, they were never installed, possibly because they would not have fit as shown—not to mention the technology of the time would not have permitted the flexibility that dimming does today." Instead, the lighting that had been installed consisted of bullet spots that were located on either side of the statue and had cast unflattering shadows.

The same fixture used to light the statue also creates a grazing wash, revealing the carving on the face of the marble altar. Adjustable accentlights provide backlight and toplight at the altar and at the lectern.

Coffered ceilings at the side aisles were painted a rich brown so that the reflected light from the fluorescent coves would create a separation from the main space. The colored light also adds depth to the columns since the warmer light from the coffers on the side aisle contrasts with the uplight at the center vault. New architectural details in the coffers conceal low-profile striplights with remote ballasts.

All fluorescent fixtures are fitted with 3000K, high-CRI lamps and dimming ballasts. A lighting control system provides push-button flexibility for a variety of moods. Preset scenes range from the more prayerful to festive holiday settings. ■



ABOVE: A LUMINOUS AURA EMANATES FROM THE SACRED STATUE OF MARY, CREATING A HALO AROUND HER. COFFERED CEILINGS (RIGHT) HOUSE FLUORESCENT FIXTURES TO LIGHT THE SPACE AND ADD DEPTH.

DETAILS

PROJECT
Shrine of Mary at Holy Hill

LOCATION
Hubertus, WI

OWNER
Carmelite Friars, Holy Hill Wisconsin

LIGHTING DESIGNER
Michael White, LC, Leedy & Petzold Associates, LLC

PHOTOGRAPHER
Steve Poast, Poast Architectural Photography

LIGHTING MANUFACTURERS
Insight Lighting; Norbert Belfer Lighting; Edison Price Lighting; Philips Lighting; Lutron

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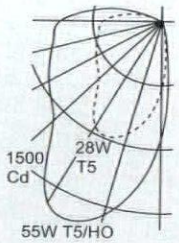

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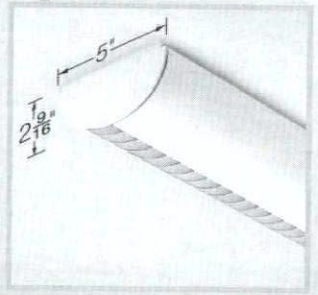

one way*

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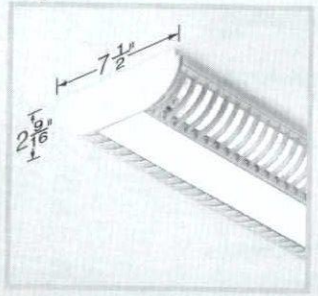

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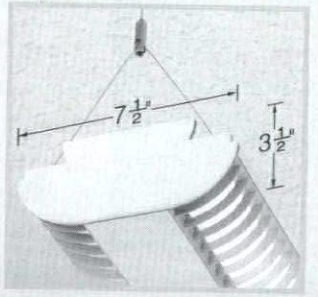

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Full Spectrum

BLENDING MEDIEVAL DRAMA AND VIVID, COLORFUL LIGHTS, THIS EXPANSIVE ENTERTAINMENT COMPLEX OFFERS SOMETHING FOR EVERYONE

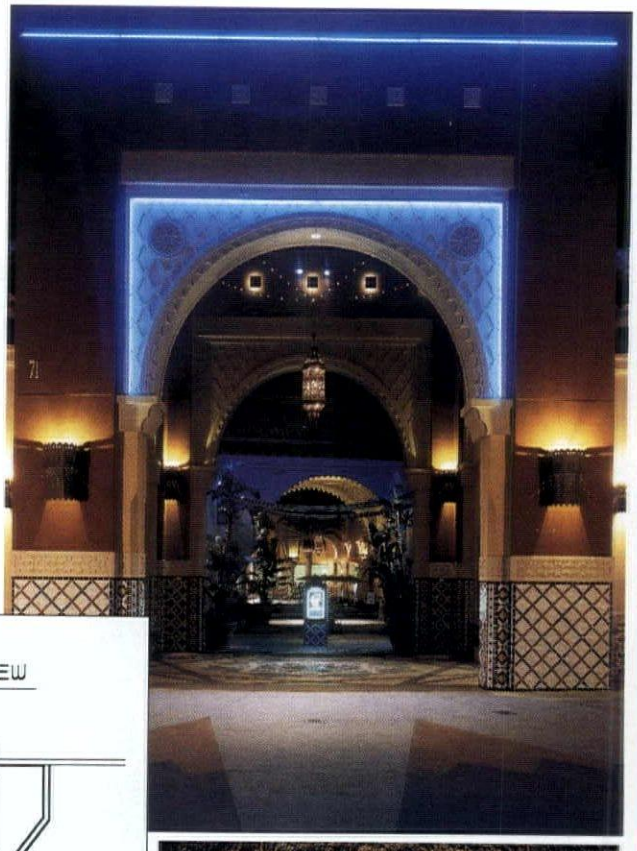
BY CHRISTINA TRAUTHWEIN, EDITOR-IN-CHIEF

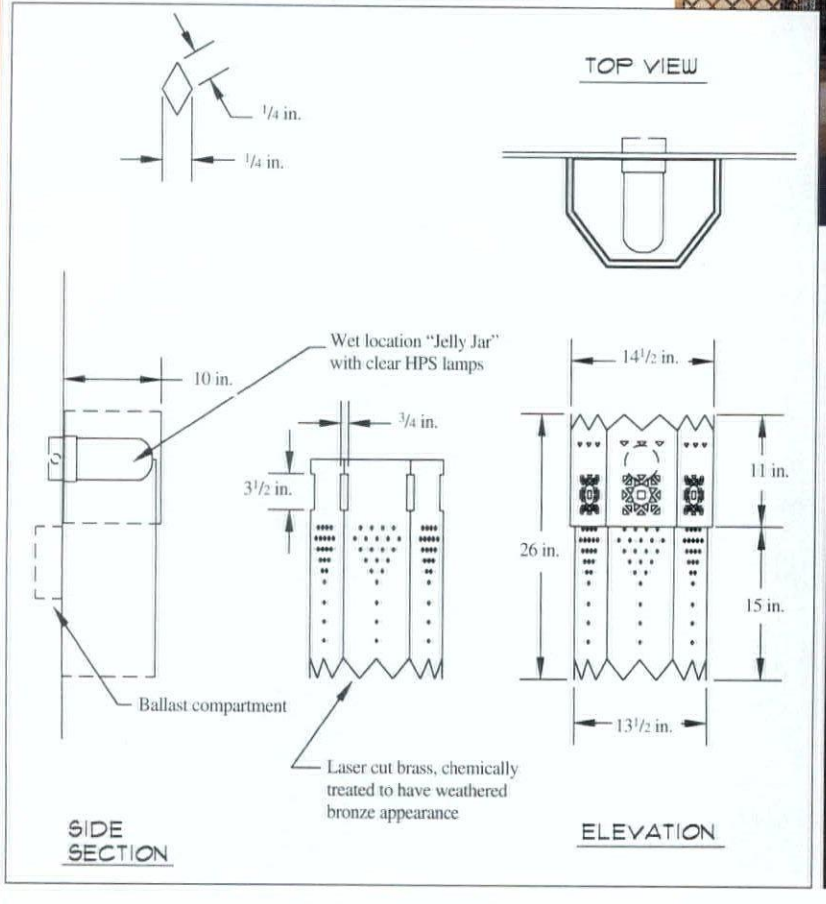
The Irvine Spectrum Entertainment Center in sunny southern California offers a complete range of activities that are intended to appeal to all visitors, whether child or adult. "It's more than a theater, more than a shopping center—it's a destination of fun," said lighting designer Andrew Powell of Lighting Design Alliance. "This rapidly expanding open-air venue includes shops, restaurants and clubs, providing nonstop entertainment that goes well past daylight hours to transform into a nightlife spot."

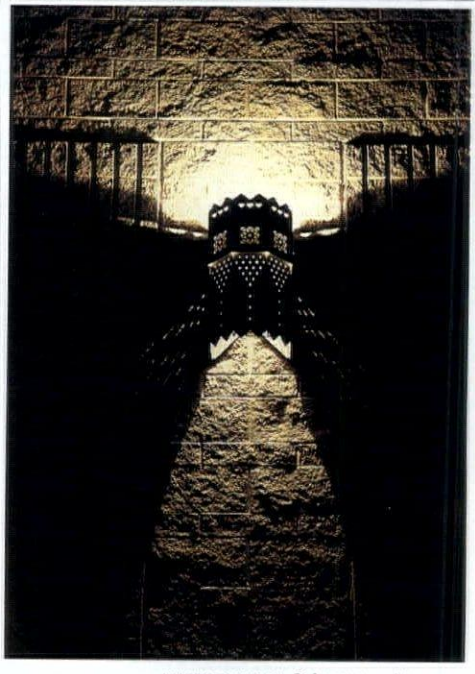
While Phase 1 of the project centers primarily around Islamic-inspired patterns and themes, Phase 2, though keeping some of these Middle-Eastern influences, focuses on a medieval motif. "Architecturally, this retail/entertainment center is based on the Alhambra in Granada, Spain," noted Powell. "While we've replicated many of the thematic design elements of the original structure, such as incorporating central courtyards into the overall plan, we've updated them to make Irvine Spectrum lively and entertaining."

Exterior facades (opposite), constructed of split-faced block, surround the center and represent the "city wall." Ground-mounted 100W HPS floodlights, concealed in the landscaping, graze the wall and accentuate its color and enhance the texture; they also provide a contrast to the metal halide parking lot lighting. "The golden color of the sodium lamps complements the warm tones of the building material," said Powell. "In fact, the effect resembles torchlight, which, of course, underscores the medieval idea."

To experience the excitement within the "city walls," patrons must enter through one of several entry gates (right). Large-scale custom-themed sconces (below), designed by Powell in collaboration with the architect, flank the archway entry; smaller versions are located in the courtyards. "We tried to ensure that the defined theme or 'story line' would be reinforced by the lighting, and that, where possible, the materials and effects would represent authenticity," said Powell. "HPS was chosen for its flame-like color, long life and energy efficiency in lieu of two incandescent PAR38 lamps, which is what's generally used in up/down sconces of this type," explained Powell. The single, clear HPS lamp is positioned high in the shroud to produce a well-defined broad spread of light up and narrow spread down. A custom, chain-suspended lantern adds sparkle to the entry gate. "We originally specified the source as incandescent," said Powell, "and the fabricator informed us that, because of the perforations in the fixture housing, incandescent jelly jars with wet-location approval were required."







PHOTOGRAPHY: © Anthony Peres

Thinking that the solution sounded "a bit clunky," Powell came up with the idea of using festoon lights, which are used throughout the project in the courtyards where they are chain-mounted. "We designed the pendants to utilize long-life (25,000-hour) 24V Xenon lamps," said Powell. "The lights are attached to a low-voltage cable, secured in a bundle and placed inside the fixtures." Several of these pendants are used in the project.

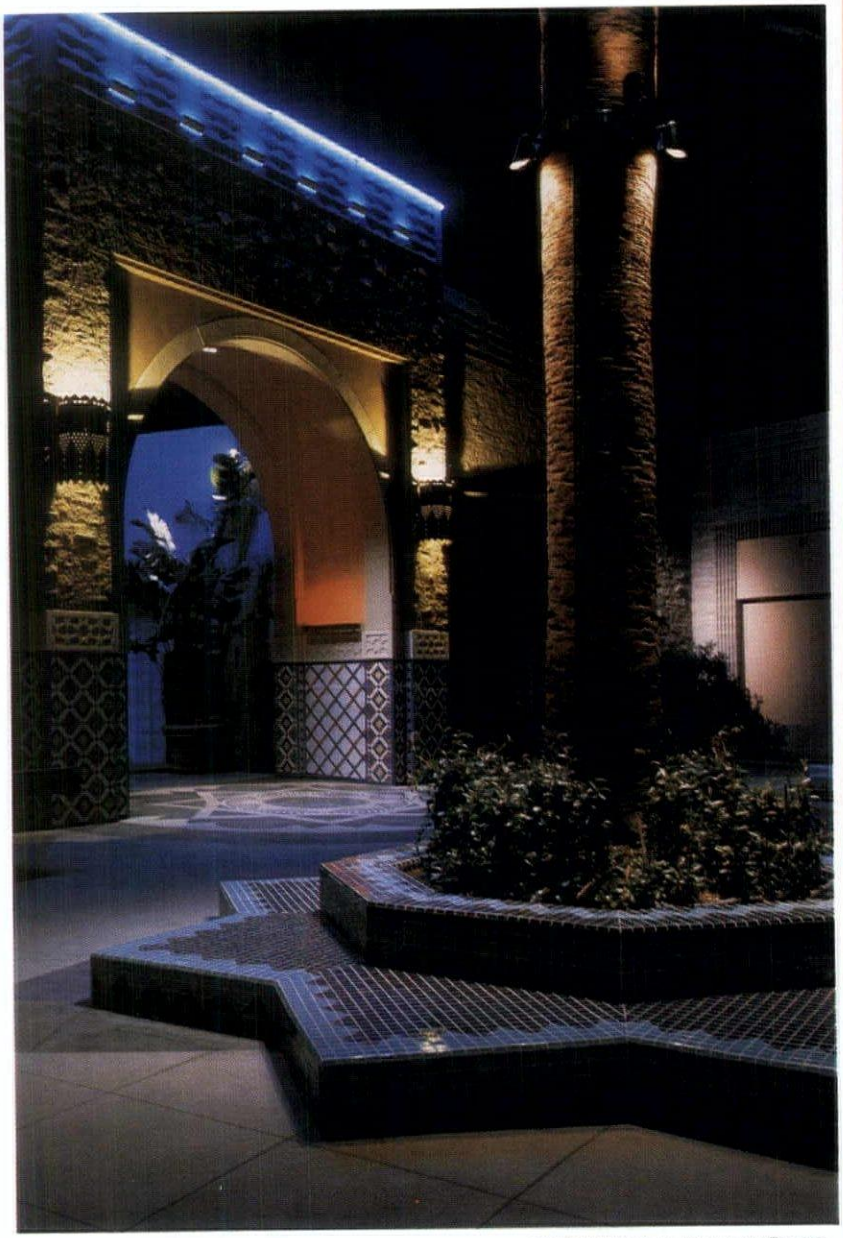
In contrast to the warm sources, an exposed band of blue neon and concealed blue neon identify the entry points from distant parking spaces. The coolness of the blue neon dramatically accents the architectural features and adds depth to the arch. T8 fluorescent floodlights with red color gels uplight the archway (right) and a single adjustable PAR38 ceramic metal halide downlight recessed in the top of the arch accurately renders the paving patterns below.

Other embellishments are used to distinguish the gateways and add character to the architecture. For example, there are surface-mounted "floating" squares that adorn the top of the main archway and emit a soft glow. "While we treated each entrance gate a little differently—through the use of neon treatments and accent pieces—the concept remained the same: to draw attention to arriving visitors in an exciting and unified manner," said Powell.

Throughout the courtyards, ceramic metal halide sources are used to uplight trees and downlight paving patterns (right). "A metal band with a series of six low-voltage MR16 bullet lights is mounted about halfway up the palm tree," said Powell. "Three aim up, three down." At the top of the tree, additional PAR20 metal halide bullet lights provide downlight to the ceramic tile surrounding the base of the tree.

A smaller-scale version of the real tower at the Alhambra is recreated in the center plaza—the Dorado Court—at Irvine Spectrum (opposite, right); here, it is empty and functions strictly as a stylistic element. Low-profile, continuous linear biax fluorescent uplights with red color gels are mounted on a ledge to illuminate the tower's mid-section. The top of the tower features three different lighting schemes, producing dramatic effects similar to those seen on the Spanish structure: A continuous band of cold cathode encircles the dome; the corners are lighted with PAR20 metal halide bullets; and linear biax fixtures with color gels add red splashes of light to the tower's surface.

Five 6-ft.-high custom pendants, similar to the one in the main entryway, illuminate bronze floor medallions



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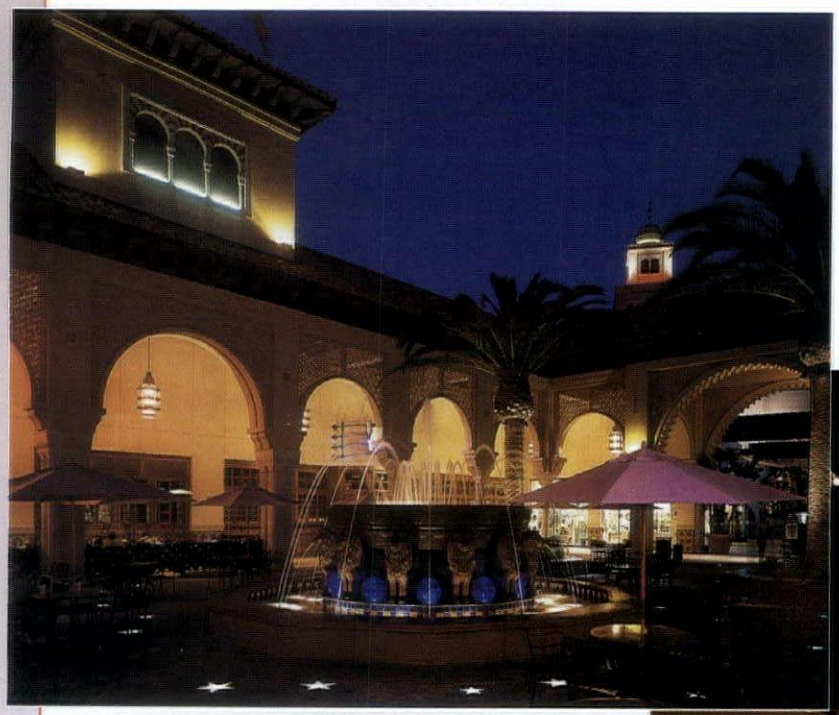

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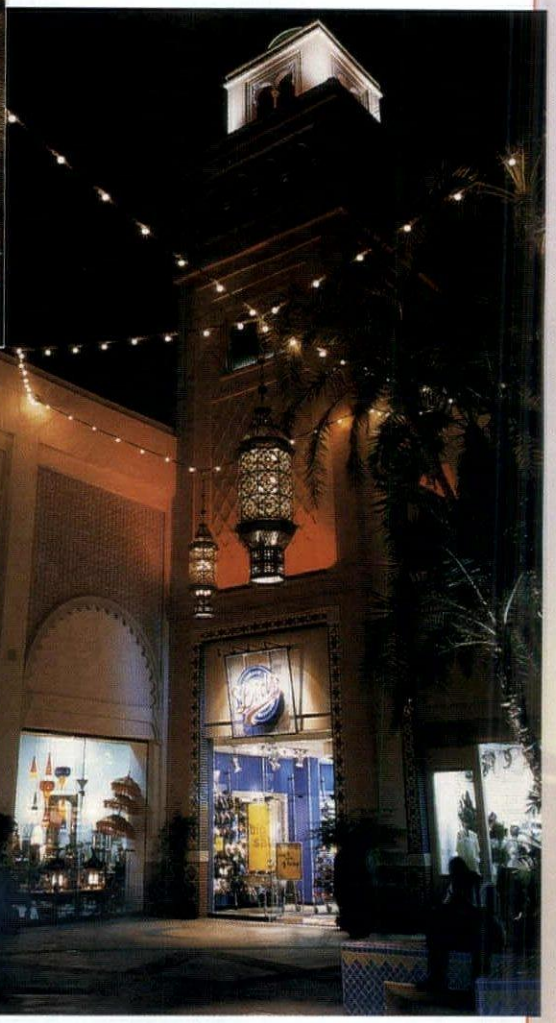


WITH LIGHT FROM A PAR38 DOWNLIGHT COMPONENT. AS THIS IS THE ONLY AMBIENT LIGHT IN THE COURTYARD—IN ADDITION TO THE XENON SWAGLIGHTS OVERHEAD—THE EFFECT IS DRAMATIC. "WINDOWS" ON THE SECOND STORY OF THE SURROUNDING STRUCTURE HOUSE "INTELLIGENT" THEATRICAL LIGHTING EQUIPMENT, WHICH, WHEN PROGRAMMED WITH THE AUDIO SYSTEM, PRODUCES A SOUND AND LIGHT SHOW IN THE COURTYARD.

IN THE LIONS COURT (ABOVE), TRANSLUCENT STAR PAVERS, DESIGNED IN CONJUNCTION WITH THE LANDSCAPE ARCHITECT AND IMPORTED FROM AUSTRALIA, ARE ILLUMINATED BY COLOR-CHANGING FIBER OPTICS. METAL HALIDE ILLUMINATORS ARE LOCATED IN THE FOUNTAIN VAULT AND ARE EASILY ACCESSIBLE. IN THE FOUNTAIN, LARGE, BLUE, GLASS BALLS EACH HOUSE A SINGLE ENDLIT FIBER, WHICH CREATES INTERNAL GLOW. AROUND THE PERIMETER, THEMED PENDANTS AND SCONCES BATHE WALLS, OVERHANGS AND ARCHES WITH GOLDEN LIGHT. THESE INCANDESCENT PENDANTS WERE MODIFIED TO INCORPORATE A DOWNLIGHT COMPONENT CONSISTING OF SMALL LINE-VOLTAGE PAR16 LAMPS AND ARE DIMMED TO ALLOW FOR FLEXIBLE LIGHT LEVELS AT EXTERIOR RESTAURANT SEATING AREAS AND TO EXTEND LAMP LIFE. "THE ARCHWAY APPEARS TO GLOW," SAID POWELL, "AND FROM MOST VANTAGE POINTS, THE LIGHT APPEARS TO BE EMANATING FROM THE PENDANTS." BUT IT'S NOT. ON THE BACKSIDE OF EACH OF THE COLUMNS, QUARTZ UPLIGHTS IN WALL-MOUNTED SCOOP FIXTURES DO THE REAL JOB OF CREATING THE OVERALL AMBIENT GLOW. ■

DETAILS

- **PROJECT** Entertainment Center at Irvine Spectrum—Phase II
- **LOCATION** Irvine, CA
- **OWNER** The Irvine Company
- **ARCHITECT** RTKL—Paul Jacob, David Schmitz, Kevin Horn
- **LIGHTING DESIGNER** Lighting Design Alliance—Andrew Powell
- **PHOTOGRAPHERS** Anthony Peres; Andrew Powell
- **LIGHTING MANUFACTURERS** Philips; RSLI; Orgatech Omegalux; Hadco; Tokistar; Architectural Cathode Lighting; mcPhilben Lighting; Arte de Mexico; Bega; Martin Professional

PHOTOGRAPHY: ©PETER AARON/ESTO

LEFT: BLUE NEON AT THE ENTRANCE HINTS AT THE FUTURISTIC ENVIRONMENT WITHIN. IN A DIMMED CORRIDOR (ABOVE), TELEVISION SCREENS AND COMPUTER MONITORS STAND OUT, AS THE MYSTERIOUS BLUE LIGHT HIGHLIGHTS THE STATIONS OR LEADS VISITORS DOWN THE PATH.

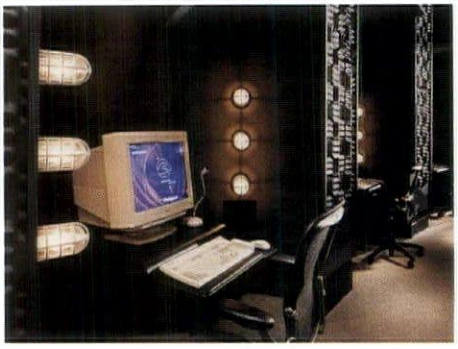
Screen Plays

A NETWORKING SOLUTIONS GIANT SHOWS OFF ITS WEB SMARTS WITH A HIGH-TECH, HIGH-DRAMA SHOWROOM THAT GIVES NEW MEANING TO "NOTHING BUT NET"

BY JEAN GORMAN, CONTRIBUTING EDITOR

How can you make something immaterial come to life? This was the question Centerbrook Architects was charged with answering in its design of Nortel Networks' Executive Briefing Center in Raleigh, NC. The center serves as an introduction to what Nortel Networks has to offer in supporting high-performance Internet networks. It also provides a stimulating facility in which to present ideas on how Web technologies can be used to create unique Internet solutions. "Our intention was to create an environment that would be dramatic and mystical—a place that would pull people in," said Amy Seagroves, senior manager of the Executive Briefing Center. "We wanted the designers to use architecture, sound and light to create a powerful, three-dimensional Web environment."

"Because part of our task was to create a way to sell an intangible, we wanted the space itself to make you understand that you're dealing with something substantial, futuristic, advanced, exciting and fun," said Centerbrook's Mark Simon, project architect. "And that's what this place does."



Working with various consultants and media specialists, the architects designed what Simon terms "a sensate space," where a mix of high-tech materials, music and sound, computer technology and moving, colored lights invites visitors to explore a range of interactive devices—each housed in a different museum-like setting. "We wanted these settings to feel distinct from one another," said Simon, "and the lighting helps to reinforce the idea of a different computer experience in each area, capturing the spirit of the individual location and making it stimulating."

ON-SCREEN SEDUCTION

The intrigue of the lighting scheme, developed by New York-based Cline Bettridge and Bernstein, starts at the entrance, where glowing blue neon surrounds the signage at the portal. "Once you're inside, just beyond the reception area, the seduction begins,"

said lighting designer Stephen Bernstein.

Along the length of a dimmed corridor, 60W PAR HIR lamps, affixed to a track fixture on the ceiling, create a path of illumination that leads the eye inward. "The entire facility communicates with the visitor through video panels, computer monitors or movie screens, so the whole space is meant to be dark to allow the light of the screens to stand out," said Bernstein. "At the same time, it is light enough to be comfortable." Barn doors attached to the track fixture and perforated metal panels overhead shield the brightness of the PAR lamps. The leading edges of the perforated metal panels, which gradually descend as one proceeds down the corridor, are delineated with fluorescent tubes covered with color gels, creating strips of mysterious blue light that echo the neon at the entrance. And industrial jelly-jar fixtures, fitted with 25W transparent blue lamps, add sparkle and define the positions of computer or television modules on each side of the corridor.

HIGH-TECH ACOUSTICAL PANELS AND MORE ETHEREAL BLUE LIGHT DEFINE THE CHARACTER OF THE INFONODE.

In a small theater, the next stop in the journey through the center, the lighting designers employed a straightforward illumination approach. A series of A-lamp downlights provides ambient light, and PAR lamps around the perimeter of the theater create scallops that bring out the texture of the surrounding curtains. In addition, two adjustable MR16 accents can be focused on a speaker, when necessary. "Here the lighting is simple to contrast with the excitement to come," said Bernstein.

After the movie presentation in the theater is completed, the screen wall slides away to reveal the next location on the journey, which is known as the Hub. In terms of lighting, this is where the action is. "Here we used lighting to help direct people," said Bernstein. "This setting offered an opportunity for us to incorporate motion." Five programmed projector lamps, each fitted with a metal halide source, spin images of the Nortel Networks logo around the room, changing color until they finally resolve themselves by stopping in front of one of five floating screens located below individual sonic domes. "As the lights spin, the floor becomes an animated surface that highlights the fact that nothing is sitting on it," said Simon. When the lights stop in front of the station, the visitors receive their cue to proceed toward a video screen to encounter their next experience.

BEAM ME UP

Atmospheric light emanating through a nearby portal surrounded by high-tech textured acoustical foam leads the visitor on to the next location—the elliptically shaped Infonode. Here again, ethereal blue light indicates key areas of activity. Web workstations tucked into millwork niches are surrounded with the cerulean glow of fluorescents covered with blue gels and hidden behind millwork valances. Recessed MR16 pinspots overhead highlight each keyboard.

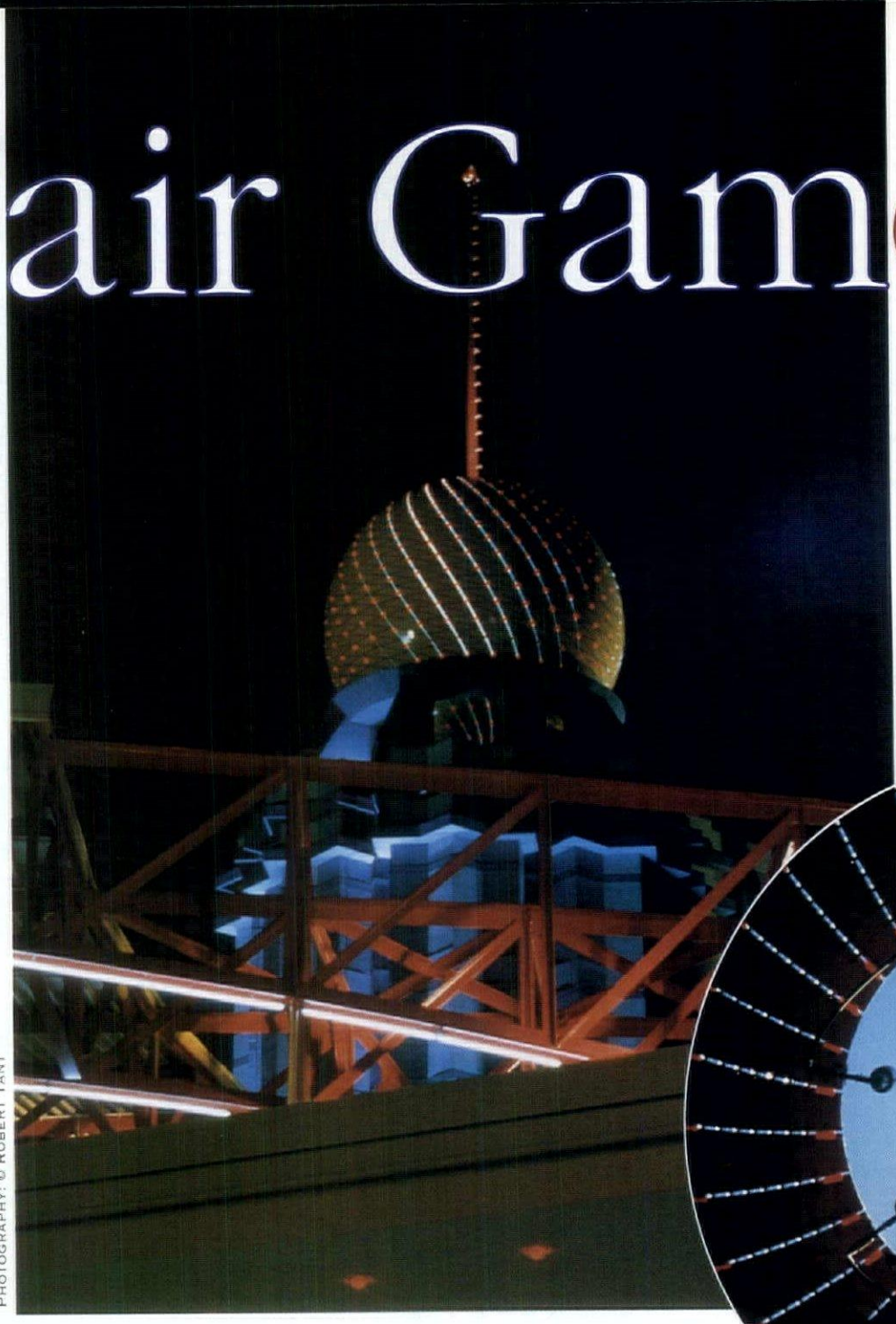
The final stop of the trip through the center is the Simulation Space. The slanting walls flanking each of several niches containing computer stations are punctuated with three jelly-jar fixtures (the same used in the entrance corridor). In this space, visitors stand in front of a computer with a blank wall behind them. Different scenes are projected onto the wall and a camera within the computers photographs the visitor, who, depending on the background scene, may appear to be in one of various destinations such as Paris or on the moon. When the camera is ready, the jelly-jar fixtures are programmed to increase to the proper light level to allow the computer to take a digital photograph of the visitor. Once the photo is snapped, the lights dim and serve as decorative fixtures, which don't interfere with the video screen. The lighting here, as in all of the areas throughout the center, is pre-programmed on an automatic control system that is both motion- and computer-sensitive.

"This is very much a 'wow' environment," said Seagroves. "It's like a combination of Disney and the Starship Enterprise. The whole design is so interesting that people want to enter the space and interact with the devices. It absolutely does what it's supposed to do." ■

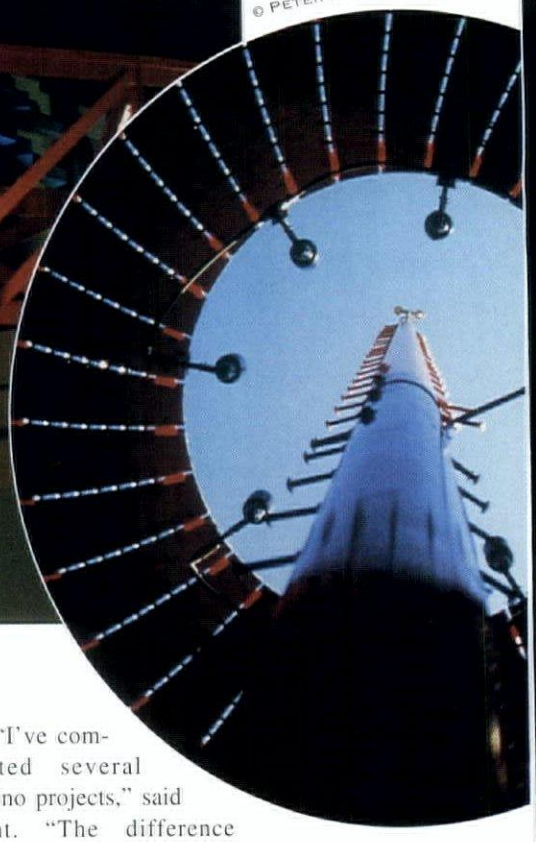
DETAILS

- **PROJECT** Nortel Networks Executive Briefing Center
- **LOCATION** Raleigh, NC
- **CLIENT/OWNER** Nortel Networks
- **ARCHITECT** Centerbrook Architects and Planners—Mark Simon, FAIA; Jon M. Lavy, AIA; Steven Tiezzi, AIA; Jeffrey Jahnke; Susan Pinckney, Allied Member ASID; Michael Sorano; Leslie McCombs; Susan Nelson; William H. Grover, FAIA
- **STRUCTURAL ENGINEER** Gibble Norden Champion Consulting Engineers, Inc.
- **MECHANICAL/ELECTRICAL ENGINEER** R.G. Vanderweil Engineers, Inc.
- **LIGHTING DESIGNER** Cline Bettridge Bernstein Lighting Design, Inc.
- **PHOTOGRAPHER** Peter Aaron/Esto
- **LIGHTING MANUFACTURERS** Zumtobel Staff; Lithonia; Gotham; Bega; Day-Brite|Capri|Omega; Stonco; High End Systems; Elliptipar; Alkco; Legion Lighting; Lightolier; Light-Project International; Osram Sylvania; GE; Philips

Fair Game

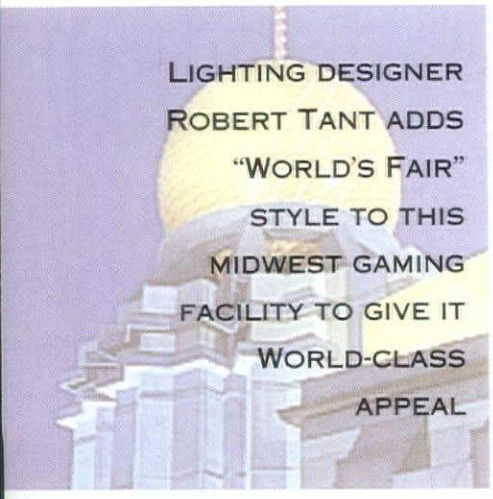


PHOTOGRAPHY: © ROBERT TANT



PHOTOGRAPHY: © PETER VAN VECHTEN

BY WANDA JANKOWSKI, CONTRIBUTING EDITOR



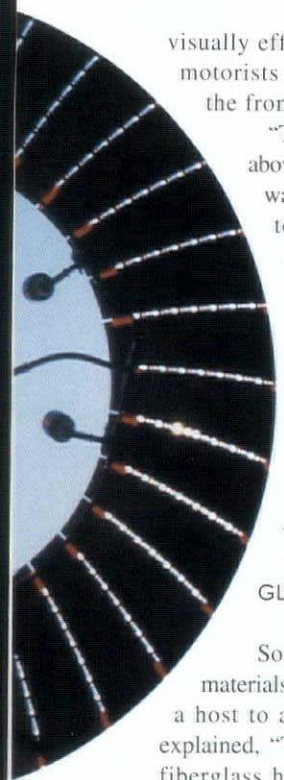
LIGHTING DESIGNER ROBERT TANT ADDS "WORLD'S FAIR" STYLE TO THIS MIDWEST GAMING FACILITY TO GIVE IT WORLD-CLASS APPEAL

Harrah's Entertainment, known for Mardi Gras-themed casino hotels in Las Vegas and Atlantic City, wanted a different theme for its new Riverport Casino Center, located on a 160-acre property near the banks of the Missouri River in Maryland Heights, a suburb of St. Louis, MO. "The drama and excitement of a World's Fair look were the buzzwords," said Robert Tant, Robert Tant Lighting Design, Monrovia, CA, who was challenged with developing a lighting design to add theatricality by night to the structure created by architect Peter Van Vechten of Skidmore, Owings & Merrill (SOM).

"I've completed several casino projects," said Tant. "The difference between designing one in Missouri as opposed to Las Vegas or Atlantic City is that the Riverport building is on water. It's actually a kind of riverboat." The Missouri River is side-tracked and the casino is built within a manmade moat. "The casino is off the beaten path, but it's a big deal in the area," explained Tant. "The owners recently added a bar/lounge overlooking the Missouri River to draw in the locals." Part of Tant's challenge was to illuminate the casino to be

PHOTOGRAPHY: © ROBERT TANT

THIS ENTERTAINMENT VENUE SPORTS A LIGHTING SCHEME THAT USES LIGHT AND COLOR IN BOLD, EVOCATIVE WAYS. DYNAMIC FORMS AND VIBRANT COLORS MARK THE THE MAIN ENTRANCE (ABOVE). A VIEW FROM INSIDE THE SPHERE (INSET).



visually effective when viewed from a distance by freeway motorists and when seen up-close by guests arriving at the front door.

"The most innovative aspect of the project is the sphere above the hotel elevator tower," said Tant. "Originally, it was to contain an internal illumination system designed to highlight the intended planetary theme. The estimated price tag for that was $300,000-$500,000." Because the fiberglass material used to construct the sphere wasn't translucent enough, the original plan was scrapped and Tant was given two weeks and a reduced budget of $40,000 to invent an alternative. "Innovation always comes from pressure," Tant said. "After all, it took Thomas Edison 10,000 tries to make the light bulb! Fiber optics would have been too expensive, as would have LEDs."

GLOBALLY SPEAKING

So Tant experimented with some interesting plastic materials. He had known about a clear plastic that serves as a host to a dye that changes its light transmission. Tant explained, "The 32-ft.-diameter sphere is made of two yellow fiberglass hemispheres, each containing 32 segments held together by bolts and separated by 2-in.-diameter x 1/2-in., clear, cylindrical acrylic spacers." In lieu of using 700 acrylic spacers, red, UV-light-sensitive acrylic plastic rectangles, each 1/2-in. thick, were cut from sheeting and bolted strategically at 2-ft. intervals between the structural joints of the sphere. This detail added no extra time to the onsite assembly of the sphere and came in below the allowed budget.

The polished edge of the finished typical plastic part is flush with the outside surface of the sphere and protrudes inwards to gather light. The plastic material gathers light through its side walls and emits it from the edges. Inside the sphere, light, produced by an array of 1000W metal halide floodlights positioned on a service platform, activates the UV ingredient in the plastic. At night, the red plastic rectangles appear as though they are individual lamps and are distinguished as a festive element in the lighting scheme. Another secondary element of light is the series of swirling lines that define the structure and are lighted as well. At certain times during a sunny day, they can be noticed from the base of the tower on the shadowed side of the sphere.

The exterior of the sphere is lighted asymmetrically from three angles with varied 1000W PAR64 CSI lamps, which render its shape by alternating intensities and allow it to be viewed from a distance by motorists driving along the freeway three miles away. The most intense light level—300 fc—falls on the side of the sphere that faces the freeway, while areas of the sphere visible from the building's front entrances are illuminated with lower light levels. "This technique defines the core shadow and helps reinforce the spherical form," said Tant. "It also allows the special lighting effects of the light-sensitive plastic to stand in contrast to the sphere, increasing the apparent brightness and thereby increasing the visibility."

A red, 100-ft.-high spire protrudes through openings in the sphere. The upper portion is lighted by eight 39W PAR30 metal halide fixtures. The spire is topped with a required 500W red aircraft warning light. Lighting for the sphere's support structure includes uplight from floodlights fitted with metal halide lamps. Their cool 4100K color is used intentionally as a contrast to the sphere's warm yellow fiberglass. The rooftop of the hotel tower has a wavy screen along the two sides that conceals mechanical equipment. This element is boldly lighted with a color-corrected HPS source.

A COOL WELCOME

Once on the property, guests driving towards the main entry are guided by a linear pattern of ground-mounted, glowing mini-light bollards set along the edges of the driveway. Metal halide sources, chosen for their excellent color rendering, illuminate the building faces and features. The exterior of the multifaceted elevator tower is uplighted with 1000W metal halide spot reflector fixtures mounted to portable skids weighted at the bases and carefully aimed to accentuate not only the surface but the articulated treatment near the top of the tower. The metal halide sources here are a cooler 4100K to enhance the blue color of the tower exterior. To further amplify the approach to the viewer, approximately 100 ground-recessed, composite-type, direct burial fixtures are used with combinations of three types of interchangeable optic assemblies, which include metal halide wallwasher reflector assemblies that model the architectural facades. These are equipped with spread lenses to allow for close fixture positioning to the building.

A curvaceous canopy flanking the two sides of the main entry is supported by 30-ft.-high columns painted in a deep red and uplighted by a second optic assembly of metal halide

PHOTOGRAPHY: © STEINKAMP BALLOGG

VISITORS ARE GREETED BY A 38-FT.-DIAMETER CEILING FIXTURE IN THE CIRCULAR ROTUNDA ENTRY THAT FEATURES A RADIATING PATTERN FORMED BY WHITE NEON (RIGHT).

reflector spotlights. The columns are topped with 24-in.-diameter white acrylic globes, each housing a 175W coated 3200K metal halide lamp. These lamps are internally shielded on the house side to eliminate any hotspots on the facade. Positioned below each globe is a group of PAR30 metal halide adjustable spotlights. Illumination from these spotlights, detailed in metalwork compartments, is directed toward the sidewalk and street curbs, eliminating the need for distracting and obtrusive streetlighting poles. Suspended from the underside of the undulating canopy are pendant-mounted downlighting fixtures designed as linear tubes to provide a relationship of form with the architecture. Each has a custom-fabricated reflector assembly in the center of the tube built around a compact T6 metal halide lamp. The fixture optics are designed to distribute light onto the sidewalk and to prevent spill light from striking the facade.

The third optic assembly consists of wallwashers with clear lenses to uplight the colorful, themed card columns that support the porte-cochere truss. Expressive lines of 15mm white neon—a neutral element against the bold colored elements of the structure—delineate the underside of the porte-cochere's red steel trusses and outline the building cornice. A portion of the red trusses is crosslighted with six PAR56 FL lamps mounted to the rooftop. Behind them, a series of PAR30 metal halide spotlights uplights portions of the facade. General downlighting of outward areas of the porte-cochere is achieved with pendant-mounted downlight cylinders housing 400W 3200K coated metal halide lamps. The pale yellow ceiling of the porte-cochere at the main entry is enhanced by an asymmetrical almost random pattern formed by 90 MR16 accent lights fitted with frosted glass trims and red dichroic lenses. While they contribute a small amount of colored light to the ground plane, 175W metal halide downlights are mixed into the field to supply functional illumination and are visually obscured amid the vivid red highlights. The red component in the incandescent lamps compliments visitors' skin tones as they approach the building.

GOING IN CIRCLES

As guests enter the building, they transition through a circular rotunda celebrated by a 38-ft.-diameter, perforated custom metal ceiling fixture suspended by stainless steel cables and designed by Tant. The complete assembly was fabricated in Las Vegas and shipped out to the site in pie-shaped pieces. The primary composition, a circular radiating pattern, is formed by varied straight lengths of 15mm white neon. Seventy-five yellow glass-trimmed MR16 decorative fixtures made in Italy accentuate the surface areas between the neon and give a strong downlight component to this transition space. At the center of the gigantic fixture is a 3-ft.-diameter indirect light well, its inside surfaces painted red and uplighted with red neon. A PAR64 spot downlight concealed at the top of the cavity is aimed down to highlight the center of the articulated floor pattern below. The surrounding painted drywall perimeter that encircles the giant floating fixture is constructed as an indirect architectural cove. It supports fluorescent striplights with colored sleeves, creating a glowing perimeter around the piece.

In spite of the complexity of the lighting systems, casino hotel complexes, in general, handle maintenance well, according to Tant, "because their images are on the line every day. This is particularly true of this project because although the effects of the lighting design are theatrical, there are no theatrical lighting fixtures used."

The Riverport Casino Center received two awards from the IESNA International Illumination Design Awards Program: a Lumen West Award from the Los Angeles Chapter of the IESNA and an Award of Merit at the regional level.

For more images of this project, visit Tant's website at www.rtldlightyears.com. ■

DETAILS

- **PROJECT** Riverport Casino Center
- **LOCATION** St. Louis, MO
- **CLIENT** Harrah's Entertainment
- **ARCHITECT** Skidmore, Owings & Merrill LLC—Peter Van Vechten
- **LIGHTING DESIGNER** Robert Tant Lighting Design—Robert Tant
- **INTERIOR DESIGNER** SOM & Yates-Silverman, Inc.
- **ELECTRICAL ENGINEER** Giovanetti and Shulman Associates
- **ELECTRICAL CONTRACTOR** Sach's Electric
- **PHOTOGRAPHERS** Robert Tant; Peter Van Vechten; Steinkamp Ballogg
- **LIGHTING MANUFACTURERS** Bega; CSL; Engineered Lighting Products; GE; Hydrel; Itre; Juno; Kim; Lumiere; Lightolier; Mikhon Lighting and Sign; Multi Electric; Northstar; Orgatech Omegalux; Philips; Prudential; Spaulding; Tokistar; Venture; Widelite

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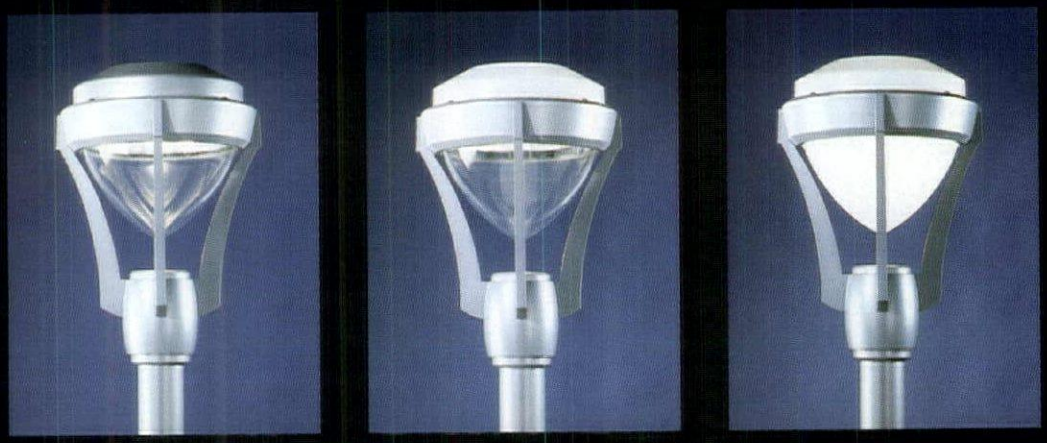

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BY STEVE JOHNSON

The Solid-State Lighting Initiative:

An Industry/DOE Collaborative Effort

A new era of technology is emerging in the area of lighting. It is being propelled by dramatic improvements in the performance of solid-state light sources. These sources offer an entirely new array of design aspects not achievable with current light sources. At the same time, their performance characteristics continue to improve and are expected to eclipse those of the most common light sources in the near future.

High efficiency is one of these performance attributes that is motivating the Department of Energy (DOE) to work with the manufacturers of this new technology to create a program plan sufficiently comprehensive to support an industry-driven Solid-State Lighting Initiative before Congress. The purpose of the initiative is to educate Congress about the potential of this technology to reduce the electric lighting load within the United States and, consequently, realize the associated environmental benefits. The initiative will solicit congressional support to accelerate the development of solid-state technology through investment in the research and development necessary for overcoming the technical barriers that currently limit the products to niche markets.

While multiple technologies are being developed as solid-state light sources, the two that hold the most promise for application to general illumination are light-emitting diodes (LEDs) and organic light-emitting diodes (OLEDs). The form of these sources can be quite different from current sources, leading to exciting new ways to design uses for the products. Being diffuse sources, OLEDs are much lower in intensity per unit area than LEDs. The manufacturing process for OLEDs lends itself to shapes that can be formed to different geometries, making possible luminous panels or flexible luminous materials. Conversely, LEDs are very intense point sources that can be integrated into a small space to create an intense source or used separately for less focused applications. Both OLED and LED sources are expected to be thinner than other comparable sources; this thinness offers additional design opportunities.

OLEDs and LEDs have other performance attributes that will enhance the operation and maintenance of the lighting system within a building and thus increase their desirability to the end-user. For example, these solid-state sources have the potential to be easily dimmed without changing color, altering product life or decreasing source efficacy. In addition, the source life is not affected by on/off cycling. Although the sources will require a power transformer, it is likely that, through standardization, only a few different types would be required; the dream of a "universal" ballast may be close to realization. Finally, the sources contain no mercury and pose no environmental hazard in disposal at the end of life.

Since both OLEDs and LEDs are diodes, they have a similar functional construction. Diodes are direct-current devices, passing current in one direction from the cathode to the anode. Consequently, these devices require a transformer to convert alternating current to direct current and to maintain the power quality of the electric supply. The diode operates when a sufficient voltage applied across the device results in electrons being injected into the N or electron transport layer (ETL) and in holes being injected into the P or hole transport layer (HTL). The applied electric field drives the electrons and holes across the device in opposite directions until they combine at the interface of the PN or ETL-HTL junction. The energy released by this recombination results in the excitation of an atom or molecule, which subsequently radiates. Different chemical compositions at the PN junction are chosen to give the desired spectral emission characteristics. Diodes that radiate in the UV, visible or IR portions of the spectrum are available.

Diodes can be very efficient light sources. With the proper selection of materials, little energy is lost in the injection and transport of electrons and holes to the PN junction. Diodes are designed to effectively convert the recombination energy of the hole and electron into radiated energy, resulting in the efficient conversion of electric power into visible light. The light generated within the device must then be effectively extracted to achieve an overall efficient light source. Both the Department of Energy and the manufacturers of solid-state light sources foresee a significant opportunity to improve lighting efficiency through the application of this emerging technology to general illumination.

The incandescent source has the lowest efficiency. Because it is a black-bodied radiator, a major portion of its radiation (emitted energy) appears in the IR region of the spectrum. Other sources, such as fluorescent and HID lamps, are discharge sources, which have a higher efficiency. They still have loss mechanisms in the electrodes and within the discharge itself. Fluorescent lamps have additional losses in the conversion of the UV radiation of the discharge to visible radiation by the phosphor.

The promise of solid-state sources is exemplified by the development of a high-efficiency (AlInGaP) red and amber LED by Lumileds. These devices are capable of converting over 90 percent of the supplied voltage to visible radiation at the PN junction. The efficiency of this process is defined as the internal quantum efficiency. The manufacturer has shaped the geometry of the chip to increase the extraction efficiency and further enhance performance by surrounding the die with a higher-refractive index epoxy to achieve an external quantum efficiency of 55 percent for the red (approximately 650 nanometers) LED. This equals that of the most efficient discharge lamp, the sulfur lamp. The remarkable feature of the device is that the potential exists for significant enhancements in performance by improvement of the extraction efficiencies. Hence, it is not unrealistic to expect the efficacy of solid-state sources to achieve 150 to 200 lumens per watt in the coming decades.

APPLICATIONS FOR LEDS

Display and signal lighting applications currently dominate the market for solid-state sources. Presently, that most LEDs in production are not high-performance devices has enabled their production cost and market price to remain low. This fact is

understandable, since traditional applications of LEDs may not have justified the added expense of using high-efficiency devices. However, the recent application of LEDs in full-color, large-area, flat panel displays, such as the NASDAQ sign in Times Square, and as replacements for filtered incandescent sources in various automotive and traffic lights marks the beginning of a market trend to new applications using more efficient devices. Similarly, the main market interest in OLEDs is presently in the display industry, specifically for full-color flat panel display applications. OLED displays are being developed for use with home entertainment and computer equipment, instrument panels and handheld communication devices. Because the cumulative size of the markets for these display and signal devices greatly exceeds that of lighting, research and development within the industry is focusing on improving product performance to meet their needs.

Solid-state light sources have the potential to fundamentally change the nature of lighting use in the building sector, with large potential savings to ratepayers and associated reductions in environmental impact. However, the core technologies are being developed for use in special niche applications (e.g. auto tail lights, displays), which do not have the same performance objectives necessary for products used in general illumination. Realizing this missed opportunity, the industry has turned to the DOE, specifically to the DOE Office of Building Technology, State and Community Programs (BTS), for leadership in supporting a program plan to develop a Solid-State Lighting Initiative.

The goal of the initiative is to accelerate the development of high-efficiency, solid-state light sources for application to general illumination. Achieving this goal will require an infusion of both private and public resources into research and development of the technology over the next five years. DOE, in collaboration with the industry, has developed a five-step program plan to create the necessary elements to support the initiative's premises.

The first in the program plan to be completed was "The Lighting Industry's Performance Requirements for Solid-State Lighting." This activity was designed to involve a broad range of individuals from across the lighting industry to ensure that the technology roadmap elements are truly targeted to their interests, since many of the manufacturers developing solid-state light sources know little about the traditional lighting industry. The final product of the activity is a set of performance requirements specifically addressing the application and market needs for solid-state light sources in their application to general illumination. These criteria will serve as performance guidelines in the development of the respective technology roadmaps.

The next two activities in the program plan are the generation of the LED and OLED Technical Roadmaps. Different technical roadmaps are necessary for each, because the research, process development and manufacturing of LEDs and OLEDs are unique to each technology. An industry consortium for each technology was established, and a common coordinating agency, the Optoelectronics Industry Development Association (OIDA), was selected by the two consortiums. OIDA will organize the two technical roadmaps and issue reports on the conclusions of the two meetings. The OIDA reports will therefore represent a consensus of the technical activities the industry feels are the most important to pursue.

Sandia National Laboratory hosted the LED technical roadmap meeting at the end of October, and Lawrence Berkeley National Laboratory will host the OLED technical roadmap meeting at the end of November. The participants in these meetings will differ from those in the previous Lighting Industry's Requirements for Solid-State Light Sources meeting. Participants will be selected for their technical expertise, and individuals will be invited from industry, academic and government research facilities.

The LED and OLED roadmaps will address the technical barriers that currently limit the use of solid-state sources for general illumination, the possible avenues of research that will overcome these barriers and the resources required to support this research. The plan will identify research activities and goals achievable within a period of five years. Industry's investment in related research over the same time period will be identified, demonstrating the commitment by the industry to this common goal. The roadmaps will also address the organizational issues associated with such a large effort.

The fourth activity will be a thorough energy analysis to document the energy savings potential for the respective technologies. The analysis will be performed by Arthur D. Little, Inc., which will utilize an extensive database to develop an analysis of the energy saving potential as a function of the larger components of the residential, commercial and industrial building sectors.

The fifth element in the program plan document is the Final Program Plan. This document will be a compilation of the Lighting Industry's Performance Requirements, the OLED and LED Technical Roadmaps, and the Energy Analysis into a single document. The Final Plan will also address the organizational issue of operating a large research program involving the participation of industry, universities and the National Laboratories, as well as collaboration with other supporting agencies. A Summary will integrate the conclusion of all four reports into a unified plan for addressing the opportunity to accelerate the development of solid-state lighting for general illumination. The Final Plan is expected to be both a working document for use within the DOE and a tool to be used externally for developing further support for the Solid-State Lighting Initiative within Congress. ■

Steve Johnson is Group Leader of Lighting Research, Lawrence Berkeley National Laboratory.

"STRATEGIES IN LIGHT" SET FOR FEBRUARY 2001

Strategies Unlimited will again host the second annual Strategies in Light conference, which will be held February 8 and 9, 2001 at the Hyatt Regency Hotel at the San Francisco Airport in Burlingame, CA.

A conference devoted to high-brightness LEDs, the event last year provided an opportunity for members of the LED community and professionals involved in lighting and other emerging applications to become familiar with a wide spectrum of applications and technologies and to share ideas.

The upcoming Strategies in Light conference will provide updates on the rapidly growing markets and applications for high-brightness LEDs and will focus particular attention on the emerging markets for LED lighting products. Speakers from major LED suppliers and users from North America, Europe and Asia will be featured. In addition, Strategies Unlimited will provide an update of the market outlook for high-brightness LEDs.

For further information on the Strategies in Light conference, call 650 941-3438, fax 650 941-5120 or email info@strategies-u.com.

OFF-BROADWAY PRODUCTIONS

Theatrical lighting techniques in architectural lighting design

BY KATHERINE C. ABERNATHY LC, IALD

In my first theatrical lighting design course, the professor wrote on the blackboard a recipe for a Bloody Mary and asked the class what he had written. The class had already taken Bartending 101 making that an easy question to answer. Satisfied with the answer, the professor then wrote another recipe on the board using slightly different ingredients. The result, a Bloody Mary drink with a slightly different twist. His point that there are many ways to mix a drink of the same name was not lost on the class.

In a theatrical production, the stage begins as an empty space, treated much like an artist's canvas. Whether a short-term production or the longest-running Broadway show, the stage is meant to be altered constantly throughout its life. Yet despite differences in production runs and in the many transformations of a stage, the objectives for lighting remain similar. In the lighting of a theatrical production, inspiration for the concept springs directly from the script and the collaborative effort of the design/directing team. Depending on their intended purpose, some of these lighting moments and looks are quite obvious, while some can be very subliminal.

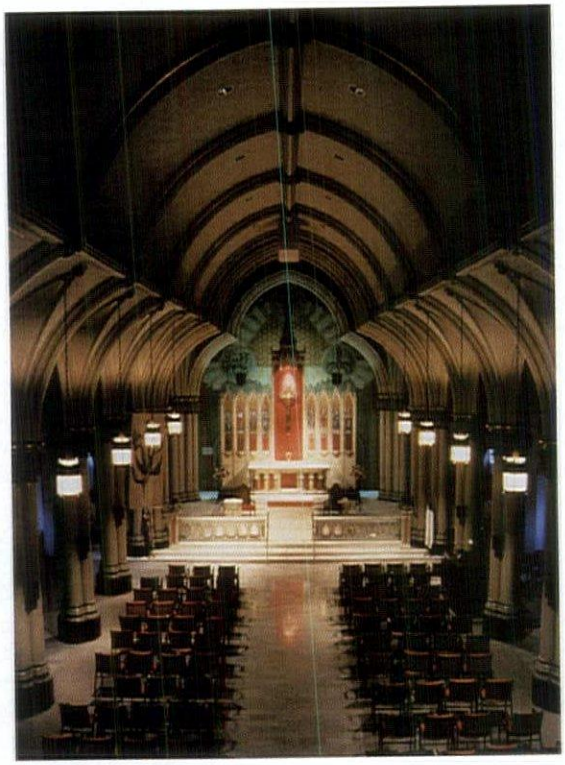


FIGURE 1—A SERIES OF PENDANTS ILLUMINATES THE CONGREGATION AT THE LACLEDE GROVES CHAPEL AND PROVIDES AN EXAMPLE OF MOTIVATED LIGHT THAT IS ERA-SPECIFIC. RECESSED DOWNLIGHTS SUPPLEMENT THE CONGREGATION TASK LIGHT. PHOTO COURTESY OF RANDY BURKETT LIGHTING DESIGN.

Certainly, the same lighting concepts used for the stage can be applied in the architectural world of lighting design. Regardless of the size of the project or its origin, be it new construction or historical renovation, the charge of a lighting designer is to create an environment that helps reinforce the customer's or end-user's goal. The lighting designer, however, should also take into consideration significant differences that exist between most architectural projects and theater. One is the intended longevity of the project. Another is that trained technicians perform the constant maintenance of the theatrical lighting rig.

In both theater and architecture, collaboration is the key to a successful lighting design. The argument that there is no such thing as real collaboration, only compromise, can be entertaining, but should not stand in the way of comprehensive discussions concerning the desired effect of the project's end result. In a theatrical production, one must talk with the director and the other designers on a team for full collaboration. In architecture, one must collaborate with many different players, ranging from the architect, interior designer and engineers to fabricators and theming designers, to name a few. Additionally, when asked to survey a possible upgrade, the lighting designer must confer with the end-user. This process provides the insight into how a space should be carved with light.

WHAT'S MY MOTIVATION?

When lighting a theatrical production or an architectural space, one can break down the thought process into basic steps that define which properties are most important to the project. These properties of light fall into two main categories: *Functions* and *Qualities* (controllable properties).

- *Functions* = visibility, motivation, composition and mood.
- *Qualities* (controllable properties) = intensity, form, color and movement.

With any space to be lighted—whether it is a theatrical production, an architectural space or a temporary setup such as a trade show or corporate meeting—the properties of light will always apply.

The first and foremost function of light is *visibility*, which takes into account the ability of the human eye to see detail accurately only when a great deal of light is present. Because of this, people are attracted to and feel more comfortable in a space with ample light. General visibility can be achieved through either direct or indirect means, but a successful lighting solution should also recognize that simply providing a single layer of light is often not as attractive or interesting to the client. (See figure 2, opposite.)

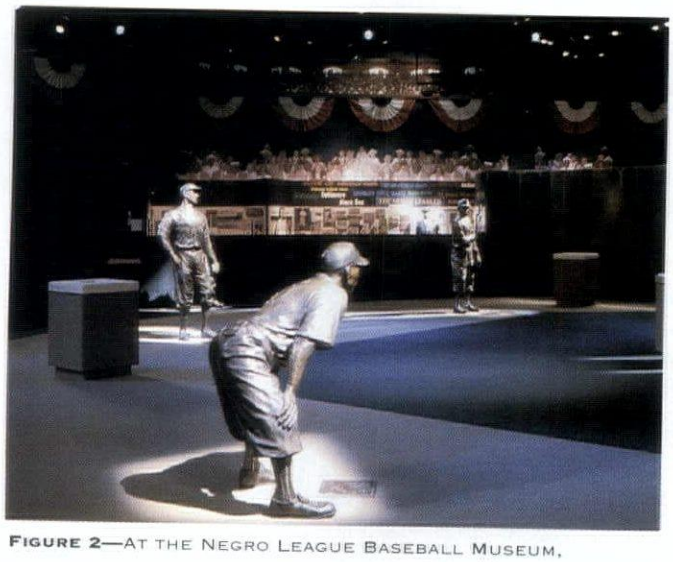


FIGURE 2—AT THE NEGRO LEAGUE BASEBALL MUSEUM, SELECTIVE VISIBILITY IS USED TO DIRECT VISITORS' ATTENTION TO THE ITEMS ON DISPLAY. PHOTO COURTESY OF AVAILABLE LIGHT.

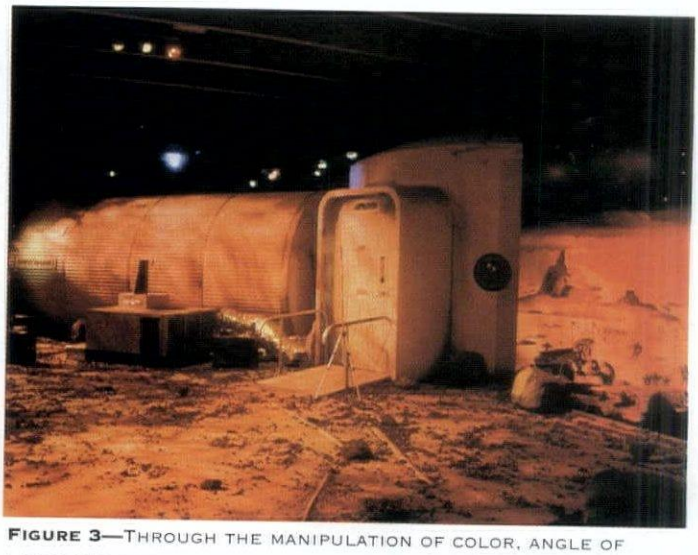


FIGURE 3—THROUGH THE MANIPULATION OF COLOR, ANGLE OF LIGHT AND PATTERN IN LIGHT, VISITORS TO MISSION TO MARS CAN ENJOY THE SIMULATED EXPERIENCE OF WALKING ON THE PLANET. PHOTO COURTESY OF RANDY BURKETT LIGHTING DESIGN.

To create interest, the lighting designer should incorporate the functional property of *motivated* light as the next step. Motivated light is the layer that begins with analyzing the "script" and helps to explain the space. This layer becomes very important in the collaboration process, prompting questions such as: What is the motivation of the space? Is there a time or a place in a specific era that can be enhanced with themed lighting? (See Figure 1, opposite.)

Composition also becomes a serious consideration, as more often than not, some fixtures will fall within the "picture the client/end-user is viewing. Although these fixtures may not serve as the only source of illumination, they must be era-specific and will provide a motivation for the second layer of light. Through the layering of light, the lighting designer is able to compose a more interesting and dynamic picture, revealing the essence of the space rather than just illuminating it.

The last function, *mood*, helps to create an environment conducive to the use of the space. Is this a workroom, a room of learning or one of total relaxation? How should people feel while in the space? In a themed environment, the opportunity to play with angles and color of light is greater than in a task-oriented environment where lighting requirements are subjected to finer restraints. While this does not prevent the use of theatrical techniques, their application should not hinder the intended function of the space. As a result, the lighting designer assumes a major role in how people react and focus within their surroundings. (See Figure 3.)

Though individually defined, the Functions of light perform more effectively as a whole. Just one property does not a lighting design make. Generally, through the collaborative process, one or two properties become more prominent and will dominate the design. A solution that uses light layering not only depends on the manipulation of these Functions of light, but also of the more controllable properties, which fall under the category of Qualities of light.

QUALITY CONTROL MEASURES

Intensity creates and allows for moments of focus. These moments are extremely important to the "story teller," giving significant information about the subject that should not be missed. There are a variety of ways to control intensity. Through the use of

FIGURE 4

FIGURE 5

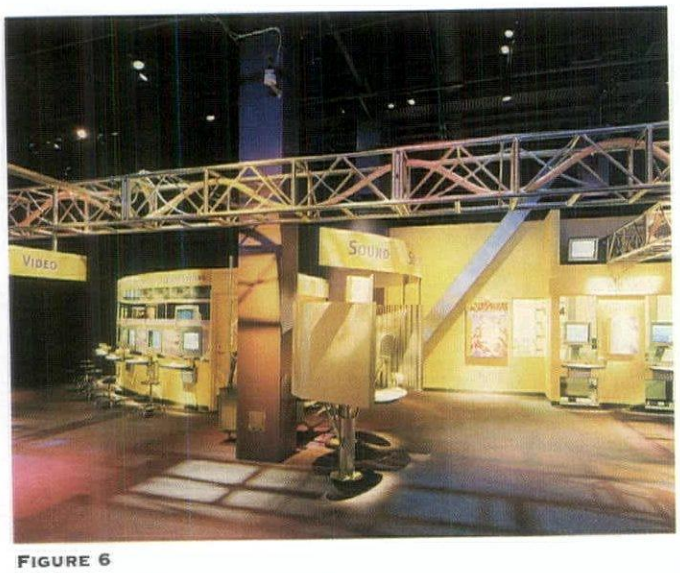


FIGURE 6

FIGURE 4—BRUSH STROKES OF LIGHT WASH THE FACADE OF THIS THEATER. PHOTO COURTESY OF AVAILABLE LIGHT.

FIGURES 5 & 6—PATTERNS AND A COLOR WASH COMBINE TO ADD A FEELING OF DEPTH TO A CONICAL WALL IN THE TECH MUSEUM OF INNOVATION (MIDDLE). A TRUSS, HIGHLIGHTED WITH COLOR, ALSO CREATES VISUAL INTEREST BY CASTING SHADOWS ON THE FLOOR (BOTTOM). PHOTOS BY MARCO ZECCHIN.

dimming, different lamp wattages and fixtures, color media and alternative mounting positions, the lighting designer gains control of the strength of light emitted on the object. As with the Functions of light, the qualities work in harmony with each other. The intensity of a light and the focus it creates relate directly with its form (size and shape).

Form is defined by lighting the object from deliberately chosen lighting positions. Composing a "keylight" system of uplight, downlight, backlight, frontlight or sidelight begins to define an object or space. If the desire is to draw attention to a particular object or element, accentuate it with something out of the ordinary. This need not be obvious to the viewer but should be bold enough to articulate the intended statement. The addition of cueing (movement), which changes angle, intensity and therefore, form, can lend an object a variety of looks and consequently, enable it to become more visually exciting.

Form is also achieved through fixture type. Because the application of theatrical techniques is not only limited to determining lighting angles, a successful lighting solution should also "accessorize, accessorize, accessorize..." Choose lighting fixtures that accept accessories, preferably two per fixture. Perhaps a sculpting lens and color could be added to the same fixture. Wash a wall with color light and accent the object with a tight beam of white light. The art of which accessory goes where is often performed during on-site adjustment and aiming sessions with the actual object or objects. Choosing a variety of fixtures and accessories allows the designer different "brush strokes of light." (See Figure 4.)

Movement in light is a change in any of the lighting properties. Movement can be achieved with a more complex system by using an automated lighting fixture or simply with a dimming system that slowly cross-fades between presets. The opportunity of cueing allows the lighting designer to create selective visibility, an extremely important aspect in the visual picture. Technology is allowing designers to bring into the architectural world automated fixtures that boast long-life lamps.

Color may be used in lighting design to motivate, accent and enhance a space. Color in light is produced through the use of lamp color temperature, dimming the lamp source and color filters. Colored glass or dichroics may be preferred for their longer life, as color filters commonly used in theater can not withstand the heat emitted from fixtures and fade over a period of time. Glass materials used in the architectural world cost more up-front, but these costs are offset by less frequent, if any, replacement of color media. The use of color contributes a great deal to *form*. The clear choice of a complementary, monochromatic or analogous color scheme is an important aspect in defining the comparative appearance of surfaces. (See Figures 5 & 6.)

Manipulating the Functions and Qualities of light affords endless layering possibilities in design. While collaboration decides the purpose and/or objectives that lead to essential choices on a project and adds "icing" as needed or afforded, aiming and on-site fine-tuning are what brings the environment to life. This is the most important step to making your design a reality both in theater and in architectural lighting design. ■

SOME FURTHER READING:

- *The Magic of Light* by Jean Rosenthal and Lael Wertenbaker. Little, Brown & Company, 1972
- *The Lighting Art*—The Aesthetics of Stage Lighting Design—by Richard H. Palmer. College of William and Mary, Prentice-Hall Inc., 1985.
- Additional technique articles on this topic can be found at www.lightforum.com/design/index.html.

Katherine C. Abernathy LC, IALD is senior associate at Available Light in Boston.

NCQLP QUIZ

1. What is the most basic function of light?

A. Mood
B. Motivation
C. Visibility
D. Composition

2. Which function of light deals most directly with era and motif?

A. Mood
B. Motivation
C. Visibility
D. Composition

3. How many functions and qualities should be considered while creating a lighting design?

A. 2
B. 4
C. 6
D. 8

4. Color in lighting is produced through the use of color filters, dimming and....

A. Lamp type
B. Sensors
C. Switching
D. Automation

5. What are the four controllable properties of light?

A. Visibility, motivation, composition and mood
B. Intensity, form, color and movement
C. Intensity, mood, color and composition
D. Visibility, form, color and movement

Responses should be addressed to Christina Trauthwein., Architectural Lighting Magazine, One Penn Plaza, New York, NY 10119; faxed to 212-279-3955 or emailed to ctrauthwein@mfi.com. All questions must receive correct responses to obtain 0.5 LEU credit.

FIBER-OPTIC LIGHTING: A STATUS REPORT

By David Houghton, PE, contributing editor

Two years ago, *Architectural Lighting* reviewed the development and promise of fiber-optic technology. What has happened since then?

Nobody disputes that fiber-optic systems are strong for those applications where they offer a unique advantage (or the only solution)—tight locations, numerous point sources, UV- or heat-intolerant subjects, underwater or wet locations, or those places where relamping is difficult or dangerous, such as atop skyscrapers or over pirahna tanks.

Two years ago, the predictions were that fiber would soon be making inroads into practical lighting applications such as downlights, task lights and cove lighting. Rising volumes would drive down the cost of fibers and illuminators, went the logic, and that would enable fiber systems to compete head-to-head against incandescent and fluorescent lighting. As one example, downlights were predicted to drop to the $150-$200 range, where their cost would compare with high-end MR16 fixtures. The fiber system would have the advantages of a single lamp for six or more downlights, saving on maintenance costs and potentially on energy costs as well.

The reality is that two years later, costs have not come down that much, and most fiber-optic systems still go into specialty or accent applications. "A couple years ago, a lot of money and effort was spent trying to legitimize the fiber industry," said Karl Haas, a lighting designer with Los Angeles-based Gallegos Lighting Design. Although Haas uses fiber for installations in theme parks, fountains and other specialized applications, he feels that the effort to push fiber into practical applications has stalled. "Vendors can wiggle a piece of fiber and make it change colors, but can they deliver footcandles to the work surface?" said Haas. "I am not convinced that manufacturers can do what they claim."

Partly to address these types of concerns, IESNA and NEMA have finally issued a standard for photometric testing of fiber systems. This standard provides a uniform method for determining and reporting the light output of end-emitting and side-emitting fiber systems and specifies measurement variables such as fiber length, intensity distribution and electrical input. Art Hatley of Fiberstars noted that the next IES project in the works is an RP (Recommended Practice) guideline to help designers apply the photometric data that will result from the new standard. "It's kind of like when indirect fixtures were first becoming popular," said Hatley. "First, we needed agreement on how to measure their light output, then we needed guidance in how to specify and space the fixtures."

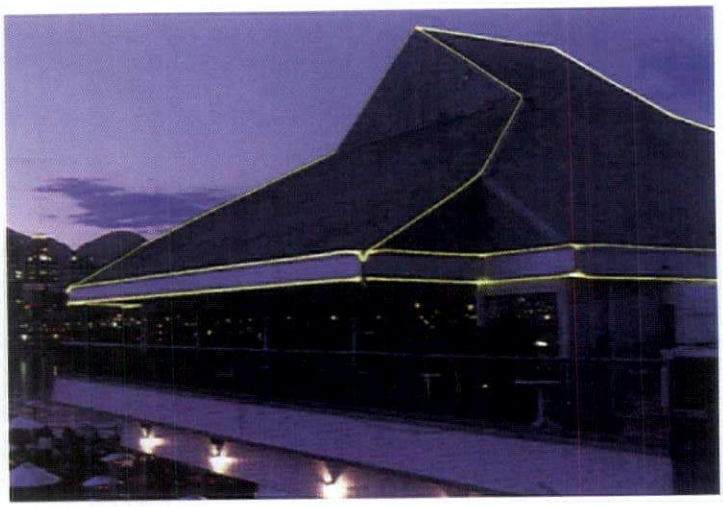
Lighting designers that do use fiber systems seem to be moving toward turnkey installers. "In our office, it's not enough to specify fibers and illuminators," said Haas. "You also have to specify a contractor. You can't hand a roll of fiber to a conventional electrical contractor and expect the installation to work right." Gallegos Lighting Design works with contractors such as L.A.-based Zinger Consultants, a small firm that specializes in fiber installations, to make sure that the systems live up to their potential.

The turnkey fiber contractor occupies a delicate middle ground between the vendor and the lighting designer. Dorian Blinko, President of StarFiber International Lighting in Burnaby, B.C., runs one such company. "We are an installation company," said Blinko. "We are not lighting designers, but because we are very familiar with the technology, we can help designers get their desired effect." StarFiber is a manufacturer's rep for several fiber vendors, but instead of just providing the sales and technical support that other lighting reps do, their employees wear tool belts and drive vans packed with the goods required for installing jobs. Their bids are for materials and installation.

As an example, he cites a recent starry-ceiling job for a casino in eastern Canada. Blinko said that the architect originally specified 20 fiber points per sq. ft. in the dome-shaped ceiling, but he was able to convince them that they only needed a fraction of that (two or three) to get their skyscape. "We were able to cut the number of illuminators from 30 down to 10," said Blinko, noting that they also simplified the design to include only three different brightnesses of point sources, via three diameters of fiber.

Another of the new breed of turnkey companies is Visual Lighting Technologies, headed by industry veteran Daniel Haydt. "We think of ourselves as system integrators," said Haydt about VLT, a company that designs, manufacturers, imports and installs fiber-optic systems. He

(Continued on page 36)



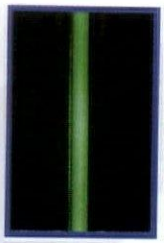
THE ROOF OF THIS RESTAURANT, LOCATED IN A MARINE ENVIRONMENT, USES A SYSTEM OF FIVE ILLUMINATORS, WHICH RUN 150W METAL HALIDE LAMPS AND A 1,000 FT. OF FIBER. PHOTO COURTESY OF STARFIRE INTERNATIONAL.

Why Fiberstars Is The Leader In Fiber Optic Lighting. And Why That's Important To You.

Photograph by Richard Saxton

Knowledge & Experience

We're Fiberstars, and we've been the leader in fiber optic lighting for more than a decade. We were one of the original fiber optic pioneers, and have maintained the industry's most aggressive R&D program since the very beginning. We put all our knowledge and experience into each product we make and every order we ship. And it shows.



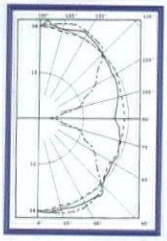
Product Quality

Our patented BritePak® III fiber, for example, is the brightest, most flexible and most durable illuminating fiber ever offered. Its design, based on years of field observation and scores of laboratory tests and evaluations, features a unique, multi-strand configuration. And, unlike lesser fibers, it's made from only the finest, optical-grade material.

Technical Innovation

Our powerful and efficient illuminators are the products of extensive development. They produce more usable output per watt than competing systems, and also include a host of other unique features, such as the most advanced dichroic coatings available. So they not only produce more light than you'd expect, they produce more pleasing light, too.

Documented Performance



Because we know how important predictability is, we publish independent photometry on every system we offer. We were the first fiber optic lighting manufacturer to independently test our systems and publish the results, and we've consistently led the industry in promoting the advancement of testing standards and procedures. After all, even the best lighting system is of limited value if the designer can't accurately predict its performance.

Unparalleled Support

To Fiberstars, being the industry leader means more than having great products – it also means having great people. From our Customer Service Department to our new Custom Effects Division, we're ready and able to provide the best product and project support you can get. We have the experience and the know-how to help with everything from simple layout advice to directing the installation of the most complex system imaginable. Which shouldn't be too surprising, since we've supplied more fiber optic lighting systems than our three biggest competitors, combined.

The next time you consider fiber optic lighting, talk to the company with the knowledge and experience to make your project a complete success. We're at **1 800 327 7877**, or visit our web site at www.fiberstars.com.

Fiberstars®

The Art & Science of Fiber Optic Lighting™

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Leadership Is Earned.

FIBER OPTICS ARE PROVIDING THE UPLIGHTS ON THIS BUILDING. WITH A TOTAL EQUIPMENT COST OF LESS THAN $400 PER FIXTURE, THIS JOB COMPARES FAVORABLY WITH CONVENTIONAL UPLIGHTS. PHOTOS COURTESY OF VISUAL LIGHTING TECHNOLOGIES.

(Continued from page 34)

acknowledges that it should be easier for electrical contractors to install fiber systems. Their company helps by pre-terminating the fiber bundles for insertion into illuminator ports and instructing contractors on the care and feeding of the systems—a service that Haydt calls *project supervision*. "We do complete installations ourselves, but we also like to show electricians how to deal with fiber," he said. "That helps build the installer base and actually increases our sales base because that contractor will tell somebody else about fiber systems."

While fiber-optic lighting may not be a serious challenge to most fluorescent and incandescent applications, neon suppliers have reason to be nervous. High-tech side-emitting fiber coupled with powerful illuminators can now surpass neon systems in light output (in white, yellow and blue-green colors; reds are still problematic), and they win the maintenance battle hands-down. As an example, a roof-edge application for a restaurant in a marine environment required a system that uses five illuminators running 150W metal halide lamps and a 1,000 ft. of fiber. The total installed cost was about $20,000 dollars.

Cost is still a barrier. Although prices have dropped somewhat—1/2-in. stranded fiber that retailed for $15 per ft. two years ago now costs about $12—the overall price tag for most fiber systems is still four to five figures. "Those prices stick out like a sore thumb in the 'value engineering' phase of a project," noted Haas. On a recent theme park project, Haas had designed 15 separate fiber installations that carried a total price tag of $175,000. "That got whacked down to two installations and twenty grand. It's just too easy for the budget cutters to attack that line item." Haas does add that the surviving systems were well received by the owners.

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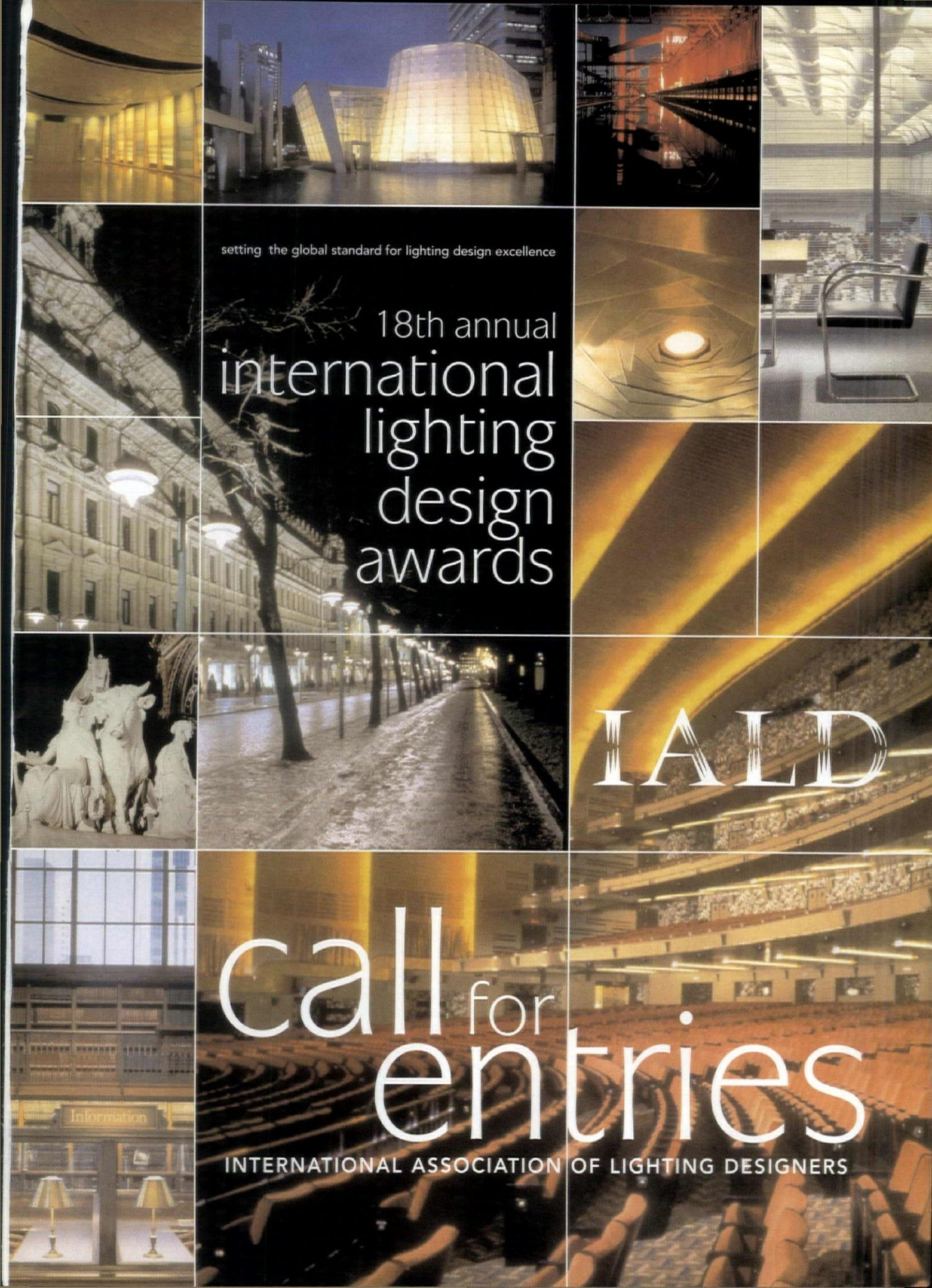
setting the global standard for lighting design excellence
18th annual
international
lighting
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IALD
call for
entries
INTERNATIONAL ASSOCIATION OF LIGHTING DESIGNERS

IALD

Program Description
The Lighting Design Awards were established to increase awareness of quality lighting design by recognizing lighting installations which display high aesthetic achievement backed by technical expertise. The awards exemplify a synthesis of the architectural and lighting design process and a sensibility to energy usage, economics, and sustainable design. As a collection of work, the awarded projects illustrate the diversity of techniques used to create outstanding lighting design.

2001 Eligibility
Anyone may enter a project for an award. The project must be a permanent architectural lighting design solution, interior or exterior, for which construction was completed after 1 June 1998. Lighting products, lighting equipment, and lighting design for theatrical performances are not eligible.

Judging
Projects will be judged individually based on aesthetic achievement and technical merit in accordance with the designer's concepts and goals. The IALD encourages submissions of all types and sizes of projects. This is not a competition, there is no minimum or maximum number of awards granted. Each project will be judged on its own merits, not against other projects. Judging will take place over two days in February.

Awards
There are two types of awards, Awards of Excellence and Awards of Merit. Special recognition may be given for certain unique solutions. Award winning projects will be recognized at the IALD Awards Dinner and Presentation on May 31, 2001, in conjunction with LIGHTFAIR INTERNATIONAL in Las Vegas, Nevada. Winning projects will be published in leading architectural and design publications and included in the IALD slide library.

Submission Requirements
All submissions must be in an 8-1/2 x 11 inches or equivalent format. No mention or identifiable illustration of a specific lighting design firm or designer may appear as any part of the presentation except the cover page.

architectural lighting

INTERNATIONAL ASSOCIATION OF LIGHTING DESIGNERS

18th Annual International Lighting Design Awards

CO-SPONSORED BY ARCHITECTURAL LIGHTING MAGAZINE

CALL FOR ENTRIES

Please include all of the following for each entry:

Cover Page: Please provide the IALD with the following information on a cover page to your entry:
- Entrant's Name
- Street Address, City, State or Province, Postal Code, Country
- Phone and Fax Number
- Name of Project
- Location of Project
- Date of Completion of the Project
- Lighting Designer on Project
- Size of Project (in square feet or meters)
- Installation Cost of the Project
- Watts per Square Foot or Meter

Written Brief: A synopsis of the special challenge(s) or restraints of the project and a description of your design solution (75 word max.) This is a critical part of your submission and is the only written information read in the first round of review.

Keyed Description: A technical and conceptual summary of the project that is cross-referenced by number to the slides you have submitted (50 words per slide max.). The description should include types of fixtures used and reasons for their selection.

Slides: The IALD recommends a minimum of six slides and maximum of ten slides per project. The quality of the photography is important in the judging process. Although the images do not need to be professionally photographed, they should be of sufficient quality to illustrate your work. Please avoid the use of fill light, or, if that is not possible, clearly identify images which include fill light or daylight. Digitally enhanced or retouched photographs are not allowed. Please identify any areas in photographs that were not the work of the submitting lighting designer. Entrants are encouraged to include photographs, which show the project in use, in context with its surroundings, and from a human vantage point. Smaller scale projects should show more detail rather than reducing the number of slides. If plans and drawings are required to describe the lighting solution, we recommend photographing essential information and including them as slides. If the project is a renovation, an image of the project before changes is recommended. If the project includes exterior lighting, at least one daytime photograph is recommended. All slides must be labeled with project and firm name and numbered to correspond with the keyed description. With slides positioned right reading, number each slide in the upper right corner and place project name in the upper left corner of the slide. Photographs, drawing, and/or magazine articles will not be considered.

Return of Slides: The IALD will retain the slides of all entries for educational purposes unless you specifically request that they be returned. If you wish your submission to be returned, please indicate so in writing and include a return self-addressed envelope with the submission.

Entry Fee: (per entry):
- $40 (U S) IALD and LIRC Members
- $75 Non-Members

Payment is by check, money order, or Visa or MasterCard credit cards.Checks must be payable in United States currency, made payable to IALD. A single payment may be used for multiple entries. Please do not send cash.

Address entries to: IALD Awards Program, International Association of Lighting Designers, The Merchandise Mart, Suite 11-114A, 200 World Trade Center, Chicago, IL 60654 USA Telephone 312-527-3677 Facsimile 312-527-3680 E-mail: iald@iald.org

Make sure you include:
- Cover Page
- Keyed Description
- Entry Fee
- Written Brief
- Slides

Incomplete entries will not be considered.
Deadline: Submissions must be received no later than February 1, 2001.

Call for entries courtesy of Architectural Lighting Magazine

(Continued from page 36)

Still, some are finding that fiber systems can go toe-to-toe with conventional lighting on a cost basis. As an example, Haydt cited an exterior building illumination job that called for outdoor recessed uplights. The fiber system used here consists of a $600 illuminator, $450 worth of fiber and six weatherproof terminal fixtures costing $200 each. At a total equipment cost of about $375 per head, the system compares favorably with conventional high-quality outdoor fixtures. Additional benefits are that the fiber system requires only one wiring run, costs less to operate and creates no burn danger from hot lamp enclosures.

Two years ago, one of the most intriguing developments in illuminators was the "Perpetual Light Pump" (PLP) from Remote Source Lighting International (RSLI), a 64-port sphere surrounding the fabled sulfur lamp. While the PLP has not emerged from the lab, most illuminators are still powered by metal halide or halogen incandescent lamps. While manufacturers continue to improve the light-to-fiber connection, the developments have been a bit frustrating to specifier Haas. "Every six months I hear about how the ultimate illuminator lamp has been created," he said. "The industry has not really been able to settle on a standard for illuminators or lamps."

Haydt is enthusiastic about one of those lamps: the Philips CDM, a 150W ceramic-tube metal halide reflector lamp that is designed specifically to power fiber-optic illuminators. The lamp delivers 90+ CRI with lots of red spectral content and offers a rigid mounting flange that helps pre-focus the lamp onto the fiber port. Haydt noted that there have been efforts to deliver more light through fiber by using brighter lamps—250W or even more. But, he said, "We prefer to get more light by improving the system efficiency—doing things like polishing the fiber ends at the port. It's also turning out that 150W of metal halide is sort of a magic number for fiber illuminators—we can get good color and lamp life without running the lamp cost up too high."

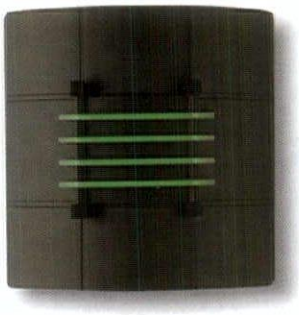
LED illuminators may hold promise for fiber optics, including the potential for single fibers coupled directly to single LEDs. This could be a relatively simple undertaking since LEDs sources are directional in nature. However, LEDs could also pose direct competition to fiber systems. These tiny sources have come a long way in the last two years—arguably further than fiber has in the same period. LEDs are now being mounted in translucent strips that give a similar effect to side-lit fiber and they could also be used in situations where many tiny sources are required to give an effect such as a starry ceiling.

One interesting trend is the maturing of the fiber optics market. A few years ago, the fiber industry consisted of everything from Fortune-1000 backed corporations to garage-based entrepreneurs. This led to a wide variety of product claims and performance, and to a competitive environment in which technology information—such as how to best do fiber-illuminator couplings—was held close to the vest. Now, many of the small operators have either dropped out or been merged into larger consolidated companies such as Fiberstars, which has purchased five other fiber-optic companies over the last two years. As a sign of the times, one of those companies does nothing but installations. "We're seeing some of the best brains in the business gathering together now and that's going to help the pace of technology development," said industry consultant Guy Esberg.

One thing that hasn't changed about fiber-optic lighting is its ability to appeal to the imagination. Even after more than a decade in the business, Blinko is still charged up. "This part of the lighting business is so creative and fun," he said. "It's got a big 'ahhhh' factor when you finally turn the switch." In the end, this may be the most dependable aspect of fiber-optic lighting. ■

For additional information on this topic and other technology articles, visit www.lightforum.com/technology/index.html.

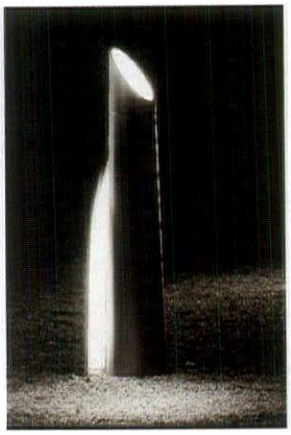
From **Holophane**, Hallbrook Series fixtures are offered with a flared reflector, providing cutoff optics and a precisely molded borosilicate glass refractor for uniform illumination and maximum spacing. Lamping options include HPS, metal halide and mercury vapor sources in wattages of 35 to 175. Poles are steel or aluminum, available in 12-, 15- and 18-ft. heights. Banner arms, street-sign brackets and weatherproof receptacles are also available. **Circle No. 40**



Featuring a 14-in. x 14-in., die-cast aluminum front door, the eSconce from **Architectural Area Lighting** is offered in three versions: ES1, ES2 and ES3. ES1 can be mounted as an uplight or downlight, and ES2 is equipped with an indirect component as well as downlighting capability. Both are available with four optical systems for use with metal halide or HPS lamps. ES3 uses 42W compact fluorescent lamps with a type 3 reflector. The standard eSconce has a glass square on the front face; various fascia, color options and finishes are available. **Circle No. 41**

Architectural Landscape Lighting's Scanlite pole- and surface-mounted landscape lighting fixtures feature a clear polycarbonate cylindrical fixture head and domed metal top with a prominent button hardware detail. Ringed louvers inside the fixture head provide diffused, evenly distributed light, and the domed top prevents light from spilling upward. Optional features include an opal acrylic fixture head for a more diffused light output and a single exterior metal band around the lens. Fixtures are constructed of die-cast aluminum; a chip- and fade-resistant black finish is standard. Custom colors are available. **Circle No. 42**

Viane lanterns from **Progress Lighting** are available in a variety of styles, finishes and dome components. Measuring 13 in. in diameter and 35 in. high with a 16 1/4-in. depth, the wall torch shown features a wrought iron tail and wall canopy, as well as a clear, seeded-glass shade. The wall torch uses three candelabra-based lamps. **Circle No. 43**



Hessamerica's Ponte bollard features a columnar light body constructed of corrosion-resistant cast aluminum with stainless steel hardware. The truncated head contains adjustable specular metal internal louvers and can rotate 360 degrees. An S-shaped curve along one side of the housing emits vertical illumination for low-level pathways. A 35W PAR30L metal halide lamp in two beam spreads provides uplighting, and a 25W T5/HO lamp illuminates pathways. The finish is a finely textured light silver-gray metallic paint. **Circle No. 44**

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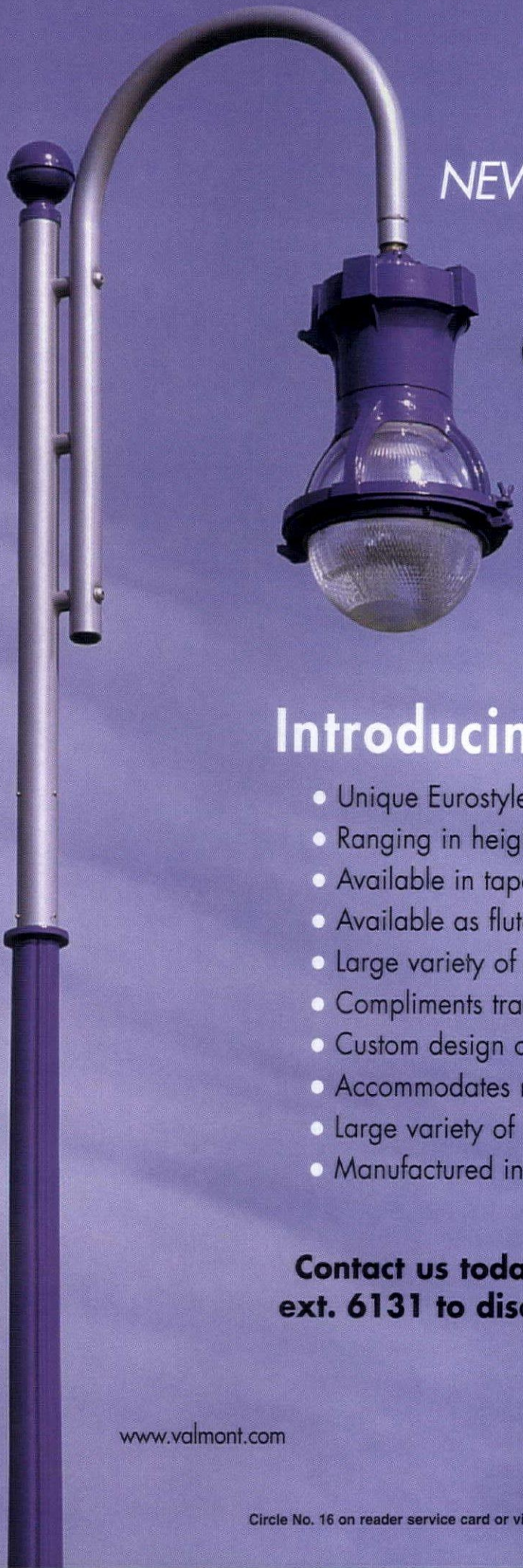

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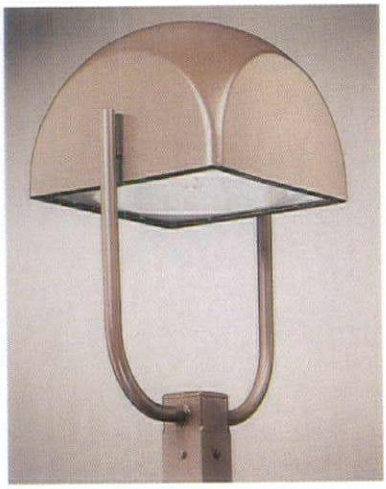
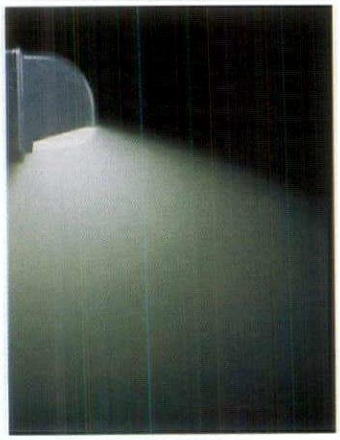


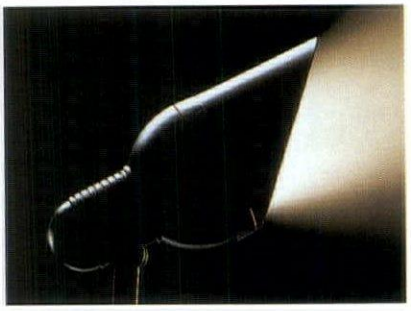
From **Ruud Lighting**, the Square Dome (S Series) integrates vertically positioned lamps with reflector systems offering three IES distribution patterns: Type II/III, IV and V. Three mounting styles are available: side-pole, post-top and wall. All S Series fixtures are standard with the Ruud DeltaGuard bronze finish and warranted for seven years against corrosion, UV degradation and abrasion. Optional finish colors include black, silver, white and verde. Fixtures are equipped with pulse-start and probe-start metal halide or HPS lamps. **Circle No. 45**

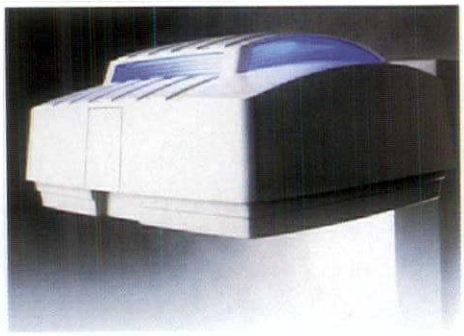
Bega's downlight bollard provides indirect light from a 39W ceramic metal halide PAR20 lamp. The light source is completely shielded inside the post by a translucent white or clear acrylic cone and produces low-glare, uniform illumination with no shadowing near the post. Post construction is one-piece extruded aluminum with 1/4-in. wall thickness and heavy, machined aluminum alloy top housing and base. Standard finish consists of two coats of black or white polyurethane, one with light texture over a phosphate base. Custom colors are available. **Circle No. 46**

Designed to address glare, sky glow and light trespass, the TWAC low-wattage wallpack from Lithonia Lighting sharply cuts off light to eliminate wasteful light above 90 degrees. The wallpack uses medium-base metal halide and HPS lamps up to 100W as well as triple-tube compact fluorescent sources. TWAC features vandal-resistant, one-piece polycarbonate lens and die-cast aluminum housing. IP65 listing ensures protection against both moisture and dust. Circle No. 47



The bullet-shaped Bolero from **Architectural Landscape Lighting** is offered with small, medium or large visors and uses a 175W metal halide lamp in spot or flood beam spreads. Bolero protrudes above the ground on a single adjustable stem, which mounts to an electrical junction box or to a compact, accessible ballast compartment recessed below ground level. Construction is corrosion-proof composite material available in architectural bronze or matte black. Composite or aluminum ballast housings may also be specified. **Circle No. 49**





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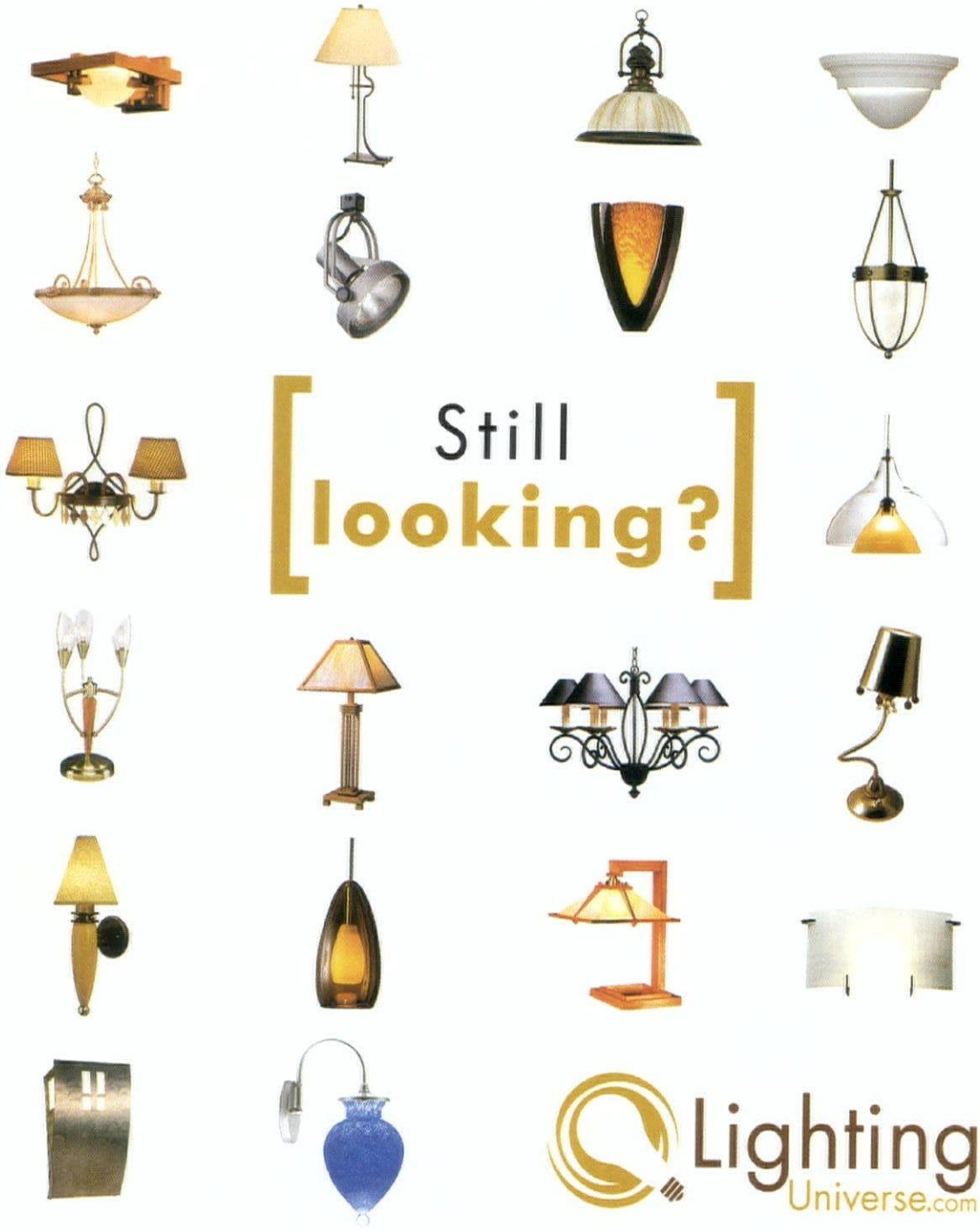

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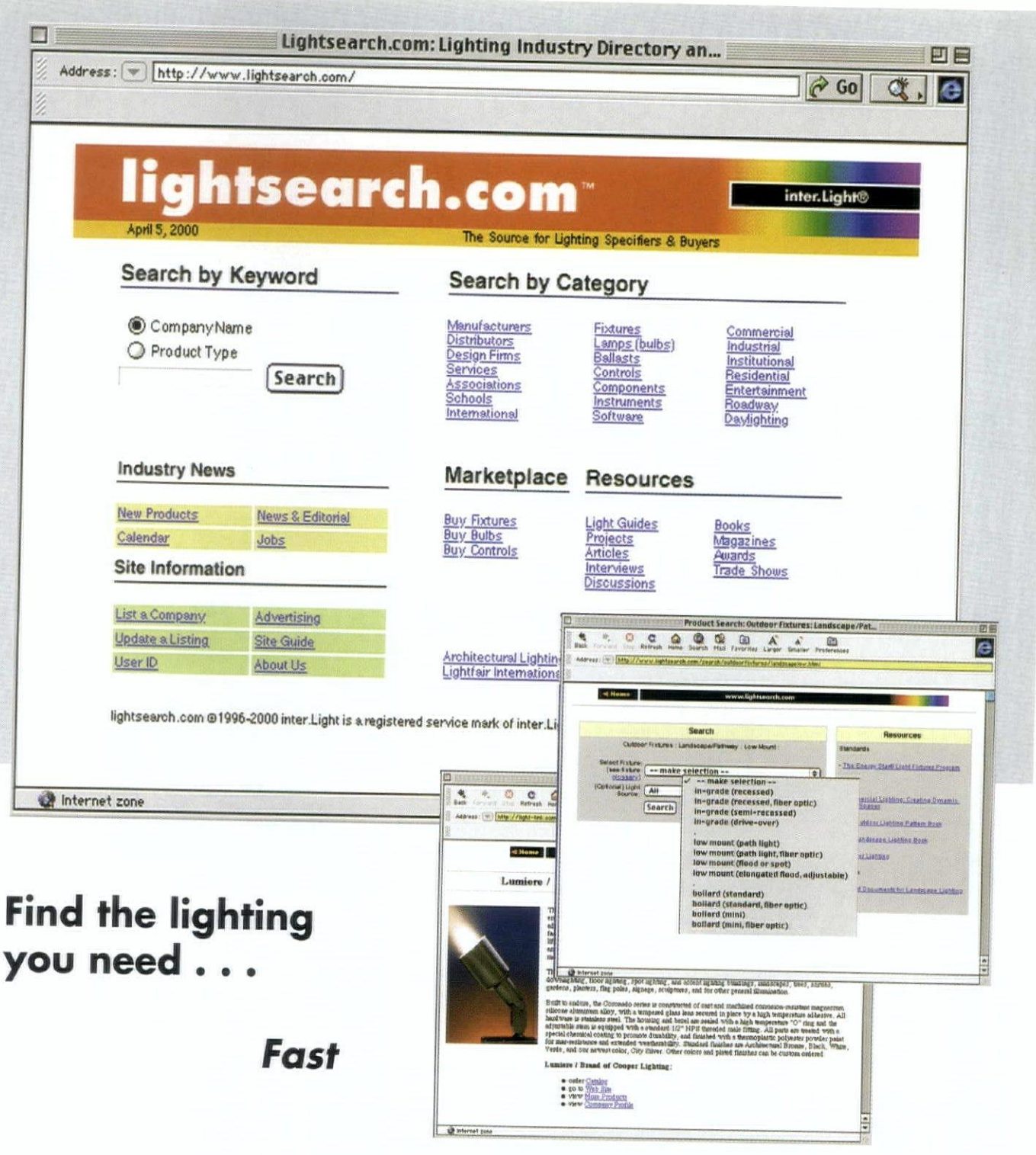

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ad index

RULE PUTS SPOTLIGHT ON FLUORESCENT LAMPS

BY PAUL WALITSKY, CHMM

Lighting literature and advertising have recently been full of talk about the Universal Waste Rule, hazardous lamps and the "mercury menace." What's going on? Does this affect lighting design? Are "Green Buildings" mandatory or just a passing fad? The following will attempt to put this in perspective and provide some clues as to where designers might want to look in order to provide their clients with environmentally responsible solutions.

Fluorescent lighting has been a mainstay of lighting design for many years. Continual improvements in energy efficiency, lifetimes and color rendering have presented lighting professionals with a myriad of choices. Lighting designers have used these choices to brighten spaces and create desired ambiance. But there is a dark side to all of this brightness. Fluorescent lamps (and HID lamps) work due to the presence of mercury. The mercury generates ultraviolet energy that energizes the phosphor, generating light. Mercury, however, is a toxic material that bio-accumulates in fish and other species.

Mercury has been regulated as a hazardous material since 1980. In an effort to protect groundwater supplies and control landfill leachate, the EPA initiated a new test protocol in 1990: The Toxicity Characteristic Leaching Procedure (TCLP). Fluorescent and HID lamps were found to fail this new test. Debate raged for almost six years between various EPA departments, the industrial community and interested stakeholders. The debate centered on finding a balance between protecting the environment and not creating an undue burden for the user community. In December 1998, EPA made its decision and chose the Universal Waste Rule. It was published in July of 1999 with an effective date of January 6, 2000.

> WE MUST CONSIDER THE BUILDING AND ITS LIGHTING AS PART OF THE LARGER ENVIRONMENT.

This Rule has been seen as a way to regulate the safe disposal of the hundreds of millions of fluorescent and HID lamps that fail the TCLP test. The Rule encourages recycling by reducing the paperwork burden associated with hazardous waste management. It allows shipments on regular trucks without hazardous shipping manifests and reduces training requirements for personnel handling these materials. It clearly puts the burden on building owners and management to handle their lamps in an environmentally sound manner. Legally, lamp disposal is an issue for possible enforcement action by the State and Federal regulatory agencies.

Lighting designers have always seen their task as making functionality and ambiance coexist in the same space. Lighting is an integral part of the building environment. Now, we must consider the building and its lighting as part of the larger environment. "Green Building" designers can reduce the environmental impact of a structure by specifying the right choice of lamps and ballasts. The designer must consider the entire life cycle of the lighting system, not just the initial design parameters.

The advent of the Universal Waste Rule makes it clear that building owners (and designers) need to consider how they will manage lamp disposal. There are several choices to consider. Will the fixtures facilitate group relamping? (This is a good option if we do not want to accumulate lamps in small quantities). Will there need to be a storage area for storing spent lamps prior to shipping? Should we consider what has now emerged as a new category of lamps: non-hazardous, TCLP-compliant lamps?

Low-mercury lamps are now available in almost all fluorescent configurations, HPS, lower-wattage metal halide lamps and in non-integrated compact fluorescent lamps.

These lamps pass most current state regulations except those of Minnesota, Vermont, Connecticut, the incinerator counties of Florida and in July 2002, Maine. Regulations change, so check with state and local authorities. The Universal Waste Rule only affects those lamps that fail the TCLP. Those that pass have either reduced mercury content or have found other technological means of producing a passing result.

What advantages does the designer gain when specifying low-mercury, TCLP-compliant lamps? The design offers building management choices if they are in the 45 states not listed above. They can recycle the TCLP-compliant lamps or seek standard disposal services. They need not put aside designated storage space if they choose not to accumulate lamps toward disposal. In the event of breakage, the lowest mercury lamps create less of an exposure hazard. Lamps that fail TCLP when broken have to be handled as hazardous waste.

The major advantage is that the designer knows that the specification reduces the environmental impact of the building on society. The lighting professional can feel pride knowing that not only does the design provide the ambiance and functionality required but that it contributes toward what can now truly be considered a Green Building.

Is there a disadvantage? The price of the lowest mercury lamps is competitive with their higher mercury cousins. Performance is identical, and lifetimes, output and color properties all match. The only disadvantage is that the designer will have to add an additional component to the design specification, low-mercury lamps.

It comes down to two thoughts. First, the Universal Waste Rule has made it plain that lamp disposal needs to be considered when initiating a new design or doing a retrofit. And second, why write a specification for a high-mercury lamp when you can specify a low-mercury lamp instead? ■

Paul Walitsky, CHMM is manager on environmental affairs for Philips Lighting Co.