JANUARY/
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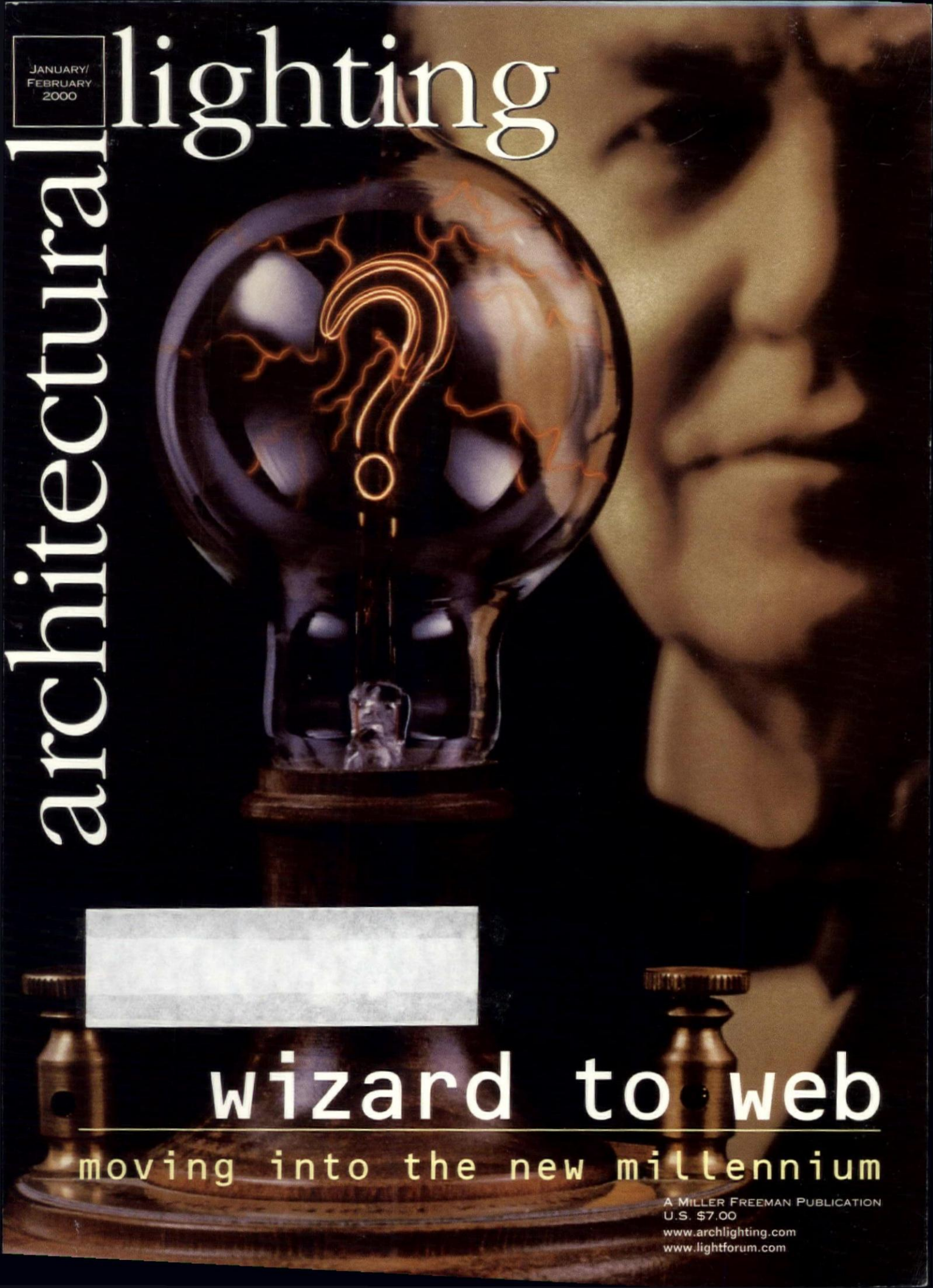
2000

architectural lighting



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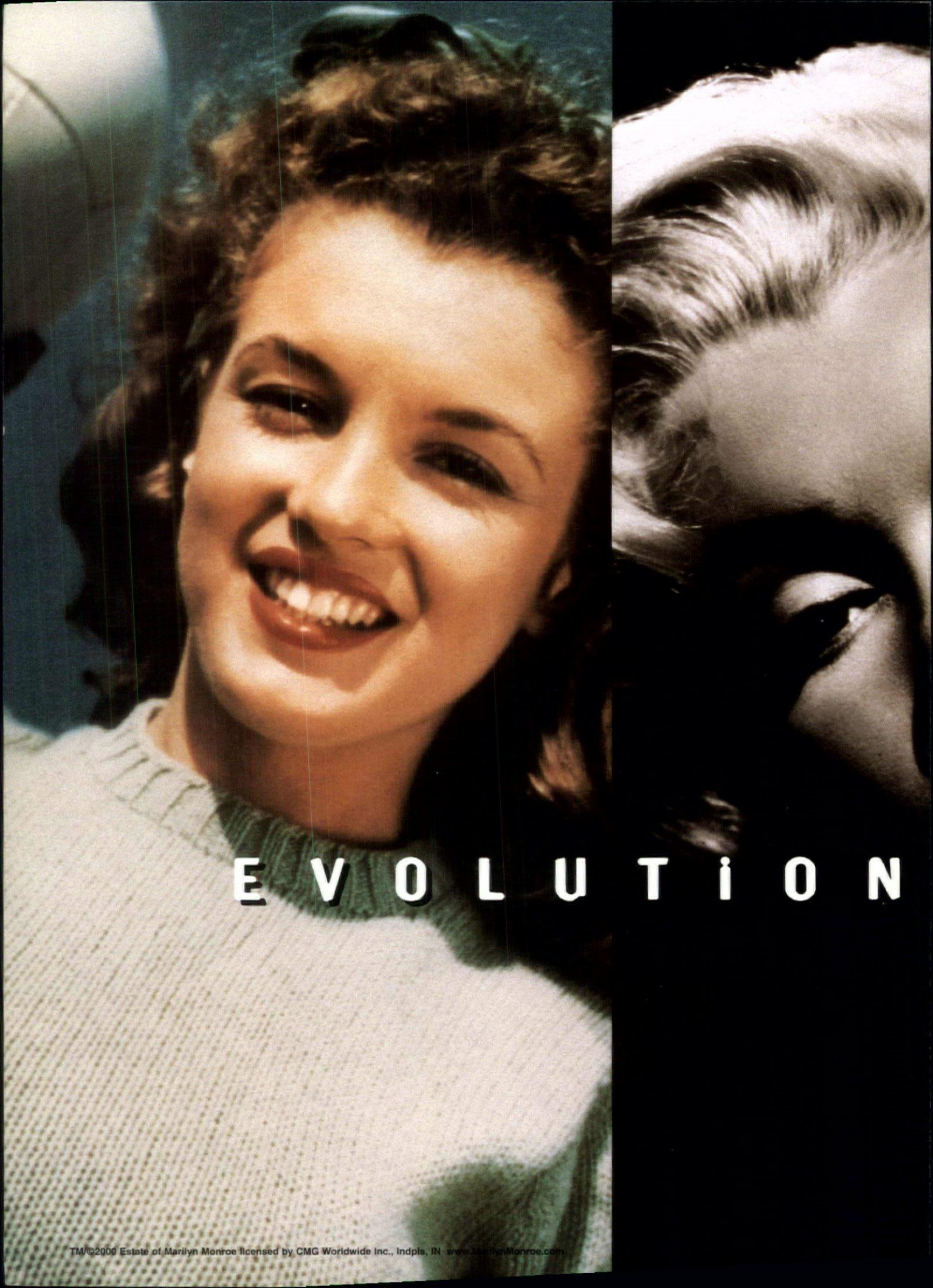

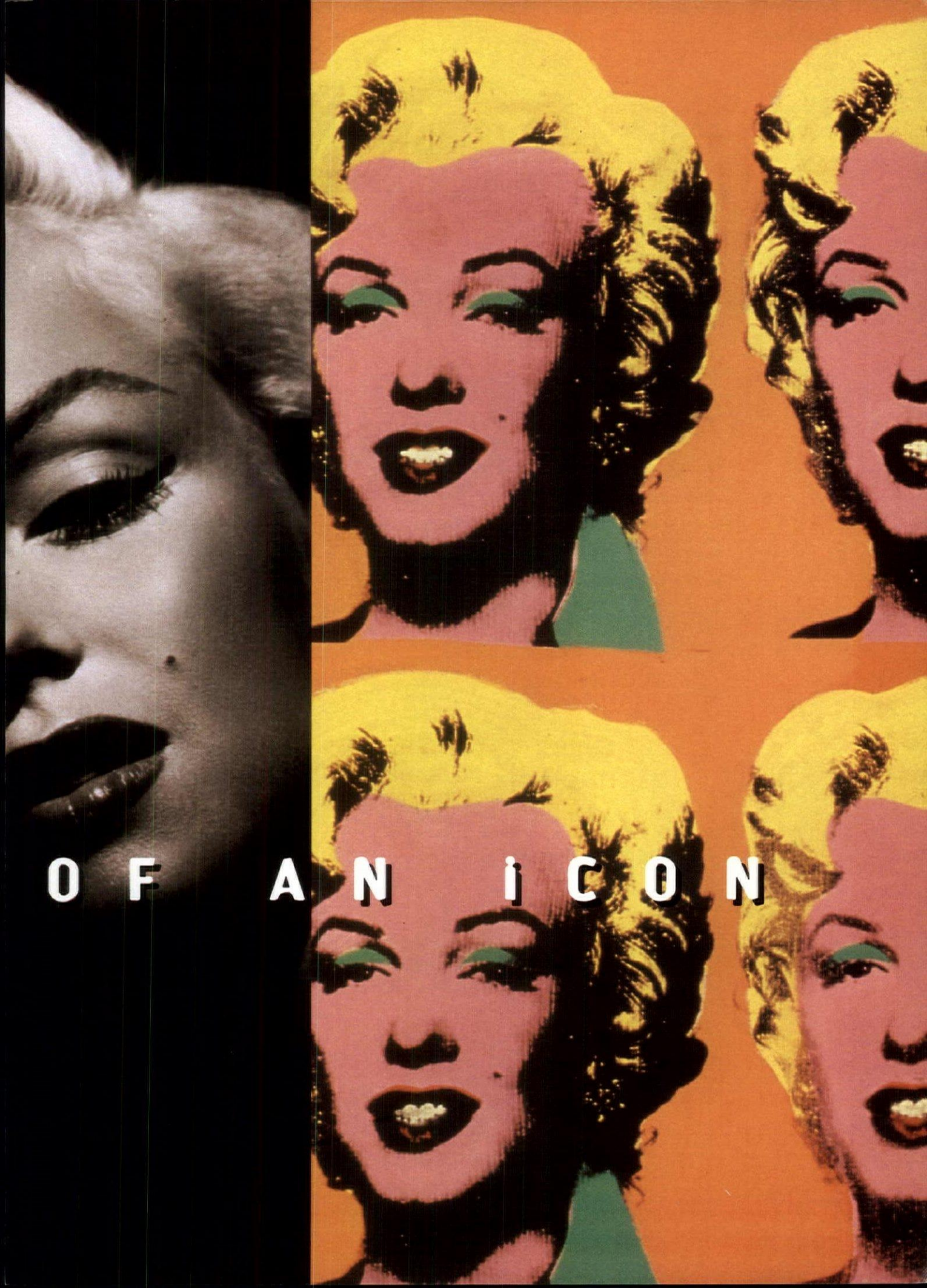
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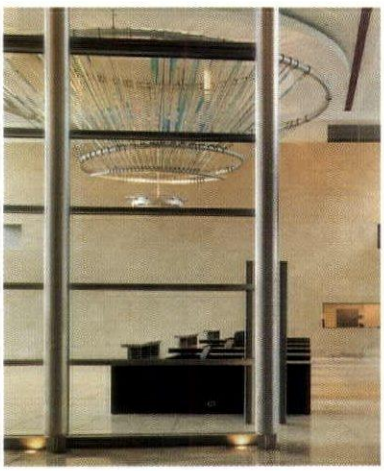

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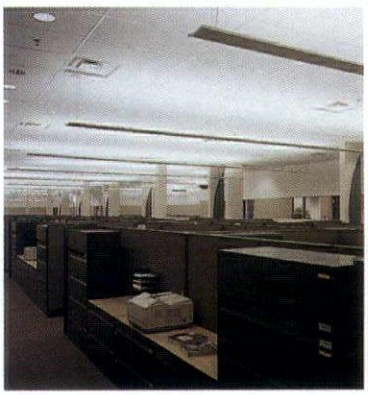

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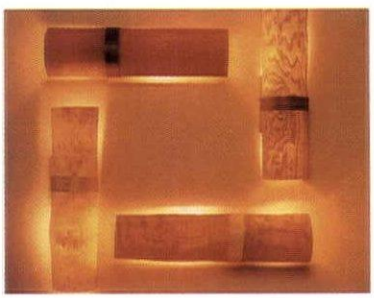

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Architectural Lighting (USPS 000-846, ISSN 0894-0436) is published eight times per year (Jan/Feb, Mar/Apr, May, July, Aug/Sept, Oct, Nov, Dec) by Miller Freeman Inc, 600 Harrison St., San Francisco, CA 94107, phone (415) 905-2200 and is distributed free of charge to individuals or firms engaged in the specification of lighting products in the US and territories. The cost of all other subscriptions in the US and territories is $48 per year. A one year Canadian subscription, payable in US dollars, costs $60 and all other foreign, $86. Periodicals Postage Paid at San Francisco, CA and additional mailing offices. Standard Mail (A) Enclosed. POSTMASTER: Send changes of address to Architectural Lighting, PO Box 1061, Skokie, IL 60076-8061. Architectural Lighting is a trademark owned exclusively by Miller Freeman Inc, a United News & Media Company. Editorial and advertising offices: One Penn Plaza, New York, NY 10119-1198. Phone (212) 714-1300. Customer Service Inquiries: For address changes, single copy sales ($7 in the US, $7 + postage outside the US, payable in advance) and subscription inquiries, write to Architectural Lighting, PO Box 1061, Skokie, IL 60076-8061 or call (800) 255-2824 in the US or (847) 647-2105 outside the US. Printed in the USA.

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List Rental		(847) 619-9800 fax (847) 619-0149
Circulation	Wendy Saar	(212) 615-2687 fax (212) 279-4460
	Customer Service	(800) 255-2824 fax (847) 647-5972
Reprints	Vicki Brewster	(516) 365-2646 fax (516) 681-7315 62 Northwoods Rd. Manhasset, NY 11030

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editorial

THE FUTURE @ YOUR FINGERTIPS

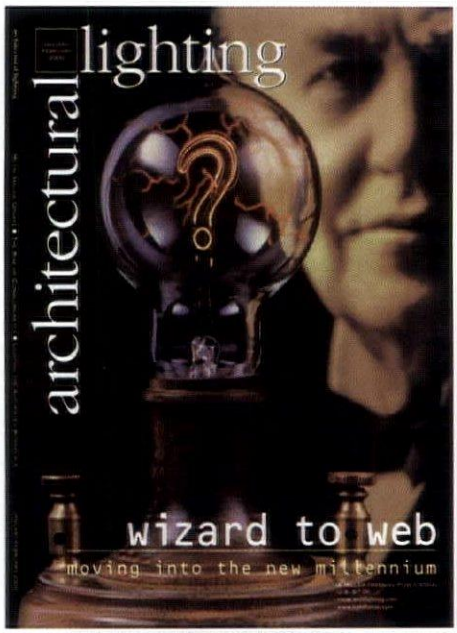
As we begin Y2K, the staff of *Architectural Lighting* thought it might be timely— and fun—to take a quick look at where we've been, but moreover, at where we're heading. It's only been a little more than 100 years since the invention of electric lighting and only about 50 since the inception of lighting design as as profession. In the context of history, that's a short time. And while there have been great strides in technology, technique and the acceptance of the Lighting Designer, we're really just on the cusp of what's to come.

The cover of this issue—a departure from our standard design project—entitled "Wizard to Web" pays homage to the man who started it all, while curiously questioning where we will be heading. What is the future of lighting design? What new developments in technology can we look forward to? Where will the information highway lead, and at what speed? In what seems like the blink of an eye, the Internet has invaded almost every aspect of our lives, both professionally and socially, offering us virtually infinite resources, opportunities and capabilities that only a few years ago seemed like a "thing of the future." Well, the future is here. And all of these rapid advances are rapidly advancing. What was cutting-edge yesterday, can be obsolete tomorrow. It's overwhelming and sometimes mind-boggling, but fascinating—as the concept of limits and boundaries begins to disappear. Is this just a trend? While some theorize it may be, the reality seems to shout, "there's no going back."

PHOTO BY CHRIS LAMB

CHRISTINA TRAUTHWEIN, EDITOR-IN-CHIEF

With that in mind, our special "Millennium Section," starting on page 36, discusses the real and possible futures of our industry. In addressing the continuing trend toward M&As, contributing editor, Wanda Jankowski begs the question, "Are conglomerates good for business?" A variety of industry professionals—from manufacturers to lighting consultants to architects—examines the query and offers opinions about the growing wave that is not only facing our industry but the entire business world. *Architectural Lighting*'s Alice Liao takes a journey on the electronic super-highway and reports on how the Internet and e-commerce are shaping the business of lighting. During this time of economic boom, being first to market is crucial. With the convergence of economic trends and technology pushing for faster construction, the Internet is a much-needed vehicle for staying competitive in the "new economy." To underscore this point, Paul Doherty, AIA, in the Perspectives column on page 84, pushes this envelope further by *urging* lighting businesses to firmly embrace electronic technology as a matter of survival.



ORIGINAL PHOTO COURTESY OF GE LIGHTING

Many of the other stories in this particular issue also touch upon growing with the times and the power of technological advancements to simply enhance and improve an environment, whether it be an office or a public space. Tracking the new T5 technology as it begins to proliferate the marketplace and appear in real-world applications, the Spotlight article presents a case study of using new T5 fluorescent fixtures in an open office space. The Technique article addresses lighting the automated workplace—a concept that has evolved dramatically since the introduction of PCs, and in requiring a new understanding of quality issues, forces the lighting solutions to keep pace with advances. In our feature story on page 32, lighting designer Randy Burkett emphasizes just how far we've come by seamlessly implementing today's technologies in a historic space. As he points out, it's only now that we as a culture can truly appreciate the advantages of what electric lighting has brought to the design industry as a whole by revealing the architecture, interior design and subtle character of an environment: "As lighting designers we can recreate the grandeur and splendor of spaces that feature intricate and detailed craftsmanship and that through the use of lighting can be realized for all their inherent beauty."

The pulse of technology is quickening and as we step back to admire old-world craftsmanship now fully realized through electric light, perhaps we can consider our fleet progress as a reminder of how far there is to go. ■

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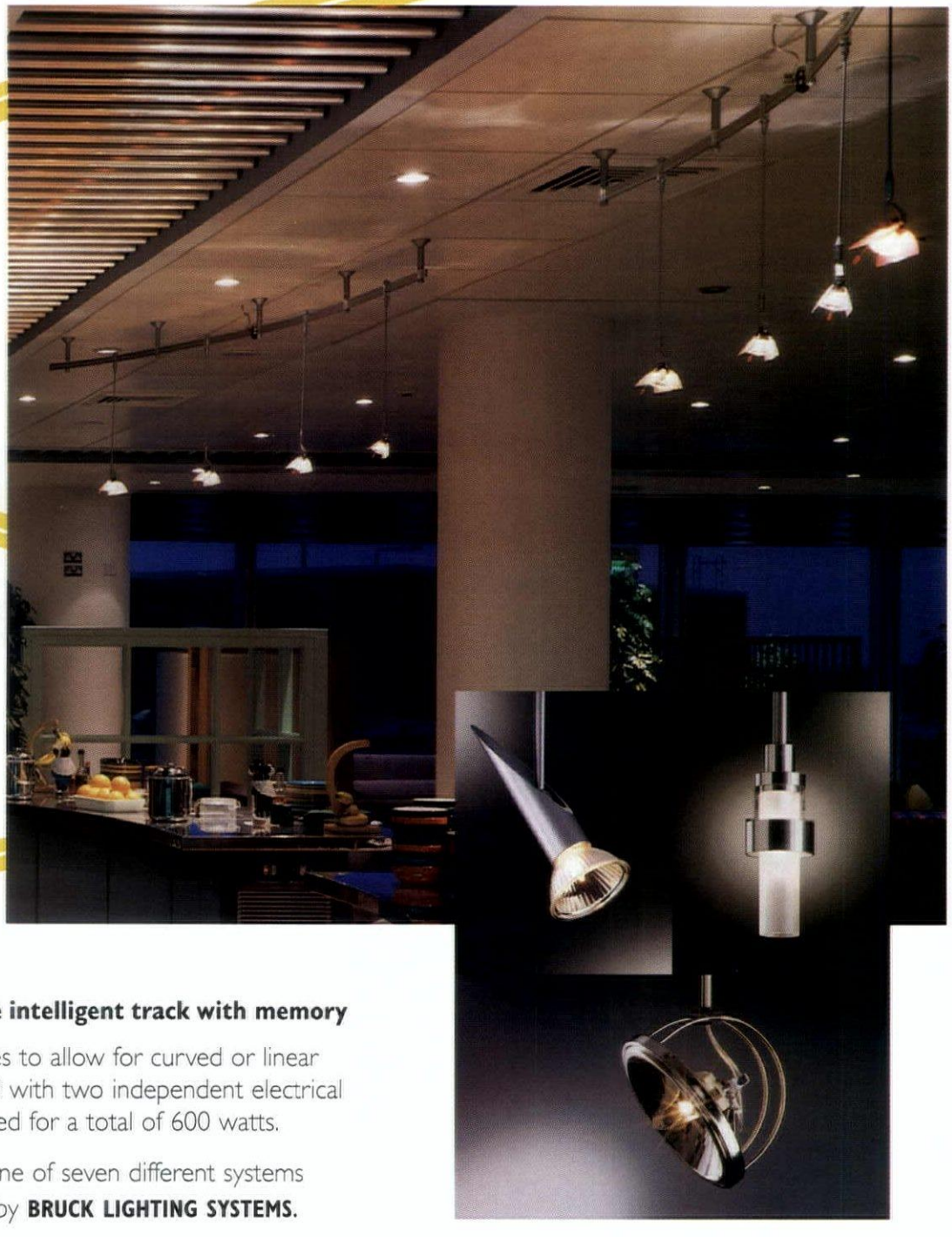

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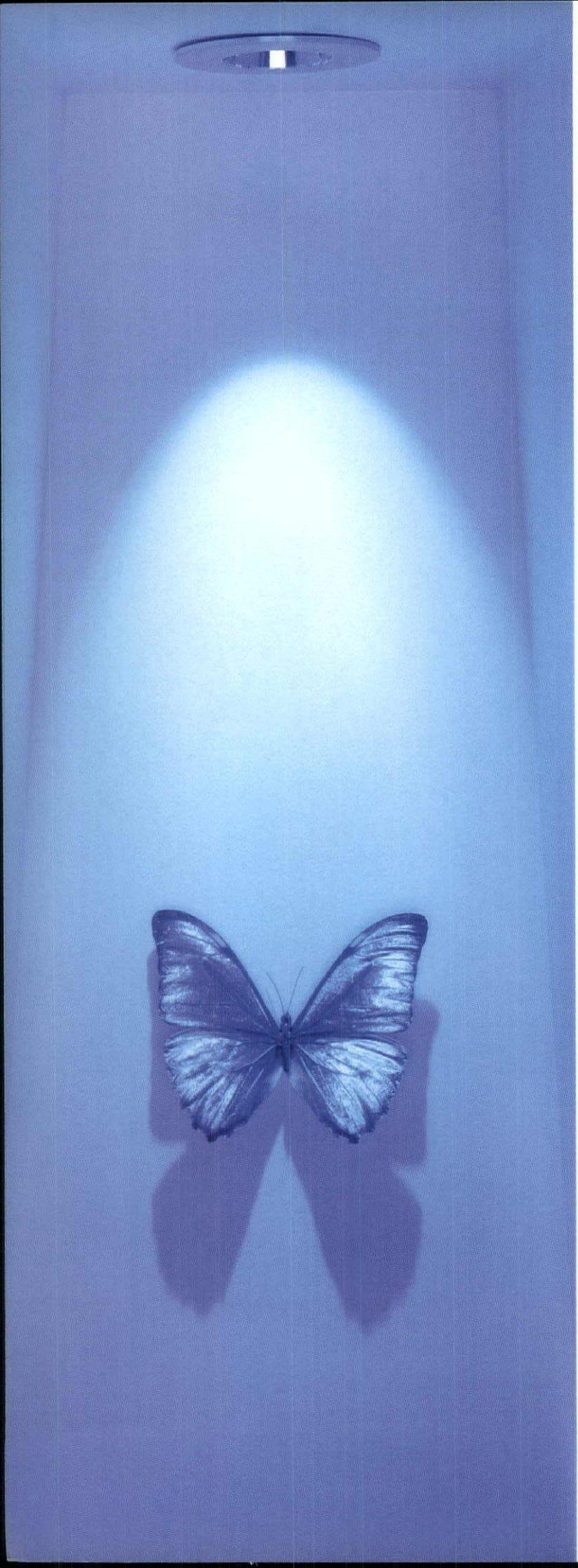

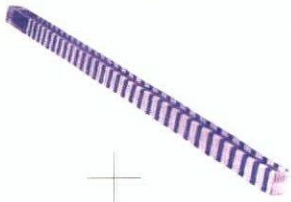

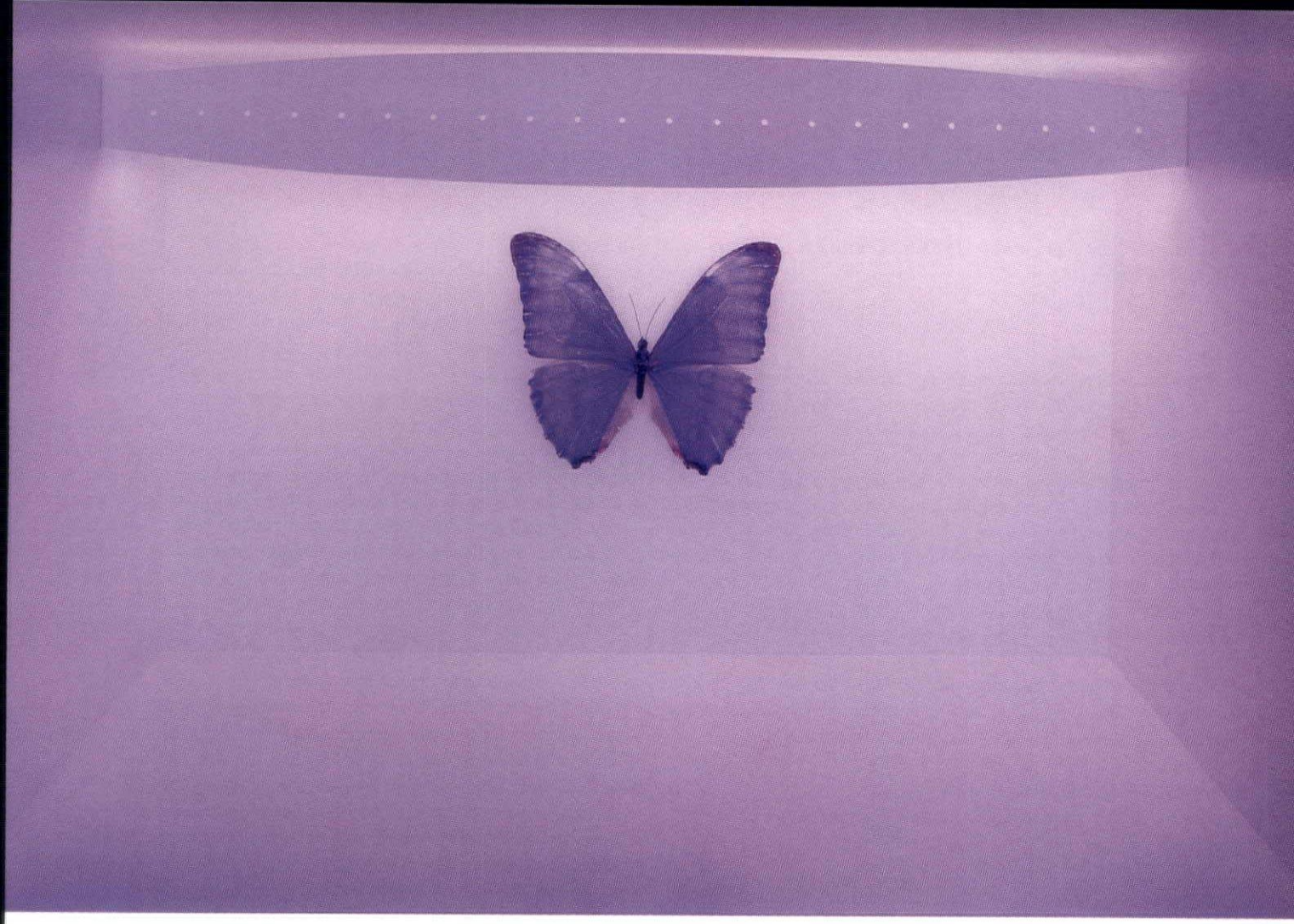

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letters

In response to November 1999's Technique article on "Sparkle Elements":

To the Editor:
It is unfortunate that the article entitled, "Sparkle Elements—A Bright Idea" (November 1999), which describes the Kresge Chapel at MIT (1955), does not credit the lighting consultant for the project. It was Stanley McCandless, Professor of Lighting at the Yale University School of Drama, who taught several generations of lighting designers for the theater as well as architectural spaces. His "method" has been employed both here and abroad with modifications. It is difficult to pick up a book on theatrical lighting that does not pay tribute to his pioneering work.

The large "fixture in the ceiling" is, in fact, an egg crate that conceals a skylight well for natural light during the day and incandescent lighting at night. Those reflections off Harry Bertoia's gold-flecked screen are from carefully angled metal rectangles to reflect the light from above. Saarinen said: "The primary element to create the right spiritual atmosphere would, of course, be light—that is the critical thing."

Charles N. Clutz, NCARB, AIA
Charles N. Clutz Associates
Hyde Park, MA

To the Editor:
I enjoyed your article on sparkle elements. I have seen too many offices with no life and a dull feeling to them. Adding these simple elements can enliven an otherwise bland environment and, I'm sure, increase productivity of workers in those areas.

I think this type of article and quiz is a wonderful way to increase knowledge of the craft of lighting design. As for myself, I am challenged by a test or quiz, took it immediately and then read the article to make sure I had answered correctly.

David Bowling, LC
Lightswitch, Inc.
Jersey City, NJ

To the Editor:
I like this "published information/quiz" format. I think it will help everyone in the industry to continue learning and have something to share.

Michael Lehman, LC
Cooper Lighting
Elk Grove Village, IL

To the Editor:
I'd like you to know what an extremely useful and informative article this was. I hope you plan to do a follow-up series on this subject.

Jim Seils
President
Ergomatrix, Inc.
(received via email)

To the Editor:
Great article and very useful! I started noticing some years ago in retail that 2x2 and 2x4 parabolics, especially in large stores, tended to make a space look very gray. We actually started having white parabolics manufactured to alleviate this problem. It is great that there are so many options available now to add sparkle without having to fall back on the "dump a bunch of incandescents into the space" technique!

I would like to point out that for question number one, I understand the author's intended response, however, I would like to suggest the following: All sparkle effects in the past were achieved with energy-hungry *incandescent.* Incandescents were always used because of their filaments, which in a clear lamp, provided tremendous sparkle. The lamp itself provided the sparkle.

Other sources like fluorescents, compact fluorescents and metal halides—because of their diffuse nature—could not provide sparkle. There is no "filament" to reflect in specular surfaces being illuminated. Note that this has recently changed a bit with the advent of clear envelope metal halides with good color rendition. The arc tube is small enough to provide some degree of sparkle.

Today, manufacturers are using the *luminaire* to modify an efficacious lamp's image to create sparkle. This is working well with sources like metal halide and fluorescent as the photos in your article illustrate. The Holophane-type prismatic highbay is another example.

- Sparkle elements support energy-efficient lighting design because they can be created using very efficacious lamps. These sparkle treatments can transform an otherwise bland design into one with sparkle and brightness that was previous typically possible with the use of incandescent.
- Sparkle elements do not necessarily support energy-efficient lighting design just because they prompt people to perceive a space as bright and cheery. Sparkle elements can be the liberal use of incandescent or the poor use of efficacious lamp sources. A design may use energy-efficient lighting yet be a poor use of energy.

A bright and cheery space may not support energy-efficient lighting design regardless of sparkle. The use of efficacious lamps does support energy-efficient design especially with sparkle!

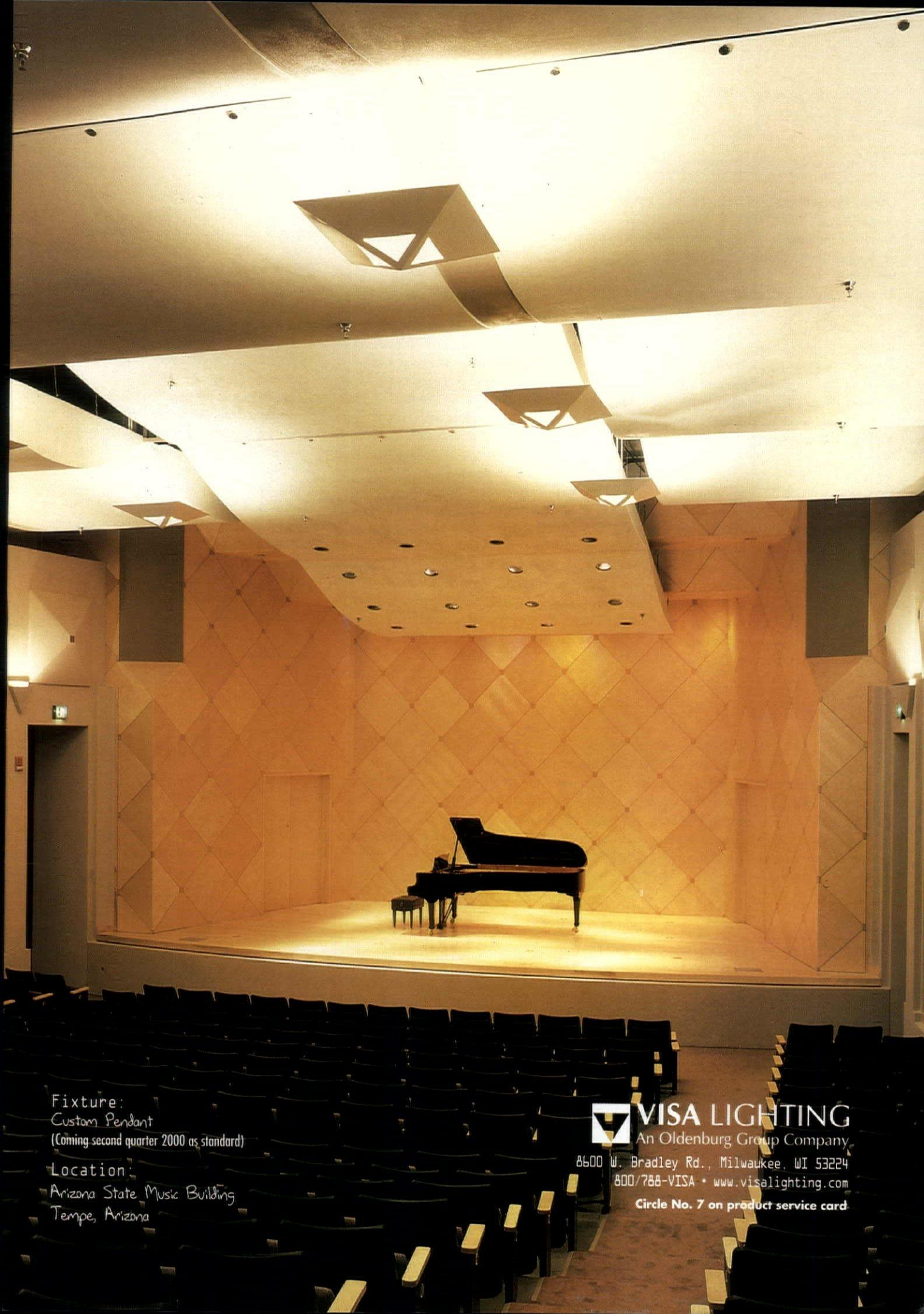
Bob White, LC, IALD, IESNA
Sigma Associates, Inc.
Detroit, MI

Author of the article, Yukio Akashi, Dr. Eng., responds:

I think your comments are very important. No matter how bright and cheerful a room looks, we cannot reduce general illuminance levels for energy savings without thinking about task performance. From this point of view, I agree with you.

However, what I really wanted to emphasize in this article is that sparkle elements support energy-efficient lighting design because they prompt people to perceive a space as bright and cheery. As I showed in my article, if sparkle elements are applied to a task-and-ambient lighting system, the sparkle elements do support energy-efficient lighting very well. The important idea is that the sparkle elements can reduce ambient illuminance levels to provide a highly efficient lighting system without decreasing brightness impression or disturbing visual performance. Moreover, what is creating each sparkle element in the photograph in my article is not an additional lamp, but just an acrylic diffuser.

In conclusion, if one considers a fluorescent lamp as a very efficacious lamp, there is more than one acceptable response. However, since I already think of fluorescent lamps as ordinary lamps for office lighting, I maintain my originally intended answer.



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ACQUISITIONS & AGREEMENTS

Osram Sylvania has signed a definitive agreement to acquire substantially all of the assets of **Motorola Lighting**, a North American producer of energy-efficient electronic ballasts. Financial terms of the agreement were not disclosed.

According to the details of the proposed sale, which is expected to become final by April (subject to customary closing conditions, including regulatory and other approvals), the Motorola Lighting business would become part of Osram Sylvania's electronic control systems business. With manufacturing, marketing and research and development operations in Lake Zurich, IL and research and development in New Delhi, India, Motorola Lighting employs approximately 450 people and had worldwide sales in excess of $125 million in 1999.

Tivoli Industries, Inc. has announced the completion of its acquisition by **Targetti Sankey, S.p.A.** of Florence, Italy. With the acquisition, Tivoli has become a wholly-owned subsidiary of Targetti. The newly formed subsidiary, known as Targetti-Tivoli, Inc., will continue to operate from a plant and office facility in Santa Ana. Charles F. Kimmel, Tivoli's president and CFO, retains the same position with Targetti-Tivoli.

Fiberstars, Inc. has announced an agreement with **Federal Sign** to jointly market and develop products for the signage market. Through the agreement, Fiberstars will become the primary vendor of fiber-optic lighting for Federal Sign, who has primarily used neon for its signage projects. The agreement will provide a long-term framework in which the two companies can cooperate in the areas of cost reductions, joint marketing efforts and technological product improvements. Federal Sign, a division of Federal Signal Corp., provides signage and sign and lighting services to companies in the gaming, retail, hospitality, banking, corporate, entertainment and sports industries.

GE Lighting has announced the completed acquisition of **Royal Lite Mfg. Corp.** of New Jersey. The announcement was made by GE Lighting's VP of North American Lighting, John Krenicki, Jr. Founded in the early 90s, Royal Lite Mfg. Corp. holds five patents for innovative lighting processes, including the shatter-resistant technology used in GE Lighting's Cov-R-Guard system.

Simkar Corporation, a manufacturer of fluorescent, HID and vandal-resistant lighting fixtures, has acquired **Kalco Lighting** of Las Vegas, NV. Kalco Lighting is a producer of moderate to high-end chandeliers, sconces and accessories. The acquisition includes the assembly and distribution centers in Las Vegas as well as facilities in the Philippines. Harry Kallick will continue as president of both Kalco and OEM, the Philippine factory. Current management and selling reps will remain in place at Kalco. Simkar is based in Philadelphia.

Cooper Industries, Inc., parent company of Cooper Lighting has reached an agreement to acquire **Regent Lighting**, a privately held company with 1998 revenues of $99 million. Headquartered in Burlington, NC, Regent Lighting manufactures residential outdoor security lighting fixtures. Cooper Industries has also acquired the electrical enclosures business of **Weidmuller UK Group Ltd.** The acquisition of Weidmuller, a company that sells products providing protection for electrical switches, controls and connections in hazardous and non-hazardous environments, includes its manufacturing facility in Sheerness, England.

LIGHT+BUILDING ANTICIPATES CROWD

light+building

More than 1,600 exhibitors from all over the world are expected to show at the first Light + Building, to be held March 19-23 at Frankfurt am Main in Frankfurt, Germany. An international trade fair for lighting electrical engineering, air conditioning and building automation, Light + Building will feature 100,000 sq. m. of new products and innovative trends, with lighting showcased in two halls.

The show will also offer special programs, seminars, talks and panel discussions in the areas of lighting, electrical engineering, air conditioning and building automation. Exemplary products from the four areas will be recognized in the "Design Plus" Award presentation and exhibition. Visitors to the show can travel from hall to hall on the travelator, Via Mobile, which links the individual halls in an illuminated tunnel system.

For information, contact Messe Frankfurt GmbH at (770) 984-8016; fax (770)-984-8023.

IALD ELECTS NEW BOARD MEMBERS AND FELLOWS

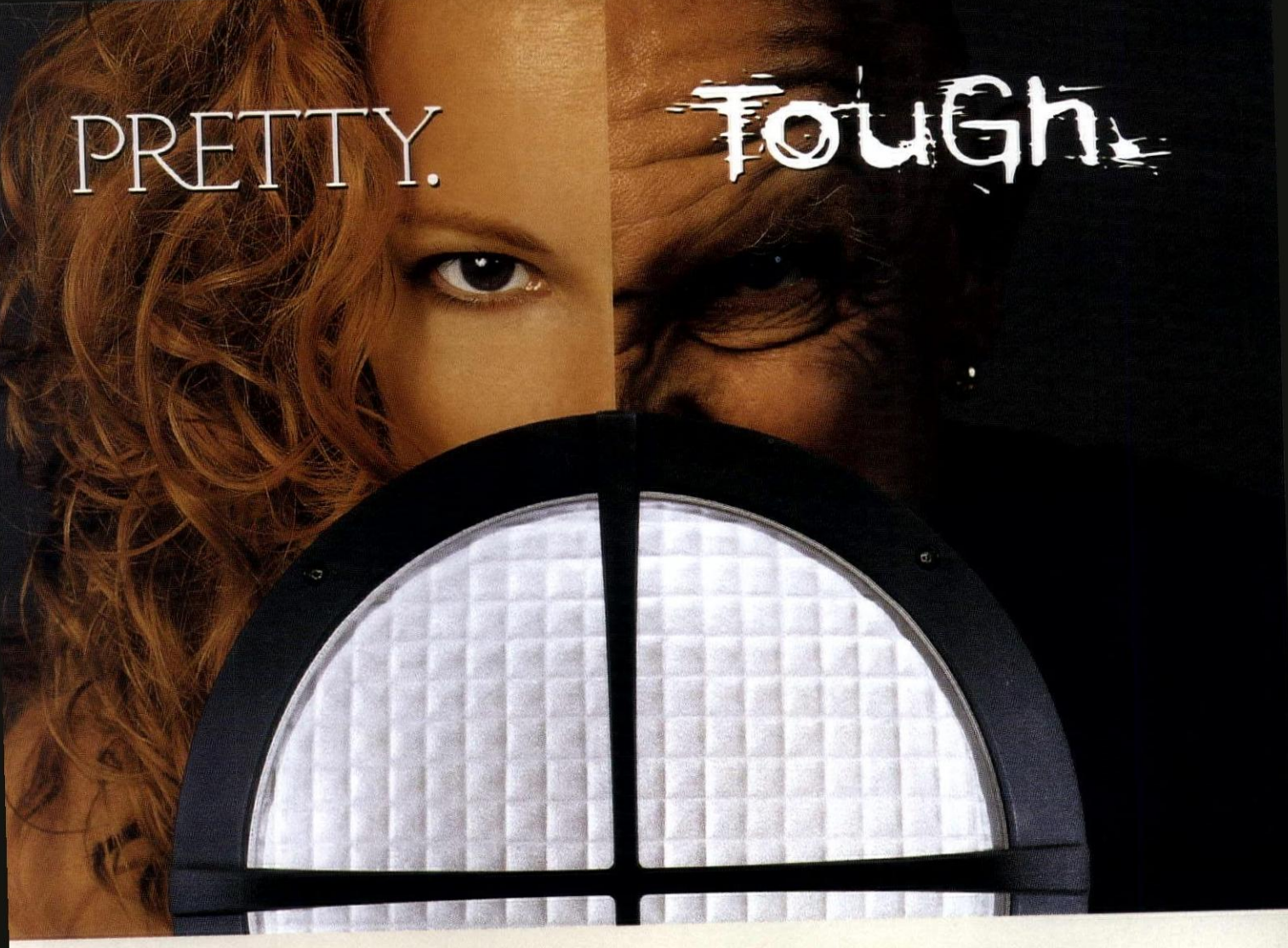
On December 9, 1999, 87 members and guests gathered at California's Long Beach Aquarium of the Pacific for the 30th annual meeting of the IALD. The association announced the results of the 1999 election. The newly elected board members are: **JoAnne Lindsley, FIALD**, chairman of its board of directors; **Mitchell Kohn, IALD**, director of finance; **Nancy Clanton, IALD**, director of marketing and external affairs; **Barbara Bouyea, IALD**, director of membership; and **James Benya, IALD**, director of education. **Philip Gabriel, IALD**, was named director at large and **Kevan Shaw, IALD** and **Michael Souter, IALD** were appointed to the membership committee.

The IALD also elected two new fellows: **William Lam, FIALD**, and **JoAnne Lindsley, FIALD** and paid tribute to the late **Don Gersztoff**, who was elected a Fellow in May 1999.

The next meeting of the membership will take place on Tuesday, May 9, 2000 in New York during Lightfair.

Did You Know....?

Vari-Lite, Inc. has landed the featured lighting role in each major television network's prime-time game show, heightening the suspense that is drawing millions of viewers to *Who Wants to be a Millionaire*, *Greed*, *Twenty One* and *Winning Lines*. "These new programs have modernized the old quiz show format with advanced production values," said Rusty Brutsché, Vari-Lite chairman and CEO. The fixtures produce the means for the producers to have cutting-edge capabilities enhancing the drama of the shows through colored lighting, beam intensity and other special effects. More than a total of 250 fixtures are used in the four programs.



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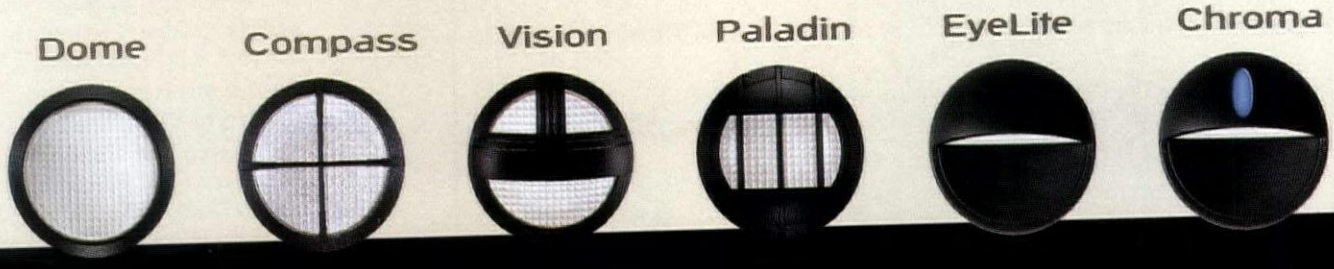
Harmony: A pretty tough product that makes the specifier's choice pretty easy.



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CHARITABLE TRUST ADMINISTERS COMPETITION

The **Robert Bruce Thompson Charitable Trust** will fund and administer a student design competition for the design of innovative lighting fixtures. The Charitable Trust will award annual cash prizes of $5,000 for first prize, $2,500 for second and $1,000 for third.

Competition will be open to any full-time student enrolled in one of the following types of accredited academic degree programs: architectural engineering, architecture, interior design, theater and industrial design. Entries for the competition will be judged on: innovative character of the overall design, use of materials and manufacturing techniques, breadth of practical application, practicality of manufacturing, appropriateness of projected sales price point based on practical manufacturing techniques if specific techniques are not proposed, aesthetic appeal and presentation of entry.

Contributions to the Charitable Trust may be sent to Shaper Lighting, 1141 Marina Way South, Richmond, CA 94804.

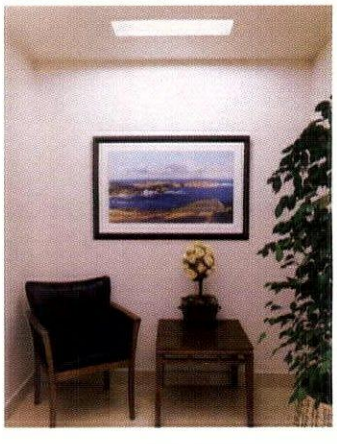
CORRECTIONS

In the November 1999 issue, Foaad Farah's name was omitted from the photography credit line for "Perfect Harmony," appearing on page 35.

Also in November 1999, the photo of Lucifer Lighting's Scapebeam fixture on page 43 of the Technology article, "Out and About—The Exterior Environment," appeared upside-down.

The following errors appeared in the 1999 December 2000 Lighting Source Directory:

In **Engineered Lighting Products'** company profile on page 63, a cropping error deleted the "Hole in the Wall" fixture (shown below) from the photo. The company's telephone number, (626) 579-0943, was omitted from their ad appearing on page 91, as was the website address, www.elplighting.com.



Con-tech Lighting was not included in the product category listings. They manufacture: indoor cable/rail, commercial wall, decorative wall, downlights, track, wall washers fixtures and showcase/display specialty fixtures.

Q-tran Inc. is a manufacturer of low-voltage lighting. Their website address is www.q-tran.com and email address is sales@q-tran.com.

Targetti-Tivoli, Inc.'s listing is: 1513 E. Saint Gertrude Pl., Santa Ana, CA 92705; phone: (714) 957-6101; fax: (714) 957-1501; email: tivoli@tivolind.com; website: www.tivolilighting.com

Architectural Lighting regrets the errors.

Robert Bruce Thompson, VP of sales and marketing for Shaper Lighting, passed away on November 12, 1999 in Berkeley, CA.

During his 25 years in lighting, Bruce worked in retail, theatrical lighting design and as a manufacturer representative in Detroit and San Francisco. In 1990, he was hired by Shaper Lighting as a factory sales representative, promoted to national sales manager in 1992 and then VP of sales and marketing in 1999. He was a member of the IESNA, the LIRC and the Foundation for Design Integrity.

Thompson often spoke and wrote about the issues of specification integrity and intellectual property rights. In addition to a variety of hobbies and passions, Thompson promoted innovation and creativity, and with this in mind, he founded the Robert Bruce Thompson Charitable Trust. When fully funded, the Trust will sponsor an annual student lighting fixture design competition (see page 16 for more details).

Lou Rozspal, president of Plastic Specialties at PSI West and PSI South, passed away on December 23, 1999 after a short illness. Hired by the Global Illumination division in the early 1960s, Rozspal transferred to the Plastic Specialties division of Lighting Parts as their sales manager and later as president, a position that he held until his death. He and two other officers purchased the rights to Plastic Specialties in 1976.

Francis Krahe & Associates has appointed **Rosemarie Allaire, IALD** to associate.

Design Collective, Inc. has promoted **Lou Ghitman, Robert Keane** and **Donald A. Harris** to senior associate; **Michael Goodwin** to associate.

Scott Rogers has joined Kluger Kollin Architects, Inc. as project architect.

Michael Bahr, AIA, Karl Lusis, AIA , Barry Yang, Laura Lamb, Kimber Scumann, Susan Wohlitz, Richard Luce, AIA, Edward Haydin III, AIA, Jon Sandeman, Michael Lynch and **Peter Tofson** have joined Plunkett Rayisch Architects.

Brennan Beer Gorman/Architects, LLP has promoted **James McMullan** to senior associate, and **Matthew Mueller, Christian Joiris, Suzanne Baumgardt, Marlon Gigantone** and **Orna Yehudai** to associate. Brennan Beer Gorman Monk/Interiors, Inc. has promoted **Amy Astfalk** to senior associate, and **Tara Valone, Edward Perez, Kimberly Kaye Weber, Shawn May, Christopher Wheeler** and **George Wong** to associate.

Osram Sylvania has appointed **Frank St. Onge** director of marketing and sales for its Precision Materials & Components Glass Technologies organization; **Eberhard Schmidt**, product marketing manager for specialty fluorescent lamps; **Mandy Studebaker**, senior applications engineer for HID lighting; and **Robert Ponzini**, product marketing manager for HID lighting.

David E. Carey has been appointed western regional sales manager for Targetti-Tivoli Inc.; **Mario Gallo** has been named manager of engineering.

Alkco Lighting has appointed **Claude Sarti** director of sales.

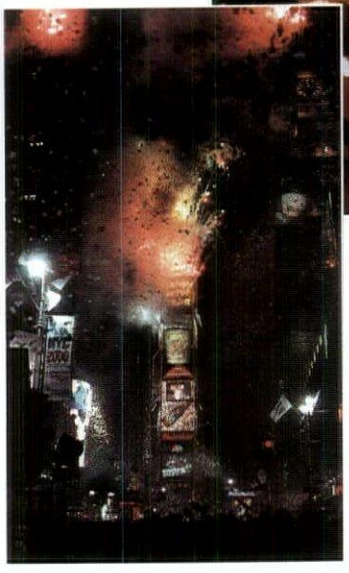
Amerlux Lighting Systems has appointed **Robert Limroth** director of national accounts.

Robertson Worldwide has appointed **Shelley DePuy** VP of marketing and sales.

NEW YORK CITY CELEBRATES 2000

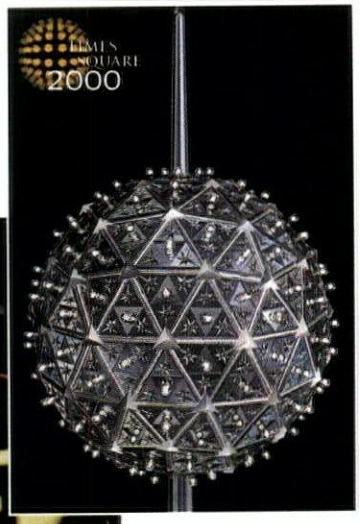
On December 31, 1999 at 11:59 pm, the Times Square 2000 (TS2000) Podium came alive with over 2,400 ft. of fiber-optic lighting. Designed by Geoff Puckett in conjunction with the Times Square 2000 group, the 5-ft. 10-in. podium was sponsored by ConEdison Solutions, a subsidiary of Consolidated Edison, Inc. Christine Nevin, marketing manager for lighting products at ConEdison Solutions said, "Because the podium had never been lighted before, it seemed like a good opportunity for us to provide an example of how fiber-optic illumination is the wave of today and the future." Three illuminators concealed in the stage and more than 200 light points—each no bigger than the head of a pin—created the blue and white chasing effects on the skirt of the podium and around the edge of the desktop.

The skirt was illuminated with 186 fibers in clusters of two, four and six. The fibers were grouped in a coherent matrix and inserted into a custom bracket that held the DMX-driven color/tracking wheel. Separately grouping the fibers within each layer of the podium's skirt produced a sweeping motion effect when the podium was lighted. The lighting system allowed for DMX-controlled input on three consecutive channels, providing both forward and reverse chases, speed control from one to 30 rpm and stop motion.



The desktop application utilized 72 fibers behind two curved 1-in.-thick etched acrylic blocks 36 in. long. The fibers were placed to chase blue and white lighting from the center out or from the outer edge inward. Light from the endpoint fiber was blended within the band of acrylic to create a moving glow.

Fiber optics also created the twinkling effect in the 26 globes mounted at the end of flexible aluminum stems. The spheres framed a miniature replica of the Times Square ball, which was pressed by New York City Mayor Rudolph W. Giuliani to light the podium and initiate the countdown to midnight. According to D. Joy Faber, spokeswoman for Consolidated Edison Inc., "We provided 83,000 watts of electrical power for the Times Square Ball and 2000 numerals alone." This was in addition to the 7 billion watts used throughout New York City and Westchester county that evening. She added, "Just for the Times Square area, Con-Edison provided 225 million watts."



New York City lighting design firm, Fisher Marantz Stone, was contracted to design the new Times Square ball. "We came up with the conception that the new millennium was about transparency and visibility," said Paul Marantz, IALD. "In the information age, everything has opened up, so we wanted to create a ball that was, for the first time, transparent." Measuring 6 ft. in diameter and weighing in at 1,070 lbs., the 2000 ball was larger and heavier than any of its predecessors. Its geodesic design consisted of 180 translucent triangular Lexan panels attached to an aluminum frame. Each panel was studded with a 60W halogen light bulb and surrounded by three 4-in. Waterford crystal triangles, which varied in size and featured a seven-pointed "Star of Hope" design. Because the 2000 event was an all-day celebration, the ball was equipped with 90 rotating pyramidal mirrors to provide visual interest during the day. The mirrors, mounted to stepper motors located at various intersection points on the exterior frame, reflected sunlight and added sparkle.

The new millennium was ushered in with a dazzling display of light and color, much of it provided by the ball's interior structure of angled wireways and surface-mounted lamps. Two-hundred-and-eight 40W clear halogen lamps accentuated the sparkling crystals from within the sphere, while 224 40W colored lamps in red, blue, green and yellow and 96 high-intensity strobe lights—48 double-ended units with 74W per pair—flashed bursts of color as the ball made its 77-ft. descent. A computerized console, addressing 350 dimmers, controlled the pyramidal mirrors and 696 lights.

Additional illumination was designed by lighting designers Jules Fisher and Peggy Eisenhauer, who lighted the ball externally with 24 spotlights mounted on the roof of One Times Square. Operated by a control console with programmed cues beginning at 6 pm, the spotlights illuminated the ball throughout the evening.

Lighting manufacturers: Lumenyte International Corp.; Philips Lighting; Vari-Lite International Inc.

2000 Scheduled Events

March 8 IESNY: "Filing for Chapter 10—Intro to the New IES Handbook," New York; (800) 217-5445, www.nyies.org.

March 9-10 DesignFest/NeoCon South, Miami Beach Convention Center, Miami; (312) 527-4141.

March 15 Designers Lighting Forum of New York (DLFNY): "Lights! Camera! Action!" New York; (212) 613-1599.

March 19-23 Light + Building, Frankfurt am Main, Frankfurt, Germany; (770) 984-8016, fax (770) 984-8023.

March 26-28 Enlightening America 2000 with special exhibit: "The Evolution of Lighting—A Century of Change," Adam's Mark Hotel, Philadelphia; (609) 799-4900, fax (609) 799-7032, lrusso@eela.com.

April 11-12 Lighting 2000, Regal Constellation Hotel, Toronto, Ontario, Canada; (905) 890-1846, ext. 342, fax (905) 890-3829.

April 12 IESNY: "Master of Light," New York; (800) 217-5445, www.nyies.org.

April 19 DLFNY: "Lighting Sets the Stage," New York; (212) 613-1599.

May 3 IESNY: "ABC's of Light," New York; (800) 217-5445, www.nyies.org.

May 3-5 Ambiente China, Shanghai Mart, Shanghai, China; (49) 69-7575-6890, (49) 69-7575-6091, fax (49) 69-7575-6808.

May 9-11 Lightfair International, Jacob Javits Center, New York City; (404) 220-2221, www.lightfair.com

May 17 DLFNY: "Lighting to Get Your Attention," New York; (212) 613-1599.

May 20-23 International Contemporary Furniture Fair (ICFF) and Decorex USA, Jacob Javits Convention Center, New York; (914) 421-3215, (800) 272-SHOW.

May 25-June 1 DLFNY Trip to Paris; (212) 613-1599.

June 18-20 BOMA International's 93rd Annual Convention & the Office Building Show, San Diego Convention Center, San Diego, CA; (888) 777-6956, fax (703) 528-1724.

June 21 IESNY Lumen Awards Banquet, New York; (800) 217-5445, www.nyies.org.

June 21-23 Ambiente Japan, Tokyo International Exhibition Centre, Big Sight, Ariake, Tokyo, Japan; (81) 3-5275-2851, fax (81) 3-5275-2867, www.ambiente.de.

September 8-12 Lumiere Paris, Paris-Nord Villepinte, France; (33) 1 44 29 02 47, fax (33) 1 44 29 02 43, www.lumiere-paris.com.

September 25-30 International Fair of Lighting Fixtures (FIAM), Valencia, Spain; (34) 96-386-11-00, fax (34) 96-363-61-11/96-364-40-64, www.feriavalencia.com.

November 1-3 Luminaire Asia 2000, Singapore International Convention & Exhibition Centre, Singapore; (65) 220-76-33, fax (65) 220-97-33, www.hfasin.com.

insights

In this issue, Architectural Lighting *interviews Barbara Cianci Horton, LC, IALD, IES, president/CEO of Horton•Lees Lighting Design Inc. Horton is a design principal for the firm's major corporate projects, where her responsibilities include client meetings, program development for lighting design concepts and design development, as well as contract negotiations, monitoring fee status, report schedules, design and quality control of the lighting design process. She focuses her understanding of the aesthetic concerns of designers and architects and her technical skills into innovative solutions. In addition to Horton's role as designer, she leads the firm in long-term planning, business development and marketing.*

—Christina Trauthwein

AL: *Tell me about your background in lighting design.*

Horton: Actually, my background is interior design. Though I had taken some lighting classes, I realized how little I knew about lighting as an interior designer when I began working on a project for which the client was relying heavily on a salesperson to give them lighting advice. Lighting designers were not as prevalent 20 years ago, and those who did practice were really challenged with selling their services. The salesman suggested we select HPS sources for the interior of a bank. I thought that sounded odd. So I mentioned this to Jules Horton, my instructor at the time, and he said, "Take your wallet and come out in the street. Okay, now tell me what color is your money?" We looked at color and the effect of color on objects and it was something that I could relate to. Suddenly, I was aware how light interacted with the environment. I had never really thought about it before, and it was then that I realized I needed to learn more about lighting.

After four years of working in interiors, I went to work part time for Jules and figured in three months I'd learn everything I needed to know about being a lighting designer, return to interior design and do it all. Well, that was 21 years ago. I never left. I discovered I loved being able to work with architects and interior designers so that I could still remain close to what was in my heart, but that I was able to combine the art and science that lighting design requires. What is rewarding is that I work with clients that I can identify with—I understand how little interior designers may know about lighting because I once had been on the other side.

AL: *Interior design can be very visual, textural. Was it difficult learning the more technical aspects of lighting design?*

Horton: Yes, my training had been related to the physical, hands-on aspects of design. But I learned to take that approach with me to lighting design. You can refer to the *IES Handbook* and numerous other tools and sources—in fact, you can do computer calculations without knowing anything about lighting anymore—but that does not provide the complete training necessary to be a good lighting designer. I had to learn sine and cosine and all those arduous mechanics of lighting design. But when I look at a computer calculation today, I have the experience of applying the artistic knowledge to the technical. The next generation doesn't have the benefit of knowing both—they often just plop in numbers.

AL: *Do you find this to be a problem with the "new generation" of lighting designers—they're computer literate but lacking in approach?*

Horton: Yes, very much. I think what students learn in school is very rule of thumb, and then they learn to immediately go to a

computer and plug in height, width, etc. without making a connection to the reality of what it is that they're doing. One of the things we've done in all three of our offices is have a light lab, which allows hands-on experimentation. We're not just proving a solution to our clients, sometimes we're proving it to ourselves. And before we go to the client and make an error in judgment on a grand scale, we need to examine and compare one fixture to another, one lamp manufacturer to another. In fact, my first job in this office was wiring a ballast. I didn't know what went where or what to do—not until I blew it up a few times. But it was memorable. A lesson learned by making the connection to something before applying it to a real installation.

I get portfolios that are completely computer generated—while nicely put together, there's nothing that shows me who that person is, what they think, how they feel, just that they've mastered a program. I'd rather see napkin sketches because it tells me more about their ability and capacity for design. And that's what our clients are looking for—a creative solution. They're already assuming we, as lighting professionals, have the technical skills to produce it in the correct format.

AL: *What motivates you?*

Horton: Interaction with the client and creating an environment that people will enjoy—maybe not even notice, but by virtue of not noticing, knowing we've done a good job. It's about the people who are going to live, work or play in those spaces. That is the priority. I just finished a middle school—a type of project that requires pragmatic thinking and resourcefulness—and the whole time I kept thinking about the spirit of the school, the quality of light and what these kids would be learning. What kept me going through all of the aggravation and construction and budget issues was that I was doing the best job I can for kids who will live in that environment for a number of years and be inspired in some way. I drew on my experience in interior design and participated on that level to arrive at a thoughtful and cohesive solution. Projects really are about what a team can do collectively and I'm very much a cheerleader and spiritual leader in that respect.

AL: *What values do you hope that you have instilled in those who work for you?*

Horton: Something I've tried to instill in everyone who works for Horton•Lees is to always do the best you can to create the quality of the lighted environment that is appropriate for the client. It should be as imaginative as it can be, but sometimes it's not just about imagination but more about thoughtful and functional lighting. We should be able to walk into a project a year later and still be proud of what we did. We should also ensure that it's maintained and that the client appreciates it and understands it. Always listen to the client, understand what they're really looking for and then, if you honestly don't believe what they're

(Continued on page 22)

(Continued from page 20)

requesting is the right thing, voice your belief. You must believe in and have the courage to face your convictions. Believe in what you're saying—don't just stick a fixture somewhere because the client told you they need an answer in an hour. Understand first *why* you're selecting a fixture or making a decision and then implement that decision.

AL: *Any advice for those entering the field?*

Horton: Make sure to have a well-rounded education—a strong mix of the scientific and the artistic. Learn more than what is taught in school. I encourage anybody coming out of school who thinks they're going to dive into a job and become a partner in the firm in a few days, to take it slow and get an education outside the office—analyze everything. Almost to the point where your friends and family hate you because you walk into a space and critique the lighting. It's in the every day living and our surroundings that one can pick up so many cues about what lighting is and does. Visit a space and if you feel something, try to figure out what it is you feel—is it the color of the space, the darkness, the lightness? Be critical of things and understand them and learn from them.

AL: *In what direction would you like to see technology and product development heading?*

Horton: We are embarking on a number of projects that have computer rendering as part of our services. It would be wonderful to see some of the rendering programs much more compatible with what architects work with on a regular basis. Let's see an integration of software that all the different team members are using.

As for fixtures and sources? I'd love to see more of the big manufacturers like Lightolier, Lithonia and Prescolite, for example, taking research money and investing it in the new lamp technologies like T5 and T2, instead of continuing to design around older sources like T8. We've been through the retrofit phase due to energy issues and it's been a disaster. We still have severe clearance problems on every project no matter what the job is, and we're still getting a 6 -in. box with a lamp that's the size of a pencil. I just can't understand why they can't take time to do research and produce a product suitable for the lamp technology.

If you think about the general office project, which is a big bulk of the construction industry, lighting fixtures are a commodity and the contractor doesn't necessarily care about the quality of lighting as long as he gets it for $65 and can sell it for $300. So then, why would a large manufacturer want to invest in new tooling and research on optics and do it right? They're big businesses, not privately owned anymore. In the past, lighting manufacturers would not have stood for this. Unfortunately now, there's an attitude in the industry from the manufacturing side to "get the thing done the most efficient way possible and don't think about what the optics are." The smaller companies that don't have a big infrastructure or machinery that they have to feed to sell their fixtures in bulk have gone back to an old way of thinking: Don't just do another mousetrap, do a *better* mousetrap. Companies like Linear Lighting and Kurt Versen, for example, are really trying to think about the optics and trying to invent a new wheel in order to work with the new technologies. As a result, I totally applaud working with smaller, individual, privately owned firms. You not only get innovation, you get service, excellent product, quality and a person to listen to you. Let's face it, mistakes happen in this industry and it's these companies that are willing to go the extra mile to make it right.

UNDERSTAND FIRST WHY YOU'RE SELECTING A FIXTURE OR MAKING A DECISION, THEN IMPLEMENT THAT DECISION.

AL: *Is there a Barbara Horton trademark?*

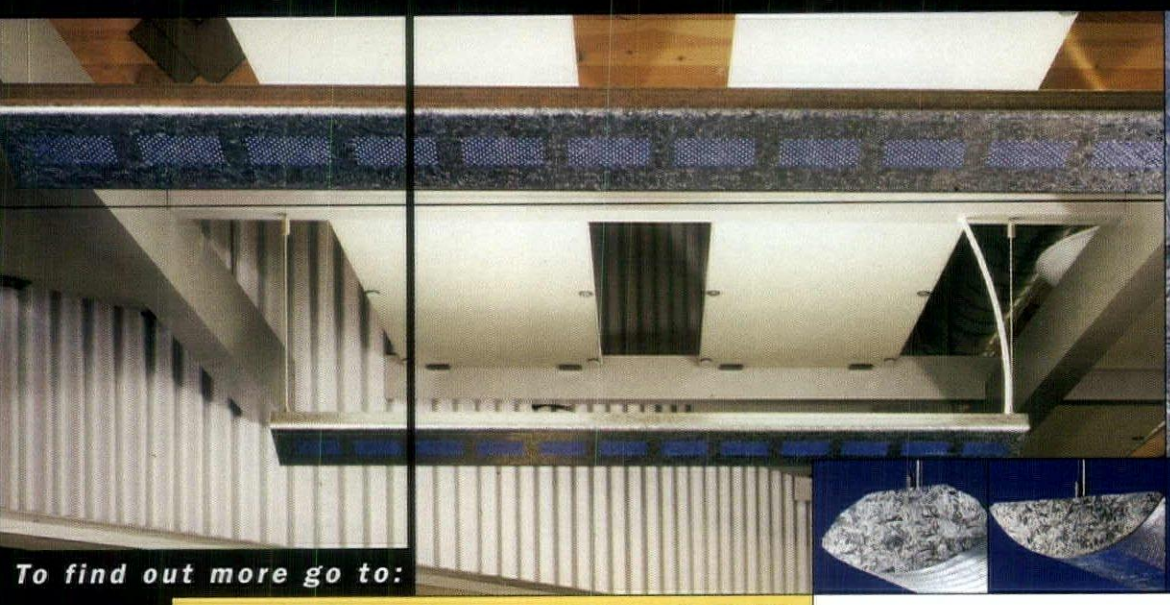
Horton: Maybe not a style, but my approach is consistent. As lighting designers, we have to respond to what our clients are looking for and there are different characteristics to each project. We must be somewhat of a chameleon: Yes, we have to apply the philosophy of design excellence and quality to each project, but we really have to realize what the architect's vision is and often highlight the architecture more than the light fixtures. That being said, though, I do have an anecdote to share: Probably every other office project I worked on I had to come up with a solution for a conference room, and each time, it was the same solution: a square in a square or rectangle in a rectangle of fluorescent sources. So after designing numerous projects, I was walking with Stephen (Lees) in Chicago to visit the site and he suddenly announced, "We're here. Your solution for lighting conference rooms is almost always the same." The architecture might be completely different and maybe the fixture, but the concept was always the same. It was classic. What I could cull from that experience was that what I was always trying to do was put vertical light in the space—which is not only functional, but extremely important to making the space feel bigger and ceiling higher—and with this approach, I didn't have to add wall washers. And to this day, I still often go back to that solution as the best.

I have clients that will want to place decorative light fixtures everywhere without realizing the benefits of integrating lighting and forming a harmonious relationship with the architecture. If the client wants to make a statement somewhere, that's fine, but the space shouldn't become a fixture showroom. In my designs, I always pull back a little bit. The other stylistic approach I've shared with everyone at the firm is that lighting needs to be designed in layers—there should be movement through the space. Sit with the client and talk about the environment. In fact, that is probably my trademark more than anything else: The manner in which I work with a client in that I constantly make them think and imagine what they want and their personalities as part of the visual environment.

AL: *If you could've done one thing differently, what would it be?*

Horton: When I first approached Horton•Lees about employment, both Jules and Stephen suggested that instead of working for them, I work for a manufacturer for a year on the design side of fixtures. In retrospect, I do think there is value to going to a factory and learning how to put it all together. I would have gained a better understanding of the optics, nuts, bolts and realities of the tool that I, as a lighting designer, would be using throughout my career. ■

FINALLY
GALVANIZED FIXTURES



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spotlight

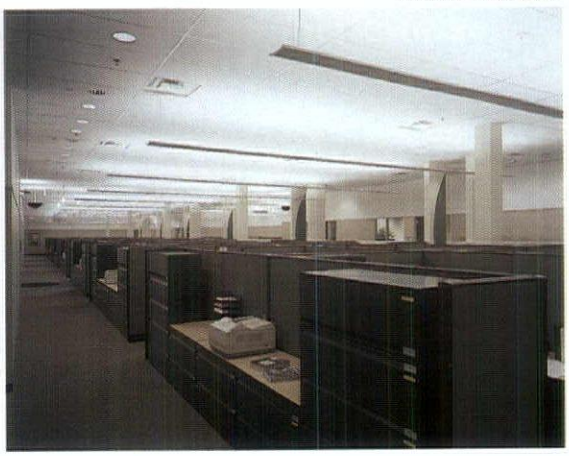
COMPANY PROFILE

Sleek & streamlined T5 fixtures provide lighting for this Dallas office

BY CHRISTINA TRAUTHWEIN, EDITOR-IN-CHIEF

CHALLENGE The new offices for Miller Freeman Inc.'s Dallas division headquarters occupy what was originally designed as a warehouse space. While challenging to create office spaces for this publishing company—parent company to *Architectural Lighting*—the openness of such a space afforded beneficial opportunities for the designer: large open spaces with no structural barriers for open offices and higher ceiling heights than average. But it also presented a large interior without natural light. In addition to producing uniform light levels to add an overall brightness to the space and providing a lighting system that would properly address the kinds of tasks performed in this office—primarily computer-oriented—the design of the space had to complement the atmosphere created by management at this MFI location. "This was the first opportunity in Dallas where all of the arms of Miller Freeman were in the same building," said Paul White Osborn of Interprise, Inc. "What struck me most upon working with MFI was the pride its employees took in their working environment—immaculate with a keen observation of visual aesthetics. The lighting needed to reflect that attitude."

© PAUL BARDAGJY



FOR THIS OPEN OFFICE PLAN, AN INDIRECT LIGHTING SYSTEM WAS USED. THE FIXTURE SELECTED TO ILLUMINATE THE SPACE UTILIZES TWO T5 FLUORESCENT LAMPS.

- **AVERAGE MAINTAINED ILLUMINANCE: 58 FC**
- **CEILING UNIFORMITY RATIO: 4:1**
- **POWER DENSITY: 1 W/SQ. FT.**

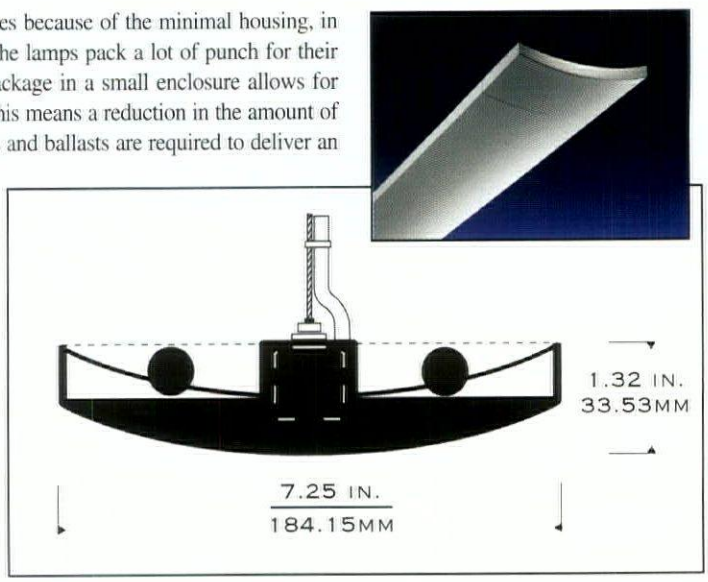
METHOD In the open office areas, the lighting designer chose ambient indirect lighting for general illumination to reduce glare on computer screens. Osborn selected a suspended two-lamp T5 fluorescent linear indirect fixture with electronic ballast. "This is the first major installation of this particular fixture," noted Osborn. "The sleek design remains unobtrusive in the streamlined space due to the slimmer profile afforded by the miniature lamp source."

Osborn added, "The use of T5 lamps permits a clean design, which in turn, allows the fixture to become an aesthetically pleasing yet highly functional element. It's exciting to work with new technology that affords designers new opportunities. And, in this case, the T5 fixtures are harmonious to the overall look—they're discreet yet beautiful."

"T5 fixtures are ideal for an indirect office lighting solution," explained Osborn. "Typically, suspended indirect fixtures intrude on a space, but as designers, we tend to prefer smaller, more aesthetically designed products. And in this case, the visual statement was equally important as function to the client."

While Osborn was interested in using these fixtures because of the minimal housing, in terms of light output and efficacy, he commented, "The lamps pack a lot of punch for their compact size (5/8in. in diameter). The high lumen package in a small enclosure allows for high light levels with fewer lamps." In many cases, this means a reduction in the amount of fixtures required in the space—and since fewer lamps and ballasts are required to deliver an appropriate illuminance level, system maintenance is simplified and visual clutter is removed from the ceiling plane.

In addition to the indirect fixtures, some decorative pendants and wall sconces are concentrated in areas that have floor patterns to provide visual relief and act as subliminal guideposts to demarcate specific areas. "All workstations are basically the same height for a really dominant horizontal scale," said Osborn, "and we wanted to provide relief from horizontal planes. So we chose fixtures that are playful, dimensional and sculptural, more than anything functional." ■



DETAILS

PROJECT
Miller Freeman Inc.

LOCATION
Dallas.TX

INTERIOR/LIGHTING DESIGN
Interprise, Inc.—Paul White Osborn

LIGHTING MANUFACTURERS
Focal Point; Osram Sylvania; Metalux; Portfolio (Cooper); Ardee; SPI; Lightolier; Ron Rezek

PHOTOGRAPHER
Paul Bardagjy Photography—Paul Bardagjy

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JUDGING FROM THE LIGHTING DESIGN OF THIS COURTHOUSE, IT IS EVIDENT THAT ENERGY EFFICIENCY AND EASE OF MAINTENANCE WERE MANDATORY OBJECTIVES

BY JEAN GORMAN, CONTRIBUTING EDITOR

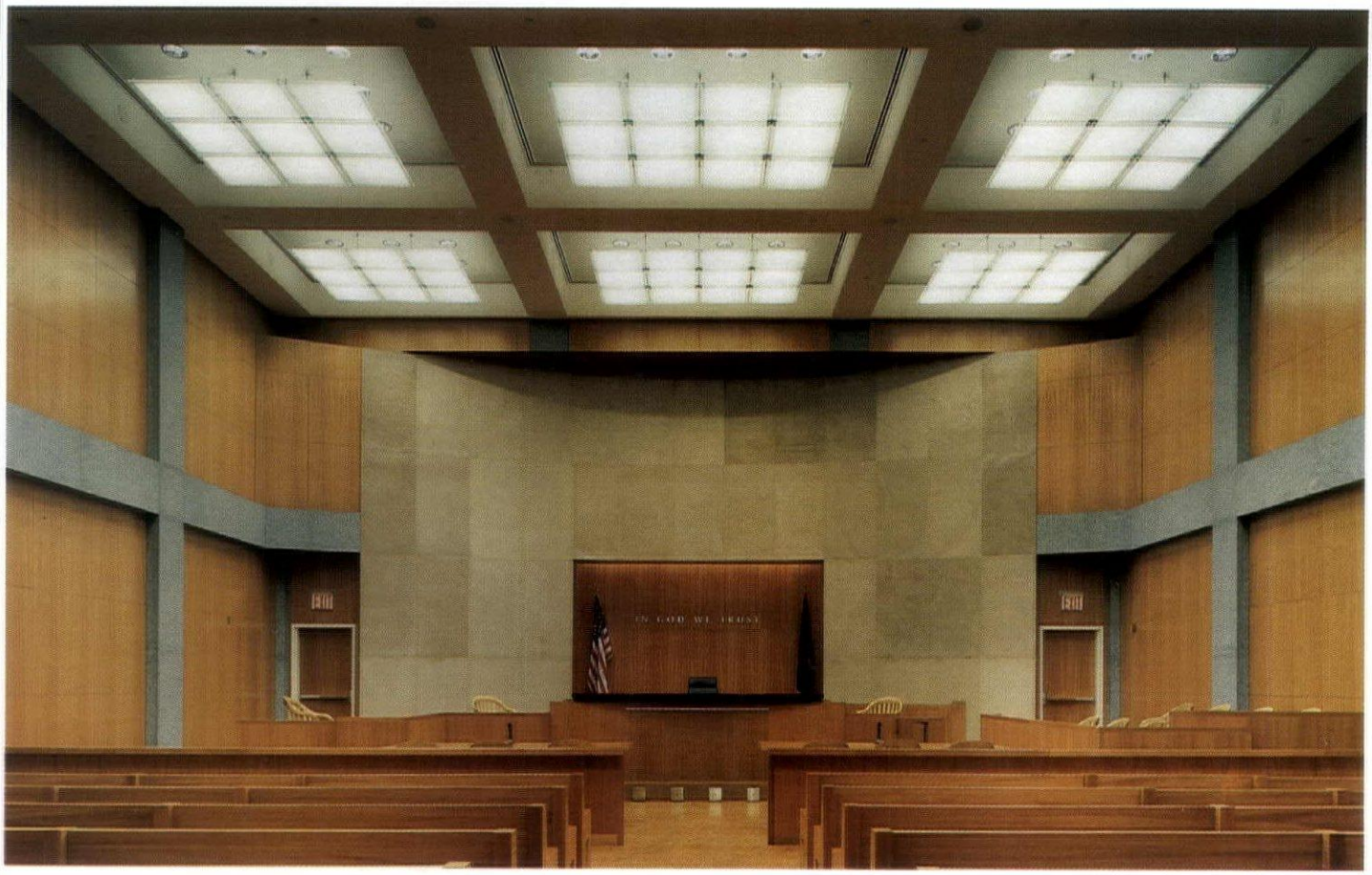
The action that takes place in a civil courtroom revolves around real people and real issues, but attorneys often deliver the facts in these cases like actors in a theatrical production. The arrangement of a typical courtroom enhances the sense of theater: The judge's bench and jurors' box are raised on a platform and the attorneys' well is positioned before it like an amphitheater.

The lighting plays a role in the spectacle by accentuating the judge with the highest level of illumination and de-emphasizing the spectators' section with the lowest levels. The recently completed 350,000-sq.-ft. Queens Civil Court building, designed by Perkins Eastman Architects with lighting by Ann Kale Associates, is a case in point. Yet, because of some changes in the lighting requirements of the Office of Courts Administration (OCA), the lighting in future courthouses may not play this sort of theatrical function.

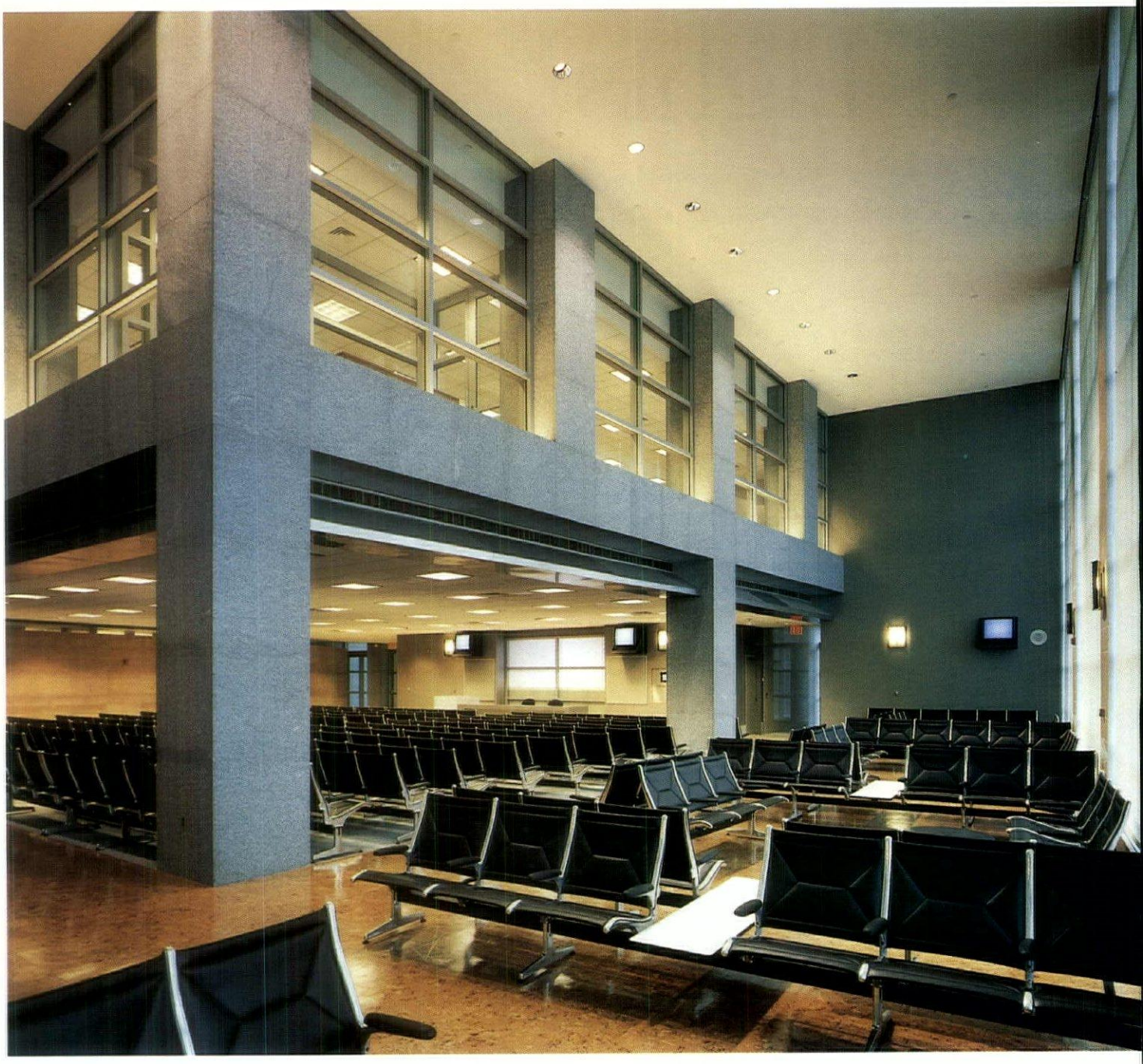
"When this courthouse was designed, the OCA agreed on a lighting approach in the courtrooms that reflects levels of authority by allowing the judge's position to dominate—not unlike a CEO's in a conference room—with 75 fc of light, while the attorneys' well is illuminated with a lower level of 50 fc and the spectators' area lower still with 30 fc," said lighting designer Ann Kale, IALD. "In the future, however, the office wants even illumination—60 fc throughout."

While the OCA's requirements for light levels in a courtroom have changed, its demands for ease of maintenance and energy efficiency still hold, and the strategy employed by Ann Kale Associates in the

PHOTOGRAPHY: © CHUCK CHOI



OPPOSITE: LOW-VOLTAGE PAR 16S ILLUMINATE THE COLUMNS, AND FLUORESCENTS IN COVES UPLIGHT THE CORRIDOR CEILING OFF THE FOUR-STORY ATRIUM, WHICH IS FLOODED WITH DAYLIGHT. COMPACT FLUORESCENTS MOUNTED ABOVE ACRYLIC PANELS PROVIDE AMBIENT LIGHT THROUGHOUT THE CEREMONIAL COURTROOM (ABOVE), WHILE PAR 38S HIDDEN IN A CEILING POCKET PROVIDE FOCAL LIGHT ON THE JUDGE'S DESK AND WASH THE BACK WALL.



FLUORESCENT UPLIGHTS IN THE TROUGHS AT THE BASE OF WINDOWS IN THE JURY ASSEMBLY ROOM (ABOVE) PROVIDE AMBIENT LIGHT. CEILING-RECESSED METAL HALIDE DOWNLIGHTS PROVIDE READING ILLUMINATION AND COMPACT FLUORESCENT WALL SCONCES OFFER HUMAN SCALE.

courtrooms as well as in the other areas of this facility aptly addresses both concerns with a conscientious mix of fluorescent, incandescent and metal halide sources. The lighting solutions are user-friendly and collectively they use less energy than the 2W/sq. ft. required by the New York state energy code.

SPECTATOR SEATS

In the large ceremonial courtroom, for example, the lighting designers installed a series of 90 downlights containing two energy-efficient 26W compact fluorescents each above sand-blasted acrylic panels (designed to simulate glass) suspended from the ceiling to provide ambient illumination over the spectators' area. Hidden in a theatrical pocket carved into the fascia of a beam over the judge's desk and attorneys' well, focal light comes from two rows of tracks of 250W tungsten-halogen PAR38 adjustable floods (chosen for their 4,000-hour lamp life and longer when dimmed) that illuminate the face of the judge and wash the limestone wall and pearwood niche behind the judge's desk. "We used two separate single-circuit tracks so they'd be easier to maintain," said Kale.

In this building, the jury assembly room is a double-height space that wraps around three sides

of a central core, where administrative offices are housed on the second floor and jurors are trained on the main floor. In the double-height areas, where potential jurors await their calls and sit reading all day, comfortable reading light was essential. The lighting designers installed recessed adjustable metal halide accents in the ceilings to provide reading light, positioned compact fluorescents around the walls to provide a human scale and concealed fluorescent uplights in troughs at the base of interior windows to provide ambient uplight. In the lower level area of the core, where jurors are trained, 2x2 parabolic fluorescents in the ceiling provide additional light.

An odd mix of aesthetic and security issues was the dominant influence on the designers' choice of light sources and approach to employing them in the lobby area, where daylight floods through a glass entrance wall. "A lobby wants to be a showplace, or a central gathering place," said Kale, "with flattering, inviting light." A large glass sculpture suspended over the central security desk gives the lobby its "showplace" atmosphere, but it also occupies the primary position the lighting designers planned to use to provide the required 50 fc of light over the metal detectors next to the security desks. To achieve the proper quality and levels of light for this space, the designers opted to install recessed 250W quartz PAR38 adjustable accents around the perimeter—some aimed toward the center of the room where the security desk and artwork are located and others washing a limestone wall on one side of the space.

LIFE TERM

"When you're working in an institutional building, you want to keep incandescent sources to a minimum for energy and maintenance reasons," said Kale. "Yet we wanted to control the lights with a photocell that would automatically adjust the light level based on the level of available daylight, and we needed to use incandescent sources with the photocell because they're dimmable. So we had to convince the OCA that these sources would save energy when interacting with the photocell, which prolongs their life." The designers also cleverly incorporated low-voltage incandescent sources—MR16s—into the glass sculpture, which the artist used to uplight the dichroic glass panels of the artwork and Kale used to downlight for additional illumination into the center of the room.

The lighting designers illuminated the three tiers of corridor balcony ceilings off the four-story atrium area with T8 fluorescents within coves along the length of the atrium. They also discreetly placed small PAR16 uplights at the base and midpoint of the atrium columns to accentuate the height of the atrium. A line of recessed metal halides in atrium ceiling provides downlight.

"Perkins Eastman really should to be commended for the integration of daylight into this building," said Kale. "My contribution was to maximize their use of daylight through controls." ■

DETAILS

- **PROJECT** Queens Civil Court
- **LOCATION** Queens, NY
- **ARCHITECT** Perkins Eastman Architects
- **CONSULTING ARCHITECT** Ed Mills
- **LIGHTING DESIGNER** Ann Kale Associates, Inc.
- **PHOTOGRAPHER** Chuck Choi
- **LIGHTING MANUFACTURERS** Edison Price Lighting; Zumtobel Staff; National; Litelab; Luceplan; McPhilben; Cornelius; Linear Lighting Corp.; C.J. Lighting Co.; A.L.P. Lighting; Litecontrol; Guth; Alkco; Hydrel; Kim Lighting; Lutron

A SUSPENDED SCULPTURE IN THE CENTER OF THE LOBBY (RIGHT) FORCED THE LIGHTING DESIGNERS TO POSITION PAR 38 SOURCES AROUND THE PERIMETER OF THE ROOM. CONNECTED TO A PHOTOCELL, THE LIGHT LEVELS AUTOMATICALLY ADJUST TO THE PRESET LEVELS DEPENDING ON THE AVAILABLE SUNLIGHT. LOW-VOLTAGE HALOGENS MOUNTED WITHIN THE SCULPTURE PROVIDE ADDITIONAL LIGHT IN THE CENTER OF THE ROOM.

Black Magic

THE LIGHTING DESIGNERS OF THIS CHIC RETAIL SPACE USE THE ART OF CONCEALMENT TO CREATE A POWERFUL ILLUSION

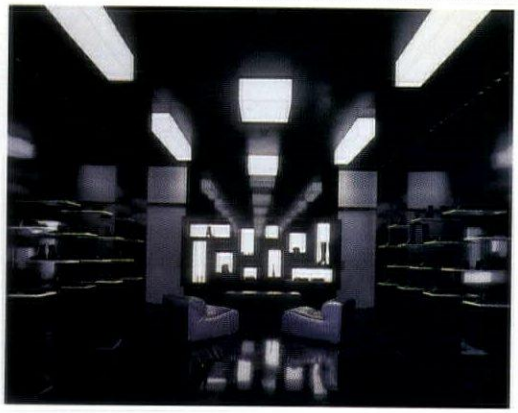
BY ALICE LIAO, ASSISTANT EDITOR

Although its all-black interiors distinguish it from sister locations scattered throughout the world, Costume National's store in New York City presented a special challenge. "The first goal, of course, is always to light the product," said lighting designer Matthew Tirschwell, formerly of Universe Lighting, now with his own company, Tirschwell & Co., Inc., "but in Costume National, we had a black store that was extremely shiny, so there were major glare concerns throughout the store." A restricted budget also tested the design team's ingeniousness. "They had virtually no money to do this job," said Scott Thurm, project manager and owner of Universe Lighting, "So we ended up spending about $7 per sq. ft. on the lighting for this upscale boutique, which is pretty tight—lower than the budget of most fast food establishments."

Glowing boxes float in the sleek, black environment formed of heavily lacquered walls—15 coats total—a poured epoxy floor and a painted ceiling. "The floating cubes were the lighting element that the client really felt was the essence of the store," said Thurm, "and the shiny floor evokes an aquatic feel." The overall effect: a sensation of endlessness. "We had this idea of the blackness as a void, and how to capture the nature of illumination in that blackness," remarked architect Chris Sharples of SHoT Architects. "The light had to define itself in relationship to the merchandise as some sort of object without necessarily overpowering the space."

Crafted from 1/4-in.-thick opaline Plexiglas and mitered to enhance their appearance as solid blocks of light, the custom light boxes in the ceiling range from 4 ft. to 5 ft. in length and measure a foot wide. Six 3500K compact fluorescent lamps mounted 9 in. on center illuminate the longer blocks from within; four light the cubes. To eliminate socket shadow, the lamps are mounted base facing upward.

PHOTOGRAPHY: © DAVID JOSEPH



FLUORESCENT LAMPS ILLUMINATE PLEXIGLAS AND ACRYLIC BOXES TO CREATE A SENSE OF DRAMA IN THIS TONY SOHO BOUTIQUE. FIBER OPTICS LEND A LINEAR ELEMENT TO DISPLAY SHELVES.

COUNTER BALANCE

On the floor, a milk-white acrylic counter streaks down the center of the store, echoing its ceiling counterparts. In its interior, a combination of staggered fluorescent lamps effuses an almost surreal glow. "That was the toughest one—we had five sets of fluorescent strips running the length of the box, two sets of strips on each end, and one strip on the top and bottom," said Tirschwell.

In the lacquer wall separating the showroom from the back office area, rectilinear cutouts serve as glowing display niches, which mimic the blocks of light. The cutouts are illuminated by a bank of 5-ft. fluorescent lamps concealed behind a sheet of opaline Plexiglas.

Explained Thurm, "The blocks of light create an environment," but lighting the racks of clothing with their glow was unfeasible. Despite the emphasis on keeping the interiors as black as possible, "a massive amount" of additional lighting was still needed to illuminate the products. However, as Thurm pointed out, "They wanted the light to just appear from nowhere."

In response, the solution tucks accent lighting in ceiling slots that span the length of the store. A raceway equipped with AR70 lamps with 10-degree beam spreads, the accent lights discreetly illuminate the clothing and display shelves below. Transformers were mounted above the glowing boxes. Highly directional, they are aimed to reflect light away from customers' eyes and reduce glare. Tirschwell remarked, "Typical downlights would have thrown light in every direction, which means that they wouldn't necessarily have lighted the merchandise or enhanced the architecture of the space." The design team also took care to minimize the number of lamp types used on the project. Display windows in the front of the store are also lighted with AR70 sources recessed in ceiling slots.

VIEW POINTS

Imparting a plunging sense of perspective to the space when viewed from outside, fiber-optic lighting lines the clear, Plexiglas shelves on both sides of the store. With illuminators hidden in the walls, lighting for the shelves uses end-point fiber and a square extrusion mounted to the backside of the shelves. "We decided on fiber optics because we knew that the shelves were not removable and that there would be no access behind the walls." However, in crude test runs, the designers soon discovered that the edges of the shelves needed to be sandblasted in order for the light to be visible. Further experimentation and adjustment ensured equal light distribution per shelf. "Mockups are really critical when you're breaking ground with new ways of lighting," commented Thurm. "We could have saved a lot more time and extra expenses if given the luxury."

Yet in talking about the monetary constraints, Tirschwell said, "We got very good at coming up with budget solutions: One of the entertaining things about this project was the way we used relatively inexpensive products in a relatively creative fashion."

Universe Lighting won a 1998 Lumen Award for the lighting design of Costume National. ■

DETAILS

- **PROJECT** Costume National
- **LOCATION** New York City
- **ARCHITECT** SHoT Architects—Chris Sharples
- **LIGHTING DESIGNER** Universe Lighting—Scott Thurm; Matthew Tirschwell
- **PHOTOGRAPHER** David Joseph
- **LIGHTING MANUFACTURERS** A&L Lighting; Liteworks; Lightly Expressed; Lightolier

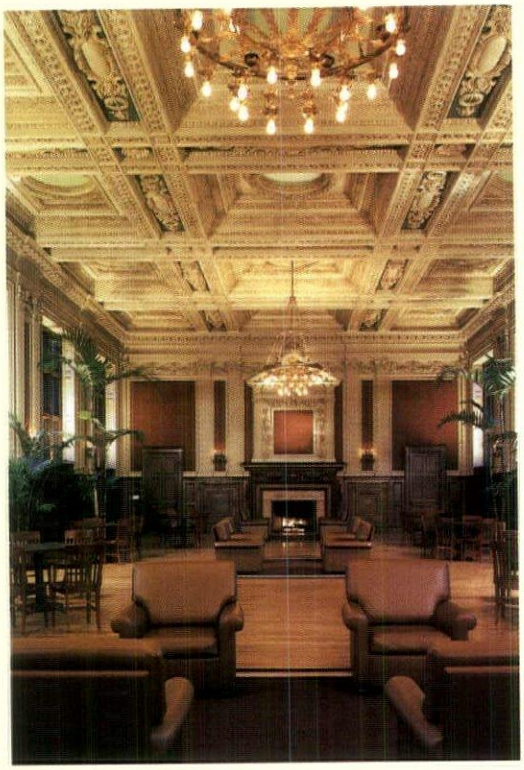
Splendor in the Past

RESTORED AND REVITALIZED, HOLMES HALL GLOWS FROM WITHIN, WELCOMING VISITORS WITH A TRULY WARM RECEPTION

BY CHRISTINA TRAUTHWEIN, EDITOR-IN-CHIEF

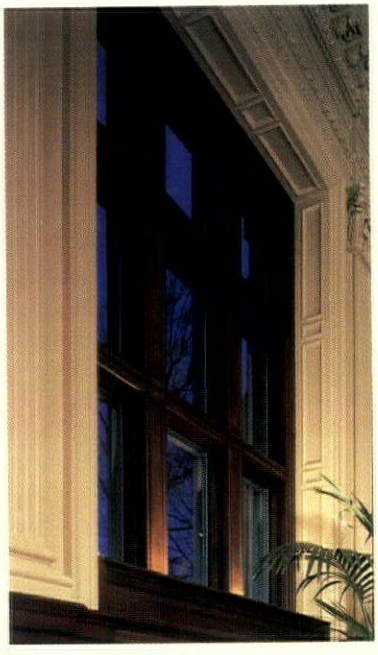
Holmes Lounge in Ridgley Hall was constructed in 1902 as part of the initial quadrangle complex at Washington University in St. Louis, which is known as one of the best architecture schools in the nation. The 40-ft. x 98-ft. x 25-ft. space served as the University's library until 1962. Thereafter, it became a study hall/cafeteria to which food service pavilions, random furniture and inappropriate lighting were incrementally added, eclipsing the room's grand scale and character. Quite candidly, the space received a lot of the wear and tear associated with spaces on college campuses that are accessed by everyone day in and day out.

In recent years, though, Washington University engaged an architecture firm in Chicago to utilize its specialty in the restoration of historic spaces to revitalize the space for use as the University's primary public reception area. Original plaster details, including pilasters and elaborate coffered ceilings, were cleaned and repaired. A color scheme was devised to enrich the existing monochromatic white paint. Quartered oak was used for new doors and to clad the inside faces of the standard aluminum windows. Oak wainscots were added at the former location of the library book shelves to conceal new HVAC units, maple floors were repaired and fabric panels were added



WASHINGTON UNIVERSITY'S HOLMES HALL (LEFT), WHICH SERVED ITS STUDENTS AS LIBRARY, STUDY AREA AND CAFETERIA SINCE ITS TURN-OF-THE-CENTURY CONSTRUCTION, RECENTLY WAS REVITALIZED FOR DIVERSE USES OF FUNCTIONAL LOUNGE BY DAY, ELEGANT, "WELL-DRESSED" EVENT ROOM BY NIGHT. THE CHALLENGE FOR THE LIGHTING DESIGNERS WAS TO REVEAL THE ONCE GRAND SPACE'S MAGNIFICENT DETAILING, SUBTLE HUES AND SOARING ARCHITECTURE WHILE DISGUISING ALL MODERN LIGHTING EQUIPMENT. THE CLIENT DECREED THAT NO RECESSED LIGHTING COULD VIOLATE THE CEILING OR WALLS.

A DETAIL WAS DEVELOPED AT THE WINDOW'S SILL (RIGHT) TO CONCEAL MULTI-CIRCUIT TRACKS. "THE LARGE WINDOW WELLS SERVED AS A PERFECT SPOT FOR LIGHTING IN TERMS OF HOW WE WANTED TO ILLUMINATE THE SPACE," EXPLAINED KURTZ. "THIS LOCATION, BECAUSE OF ITS DEPTH (ABOUT 15 IN.), SEEMED TO OFFER THE BEST OPPORTUNITY FOR US TO PLACE LIGHTING EQUIPMENT. SO WE DECIDED TO USE IT AS A STAGING POINT TO UPLIGHT THE CEILINGS." KURTZ EXPLAINED FURTHER, "IN EACH WINDOW ELEMENT, THERE ARE TWO 500W QUARTZ-HALOGEN WALL WASHERS—OR WHAT ARE NORMALLY USED AS WALL WASHERS—MOUNTED TO TRACK ON THE LEDGE IN FRONT OF THE WINDOW." THE LIGHT FROM THIS CONTINUOUS LINE OF TRACK ALONG THE WINDOWS' HORIZONTAL SURFACES, WASHES ACROSS THE CEILING, REVEALING TEXTURE AND COLOR AND PROVIDES THE UPLIGHTING WITHIN THE SPACE. TRACK FIXTURES IN THE WINDOW WELLS ON EACH END OF THE ROOM ALSO INCLUDE SOME PAR36 ACCENT LIGHTS THAT ILLUMINATE THE ARTWORK ON THE END WALLS AND THE ARCHITECTURAL ORNAMENTATION.



MANIPULATION OF THE FIXTURE'S SIDE- AND BACKLIGHT WITH LOUVERS AND LENSES BATHES THE PLASTERWORK CASING AND HIGHLIGHTS THE CENTURY-OLD WINDOW FRAMES.

PHOTOGRAPHY: © ALISE O'BRIEN

to the upper walls to enhance acoustics.

But probably the most remarkable addition to what had become an informal space fallen to disrepair is the new lighting scheme. And while it is certainly notable, it is intentionally not *noticeable*. Lighting designers Randy Burkett and Ron Kurtz designed the lighting of Holmes Hall to honor its past, respect the architecture and enhance the space by adding replications of original wall sconces, uplights within the window sills to provide the room's general illumination and custom chandeliers to add scale and richness.

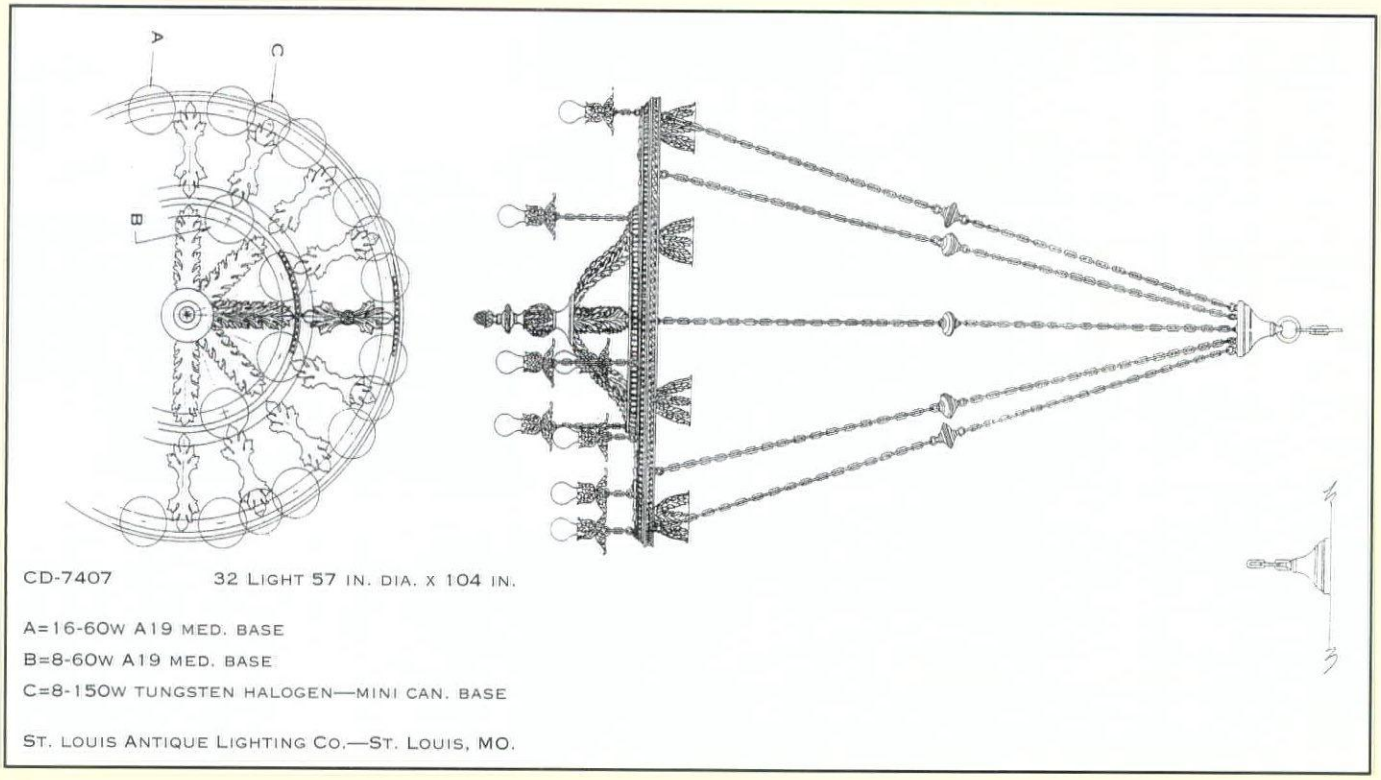
"Washington University is one of the most heavily endowed schools in the country," noted Burkett, "so one of the programmatic roles of Holmes Hall was to create a space for fundraising and special events." According to Burkett, until the restoration of the historic hall, the university held most of its significant events off campus. "This was a chance to give them a showpiece on campus that could be used for activities right on campus," said Burkett. "After all, under that crust was a marvelous old room. The premise of the project was to celebrate the grandeur that once was—and to do so in a way that was respectful of the original design and fabric of the room."

To best accomplish this, the historic architects required that the lighting not penetrate the ceiling and that it not be conspicuous. "When entering the space, one's eyes immediately travel to the ceiling and the wonderful decor," explained Burkett. "The architect wanted accent light for the art and architecture, special lighting for perimeter window and wood, but no obvious fixtures." Consequently, there are no visible lighting elements that are not ornamental or thematic in content—everything is concealed in some way so that the lighting equipment is virtually invisible. "No accent lights or downlights are in traditional locations,"

"WHERE NEEDED, WE FITTED THEM WITH LENSES TO DIFFUSE THE LIGHT IN SUCH AWAY AS TO ALSO LIGHT THE CASEMENT IN THE SIDES OF THE WINDOWS AND THE TOPS OF THE ARCHES," SAID BURKETT. "WE WERE ABLE TO ACCOMPLISH MORE THAN A FEW TASKS ALL FROM THIS ONE POSITION."

OTHER TRACK CIRCUITS STAGE 12V PAR36 NARROW SPOTS AND VERY-NARROW SPOTS, PEEKING JUST ABOVE THE MASKING VALANCE, TO HIGHLIGHT CORNICE DETAILS AND WALL FABRICS AND PALMS. LIMITING AIMING ANGLES TO THE UPPER THIRD OF THE SPACE AND ADDING AN ARCHITECTURAL MOLDING TO THE DESIGN OF THE PERIMETER WOODWORK OBSCURE THE EQUIPMENT FROM BOTH INTERIOR AND EXTERIOR VIEWS.

IT WAS THOUGHT THAT BOTH AESTHETIC AND FUNCTIONAL MISSIONS COULD BE BEST SERVED BY ADDING TWO GRACEFUL CHANDELIERS; SURPRISINGLY, THIS SPACE DID NOT ORIGINALLY HAVE CHANDELIERS (ABOVE, CIRCA 1940). "WE DEFINITELY THOUGHT



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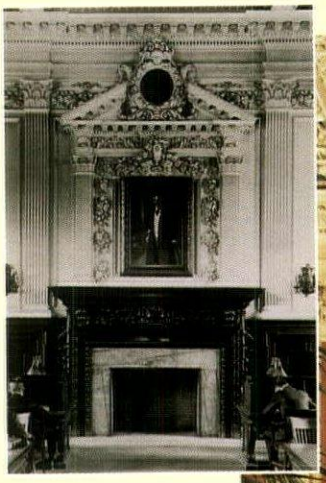
said Burkett, "and in fact, that was the real challenge." Added Kurtz, "Our charge coming into this was to try to recreate the original splendor of the room and to try to make it a multifunctional space with no obvious intrusion. This really limited us on where we were going to put lighting equipment."

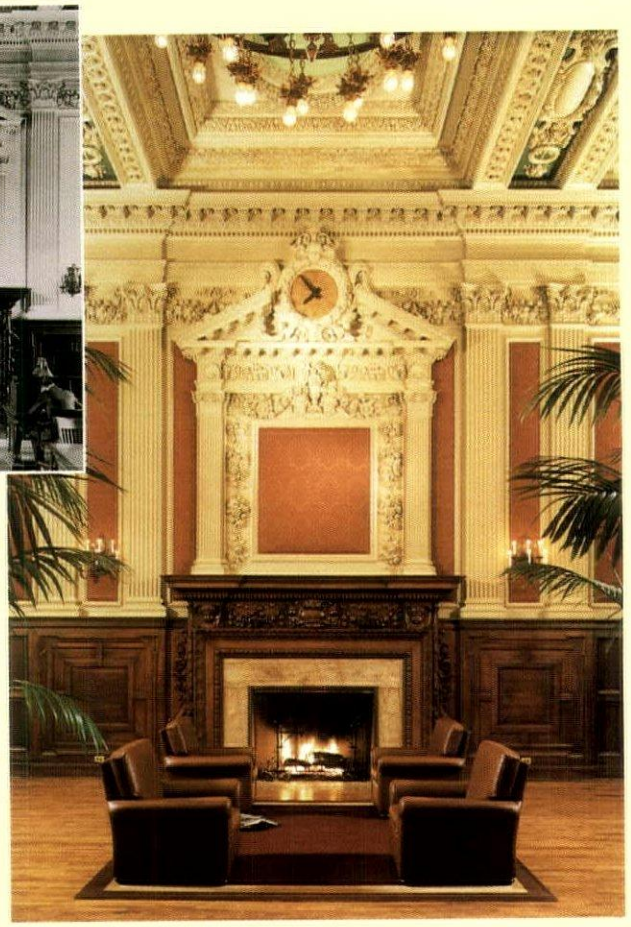
Said Burkett, "The overriding message in this project is how we, as lighting designers and architects, can recreate the grandeur of spaces from a previous time when electric light was not available or as sophisticated, and yet still remain as true to that period as possible while using modern technology to reveal some of that wonderful detail and painstaking craftsmanship that went into the designs." Added Burkett, "At the time spaces such as this were created, they were actually quite dismal after dark. We're spoiled as a culture. We watch films or stage plays where the lighting in these spaces is colorful and rich and we get a skewed sense of the reality of the times. Spaces such as Holmes Hall, while beautifully ornamented, were actually terrible at night, illuminated mostly by candle light or bad electricity—there was excessive glare and shadow and not much glamour." At the heart of the success of this project was the exemplary integration of technology—dimming, accent lighting, ceiling wash—into the original design.

"Those who enter the hall feel the lighting is entirely produced by the chandeliers and decorative elements," noted Burkett. "The magic of the space is that the illumination is all concealed and allows the occupants to believe otherwise." ■

DETAILS

- **PROJECT** Holmes Lounge at Ridgley Hall—Washington University
- **LOCATION** St. Louis, MO
- **OWNER/CLIENT** Washington University—St. Louis
- **ARCHITECT** Vinci/Hamp Architects
- **LIGHTING DESIGNER** Randy Burkett Lighting Design—Randy Burkett, IALD, principal and Ron Kurtz, associate; collaboration on chandelier design with Eugene Mackey, FAIA, Mackey Mitchell Assoc.
- **GENERAL CONTRACTOR** Hensley Construction, Inc.
- **STRUCTURAL ENGINEER** Lapin-Ellis & Associates
- **MECHANICAL ENGINEER** Tennill & Associates, Inc.
- **PHOTOGRAPHER** Alise O'Brien Photography—Alise O'Brien
- **LIGHTING MANUFACTURERS** GE; St. Louis Antique Lighting; Lighting Services Inc; Charles Loomis; Lutron; Rosco





THE ROOM WAS LACKING SOME DIRECT LIGHT, WHICH IN A SPACE OF THIS VOLUME IS CRITICAL FOR HUMAN SCALE," SAID KURTZ. "THE CHANDELIER DESIGN (DETAIL, PREVIOUS PAGE) WAS INSPIRED BY THE TURN-OF-THE-CENTURY ST. LOUIS PUBLIC LIBRARY BUILDING," NOTED BURKETT. "THE DETAILING WAS USED AS THE BASIS FOR THE DESIGN AS WE WANTED TO KEEP SOME TIES TO THE HISTORY OF THE CITY AND THE ARCHITECTURE WITHOUT TRYING TO COME UP WITH SOMETHING PULLED FROM A BOOK."

THE RESULTING FIXTURE IS VERY LIGHT AND TRANSPARENT, AND CERTAINLY COMPLEMENTARY TO THE ARCHITECTURAL STYLE. AND NOT ONLY DOES IT ADD A DIRECT LIGHT COMPONENT TO THE SPACE BUT A VISUAL FINISHING TOUCH TO THE ROOM. DIRECT LIGHT FROM 24 40W CLEAR A15 LAMPS IS DIMMED TO VISUALLY COMFORTABLE INCANDESCENCE. THIS HEAVY FILAMENT LAMP WAS SELECTED, IN PART, BASED ON ITS SIMILARITY IN APPEARANCE, WHEN DIMMED, TO A CARBON FILAMENT LAMP TYPICAL OF THE EARLY CENTURY. EIGHT 100W QUARTZ-HALOGENS IN SYMMETRIC REFLECTORS ARE WOVEN INTO THE CHANDELIER'S DETAIL PROVIDING UPLIGHT TO THE CEILING.

WALL SCONCES WITH 25W G LAMPS EMULATE THE ORNAMENTAL DESIGNS RESEARCHED IN ROOM PHOTOGRAPHS UNCOVERED IN UNIVERSITY ARCHIVES (INSET), AND REPLACE THE PLASTIC "QUARTER-SPHERE" SCONCES THAT EXISTED PRIOR TO BURKETT AND KURTZ EMBARKING ON THIS PROJECT.

MINIMAL ELECTRIC LIGHT IS REQUIRED DURING DAYTIME DUE TO THE SPACE'S EXPANSIVE WINDOWS. THE INFREQUENT HOURS OF THE ELECTRIC LIGHTING SYSTEM'S OPERATION, THE USE OF VOLTAGE-LIMITING PRESET DIMMING TO EXTEND LAMP LIFE AND EASY ACCESSIBILITY OF ALL SOURCES FOR RELAMPING PERMITTED THE USE OF INCANDESCENT/TUNGSTEN-HALOGEN IN BRINGING THE TREASURE TO LIFE.

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Remembrance of things past...

Since the beginning of civilization, lighting design has been a conscious practice. From the Great Temple of Abu Simble in Egypt to the Parthenon in Greece to the Pantheon in Rome, throughout the history of architecture, light has played an important role by enhancing details, creating drama and ceremony, transforming atmosphere and articulating space.

Lighting design as a distinct profession began in the New York City area in the 1950s and '60s. Two teachers are often cited as the fathers of modern lighting design: Stanley R. McCandless and Richard Kelly. McCandless, who taught at Yale University, imagined a system of stage lighting that sculpted actors' faces with light and enhanced their expressions. Kelly, a professor at Columbia University, wrote about three types of architectural and display lighting—focal glow, ambient luminescence and play of brilliants—and worked with architects Mies van der Rohe, Louis Kahn, Eero Saarinen and Philip Johnson. McCandless and Kelly's teachings impacted many of the first generation of lighting designers.

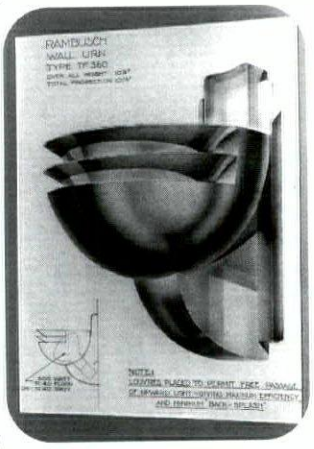
In 1969, Howard Brandston, Abe Feder, Jules Horton, Richard Kelly, James Nuckolls, Leslie Wheel and others came together to found the International Association of Lighting Designers (IALD), a professional organization dedicated to "the advancement of lighting excellence in the built environment." Since its inception, membership has expanded to over 600 members.

But while the history of lighting is expansive, the future of our industry—from both a technological and business standpoint—is, in some respects, already upon us, and its vision, blurred by the rapidly changing face of technology, is electrifying. With the recent wave of conglomeration and the advent of the Internet and e-commerce, lighting and the business of lighting are assuming a new form and urgency as we step into the new millennium.

—Christina Trauthwein

EARLY FIXTURE DESIGN

On December 17, 1898, the Rambusch Company—variously known as Rambusch Studios, Rambusch Decorating Company and Rambusch Lighting—was founded. Since that time, the company has executed over 45,000 commissions that reflect the major styles of the 20th century. From churches to cathedrals, homes to historic museum salons to a bishop's ring to camouflaged airbases in WWII, the company's designs have been applied to historic replication and restoration, ecclesiastical art, stained glass, art metal, mosaics and engineered lighting.



In 1906, Frode Christian Valdemar Rambusch, the founder of the company, created a repoussé cylindrical "Light Shield" to place over the—then new—incandescent light bulb. The shield reduced the glare that made it impossible for people to see his intricate decorative painting on the ceiling and walls. Thirty years later, Edward Rambusch refined this apparatus, recessed it into the space above the ceiling and directed the light onto its object—thereby inventing, engineering and patenting the first "Downlite." Headed by Edward Rambusch for 40 years, the Rambusch Lighting Division also produced such fixtures as the Aurora pendant, which was designed in 1931 and provided three-way directional illumination.

2000 MARKS 120TH ANNIVERSARY OF LIGHT BULB

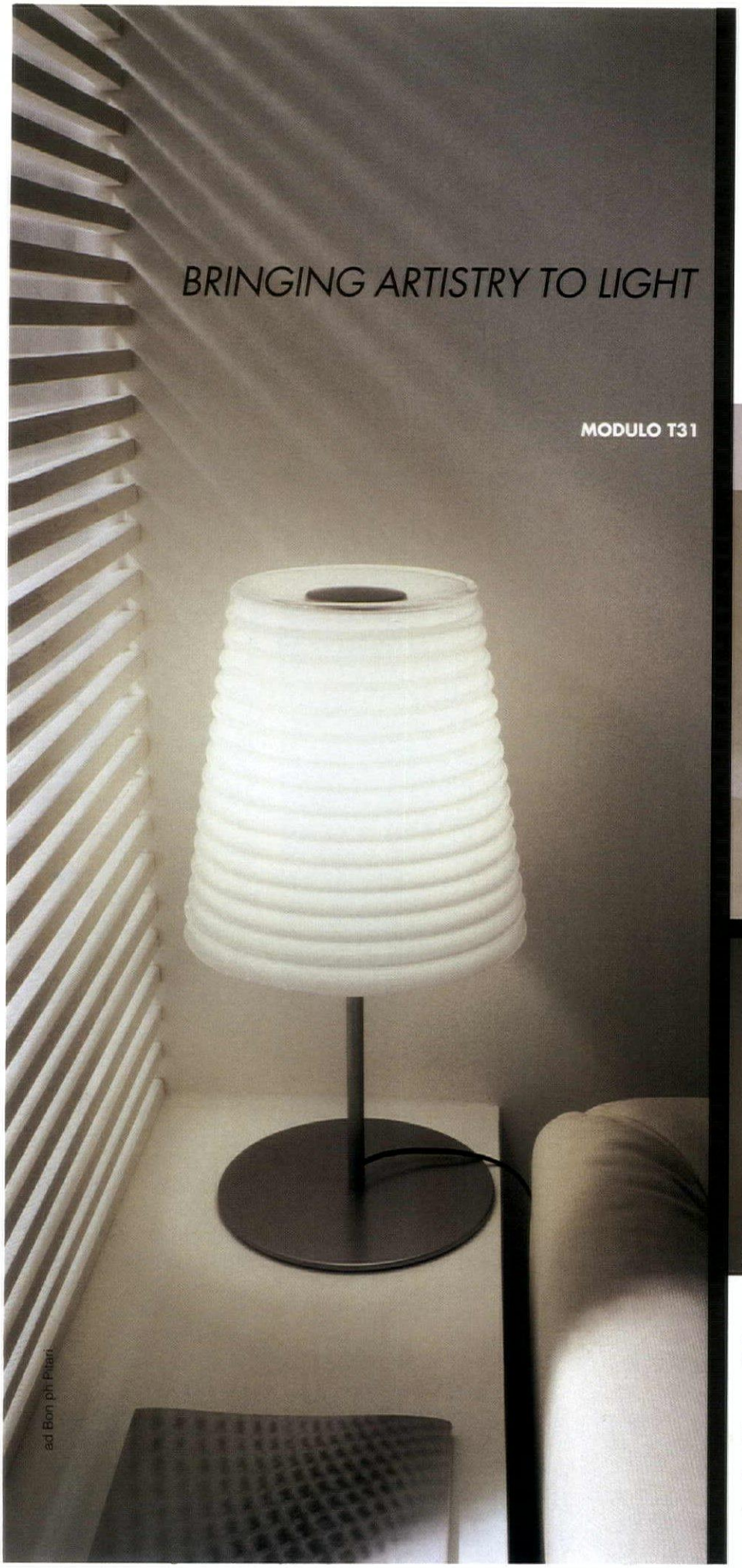
Did you know that Thomas Edison was afraid of the dark? Yet, ironically enough, 120 years ago in a small laboratory in Menlo Park, NJ, he invented the first practical incandescent lamp, which earned him the name, "Wizard of Menlo Park."

Born in Milan, OH in 1847, Edison showed an early interest in science when, at the age of 10, he built his first lab in the basement of his family home. And it was from those humble beginnings that he went on to invent the first practical incandescent lamp.

Edison tested more than 6,000 types of plant material and conducted 1,200 experiments to find the right filament for his light bulb. A lamp that showed promise used a platinum filament, but platinum was a rare and costly metal. As a more practical alternative, Edison created a light bulb using a carbonized filament from common sewing thread. He carbonized the filaments by burning them in an oven, and then surrounded them with a glass bulb and pumped out the air to create a vacuum. Edison's original lamp lasted 40 hours.

Edison first demonstrated his new lamp to the general public on New Year's Eve, December 31, 1879, at Menlo Park, and in 1882, installed the first central electric generating station on Pearl Street in New York City. Its stream-driven generators of 900 horsepower provided enough power for 7,200 lamps. The Pearl Street Station began serving 59 customers in the Wall Street district of Manhattan by supplying electric current for more than 1,000 lamps.

Edison's original lamp received its patent on January 27, 1880.



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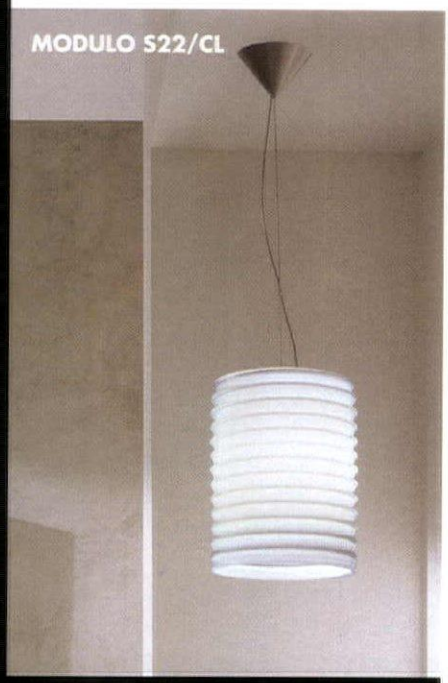

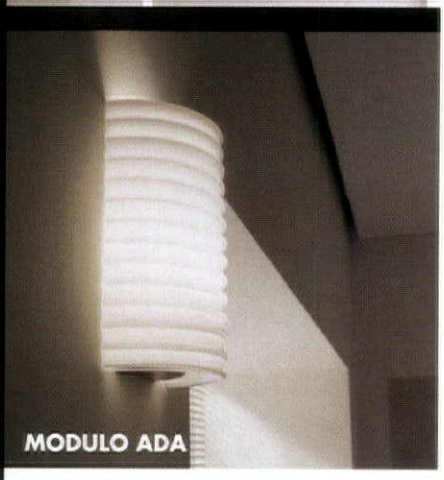

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BY ALICE LIAO, ASSISTANT EDITOR

e-lectric Avenues

Knowledge is power. Time is money. Never have these words resonated so forcefully as they do in the age of e-commerce and the Internet. As the race is on for wireless Internet access, and talks of digital subscriber lines (DSL), fiber-optic networks and mergers flood the public media, what does this emphasis on speed, this embracing of the Internet and its aptitude for quick delivery and broad access, mean for the lighting industry, whose roots lie in a tradition of vertical sales and distribution channels?

"In the information age, there's a new measurement that blows away the old industrial-age metric of productivity because productivity doesn't apply when you're talking about information—it's effectiveness and efficiency," said Paul Doherty, AIA, principal of the Digit Group, an information technology consulting firm. "Although lighting is an important piece of any project and people should spend a lot of time on it, the reality is that they spend X amount of time, which is usually a short amount of time, to make a very quick decision."

With business and economic trends pushing for faster construction, the marriage of the Internet with various software technologies is facilitating an integration of the design and ordering processes. "It used to be that we were in this world of design, bid, build," said Doherty. "Silicon Valley-based companies and more established corporations are all experimenting with a new procurement process called design/build, which blurs the lines as to when products are actually purchased." Explained Jordan Ayan, general manager of lighting.com, "As the designers put the components into their drawings, their components can electronically be specified and ordered on-line interfacing between the design process and the order process—that's not that far out there."

As Application Service Providers like buzzsaw.com, which integrates CAD systems with the Internet, bring the process of ordering closer to the process of design, where should a company position itself on the Internet to ensure participation in this accelerated world of design/build?

"We could even go as far to link that into a project management software so that as I'm actually building that building, the system or the Internet can track where I am in that project and know when I will need those fixtures and lamps," speculated Ayan. "The capability for this to happen exists today; from my perspective, this probably will happen within the next five years."

GETTING ONLINE

Many lighting manufacturers already have websites that offer online product catalogs, information on product availability, various downloadable files and links to members in their sales and distribution network. Manufacturers, such as Prescolite, who are connected to an established sales and distribution structure, are using the Internet to enhance relationships with their distributors and sales reps. According to John Nadon, marketing VP for Prescolite, "The Internet is an ideal replacement for expensive, cumbersome traditional EDI methods." By enabling quicker and more accurate transactions with distributors and sales agents, the Internet allows manufacturers such as Prescolite to improve the efficiency of their overall sales and distribution structure while reducing transaction costs. "Eventually, if not already, the key issue is integrating all of the traditional aspects of the sale into a one-stop shopping experience for technical information," said Nadon. "As an example of this, we provide links to sites for our common ballast vendors so that a designer can obtain more generic information from us and then jump to another site for more detailed information."

However, in addition to or instead of maintaining an individual website, which according to Doherty is "very 1999," a manufacturer may want to consider positioning themselves in an e-marketplace, or an e-mall, where charges are levied for the actual sale of products and not for establishing a presence. Gary Rubens, president and CEO of lightinguniverse.com, feels that allowing manufacturers to show products on their website for free provides an alternative opportunity for smaller, independent companies to create instant Internet presence. "A small manufacturer doesn't necessarily have a rep system or the budget for print advertising," Rubens explained. "If they can formulate a website or sell over a site like ours, they can reach specifiers with relatively little cost. It's also easier to bring new products to market, because the information can be instantly updated."

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For some in the lighting industry, though, sites such as lightinguniverse.co pose a threat to traditional methods of distribution and sales as they seem bypass these channels. Rubens said, "I see us and the rep system worki together in the future, because reps add a lot of value and service that we ca necessarily provide." He added, "As far as light fixtures go, there are still a l of people who need to go see, touch, feel. And you can't always tell the quali over the Internet." Rubens also envisions instituting a national rep syste whose role is to show clients how to best use the Internet for accessing produ information. He said, "When I hear about reps getting worried and scared, I c understand, but my intention at lightinguniverse.com is not to eliminate an body, because the rep system is needed: It's just going to change."

Dave Burtner, president of inter.Light, which produces lightsearch.co agrees. He predicts that simple decorative fixtures, fixtures requiring le complicated specification, will be the first to move to the Internet. "Sal reps will be affected, but less so at the higher end, performance-based fixtu end of the market," said Burtner. "Performance fixtures will still ne knowledgeable reps to help in the specification. I think that's where re should be looking: to improve their customer service and knowledge in pe formance fixtures."

As to the distribution of lighting products, Burtner sees manufacture using the Internet as an additional distribution channel through partnershi with e-commerce sites, but also feels that "there's often a disconnect betwe the specifier and the buyer of the lighting." "The vast majority of electric contractors are buying the product by going through their local distributio Burtner commented. "In the vertical market, as of now, I don't think there an e-commerce model that is providing a huge incentive for buyers to go the Internet." According to Burtner, to build an effective Internet experien for buyers in the vertical lighting market requires an understanding of beha ioral and not technical issues.

"The promise that the existing e-commerce groups are bringing real doesn't pan out in the lighting industry," said Doherty. "What the Intern and e-commerce should be doing for the lighting industry is providi another type of channel that incorporates distributors." Perhaps an e-co merce model resembling the FTD for florists?

GOING TO MARKET

Yet be it in an e-mall or linked through a hub site, how does a website attra lighting professionals to browse, specify and ultimately purchase a product?

In an economy where the measurement is no longer productivity, but ef ciency and effectiveness, good marketing goes beyond extolling the valu of a product to provide services that aid in specification and quick decisio making. "As a designer, I look more for technical information and 'easy-i easy-out' access," said lighting designer and new IALD chairman JoAn Lindsley. "Sometimes the marketing effort on the part of the manufactur gets in the way of that. I look for clear data, not superlatives." Although pri and banner ads will still exist in profusion, recent marketing efforts are ta ing advantage of the interactive nature of the Internet. Allowing specifiers execute detailed product searches or to have instant access to printed mat ial is all a part of marketing on the Internet. "To the extent that compani have done that, that has probably improved the company's ability to mark their products, because of the immediate availability of the material," sa Burtner. "For example, from a marketing perspective, companies should a better job of providing designers with those photometric files; their pro ucts would get specified more if those files were available immediately."

Factors such as speed, timeliness and accessibility make up an effecti

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marketing strategy as the lines between specification and marketing become blurred. Said Doherty, "To specify is to market, which is to purchase."

"Traditional lighting libraries are dependent on consistent mailings or manufacturer rep updates, which often are the exception rather than the rule," commented lighting designer Earl Levin of Pacific Lightworks, LLC. "Searching through catalogs requires more time than detailed searches on the Internet. In addition, in-house library catalogs for a specific manufacturer are limited to one user at a time." As specifiers migrate to the Internet first as a source for product research and specification, the demand for greater selection and, as Lindsley remarked, "pure technical information" will grow. Rubens commented, "Even with 5,000 products on our site, that's just a drop in the bucket."

"To be a great tool, information on the Internet will have to be complete, interconnected via links providing technical information and visual representation," commented Pam Yenawine, lighting products manager of Construction Zone or c-z.com. For sites linked through hub models like c-z.com and lighting.com, uniformity in the presentation of information will help specifiers in the process of product selection and comparison. "That's probably the biggest challenge right now—we really need to put pressure on the manufacturers to help this process come to fruition," said Ayan. "We have to make sure that they're using common formats in presenting information, so that when specifiers need that information, they no longer have to go to a bookshelf or contact the manufacturer for a catalog, but they'll be able go to a single point. Ultimately, that should streamline the specification process."

EDITORS' PICKS

C-z.com: an online marketplace designed to help decision makers find, identify and buy products and services, and suppliers to cost effectively market them.

Lightsearch.com: an online search tool for the vertical lighting industry. Specifiers can access information about lighting companies and products.

Lightforum.com: an online library of articles from *Architectural Lighting*, IALD, LRC, NLB and others; industry links; message-board; interviews; classifieds; and book store.

Lighting.com: an online lighting resource for lighting professionals. Focused only on the professional market, the site provides industry news and information and links to products and services.

Lightinguniverse.com: an Internet lighting store with more than 5,000 products and 50 manufacturers represented. The site went live November 1999 and is targeted at the trade.

AT YOUR SERVICE

In the "new economy," service is key, and companies are equipping their sites with features and tools to ease design, specification and procurement. Lightinguniverse.com offers fixture line art that can be inserted into elevation drawings and a catalog builder that assembles a virtual catalog, which then can be emailed to clients or design team members. At c-z.com, specifiers can contact sales reps and check codes, and contractors can access the same information to complete procurement as well as check for installation information or training.

"Networking will become a very powerful selling tool and a powerful way to get things done," remarked Levin. "Projects can easily be shared between offices in different locations when resources no longer need to be at the same location to produce a coordinated effort." Two areas where the Internet has proven itself is in communication and information storage. It is allowing greater collaboration between architects, designers and other professionals via private websites where information can be shared and stored. It also provides 24-hour libraries of information easily accessible from any computer with an Internet connection. Architectural Lighting Magazine's own website at lightforum.com, containing a library of articles from the editors and other sources such as books, the IALD and the Lighting Research Center, is largely based on this model.

For lighting designers, having access to a wider pool of products and tools may empower them to create bolder solutions. As Burtner said, "We may see more innovation in lighting design because designers are more aware of products that can help solve specific design problems." According to Ayan, other opportunities and benefits for specifiers abound, including setting up websites to market services and linking them to online resources focused on the trade. Positioning themselves "in a new way on the Internet will allow designers to do their job more effectively."

THE SURVEY SAYS...

In the 1999 *Architectural Lighting E-commerce Survey* of about 200 manufacturers, 49 percent of respondents expressed interest in selling selected lighting products directly to specifiers over the Internet. In response to the question, "Do you intend on selling products over the Internet in the foreseeable future?" 57 percent answered affirmatively. Of that 57 percent, 65 percent indicated that their response was in fact a formalized, stated company goal.

FUTURE POTENTIAL

With the focus shifting from product to service in this new world of the Internet, the possibilities seem endless and business models are evolving. Doherty envisions an emerging virtual talent market where a lighting designer's success can affect his "stock value": "There's another company emerging that will actively put value on you so you're your own stock, your own IPO." The auction model may also provide opportunities for the lighting industry, with sites like e-steel.com offering clues as to what manufacturers can do to move excess inventory. An auction site for introducing new products may also accelerate creation of market share. Burtner suggests a site for institutional buyers to solicit bids. Yenawine remarked, "I think there are opportunities on the Internet that haven't yet 'come to light.'"

When compared to other industries, the lighting industry has been slow to enter the age of information and e-commerce. As rapid technological advances resolve the problems of speed and bandwidth, the future is wide open. Said Burtner, "I don't think there are any technical barriers," and many agree that the obstacles are human: Uncertainty, fear of change, fear of the unknown and vision. Only time and education can overcome these human factors. According to Bloomberg News, with business-to-business e-commerce expected to grow to 7.29 trillion in 2004, the effort will be worth it.

BY WANDA JANKOWSKI, CONTRIBUTING EDITOR

The Urge to Merge

Although many of the subsidiaries in the rosters of today's multi-brand lighting companies had existed independently for decades, it wasn't until the 1980s and '90s that lighting conglomerates began to grow and multiply significantly. Is bigger really better? Are they truly benefiting the industry? *Architectural Lighting* asked industry professionals about the changing business landscape.

Do you think the growing wave of conglomerates and mergers and acquisitions in the industry is a positive or negative trend for lighting designers and the industry as a whole? What conclusions can you draw about how it will affect the future of how lighting systems are specified?

James Benya, IALD
James Benya Lighting Design

Everything is pluses and minuses. I see the growth of conglomerates potentially as a plus. Lighting designers will be working with stronger lighting companies that offer a greater variety of products. That will make for a stronger industry. The larger companies also are the ones that can provide funding for research. We will always need the creativity that small companies offer, but they don't have the capacity to fund major initiatives, lobbying activities or research.

The lighting industry has a history of big companies turning into producers of low-priced commodities. But today that isn't always the case. Lithonia, for example, has bought Peerless and Hydrel. They are growing by adding innovative brands. If the growth of conglomerates proceeds that way in the future, that's fine. If they grow by buying companies that produce inexpensive fixtures just to keep up with the Joneses, then it will be worse. Lighting designers need to actively remind these large companies of the importance of research and other business initiatives to keep the industry healthy. Lighting designers can't say, "We're too busy with deadlines to worry about the future." The future could be good for us and the industry if we go to them and ask, "What are you going to do with the next generation of products?" The future depends on what lighting specifiers make out of it. We are a powerful, small group and have enormous influence. If we sit back lethargically, the future will not be bright. If we take steps to move companies forward through product innovation, education and research efforts, the future will be a good one.

Michael Bauer
VP of sales, Cooper Lighting

I feel that consolidation within the lighting industry, if done right, can provide the lighting designer with the best of both worlds: Entrepreneurial uniqueness and specialization, along with a simplification of the specification and design process by dealing with fewer manufacturers. When acquiring new companies, we look for a strong brand name and a company that has a leadership position in the market.

Cooper Lighting's philosophy is placing the customer first and providing a single source for all their lighting needs. We opened our Customer First Center in Peachtree City, GA in 1997 to provide "one-stop shopping" for all of our brands. From product information and design and application assistance to order placement, consolidated shipping and post sales service—all of these services are provided from one point of contact at our Customer First Center. Though the order and delivery systems among brands are coordinated, each Cooper brand name maintains its own identity to the market. It's a powerful package that offers a wide variety of options; however, we never want to lose the entrepreneurial spirit that created the brands. Our marketing managers are charged to keep in touch with customers and to maintain the feel of a small company.

Consolidation will continue and the size of the major lighting manufacturer is going to increase in the future. The ability to leverage fixed costs, capacity and operation strength benefits the individual brands.

Peter Mitchell
VP, JJI Lighting Group

A conglomerate is a company that diversifies its industries. Hubbell, for example, is in wiring and other industries as well as lighting. JJI is a group of lighting of companies dedicated to various niches of the lighting industry. Unlike Cooper or Lithonia, we don't go to market as JJI. We believe in individual brand identities and specialize in commercial, industrial and hospitality lighting. And we approach growth both from within and through acquisition. The benefit to the industry is our dedication to product development and the orientation to specification. We try to maintain the niches and don't have a problem putting the bells and whistles on.

Michael John Smith, IALD
Michael John Smith Lighting Consultant

Some fixtures are generic and there are a lot of equals out there. Many contractors do respect what is specified, but on very large jobs, like hospitals and hotels, I know not to get my heart set on everything because the bidding wars begin.

So who changes the specs? Sometimes it's the manufacturer's rep who tries to package everything to keep all the products within the different factories that he represents. The pricing games start. Most reps in our market will respect my specs because they don't want to get on my bad side because of future work. I try to rotate specifications to involve different agencies whenever possible so that when a particular product is the only one that will work, the other guys will leave them alone.

Contractors and owners' representatives will also try to change fixture schedules whenever the dreaded process called "value engineering" comes into play. They seldom realize that there are real differences between fixtures that take the same lamp. For instance, one manufacturer's reflector system for an exterior wall wash will have a wider, more even beam-spread than a cheaper fixture. So it takes fewer

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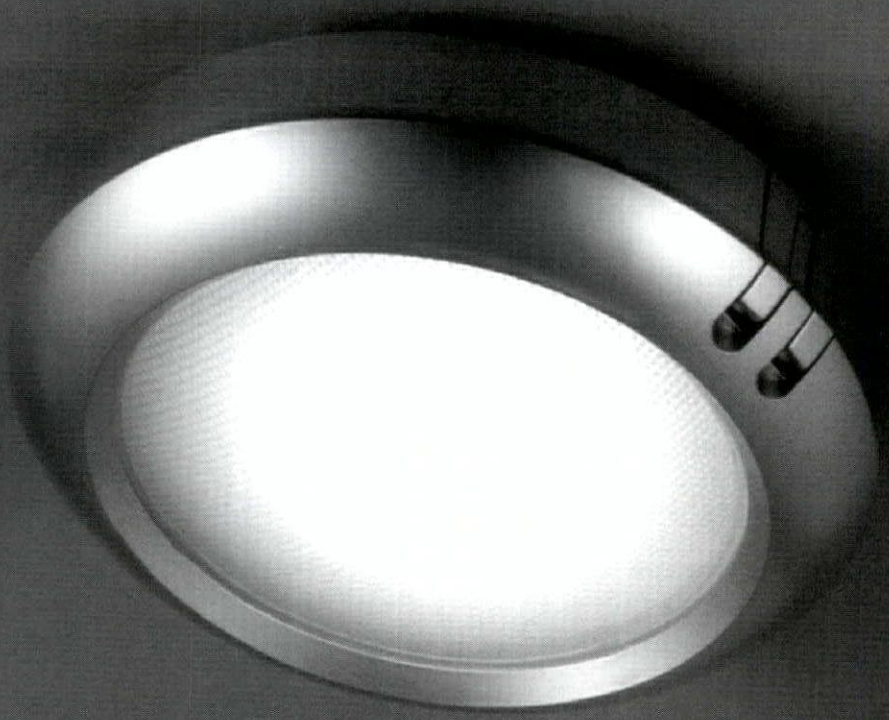

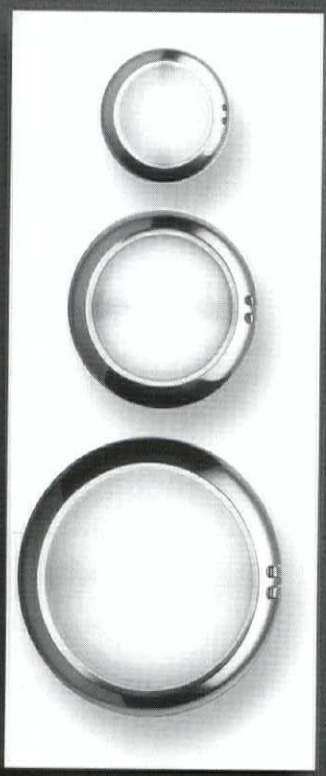

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fixtures and therefore less energy to light a wall. That fixture is always going to be more costly because of the development and manufacturing process and higher quality reflector material. That higher cost is offset by the savings in energy and the need for fewer fixtures. It can be a problem if the contractor is willing to keep the same number of luminaires, but goes to a less expensive fixture that does not spread the light as well. The worst case is if a low-efficiency reflector luminaire is substituted and the number of luminaires is decreased. Lots of money will have been "saved," but no one is happy with the final result.

I always say that it doesn't matter if the design documents are altered, as long as there is an opportunity to explain to the client how it will appear when the installation is complete. The owner may do what he or she wishes as long as the designer has done his job in allowing the owner to make an informed decision. It's the surprises that cause the problems. For that reason, it is imperative that the lighting consultant is always given the opportunity to review fixture and control submittals. If the owner hears only from the bean counters, he is only getting part of the information needed to make any value engineering decisions. If we end up with only three worldwide fixture conglomerates, it may become more and more difficult to design unique luminous environments. But it may also mean that those three mega-companies will try even harder to have all the tools that the lighting designer needs.

Anthony J. Denami, LC
Gresham Smith & Partners

The trend toward mergers and acquisitions has been going on for years. The difference today is that the companies being purchased by the conglomerates are larger now. I believe the overall effect of this trend is good, because it is resulting in larger companies that can provide broader luminaire packages and better competitive pricing. The downside is that independent companies are going to have a tougher time getting business on larger projects due to the bidding situation. On smaller projects, such as a dentist's office, it won't be a significant factor. On a 30-story office high-rise building, it is difficult to avoid packaging. Packaging may have an effect on quality, but it is up to the lighting specifier to do research and comparisons and to submit enough information so that a viable equal substitution can be made.

John K. Morgan
Senior VP, sales & marketing, Lithonia Lighting

Lithonia Lighting operates with a goal to provide the best value in lighting and be easy to do business with. It is important to us that we do things right for our customers, our business and our people. For us, this includes the integration of technology, componentry and services. Lithonia Lighting is somewhat of a brand "umbrella." Product groupings such as Hydrel, Peerless, Gotham, Paramax, Reloc and Lithonia Architectural Outdoor all fall under the Lithonia Lighting umbrella. In terms of "brand equity," I believe that Lithonia Lighting carries a connotation of best value and superior service. Brands within the Lithonia Lighting umbrella must fit this connotation for products of its own class and use.

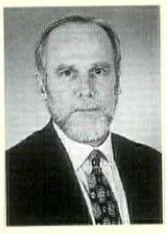
Lithonia Lighting has been fortunate to be able to make a few acquisitions of product lines with strategic fit. Generally, however, our growth has been occasioned by internal development of product. I guess when you look at where we are strongest, you would have to say our specialty is the commercial and industrial markets. We have also focused resources on areas which have been less traditional for Lithonia, such as residential applications. Whatever the market and whatever the product, our focus is to provide the best value.

Clearly, conglomerates have had the resources to provide certain benefits to the industry. The development of an industry data warehouse, energy and related research, lighting education and legislative issues have all benefited from conglomerate support. There is, however, no monopoly on great ideas. Great ideas in lighting come from individuals who may be part of a conglomerate or a single entrepreneur. Our industry is blessed with many individuals with great ideas. Product development ideas are generated in many ways. We like our people to use their imagination and try ideas they may have. Generally, however, product ideas come from developing solutions to a client's lighting needs. When we come to understand the client's working environment and his/her overall needs, we can generate many product ideas. Client feedback gets to us in a number of ways but the most common methods are the use of our website and through our sales people.

Lee Waldron, IALD
Grenald Waldron Associates

Conglomerates can make it more difficult to hold a specification because there is a tendency by the contractor and suppliers to have it all under one tent. The issue is it prevents uniqueness in the design from being achieved. Some conglomerates do offer a very broad product range, but there is less of an incentive to develop new and innovative products. On the other hand, it has made it easier to select certain products, but it definitely minimizes options. There is more competition to get the best price as opposed to creating the best solutions for lighting design.

John Nadon
VP, marketing, Prescolite, a division of Lighting Corporation of America



I can understand the concerns about the recent intense level of consolidation in our industry among professional lighting designers. But you can't discuss the issue meaningfully on a general basis. The issue of consolidation itself is neither good nor bad. The issue of concern, I think, can only be meaningfully discussed as it relates to the motivation of the acquisitions and the potential impact of the acquiring business culture on the acquired business culture.

Companies are a result of ideas, money and people. The ideas and the people create a culture. If the purpose of a conglomerate is to acquire a great brand name—a brand name that is great because of the culture it has created—with the sole purpose of merging it with a distinctly different, even sometimes opposing culture, I believe that there would be a legitimate cause of concern for the design community. The result could be a loss of what was the success of the acquired brand name. A loss of motivation or service orientation, which means a lessening of quality. In business, "capturing synergy" sounds great. But it technically means reducing people and plant. How do you, for instance, take two different downlighting lines, give them one management, one design

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team and make them in one location and keep their unique differences? You lower costs, but potentially you lower quality, you change the culture. If, on the other hand, the two companies merge because each has a competence missing in the other, then you can get something better.

LCA's acquisition of Dual-Lite is a great example. Dual-Lite had a unique fit. Prescolite Emergency excelled in areas where Dual-Lite didn't and vice versa. Prescolite had ideas but lacked people and Dual-Lite had great management people but lacked resources (money). In addition, LCA historically is run as a group of separately managed companies—each having a distinct culture—operating with a common sense of mission from LCA management. Therefore a clash of cultures is less a problem and more and better products and services are more likely the result.

Ultimately, the professional design community is in the position to judge the nature of the recent consolidations. To an extent, they can influence the outcomes of individual acquisitions by letting the acquiring companies know about any negative changes they see. Ultimately, they can exert that influence by what they support in their specifications and, if a negative change in product or service quality is something they see happening, their decisions not to use a product will send a message that I can assure them will be not only heard but responded to.

Mitchell Kohn, IALD
Mitchell B. Kohn Lighting Design

The effect of the increasing size and prevalence of conglomerates is currently a negative one. The acquisitions and mergers have caused upheaval in the industry that doesn't serve specifiers well. There has been a lot of "people shifting." Many companies have had to change reps completely, adding new reps with no experience and lacking adequate training. The previously established contacts aren't there anymore. It has made lines that were reliable unreliable because the changes have occurred all throughout the business—in sales personnel, manufacturing and other areas. Over the long term, some of these short-term issues will be resolved. But there are long-term problems that will persist, such as less innovation, more commodity fixtures and more concern about pricing than performance coming from these larger companies. Because of their size, the larger companies have less incentive to be innovative and take creative risks. The smaller lighting companies don't exist anymore. They had more incentive to be innovative. An exciting new product that produces a half million dollars in revenue adds significant growth to a smaller company but it doesn't contribute significantly to the bottom line of a large one, so there is less incentive for the conglomerate to be innovative because the return isn't great enough. The larger companies are looking for mass market products to provide them with significant growth. The lighting industry has never been very responsive to market needs. If any entity had been responsive to the need for innovation, it was the smaller-scale companies. Over the next 10 years, I don't see many small companies starting up. And cheaper, not better, is what the larger companies are tending toward.

Rand Elliott, FAIA
Elliott + Associates Architects, Inc.

It's never been my philosophy to approach a project by having it be about using "so and so's" fixtures. It's about finding the right solution for the project. We are always searching for new materials and products. We are doing more and more correspondence with European manufacturers who seem to be better problem-solvers than U.S. manufacturers. Small companies tend to be excited to work with you, easy to work with and flexible in their approach toward meeting lighting criteria. Big companies are about standard products, such as variations on can lights. They are a baseline for offering standard fixtures. The benefit is the wide variety of materials that is available through them at that level.

Conglomerates fulfill a role. I'll use larger companies for standard lighting. But I'll go to Flos, Artemide and others for high design and for something unique or special. Often, larger companies don't want to do specials or small quantities. At the same time, some small companies have a tenuousness. The founder or owner may retire or pass on and the company goes out of business. But often there's someone else right behind to start up something new. So they fulfill a niche as well.

I hope there will be a number of small startups in this robust economy. We need conglomerates and larger companies for basic fixtures, but companies like Fontana Arte, Tech Lighting and Ingo Maurer for something different. ■

The Big 5

Selected acquisitions/brands

**(approximate 1999 annual revenue)*

Cooper Lighting
**(over $1 billion)*

Atlite
Corelite
Fail-Safe
Halo
Iris
Lumark
Lumiere
McGraw-Edison
Metalux
MWS
Neo-Ray
Optiance
Portfolio
Regent
Sure-Lites

Genlyte Thomas Group LLC
**($978.3 million)*

Bronzelite
Canlyte
Capri
Crescent
Day-Brite
Emco
ExceLine
Forecast
Gardco
Hadco
Horizon
Ledalite
Lightolier
Lightolier Controls
Lite-Energy
Lumec
Lumec-Shreder
Matrix
mcPhilben
mcPhilben Outdoor
Omega
Stonco
Thomas
Thomas Lighting Canada
Wide-Lite
ZED

JJI Lighting Group
**($160 million)*

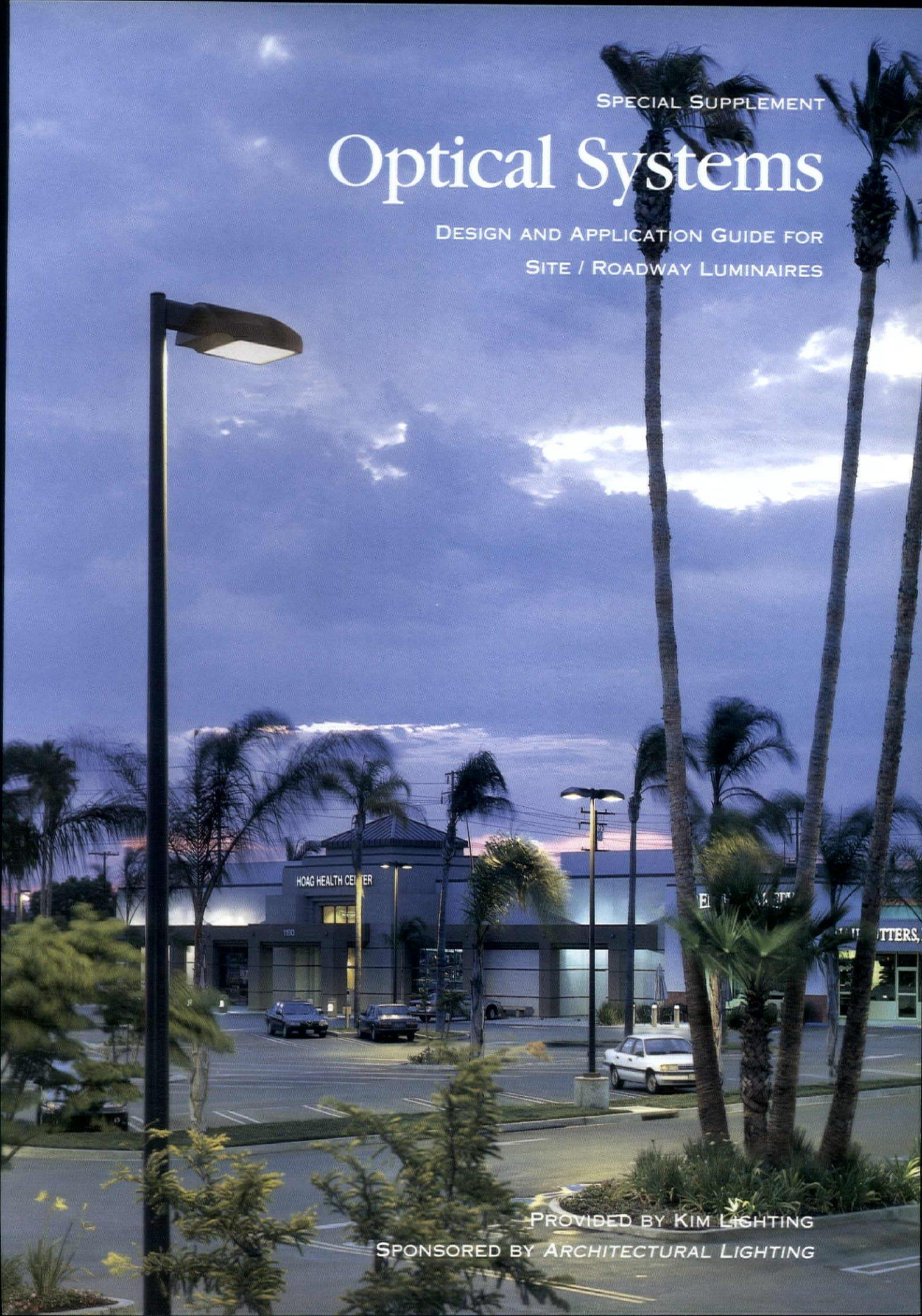
Alkco
Architectural Landscape
Ardee
d'ac
Guth
High-Lites
.hessamerica
Hoffmeister
Lam
Metrolux
Morlite
Nessen
Quality
Specialty
Vista

Lighting Corporation of America (LCA) **($805 million)*

Architectural Area Lighting
Columbia
Dual-Lite
Kim Lighting
Prescolite
Progress Lighting
Moldcast
Siteco
Spaulding Lighting, Inc.

Lithonia Lighting
**($1.2 billion)*

Hydrel
Gotham
Holophane
Infranor Canada, Inc.
Lumaid
Peerless
Reloc
York Lighting Co.



SPECIAL SUPPLEMENT

Optical Systems

DESIGN AND APPLICATION GUIDE FOR SITE / ROADWAY LUMINAIRES

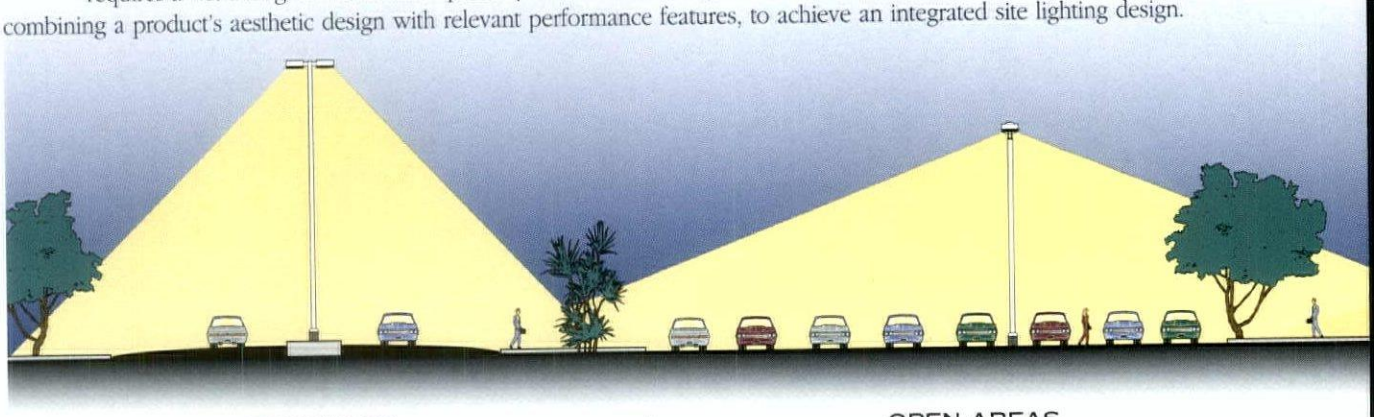
PROVIDED BY KIM LIGHTING

SPONSORED BY *ARCHITECTURAL LIGHTING*

SITE INTEGRATION

Design, Focused on Applied Performance

Conceptually, project sites can be classified into four basic areas; Roadways, Open Areas, Pedestrian Areas, and the Site Perimeter, each representing a unique set of lighting circumstances. Meeting the diverse needs of site illumination requires a wide range of solutions. Optical systems selection begins with identifying the specific illuminance requirements, combining a product's aesthetic design with relevant performance features, to achieve an integrated site lighting design.



ROADWAYS

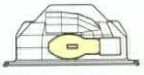
Roadways require narrow perpendicular and wide lateral beam spreads. This facilitates wide pole spacings, excellent uniformity, and control of glare.

Luminaire selection criteria includes performance, consideration of maintenance, lamp choices influenced by utility interests, and the ability to remain in service for long periods with minimal attention.

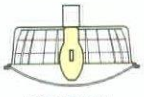
Optical designs must include an array of distributions in order to illuminate varied roadway widths, traffic patterns and to support traffic flow / organization.

DESIRABLE OPTICAL FEATURES

LAMP ORIENTATION

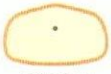


HORIZONTAL LAMP
FLAT LENS



VERTICAL LAMP
CONVEX LENS

DISTRIBUTION OPTIONS



TYPE II

TYPE III
ASYMMETRIC

CUTOFF CONTROL

OPEN AREAS

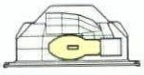
Open Areas require careful consideration of illuminance requirements, uniformity, and brightness control.

These areas are subject to scrutiny relevant to the safety and security of site occupants and the interface between vehicle and pedestrian traffic. Parking areas and connecting walkways are a potential source of litigation and liability for the project owner, requiring accurate prediction of illumination levels and dependable performance.

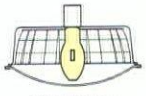
Illumination levels, uniformity, and glare must also be controlled to optimize visibility. Maximized luminaire spacings produce an economical installation.

DESIRABLE OPTICAL FEATURES

LAMP ORIENTATION

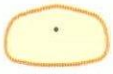


HORIZONTAL LAMP
FLAT LENS



VERTICAL LAMP
CONVEX LENS

DISTRIBUTION OPTIONS



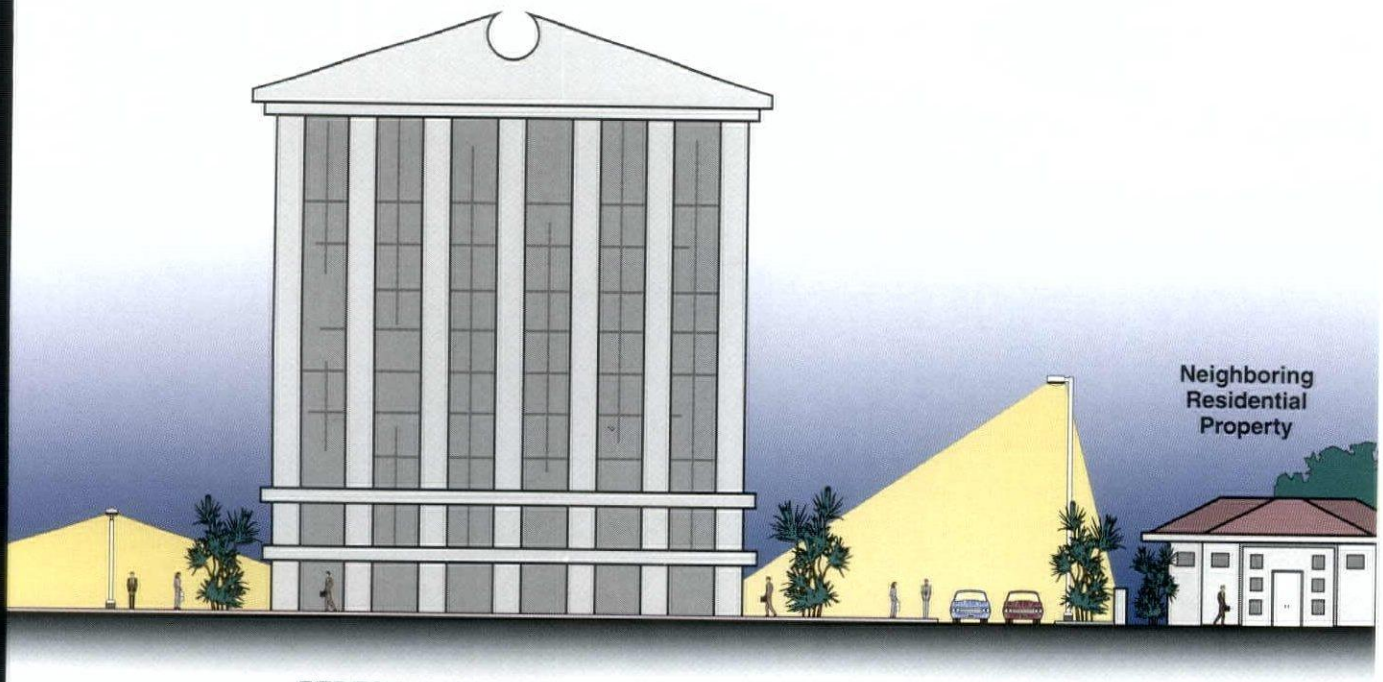
TYPE II

TYPE III
ASYMMETRIC

TYPE V
SYMMETRIC

ROTATABLE OPTICS

CUTOFF CONTROL



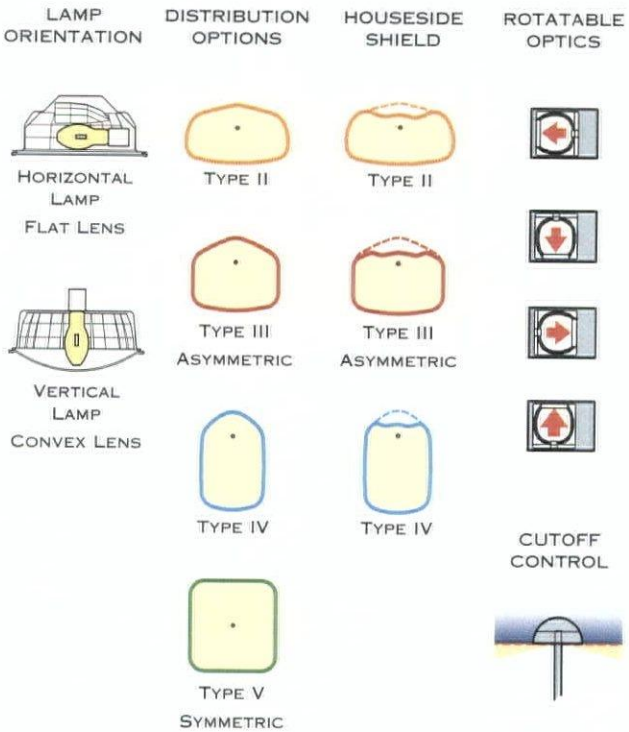
PEDESTRIAN AREAS

The transition between the surrounding site and the building itself defines the Pedestrian Area. Plazas, Courtyards, and Pathways require the widest range of optical solutions. These areas combine the concerns of Open Areas, with a heightened concern for integration of luminaire appearance with site architecture.

Illumination of irregularly shaped spaces, and a need to control stray light, requires optical diversity. Fixture placement may also be influenced by aesthetic concerns.

Luminaires in this area are highly visible, requiring attention to finish quality and detail. Design components shared with other area luminaires enhance integration of the entire site.

DESIRABLE OPTICAL FEATURES



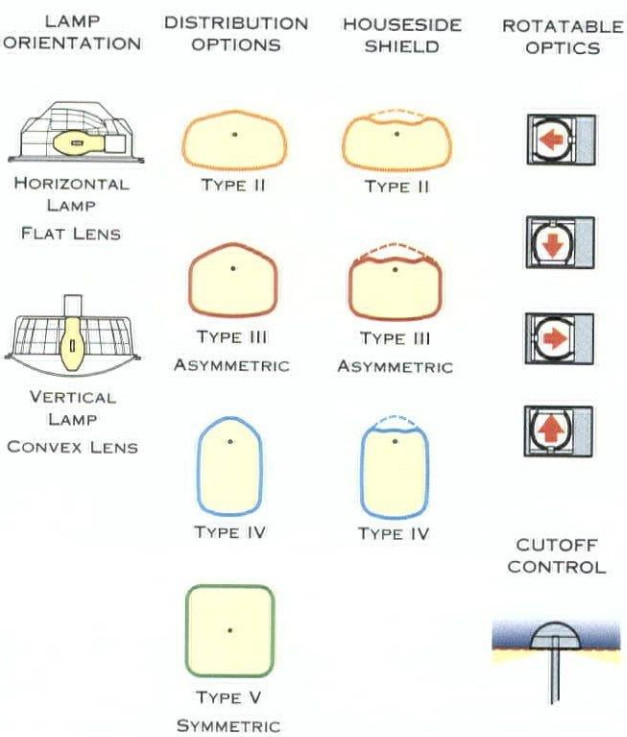
SITE PERIMETER

The Site Perimeter may include requirements to control illumination onto adjacent properties.

Light trespass ordinances, and courtesy to neighboring property occupants, require tight control of light emitted behind the luminaire.

Efficient design satisfies some of this demand, while cutoff optics provide an additional level of control. Houseside shields may also be required to provide even tighter control by trimming the distribution pattern. These concerns must be satisfied, without affecting overall system performance.

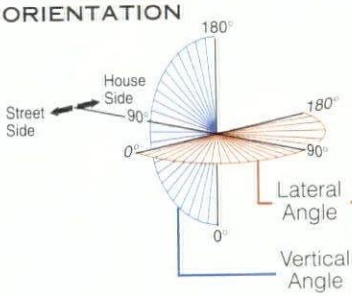
DESIRABLE OPTICAL FEATURES



PHOTOMETRY INFORMATION

Basic Language and Presentation

LUMINAIRE ORIENTATION



CANDELA TABULATION

Presenting the raw data used for all illuminance calculations, the information is tabulated with the Vertical Angles in rows and Lateral Angles in columns.

Lateral values from 0° to 90° are in front of the luminaire and referenced as "Street Side." Lateral values from 90° to 180° are behind the luminaire and referenced as "House Side."

Vertical values from 0° to 90° are below the fixture, while values 90° to 180° are at the fixture level and above.

Candela data is also used to define a luminaire's distribution type and cutoff characteristics.

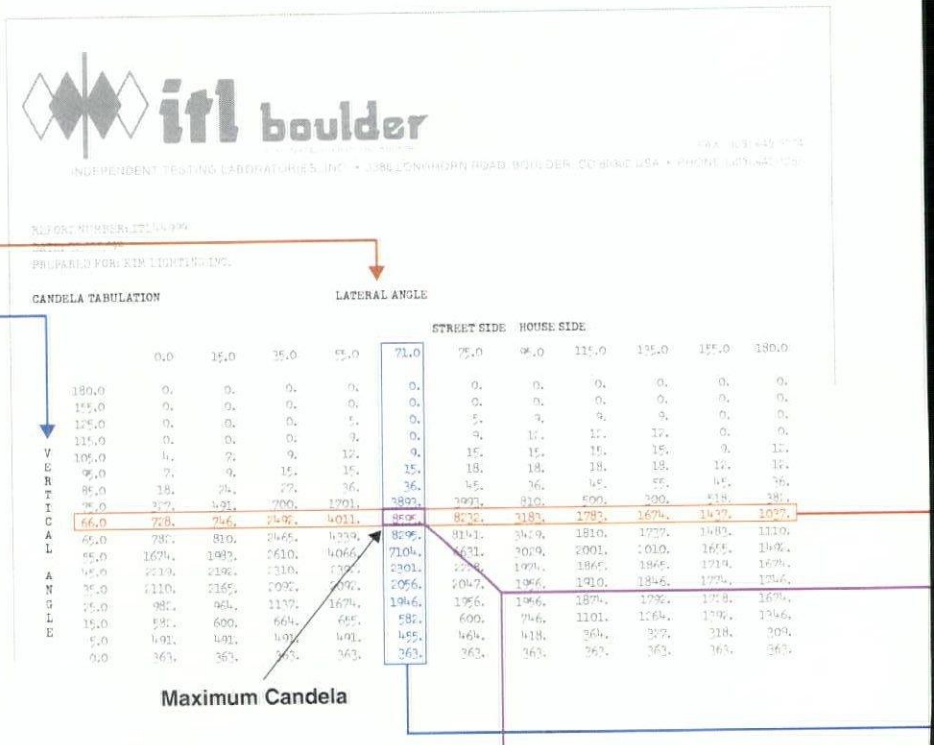


figure 4.1

FOOTCANDLE CALCULATIONS

The data provided in the candela tabulation is used to calculate footcandle levels within a proposed lighting design. Generally, this is accomplished by using computers to produce numeric calculations.

The evaluations are dependent upon the accuracy of the data used to make the requisite calculations.

Figure 4.2 illustrates the relationship of the calculated illumination at a single point, to the information provided in the Candela Tabulation. See figure 10.1 for the correlating location on an Isofootcandle Plot.

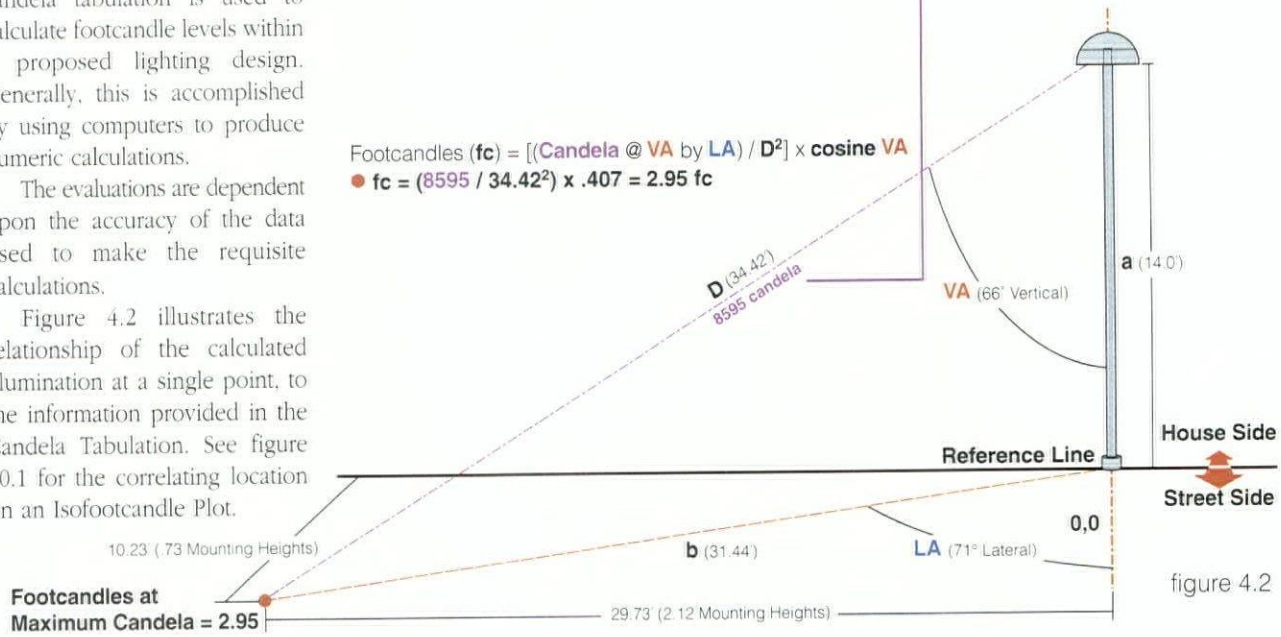


figure 4.2

Photometry is the foundation on which all evaluations of luminaire performance are built. Independent testing assures the photometry is accurate and reliable.

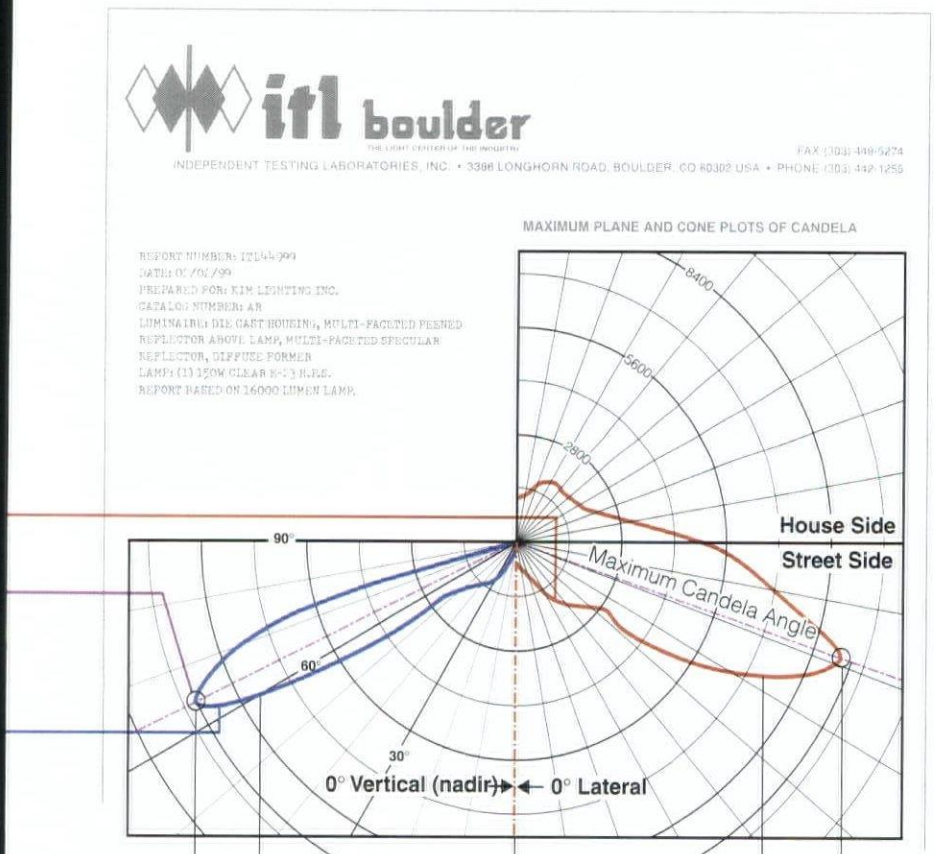


figure 5.1

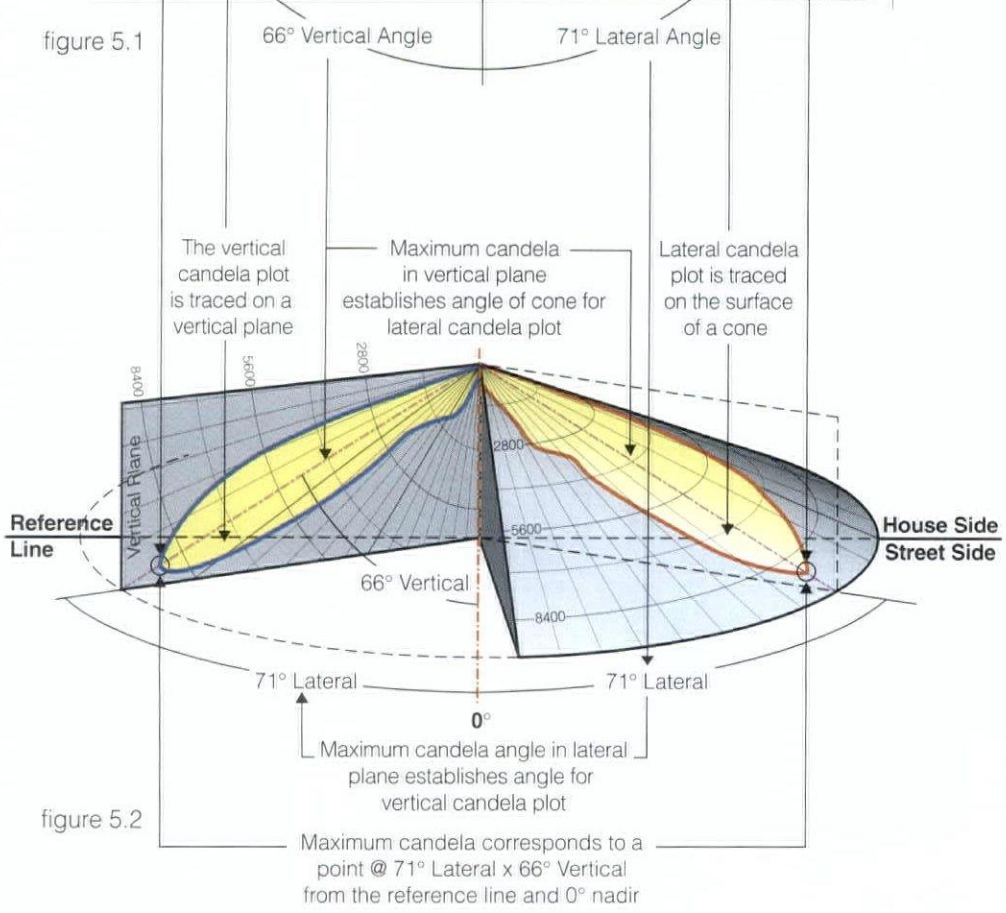


figure 5.2

CANDELA PLOTS

Candela Plots are based on the candela tabulation data (figure 4.1). Outdoor lighting produces unique light patterns, that are difficult to represent in a flat two-dimensional plane.

To create distribution plots that illustrate luminaire performance, curves are plotted with a three-dimensional dynamic.

Using the **maximum candela value** – in this example **8595** – two planes are identified; a lateral angle of **71°**, and a vertical angle of **66°** (see figure 5.1).

The vertical angle is used to create a cone, with its slope equal to the vertical angle of **maximum candela** – in this example **66°** – on this cone, all **lateral candela distribution values** from the tabulated data row at **66°** are plotted. The result is shown on the right side of the chart (figure 5.1). The two-dimensional view is looking down at the top of the constructed cone.

The second value – the **lateral angle** of **71°** – is used to construct a vertical plane off the lateral baseline. On this surface, all **vertical candela distribution values** from the tabulated data **column** at **71°** are plotted. The result is shown on the left side of the chart (figure 5.1). For purposes of presenting the plot, the vertical plane is flattened – or laid back 90° – to show it in the same plane as the right side plot.

The combination of the two curves represents luminaire performance in three dimensions.

Figure 5.2 (at left) shows the chart in a perspective view, to help visualize the relationship between the two plotted curves.

PHOTOMETRY TESTING

Variables Affecting Accurate Information

THE IMPORTANCE OF ACCURACY

Site / Area Illumination design is concerned with relatively large lamp sources, applied over large areas. Visual acuity is greatly influenced by control of glare and uniformity. In this, subtle variations in the performance of luminaires have a dramatic effect on the illuminated field. The only way to accurately predict the performance of a proposed design, is through the application of accurate performance data.

COMPARING PERFORMANCE

In addition to accurately predicting the performance of a single system, comparisons of performance between two systems, produced by disparate providers, can only be accomplished if the data provided by both is acquired using some form of mutually accepted standard. Ideally, this would include an independent source of testing, unbiased, utilizing industry established standards.

True comparisons of different optical systems can only be accomplished when the method of testing is the same for both systems.

ASSUMPTIONS AND COMPROMISES

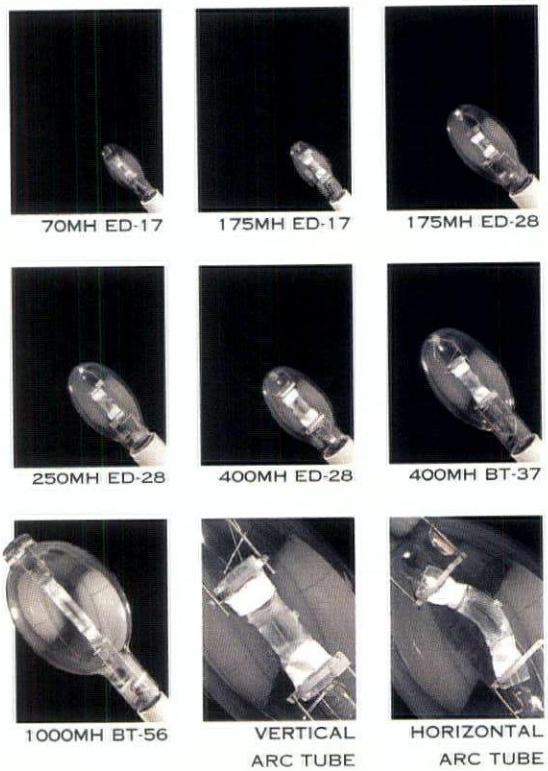
To save money, many manufacturers utilize methods that compromise accuracy under the assumption that small variances are not important. Just how far these assumptions are carried is never clearly defined and varies from one provider to another. This makes it very difficult to determine where actual test information and the compromises begin and end.

To make the most qualified, informed decisions, accuracy and dependability of information is vital. Compromises and assumptions have no place in the raw data being used to make selections.

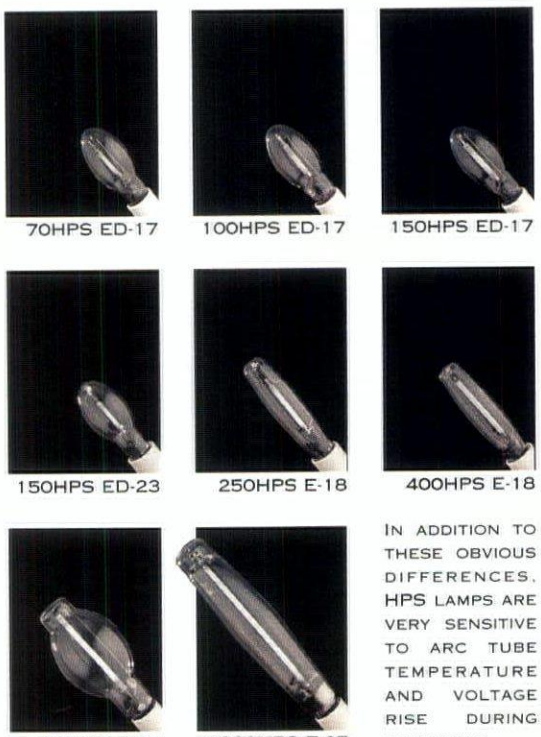
LAMP VARIATIONS

(IMAGES TO SCALE WITH EACH OTHER)

METAL HALIDE



HIGH PRESSURE SODIUM



IN ADDITION TO THESE OBVIOUS DIFFERENCES, HPS LAMPS ARE VERY SENSITIVE TO ARC TUBE TEMPERATURE AND VOLTAGE RISE DURING OPERATION.

figure 6.1

PRORATING

Prorating is a common practice in the representation of luminaire performance. It is based on applying multipliers, based on raw lamp lumens, to a known test result. For example: A test accomplished on a system with a 10,000 lumen lamp, is pro-rated to represent a system using a 5,000 lumen lamp, by simply applying a .5 multiplier to the test data on the base luminaire.

This wrongly assumes that all other factors are exactly equal, that the only variation is raw lumens.

With High Intensity Discharge (H.I.D.) sources, every lamp is different, based on:

- Arc Tube Shape (Metal Halide or High Pressure Sodium)
- Arc Tube Size
- Envelope size (ED-17 through BT-56)
- Base Size (medium or mogul)
- Envelope shape
- Intended operating position (vertical, horizontal or universal)
- Position of the arc tube within the envelope
- Whether or not the socket design locks the lamp into a given position (pin orientation).

The combination of these elements produces unique configurations for virtually every H.I.D. lamp. Prorating cannot account for these variables.

The photos shown in figure 6.1, show the numerous variations in common H.I.D. lamps.

In addition to these variables, the position of the lamp within a reflector system, heat dissipation, internal reflection and lamp/optical system interaction are all variables not represented in prorated performance reports.

In the case of High Pressure Sodium lamps, heat plays a large part in lamp life. HPS lamp Voltage Rise at Arc Tube information is an indication of how the optical system controls arc tube heat. The higher the rise, the shorter a lamp's life will be. This is also not considered in prorated information, as it can only be gained through testing of each optical system.

TEST SOURCES

Photometry testing can come from several sources. The two most common are the manufacturer or an Independent Test Facility. The two most recognized independent testing facilities are ITL of Boulder Colorado and ETL.

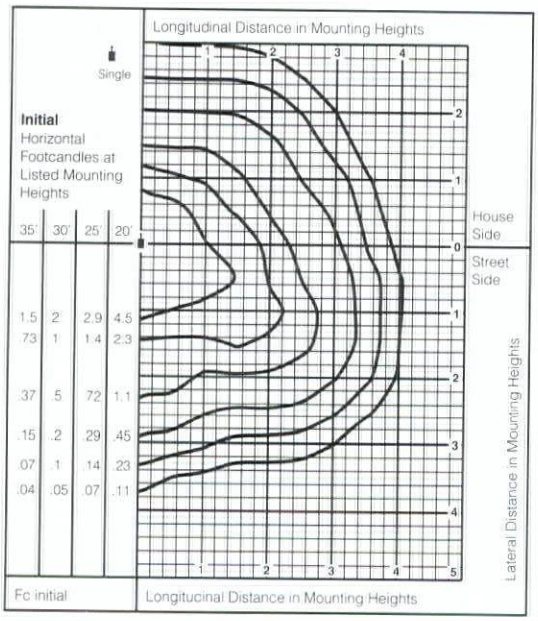
Manufacturers' data may or may not be trustworthy and must be carefully scrutinized. It is very difficult to determine whether the information provided by two different manufacturers can be accurately compared. Unless the testing procedures used by each producer are known, comparative results may be highly suspect. If the manufacturer has no other process in place to assure that every test is accomplished under strict procedural standards (such as ISO9001), test results may not be accurate. Without strict control, testing process may shift, creating variations from one test to another over time.

Independent testing by ITL and ETL are accomplished using IES established standards, under strict procedural processes. In addition to this, independent labs utilize seasoned lamps of known output, driven by laboratory quality ballasts, whose electrical characteristics are tightly controlled. This produces results that are accurate from one optical system to another, regardless of when they are tested.

A Hybrid method, where a core series of optical systems are tested by an independent source, with additional tests accomplished by the manufacturer, can also be used. By providing a redundant series of bench-mark tests against the independent data, the accuracy of the manufacturers' information can be determined. This allows the manufacturer to test a larger range of systems which might be otherwise impractical.

In any case, it is important to know the origin of test data. If the source is suspect, so is the information provided.

400MH TYPE III



400HPS TYPE III

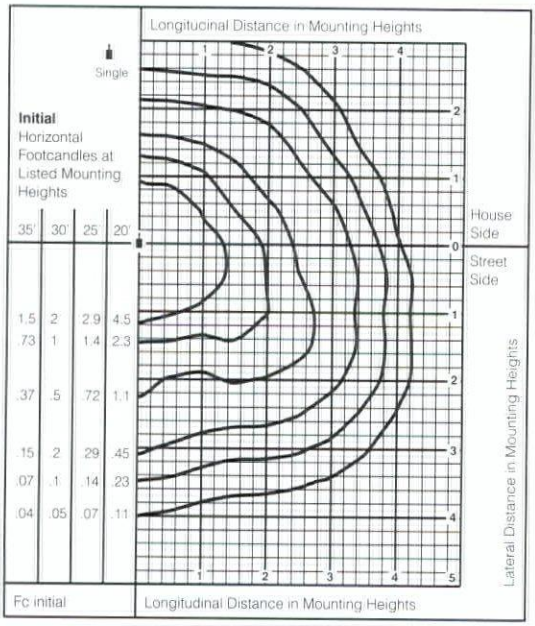


figure 7.1

PHOTOMETRIC VARIATIONS

The subtle variations in these two isofootcandle footprints are based on differences in lamp configuration only. All other components of the optical systems were identical.

OPTICAL VARIATIONS

Optical systems are precise devices, that are affected by a wide range of variables. The effects of subtle variations from one lamp to another, an arc tube design, or the position of the lamp within a reflector system, can have a dramatic impact on performance. Any change in these variables requires testing to create accurate evaluation of performance. Figure 7.1 shows an example of how two reports vary, resulting from a change of lamp (MH to HPS).

FOUR BASIC RULES

The following guidelines assure that the information used to evaluate and compare the performance of optical systems is the most accurate and dependable:

1. **TESTING OF EVERY CONFIGURATION**
   The only way to be assured that performance information is accurate is through testing. Each lamp/reflector combination must be tested. Prorating does not accurately represent actual performance.
2. **KNOWN TESTING PROCEDURES**
   Testing and manufacturing should employ a quality program that is audited to ISO9001 standards. This assures that procedures are in place that control consistency in testing and manufacture.
3. **INDEPENDENT VERIFICATION**
   Independent testing and/or verification is the only way to assure that the data provided is accurate and does not include special "tuning" of performance to gain more attractive test results.
4. **SEALED OPTICAL SYSTEMS**
   To assure the performance desired is achieved in application and will remain so without degradation from optical system contamination, the optical chamber must be tightly sealed.

DISTRIBUTION TYPES

Definitions and Methodology

METHOD

Outdoor Luminaires produce lighting patterns that can be identified by their reach in front and to each side of a single fixture location. Distribution Types describe the reach of the luminaire's light pattern forward of each fixture, while Distribution Ranges define the reach to either side.

DISTRIBUTION TYPES

Classification is based on locating the luminaire's effective major output pattern on a grid representing distances in Mounting Heights. The pattern is defined by tracing an area representing distribution at 50% of Maximum Candela. Classification is established by measuring where the bulk of this pattern falls on the grid (see figure 6.2).

In some cases, minor deviations in a beam pattern may cross the boundary from one pattern description into another. Where this has a nominal effect on applied performance, it should not be considered.[1]

Distribution Type defines how far forward of the luminaire (Street Side) the effective output reaches. Type II defines shallow reaches, while Type IV identifies luminaires with a definite forward-throw distribution. See the following diagrams for definitions of each specific type.

DISTRIBUTION RANGE

Distribution Range defines how far the distribution pattern reaches laterally, perpendicular to the axis used to identify general Type. See the definitions below figure 6.2 for each of the ranges used.

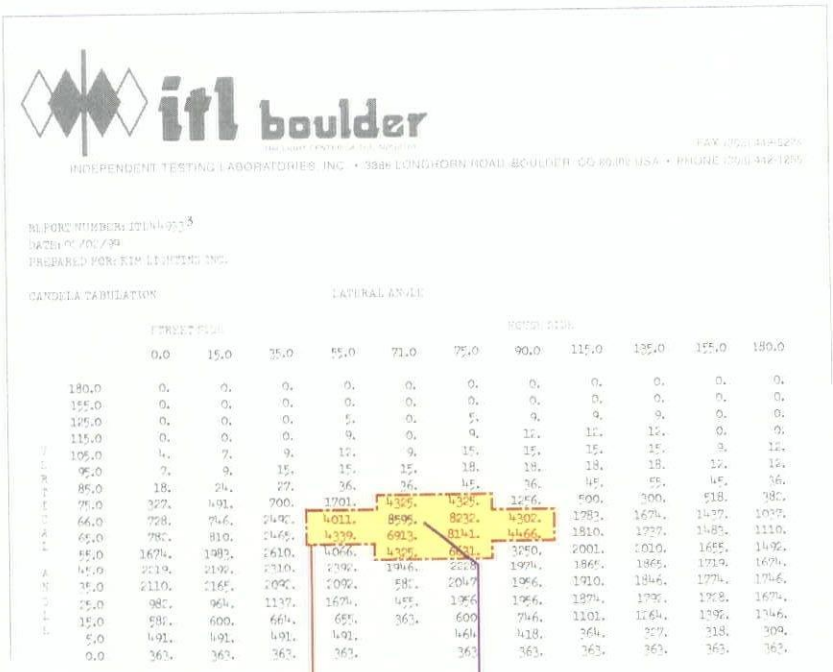


figure 6.1

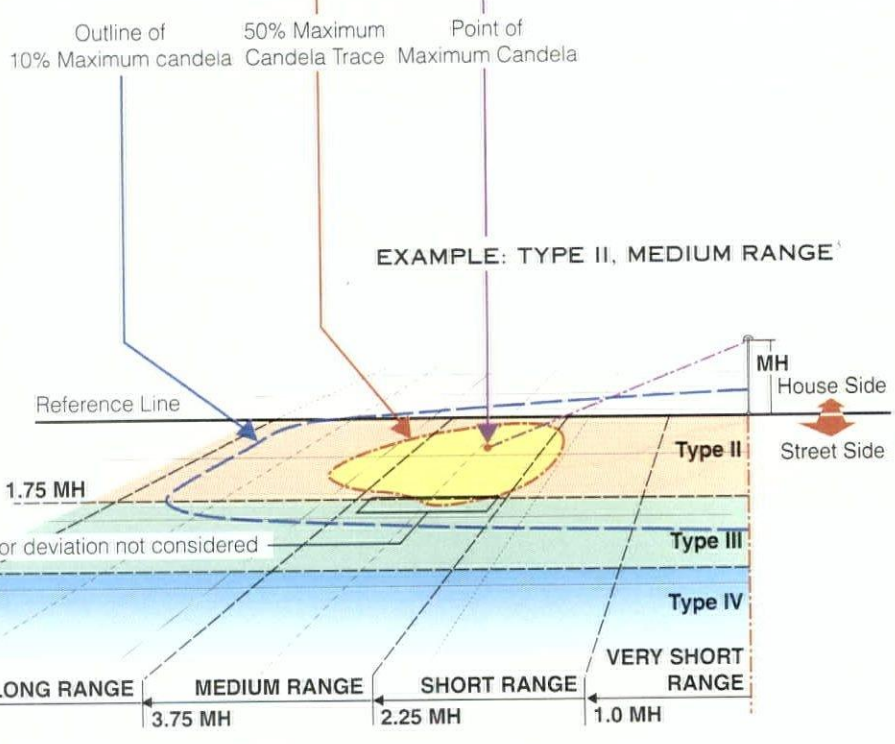


figure 6.2

LONG RANGE

A distribution is identified as Long Range when the point of maximum candela lies from **3.75 to 6.0 MH** from the luminaire's centerline, along the reference line.

MEDIUM RANGE

A distribution is identified as Medium Range when the point of maximum candela lies from **2.25 to 3.75 MH** from the luminaire's centerline, along the reference line.

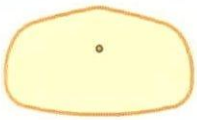
SHORT RANGE

A distribution is identified as Short Range when the point of maximum candela lies from **1.0 to 2.25 MH** from the luminaire's centerline, along the reference line.

VERY SHORT RANGE[2]

A distribution is identified as Very Short Range when the point of maximum candela lies from **0 to 1.0 MH** along the reference line.

Distribution Types only generally describe a distribution pattern. To establish the suitability of a luminaire for an application, evaluation must be completed using actual photometric data for the specific fixture and lamp combination being considered.



TYPE II HORIZONTAL LAMP

A distribution is classified as **Type II** when the **50% maximum candela trace lies within 1.75 MH** on the street side of the reference line.[4]

EXAMPLE: TYPE II, MEDIUM RANGE[5]

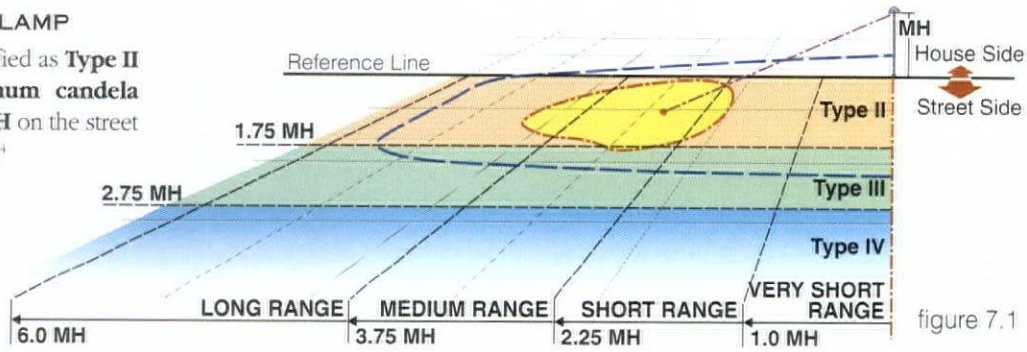
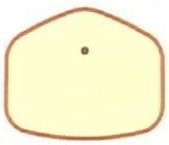


figure 7.1



TYPE III HORIZONTAL LAMP

A distribution is classified as **Type III** when the **50% maximum candela trace lies within 2.75 MH** on the street side of the reference line.[4]

EXAMPLE: TYPE III, MEDIUM RANGE[5]

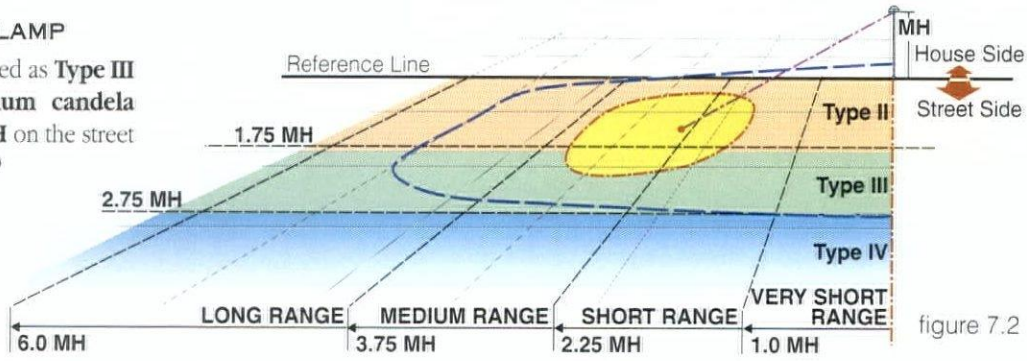
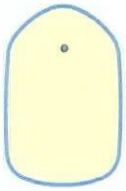


figure 7.2



TYPE IV HORIZONTAL LAMP

A distribution is classified as **Type IV** when the **50% maximum candela trace lies beyond 2.75 MH** on the street side of the reference line.[4]

EXAMPLE: TYPE IV, SHORT RANGE[5]

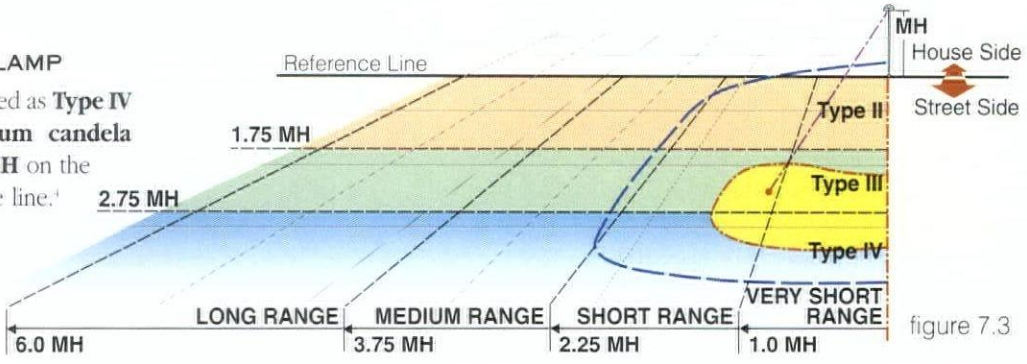
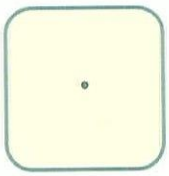


figure 7.3

DISTRIBUTION TYPES

Definitions



TYPE V SQUARE[5] HORIZONTAL LAMP

Distribution is classified as Type V Square for horizontal lamp luminaires when the **50% maximum candela trace is symmetric in four quadrants.** This distribution is characterized by four candela peaks, diagonal to the reference line.

EXAMPLE: TYPE V SQUARE[5]

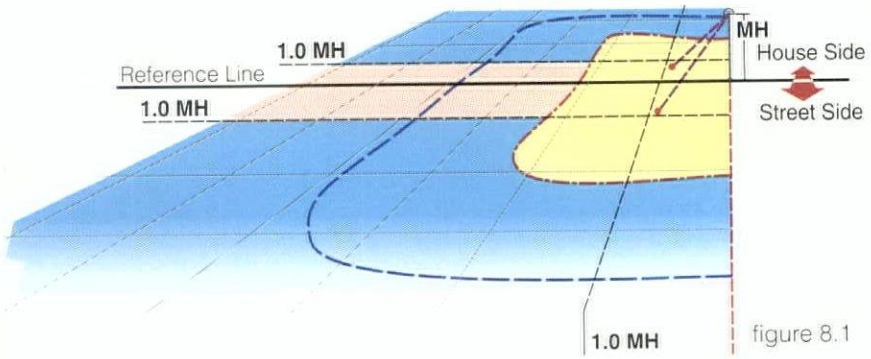
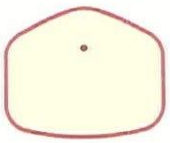


figure 8.1



ASYMMETRIC[5,6] VERTICAL LAMP

General pattern appearance is similar to Type III. Distribution is classified as Asymmetric for vertical lamp luminaires when the **50% maximum candela trace lies beyond 1.0 MH** on the street side of the reference line, and inside 1.0 MH on the house side of the reference line. **Narrow Range distribution** is identified when the **point of maximum candela** falls **inside of 2.25 MH, Wide Range** is identified when the **point of maximum candela falls beyond 2.25 MH.**

EXAMPLE: ASYMMETRIC, WIDE[5]

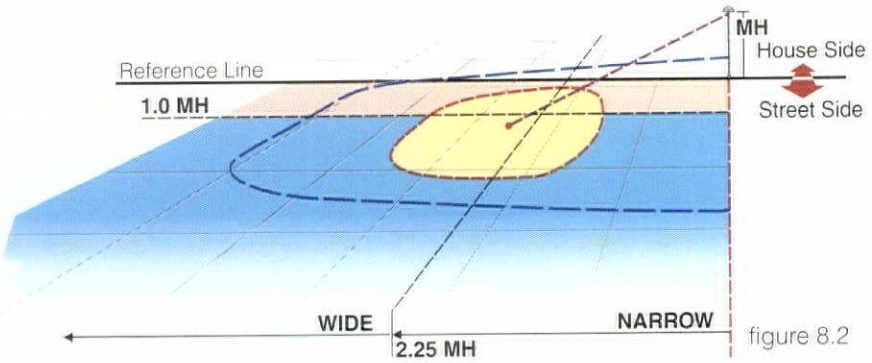
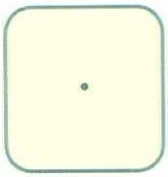


figure 8.2



SYMMETRIC SQUARE[5,6] VERTICAL LAMP

General pattern appearance is similar to horizontal lamp Type V Square. Distribution is classified as Symmetric Square for vertical lamp luminaires when the **50% maximum candela trace is symmetric in four quadrants** on both street and house side of the reference line. **Narrow Range distribution** is identified when the **candela peaks** fall **inside of 2.25 MH along the reference line, Wide Range** is identified when the **candela peaks** fall **beyond 2.25 MH.**

EXAMPLE: SYMMETRIC SQUARE, NARROW[5]

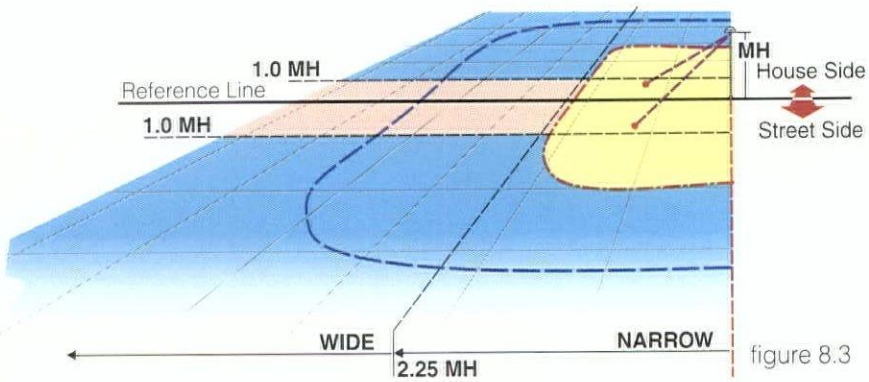
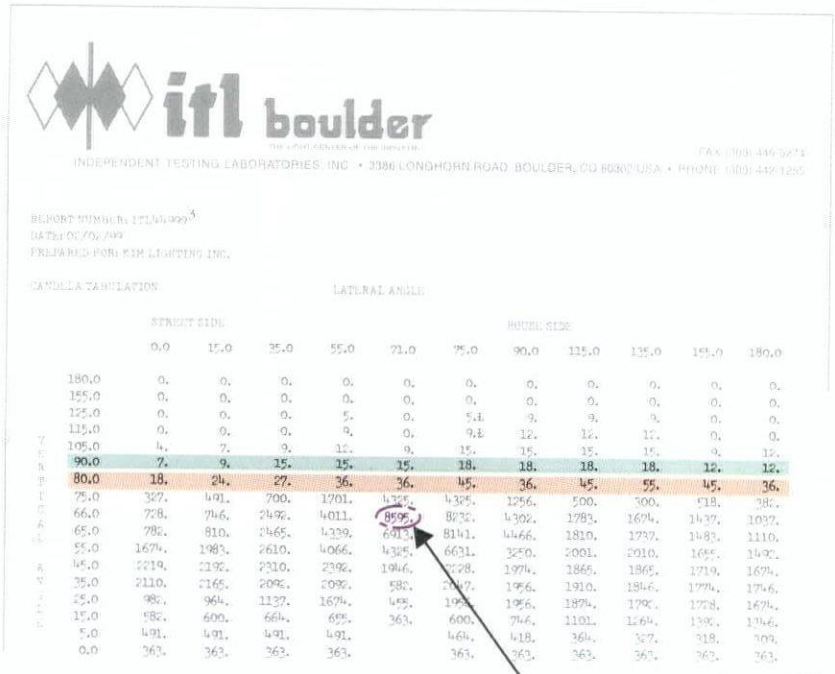


figure 8.3

CUTOFF

Definitions and Methodology



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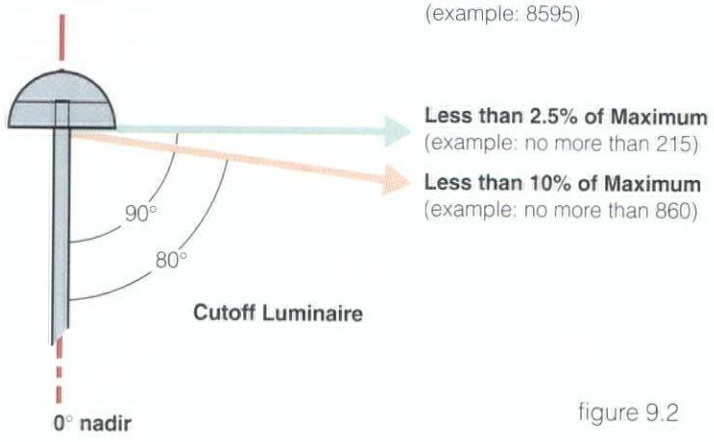
CANDELA TABULATION — LATERAL ANGLE

VERTICAL ANGLE	STREET SIDE 0.0	15.0	35.0	55.0	75.0	HOUSE SIDE 75.0	90.0	105.0	125.0	145.0	180.0
180.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
155.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
125.0	0.	0.	0.	5.	0.	5.	9.	9.	9.	0.	0.
115.0	0.	0.	0.	9.	0.	9.	12.	12.	12.	0.	0.
105.0	4.	7.	9.	12.	9.	15.	15.	15.	15.	9.	12.
90.0	7.	9.	15.	15.	15.	18.	18.	18.	18.	12.	12.
80.0	18.	24.	27.	36.	36.	45.	36.	45.	55.	45.	36.
75.0	327.	491.	700.	1701.	4395.	4395.	1256.	500.	300.	518.	382.
66.0	728.	746.	2498.	4011.	8595.	8032.	4302.	1783.	1694.	1437.	1037.
65.0	782.	810.	2465.	4339.	6913.	8141.	4466.	1810.	1737.	1483.	1110.
55.0	1674.	1983.	2610.	4066.	4385.	6631.	3250.	2001.	2010.	1655.	1492.
45.0	2219.	2192.	2310.	2392.	1946.	2228.	1974.	1865.	1866.	1719.	1694.
35.0	2110.	2165.	2096.	2080.	582.	2007.	1956.	1910.	1846.	1774.	1746.
25.0	982.	964.	1137.	1674.	455.	1955.	1956.	1874.	1795.	1728.	1674.
15.0	582.	600.	664.	655.	363.	600.	746.	1102.	1264.	1301.	1346.
5.0	491.	491.	491.	491.		464.	418.	364.	327.	318.	309.
0.0	363.	363.	363.	363.		363.	363.	363.	363.	363.	363.

figure 9.1

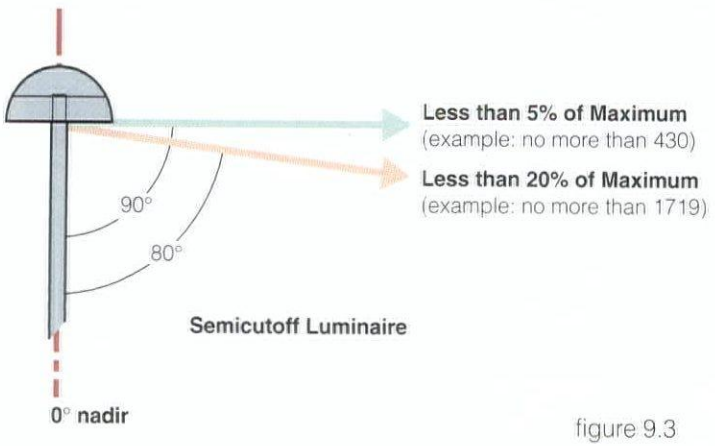
Maximum Candela
(example: 8595)



Less than 2.5% of Maximum
(example: no more than 215)

Less than 10% of Maximum
(example: no more than 860)

figure 9.2



Less than 5% of Maximum
(example: no more than 430)

Less than 20% of Maximum
(example: no more than 1719)

figure 9.3

WHAT IS CUTOFF?

Beyond distribution and range, luminaires are defined by how well they control light at angles above 80° from nadir.

Luminaires with good cutoff characteristics produce less light pollution and distribute a greater portion of their output into usable lighting zones. This is not only more efficient, it produces a more conscientious overall lighting design.

Designs without cutoff characteristics distribute light in zones unlikely to contribute to useful visibility, contribute to light pollution, and are inefficient.

DEFINITIONS

Definition of Cutoff is based on what proportion of the maximum candela output is being distributed at 80° and 90° above nadir.

CUTOFF

A luminaire's distribution is designated as cutoff when the candela at 90° above nadir does not exceed 2.5% of maximum candela and the candela at 80° above nadir does not exceed 10% of maximum candela in any lateral angle around the luminaire.[1] See figure 9.2

SEMICUTOFF

A luminaire's distribution is designated as semicutoff when the candela at 90° above nadir does not exceed 5% of maximum candela, and the candela at 80° above nadir does not exceed 20% of maximum candela in any lateral angle around the luminaire.[1] See figure 9.3

NONCUTOFF

A luminaire's distribution is designated as noncutoff when the candela at 80° above nadir exceeds 20% of maximum candela.[1]

EXAMPLE:

The luminaire represented in the sample Candela Tabulation (figure 9.1) produces a **Maximum Candela value of 8595**, with **18 candela at 90°** (.02% of Max. Candela) and **55 candela at 80°** (.04% of Max. Candela). These values fall within the defined ranges shown in figure 9.2, classifying this as a **Cutoff Luminaire**.

ISOFOOTCANDLE PLOTS

Conventions and Usage

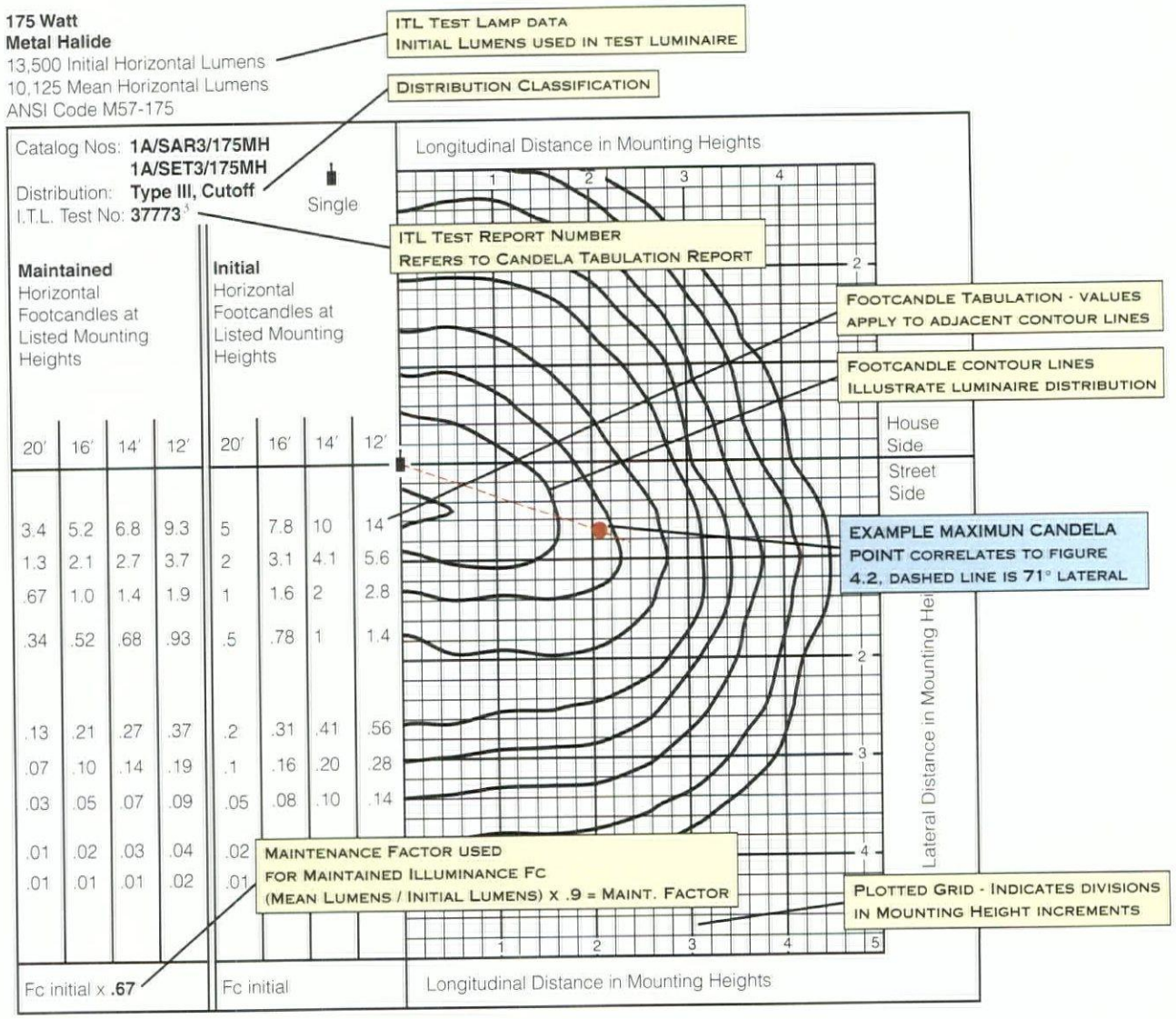


figure 10.1

CONVENTIONS

Footcandle calculations are shown with the luminaire at various mounting heights. Contour lines are drawn through illuminance values. Each contour, from the center out, represents approximately 50% of the value of the previous contour.

The plot is placed over a grid, indicating mounting height divisions, to demonstrate the luminaire's applied performance.

USAGE

The isofootcandle plots graphically represent the luminaire's lighting pattern, in illuminance, striking a horizontal surface. These plots are scalable as they are represented in mounting height increments.

An approximation of pole spacings required to attain a desired uniformity can easily be determined from the information provided.

These plots also provide a productive tool for the comparison of various luminaires. The easily read visual reference indicates beam patterns graphically, where other information (such as candela tabulations and isocandela curves) may be less clear.

EXAMPLE MAXIMUM CANDELA POINT

and lateral angle line is included here to illustrate how illumination levels at a point correlate with the Isofootcandle Plot information shown.

The location of the point is 2.12 Mounting Heights lateral to the fixture reference line and .73 Mounting Heights from the Street Side.

The point represents a calculated 2.95fc, which corresponds to its position between the 2fc and 4.1fc Isofootcandle contour lines (at a 14' Mounting Height).

Estimated Spacing and Uniformity

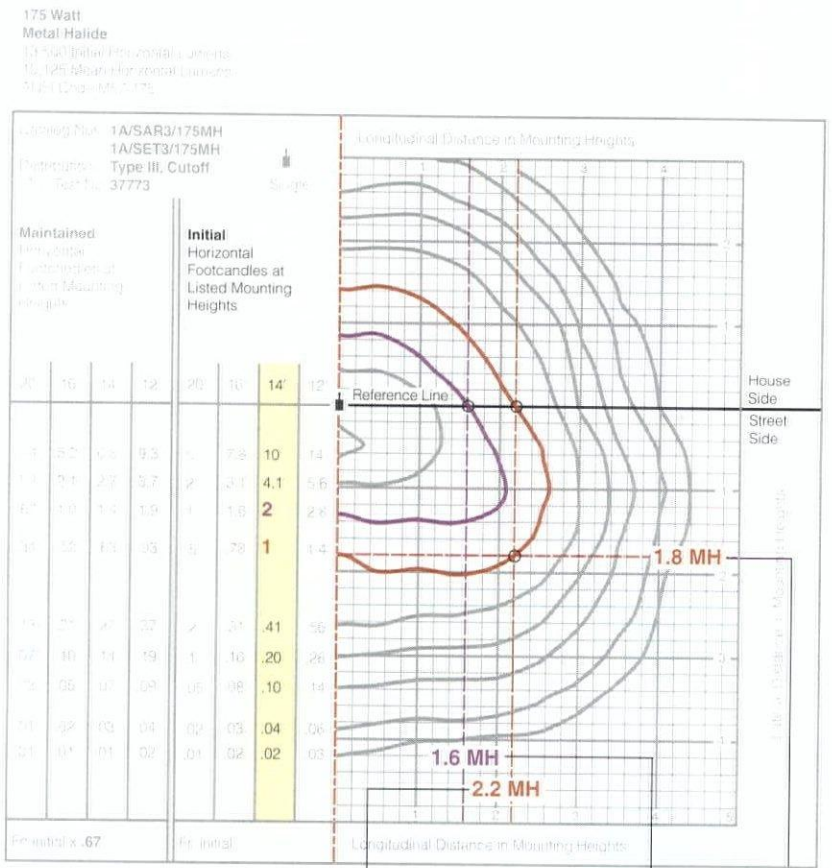


figure 11.1

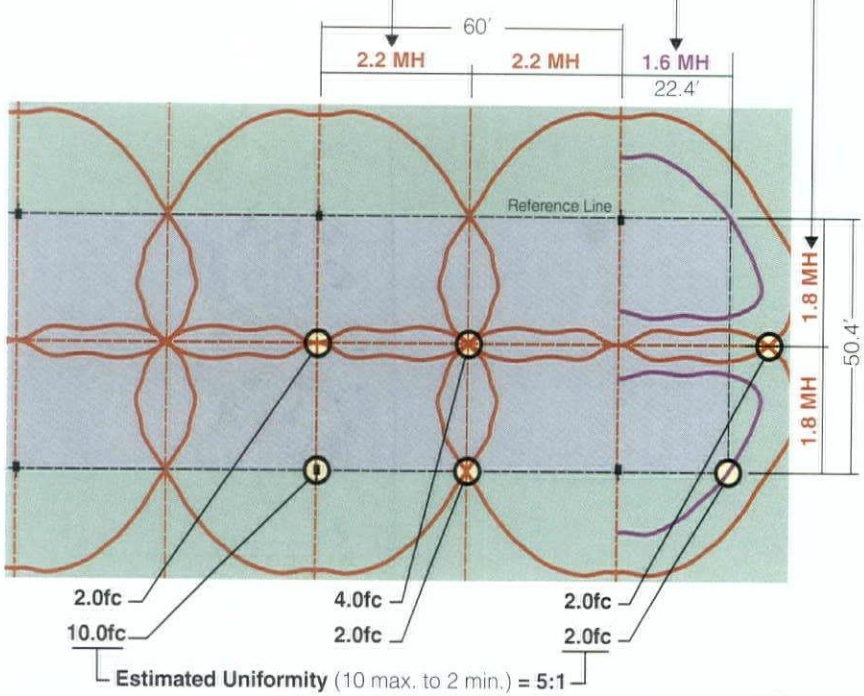


figure 11.2

ESTIMATING MAXIMUM SPACING

During the Schematic Design phase of a project, rough luminaire layouts can be created using isofootcandle plots.

EXAMPLE

This example assumes a desired **Minimum Initial Illuminance of 2.0fc,** using luminaires mounted on 14' poles.

To estimate a fixture layout - start from the perimeter, where the **2.0fc** isofootcandle trace crosses the Reference Line, to establish the maximum single fixture distance to the site perimeter (**1.6 MH**, figure 11.1).

In order to attain the minimum illuminance (2.0fc) between fixtures, the 1.0fc traces of two fixtures must intersect at the site perimeter and interior. Therefore, lateral spacing is determined by where the 1.0fc trace intersects the Reference Line (**2.2 MH**), and maximum forward spacing is identified where the lateral spacing line intersects the 1.0fc trace on the street side of the luminaire (**1.8 MH**). These two dimensions indicate the mid-points between luminaires, in Mounting Heights.

Multiplying these **M**ounting **H**eight dimensions by the pole height (**14'**) defines the maximum luminaire spacings in both directions. In this example, **60'** (4.4 MH x 14') x **50.4'** (3.6 MH x 14').

APPROXIMATE ILLUMINANCES

By overlaying Isofootcandle Plots, a rough idea of illuminances can be accomplished by adding the values of each contour where they intersect (figure 11.2).

More accurate calculations (computer generated evaluations) will generally return levels higher than those achieved using this method, as smaller contributions from every adjacent luminaire would be included.

APPROXIMATE UNIFORMITY

Through observation of the overlapping of the Isofootcandle Plots, approximate uniformity can also be estimated (figure 11.2).

APPLICATION

Distribution Pattern Uses

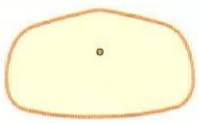
ESTIMATING MAXIMUM SPACING

Ideally, all light energy produced would be focused into desired "lighted" zones with no wasted energy being directed elsewhere. This would require an infinite array of distributions, with the ability to tune them to every site condition.

While this is not realistic, the combination of careful luminaire selection, mounting height, and luminaire placement, can produce very efficient designs, using just four basic distribution patterns.

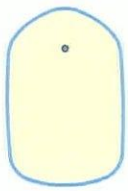
For each of the basic distributions, variations such as range and the characteristics of horizontal vs. vertical lamp optics, produce additional choices. Further fine tuning can be attained with houseside shields and reflector orientation.

The example below (figure 14.1) shows how the combination of four basic distribution patterns are used to direct light energy into the lighted zones.



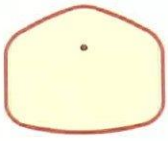
TYPE II

Type II distributions are well suited for narrow areas, running parallel to the luminaire's reference line, such as roadways, paths and driveways.



TYPE IV

Type IV distributions produce a deep forward throw, well suited for perimeter lighting.



TYPE III - HORIZONTAL LAMP
ASYMMETRIC - VERTICAL LAMP

Type III and Asymmetric distributions are well suited for site / area perimeters, wide roadways, and open areas.

TYPE V SQUARE - HORIZONTAL LAMP
SYMMETRIC SQUARE -VERTICAL LAMP

Type V and Symmetric distributions produce a wide, symmetrical pattern with excellent uniformity for large, open areas.

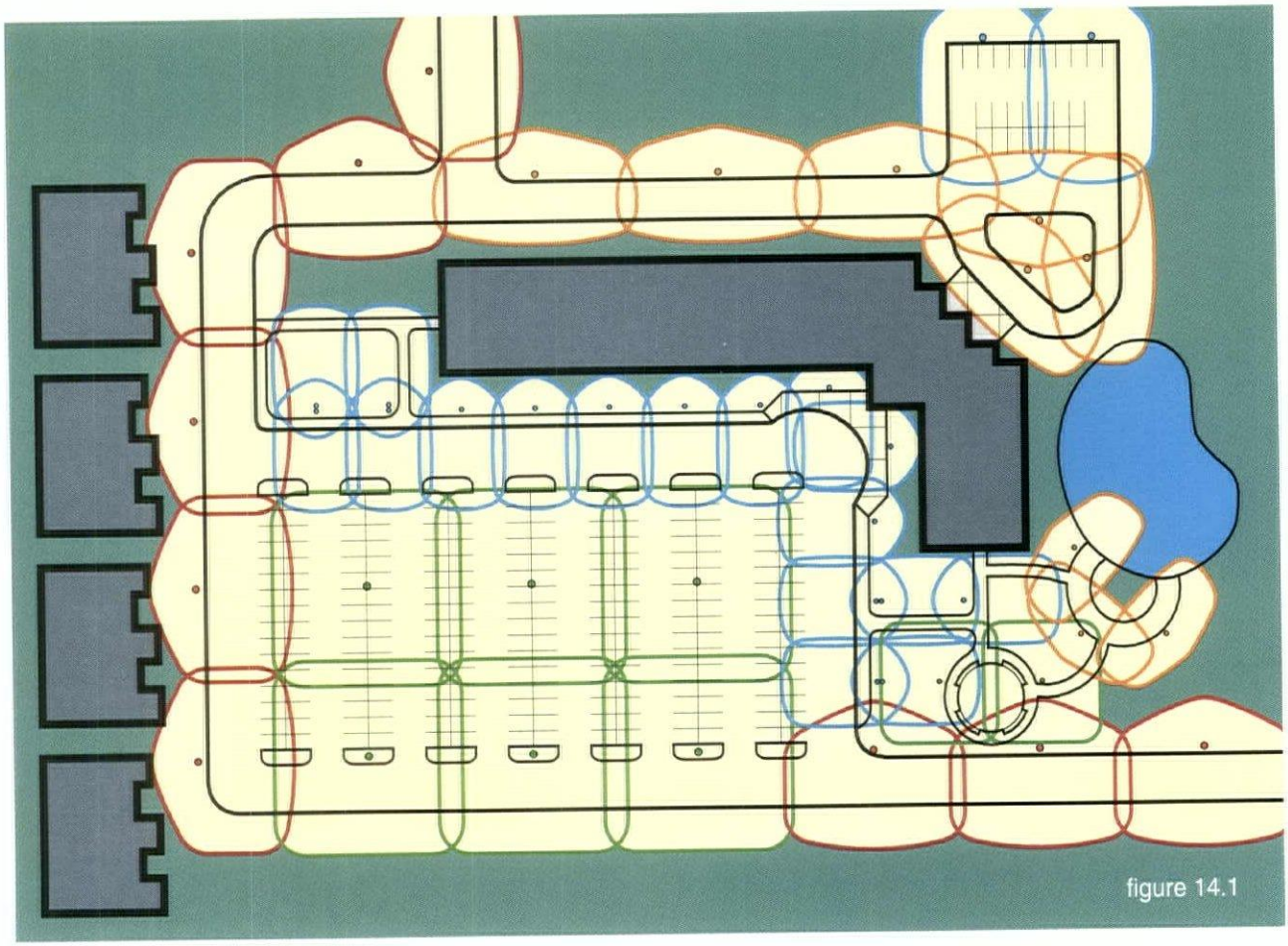
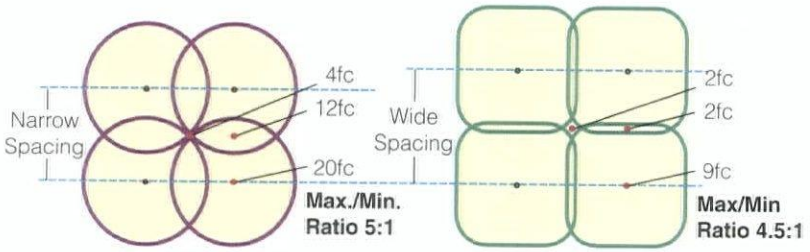


figure 14.1

Important Features for Fine-Tuning Designs



TYPICAL ROUND PATTERN OVERLAP

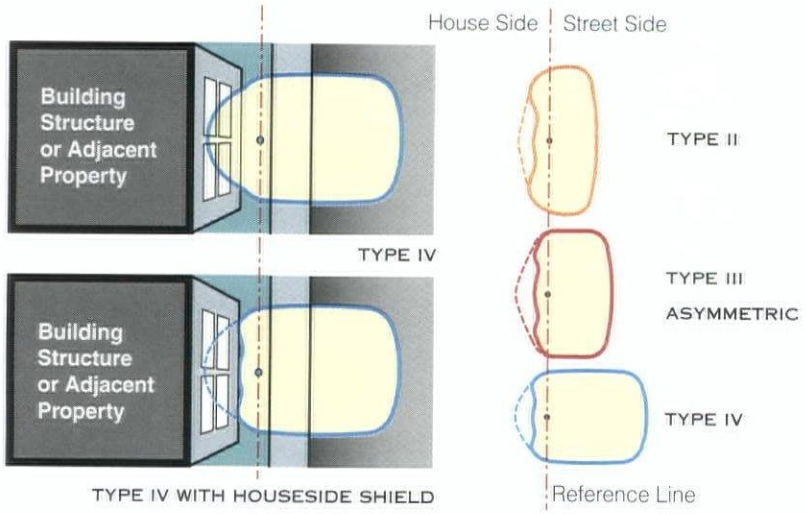
Poor diagonal overlap requires tighter pole spacing to maintain acceptable uniformity.

TYPE V SQUARE PATTERN OVERLAP

Improved diagonal overlap allows wider pole spacing while maintaining excellent uniformity.

SQUARE VS. ROUND DISTRIBUTION

For large areas, symmetric distributions provide maximum pole spacing in both lateral and longitudinal directions. Round distributions, however, do not reach well diagonally between pole locations, reducing uniformity and requiring shorter distances between luminaires. Kim square distribution patterns are specifically engineered to maximize pole spacing by improving uniformity diagonally between fixture locations.



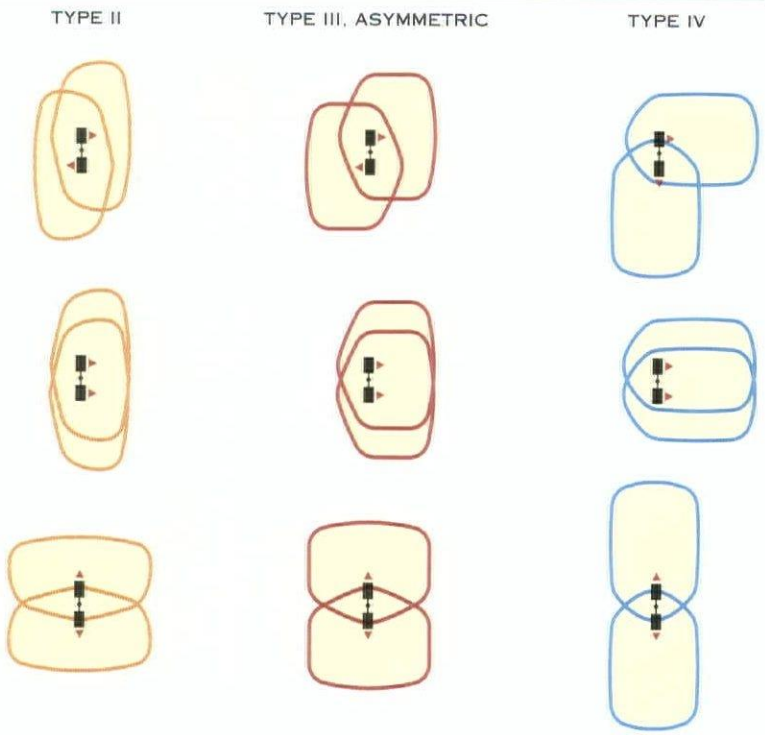
TYPE IV WITH HOUSESIDE SHIELD

HOUSESIDE SHIELDS

When luminaires are located close to structures, or areas where the illumination emitted on the houseside of the reference line is objectionable, houseside shields offer additional control.

These devices "trim" light emitted by the lamp, as well as light reflected from within the optical system. These are applied to Type II, Type III and Type IV (horizontal lamp) and Asymmetric (vertical lamp) optical systems only.

Houseside shields are not applied to Type V or Symmetric optical systems, as they will not function properly.



REFLECTOR ORIENTATION / ROTATABLE OPTICS

Orientation of luminaires is often controlled by available pole locations and product aesthetic design. The luminaire head, arm or yoke may dictate an orientation that varies from the desired optical orientation.

The ability to rotate optical systems provides a high degree of flexibility to tailor luminaire performance to specific applications, while maintaining aesthetic continuity of the luminaires used.

The combination of optical distributions in multiple luminaire applications produces additional unique "footprints," creating customized performance and/or increased illumination levels to suit a very wide range of needs.

The illustrations shown at left are just a few examples based on a simple twin mounting arrangement.

OPTICAL SYSTEM DESIGN

Lamp and Reflector System Integration

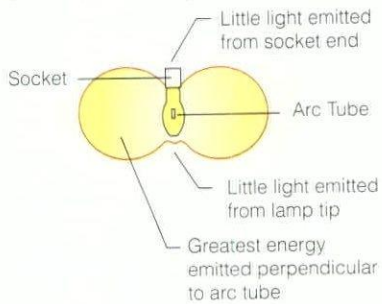
OPTICAL DESIGN

The function of an optical system is to direct light energy emitted by the lamp into desirable luminous zones. This can be accomplished by reflection, diffusion, baffling, refraction, or transmission through a lens.

Lamp placement also plays a significant role in determining optical system performance. Lamps placed higher in reflector systems produce narrower distributions with very sharp cutoff control, while lamps placed lower in reflector systems produce wider distributions with less precise cutoff.

LAMP CHARACTERISTICS

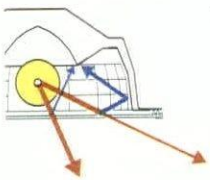
Clear envelope H.I.D. sources do not produce significant output from the lamp ends (socket and bulb tip). This characteristic has a significant impact on optical system design.



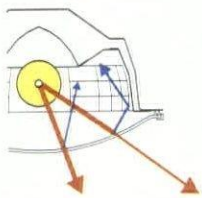
Lamp orientation and the design of reflector components use these characteristics to achieve the greatest end result.

LENS EFFECTS

As light strikes the surface of a flat lens, some portion is reflected back into the optical system. This is most apparent at shallow incident angles and impacts the ability of an optical system to spread light horizontally.

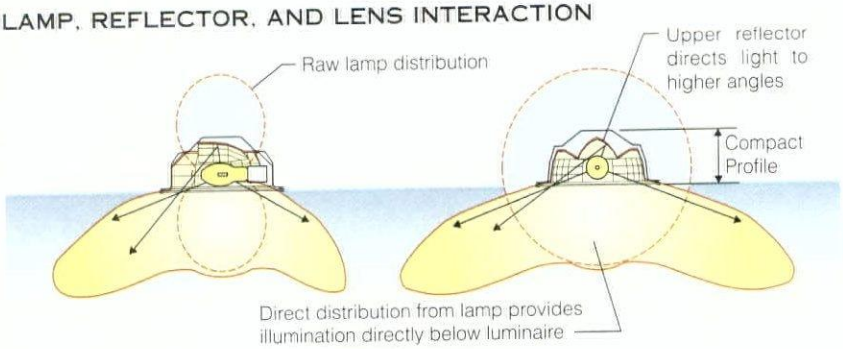


Flat lens surfaces can produce undesirable inter-reflections at shallow incident light angles.

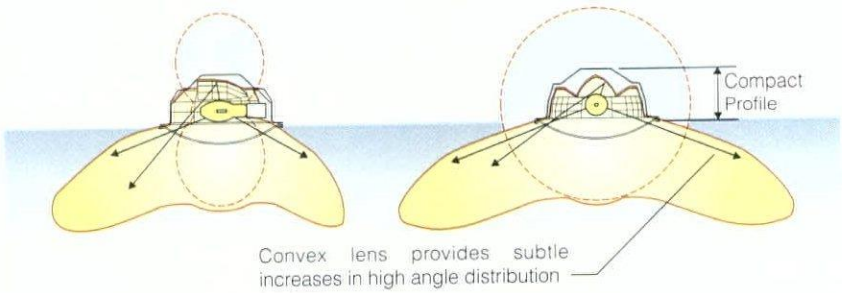


Convex lens reduces inter-reflections, improving luminaire efficiency at high distribution angles.

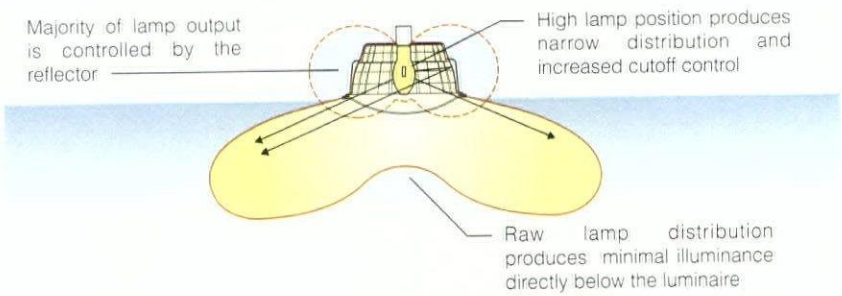
LAMP, REFLECTOR, AND LENS INTERACTION



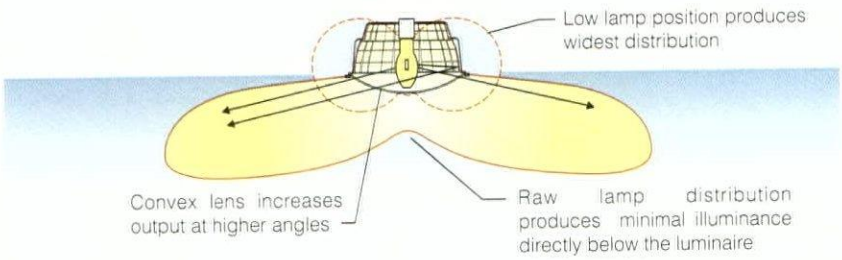
HORIZONTAL LAMP WITH FLAT LENS is well suited for asymmetric distributions with very sharp cutoff control.



HORIZONTAL LAMP WITH CONVEX LENS is well suited for asymmetric distributions with good cutoff control, where increased lens presence is desirable. A subtle improvement in uniformity is also realized.

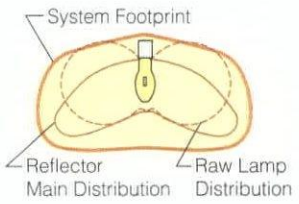


HIGH VERTICAL LAMP POSITION WITH CONVEX LENS is well suited for narrow symmetric distributions with sharp cutoff control.

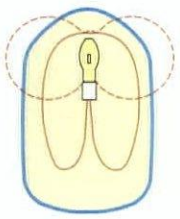


LOW VERTICAL LAMP POSITION WITH CONVEX LENS is well suited for wide symmetric distributions.

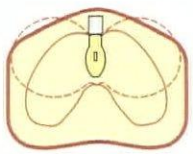
Design Considerations



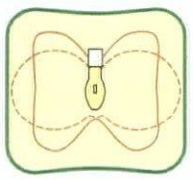
TYPE II - HORIZONTAL LAMP



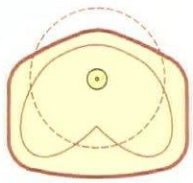
TYPE IV - HORIZONTAL LAMP



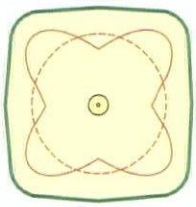
TYPE III - HORIZONTAL LAMP



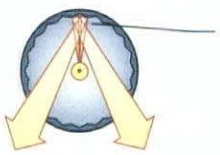
TYPE V SQUARE - HORIZONTAL LAMP



ASYMMETRIC - VERTICAL LAMP



SYMMETRIC SQUARE - VERTICAL LAMP



SPLIT-BEAM OPTICAL DESIGN
Vertical lamp reflector design redirects light energy away from the arc tube center by "splitting" distribution using reflector facets.

ORIENTATION

Using the lamp's natural distribution to its greatest advantage produces the most effective optical designs. In plan view, the horizontal lamp orientation produces asymmetric lateral distribution, while vertical lamp orientation produces a strong symmetric pattern. Reflector designs that enhance these characteristics produce the most efficient results.

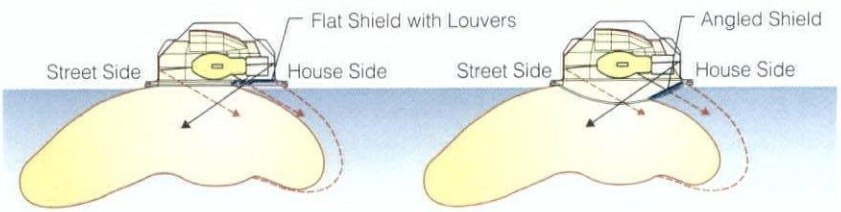
HORIZONTAL LAMP ORIENTATION

Horizontal lamp orientation provides the greatest control over lateral distribution. The normal lamp distribution is very well suited for asymmetric as well as square symmetric distribution. Horizontal lamp orientation produces relatively small arc tube exposure to high distribution angles. This produces a superior cutoff characteristic.

VERTICAL LAMP ORIENTATION

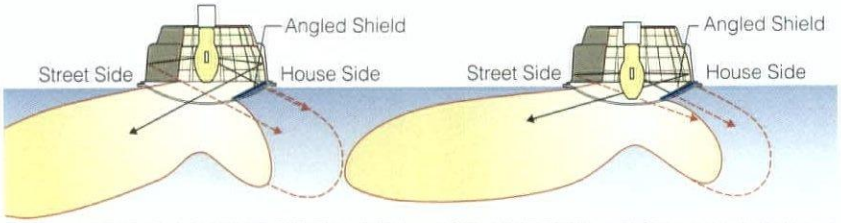
Vertical lamp orientation subjects the greatest portion of the lamp's output to control by the reflector system, producing optimum vertical distribution control. This orientation provides less control over lateral output, favoring symmetric distribution patterns. Vertical lamp orientation also takes advantage of the higher lumen output produced by a vertical arc tube positioning.

Split-Beam optical features produce the optimum optical system performance by reducing energy being redirected through the arc tube and lamp envelope. This also reduces damaging arc tube voltage rise in High Pressure Sodium sources.



HORIZONTAL LAMP WITH FLAT LENS: Least effective shielding

HORIZONTAL LAMP WITH CONVEX LENS: Effective shielding



HIGH VERTICAL LAMP POSITION WITH CONVEX LENS: Most effective shielding

LOW VERTICAL LAMP POSITION WITH CONVEX LENS: Very effective shielding

HOUSESIDE SHIELDS

The effects of lamp orientation and lens configuration on houseside shields are dramatic.

Main reflector distribution, street-side reflector brightness, and direct lamp visibility are factors that determine the effectiveness of houseside shields in reducing unwanted brightness on the house-side of the optical system.

Horizontal lamp orientation presents the greatest challenge in designing effective shielding. Convex lenses allow more effective control, as the shielding device is able to better control direct arc tube brightness. Vertical lamp orientation provides even greater control, as the arc tube is already deeper in the optical system.

REFLECTOR MECHANICAL DESIGN

General Methods of Construction

REFLECTOR CONSTRUCTION

Reflectors can be constructed using several methods: hydroforming, stamping, spinning, segmented strips and fabrication. The greatest difference between methods lies in how the reflective surfaces are finished and how precise the reflector elements are shaped and held in place.

Hydroforming, stamping, and spinning begin from raw, unfinished sheet metal, which is formed, then finished in one piece. The material used in these methods often compromises reflectivity to accommodate forming and finishing of the component. The shape of the reflector segments, corner radii and surface texture are also affected by these forms of manufacture, at the cost of performance.

Pre-finished optical reflector sheet offers much higher reflectivity than any post-form finishing. The variety of reflective qualities and surface textures produces the greatest level of design control. These materials are alloyed to improve reflective qualities and are finished to very tight tolerances, using computer controlled machine processes. The pre-finished surface, however, cannot be hydroformed, spun or stamped, as this destroys the reflective qualities and durability of the material.

Reflectors made from pre-finished reflector materials must be carefully formed and fastened to create an optical assembly.

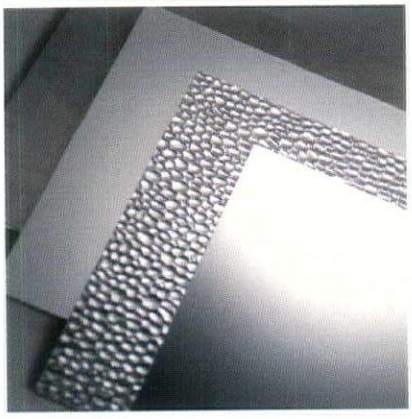
Strip segment reflector assemblies utilize pre-finished lighting sheet, cut into strips, break formed and riveted along a single edge to a lightweight backing pan. While inexpensive to manufacture, these assemblies can easily be distorted during regular maintenance.

FABRICATED CONSTRUCTION

Fabricated optical systems utilize pre-finished, interlocking reflector elements that are fastened by tabs and rivets to a rigid frame. These systems offer high levels of repeatability in manufacturing with accurate placement of reflector elements. Fabricated systems are durable and able to withstand regular maintenance.

HYDROFORMING, STAMPING, OR SPINNING

Reflectors created with these forming methods require the addition of draft-angles for tool release and large corner radii. These requirements often result in a compromise to optical design. Final finishing of these components may suffer unevenness in corners and bends. While producing consistent shape and allowing easy scaling of the optical chamber, these forming methods do not offer the precision of pre-finished lighting sheet. These forming methods are well suited to small scale optical systems, where compact design is more critical than optimum output.

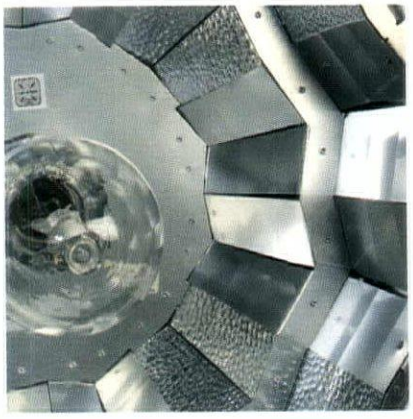


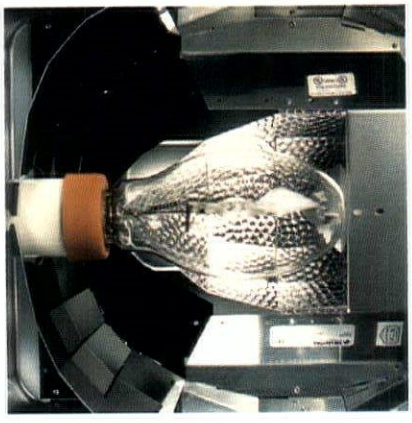
PRE-FINISHED LIGHTING SHEET

Pre-finished optical sheet materials offer the most precise surface finish, optical quality, surface durability and consistency. These materials are alloyed and finished specifically to produce the reflective qualities. Reflectivity can be as high as 98%, with optical clarity near that of scientific first-surface mirrors. The availability of a wide range of finishes (specular to diffuse) and surface textures (flat to heavily dimpled), provides the opportunity to create very precise optical systems, not possible with other forming methods.

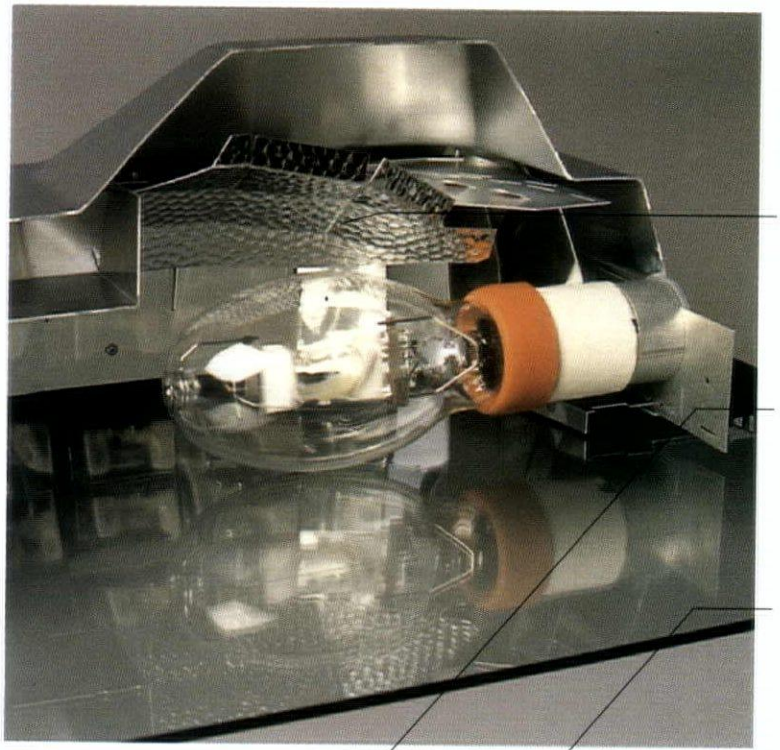
FABRICATED CONSTRUCTION

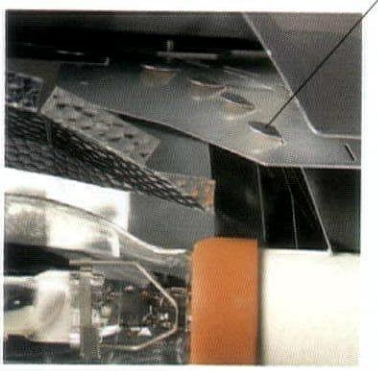
Using a combination of pre-finished materials, formed, interlocked and riveted to a rigid frame, this method of construction creates a robust optical system. Each reflector element is held firmly and precisely in place. The three dimensional attributes of this design also increase efficiency by controlling a larger portion of lamp output. These systems are tough enough to be cleaned and will withstand years of regular maintenance with no degradation of performance or precision.

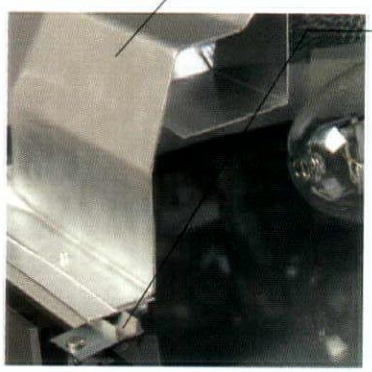




Fabricated Construction Features







PREMIUM MATERIALS

Use of the pre-finished reflector materials provides the most effective choice of reflector system design. Reflector surfaces should be protected by plastic film throughout the manufacturing and assembly process.

CLASS A TOOL TOLERANCES

All tools used to form the optical components should be Class A, producing the sharpest possible bend radii, which eliminates undesirable inter-reflection caused by soft or large radius corners in an optical system.

FASTENING

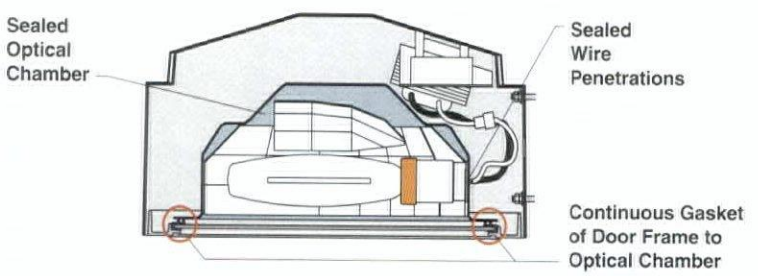
All reflector elements should be secured by tabbing into the carrier frame and adjacent elements, then riveted to provide a permanent attachment. One-way fitments assure consistency in fabrication and resistance to deformation during maintenance.

RIGID FRAME

Reflectors should be constructed using rigid frames. Die-cast, spun, or hydroformed, to create the foundation for the optical components. Frames should be finished by chemical etching or anodizing for corrosion resistance.

PURE SILICONE GASKETING

Premium molded gasket material will produce the optimum seal and eliminate out-gassing, which can fog or haze the reflector system and lens. Silicone also has the highest memory retention for a repeatable seal after every lamping. All lens frame gaskets should be molded in one piece, or extruded with the ends fused to produce a continuous loop, to eliminate gaps that allow intrusion of foreign objects into the optical system.

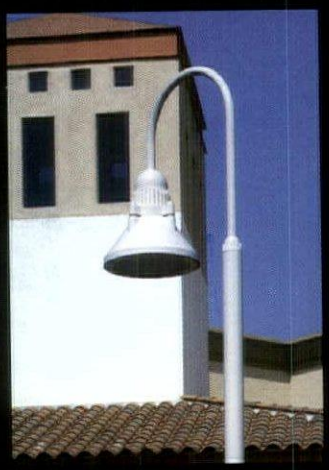


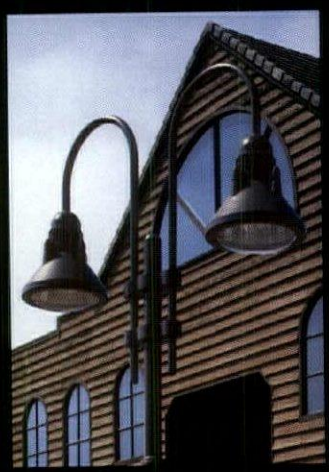
SEALED OPTICAL CHAMBER

Sealing the optical chamber inside and out eliminates intrusion of foreign material, from all other components and cavities. The optical system should be sealed against the lens or housing and held in place by a rigid door frame. All other penetrations, for wire or fasteners, should be sealed. This completely eliminates penetration of contaminants.

FOOTNOTES:

1. ITL Reports using IES guidelines consider any crossing of the identified boundaries as definition of overall Type, regardless of its impact or significance to applied performance. Classifications indicated do not consider minor deviations in classification of Type shown.
2. The "Very Short Range" identification is not an IES standard definition, but is used by ITL to identify distributions with ranges inside the 1.0 MH allowed in the "Short Range" definition established.
3. Information shown is for illustrative purposes only and does not represent a specific luminaire's performance.
4. Definition is extracted from IES Lighting Handbook, 8th edition.
5. Definition has not been identified by the IES at this time. Definition shown is based on Kim Lighting research and development efforts and engineering of optical systems to improve applied performance.
6. Distribution may be classified by ITL, using IES standard practices, as a Type IV distribution, due to a small portion of the 50% isocandela trace falling beyond the 2.75 MH line. This aberration in classification methodology conflicts with luminaire applied performance. Classification indicated more accurately represents actual luminaire usage.





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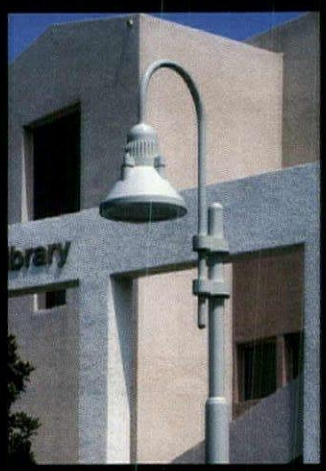

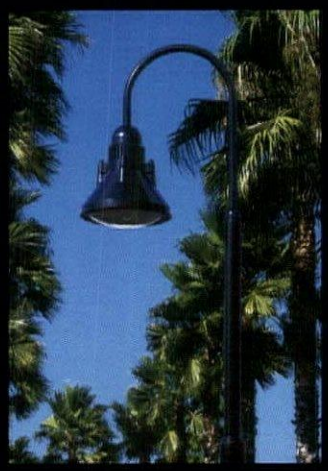

KIM LIGHTING

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www.kimlighting.com

LIGHTING THE AUTOMATED WORKPLACE

BY FRED OBERKIRCHER, LC, IESNA, IALD

"... Statistics indicate that less than 10 percent of the 1,000 largest industrial companies in the United States have fully implemented advanced office technologies. Word processors, the vanguard of office automation, have replaced fewer than 10 percent of the typewriters in 500 of the largest industrial companies. But, on the other hand, consider that the Wall Street Journal *predicts an awesome 10 million VDTs will be in use by 1985. By 1990, between 40 and 50 percent of all American workers will be using electronic office terminal equipment, and within the next 10 years after that, the 380,000 micro-based systems presently used in companies with more than 100 employees are expected to increase to more than 9 million."* —"Designing the Automated Office," Pulgram and Stonis (1984)

The year 1964 was not that long ago. In fact, the Illuminating Engineering Society of North America (IESNA) took its first stab at defining criteria for office lighting, "VDT Lighting RP-24," and by extension, the automated workplace in 1989. Yet, who among us thinks that the typewriter, especially a typewriter producing carbons, represents current technology? The term "personal computer" was not part of the common lexicon and the laptop was only on the distant horizon. For a culture caught up with current technology, recent history provides a valuable insight into the profound changes that have become our accepted way of living and doing business.

In 1984, the automated workplace was comprised mostly of VDTs and keyboards connected to main frame computers. Images were displayed on highly curved, highly reflective glass, and the images themselves were primarily green text on a black background (it's a new century, time to forget about DOS!). Educators and advertising agencies typically utilized Apple technology (black characters on a white screen), but were considered far enough out of the mainstream that this technology drew not a single mention in the Pulgram book and hardly a mention in RP-24. The remainder of the automated office consisted of a limited number of printers and copy machines—usually relegated to storage rooms because of the noise—and phones. All of this tied together with extensive wiring and housed in an envelope that had not changed much since the '50s.

THE DYNAMIC WORKPLACE

One word can be used to describe the current workplace—"dynamic." Technology has made the world the workplace. Work is being done via laptop computers and cell phones in every conceivable location. Clerks use computers to run transactions in every place of business. Kindergarten students gather around desktop computers, while elementary schools find fourth and fifth graders using laptops on the floor. Warehouse workers bar scan packages for delivery and check inventory on a computer, while industrial workers enter data into a computer milling machine. The industrial world has become an automated workplace.

The "traditional" office is seeing similar changes. ADA (American with Disabilities Act) and Universal Design are now commonly understood terms as concern over worker health—both mental and physical—has lead to an increased awareness of the dangers of repetitive motions and procedures. Worksurfaces as well as chairs now adjust to permit the worker greater ranges of motion. A workstation may serve more than one person as companies implement "hoteling" for employees who spend a significant amount of their time outside of the office. The concept of "teaming" has revolutionized the furniture industry as companies seek to organize people for a specific assignment that requires furniture, technology and communications.

The computer has drastically altered the location of work itself. Millions now work entirely or in part at home—a condition that has proved advantageous for both employer and employee. However, there is increasing evidence that, from an ergonomic point of view, the "home office" may be the least functional of all workplaces. Insurance companies and OSHA are both beginning to look closely at home offices as claims for injuries arise.

THE LIGHTING DILEMMA

"When we think about lighting in the workplace, the first thing that comes to mind is the obvious physical effect it has on us. Inappropriate lighting can lead to a host of problems, ranging from eyestrain to serious musculoskeletal injuries. In fact, more than two-thirds of those responding to a Steelcase Workplace Survey indicated that they had experienced serious physical problems associated with a poorly lit workplace. This isn't new. These responses are consistent with what people have been saying in studies and surveys for years." —"Seeing the Difference, The Importance of Quality Lighting in the Workplace," Steelcase, 1999

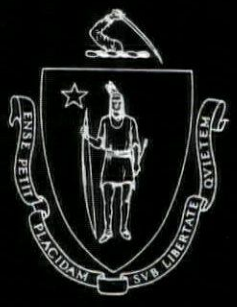
(Continued on page 72)

OFFICIAL ANNOUNCEMENT

Code Change to Affect All Commercial Construction in Massachusetts

The Massachusetts Board of Building Regulations and Standards (BBRS) has adopted NEW ENERGY CONSERVATION REQUIREMENTS into the State Building Code (780 CMR, Chapter 13.) The new provisions will take effect on JANUARY 1, 2001, and will cover all new commercial and high-rise residential construction in the state.

BBRS, in cooperation with the U.S. Department of Energy, the Massachusetts Division of Energy Resources, and the state's gas and electric utilities, will be offering **FREE SEMINARS** on the new Energy Code throughout 2000. Lighting designers, architects, engineers, contractors, and others are encouraged to attend. The following schedule is for LIGHTING/POWER seminars. (Sessions on Envelope and on HVAC requirements will also be offered.) Registration is required at least one week in advance. Please register by e-mail at www.state.ma.us/bbrs/register.htm or call 617-951-1433 x323. AM sessions run from 8:30 to 12:00, PM sessions from 1:00 to 4:30. Directions will be sent with confirmation.



FREE LIGHTING/POWER SEMINARS

CITY	DATE	TIME
Peabody	2/2/00	8:30 AM
Boston	2/10/00	1:00 PM
Andover	2/23/00	8:30 AM
Northborough	3/2/00	1:00 PM
Swansea	3/15/00	8:30 AM
West Springfield	3/21/00	1:00 PM
Cambridge	4/6/00	8:30 AM
Boston	4/12/00	1:00 PM
Northampton	4/26/00	8:30 AM
Needham	5/4/00	1:00 PM
Cambridge	5/16/00	8:30 AM
Boston	5/24/00	1:00 PM
Northborough	6/7/00	8:30 AM
Boston	6/13/00	1:00 PM
Newburyport	6/27/00	8:30 AM
Andover	7/12/00	1:00 PM
Wareham	7/26/00	8:30 AM
Yarmouth	8/1/00	1:00 PM
Cambridge	8/22/00	8:30 AM
Northborough	9/12/00	1:00 PM
Boston	9/26/00	8:30 AM
Billerica	10/2/00	1:00 PM
West Springfield	10/18/00	8:30 AM
Boston	10/24/00	1:00 PM
Boston	11/9/00	8:30 AM
Andover	11/15/00	1:00 PM
Boston	12/6/00	8:30 AM

(Continued from page 70)

From a location point of view, the theory was simple (see Figure 1). In order to avoid the most insidious problem in the automated office (glare on the computer screen), overhead lighting fixtures should be placed on either side of the computer and slightly behind. Additionally, the luminance of the fixture itself should be limited depending on its relative position to the screen (IESNA RP-1). Finally, if there was any window daylight, the computer should be placed at a 90-degree angle to the window.

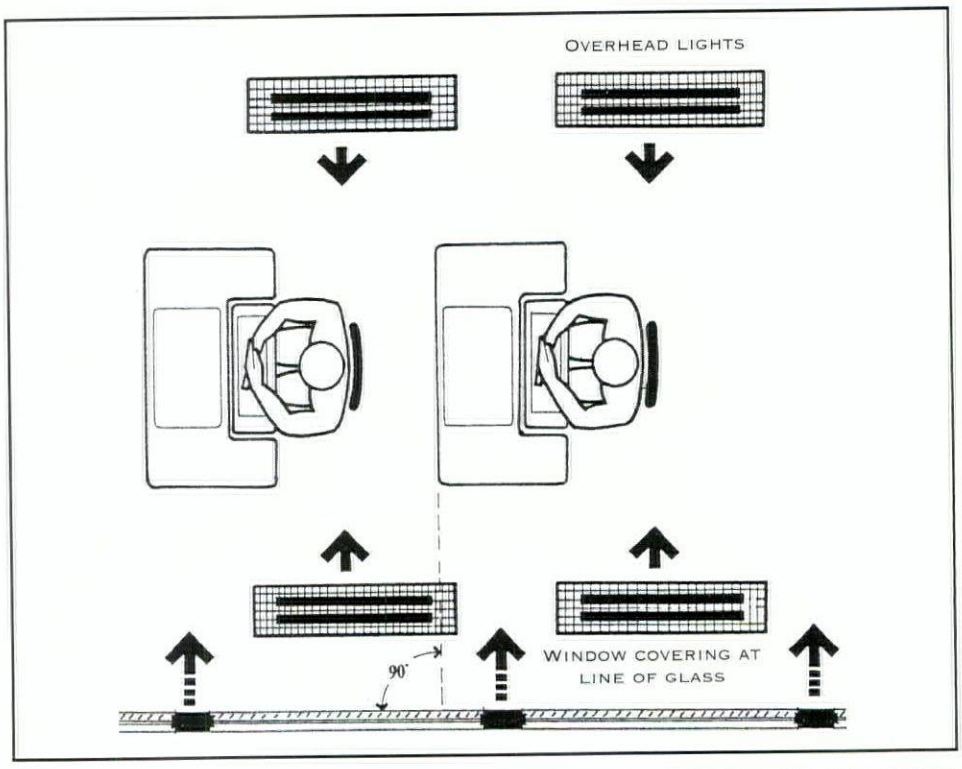


FIGURE 1—IN ORDER TO AVOID GLARE ON THE COMPUTER SCREEN, OVERHEAD LIGHTING FIXTURES SHOULD BE PLACED ON EITHER SIDE OF THE COMPUTER AND SLIGHTLY BEHIND.

Compounding the problem of glare was an aging workforce. Workers beyond the age of 40 found it increasingly necessary to use reading glasses (in either their traditional or contact form). For individuals with normal vision, the addition of reading often required changing head positions as the individual moved from a focal distance that required the correction to one that didn't. This movement increased the possibility of finding glare in the field of view. For individuals with bi- or trifocals, an additional problem is added. In order to utilize the increased magnification, the individual would have to raise his/her head—in effect looking at the ceiling—to see type on the computer screen. Because of this awkward viewing position, the brightness of the ceiling and upper walls will be even more of an important design consideration.

In a corporate world that expected its workers to remain fixed at a fixed location, the theory worked reasonably well. But as the corporate world began to change toward greater variety of both worker position and location, the theory needed to change also.

LIGHTING QUALITY ISSUES

The chair of the IESNA's Quality of the Visual Environment Committee (QVE), Naomi Miller, in conjunction with a parallel committee from the IALD, the Metrics of Quality Committee (MOQ), has been leading a movement toward a new understanding of the way lighting is perceived and utilized. The goal is to identify the issues that impact the design of any lighted space and to deal with that space in a holistic manner. Work has progressed to the point that the upcoming 9th edition of the *IESNA Lighting Handbook* will describe these issues in Chapter 10. Listed below are the Lighting Quality Issues that should be considered for any commercial application. Depending upon design and client considerations, specific issues will vary in their importance.

- √ Source/task/eye geometry
- √ Color appearance
- √ Flicker
- √ Direct glare
- √ Reflected glare
- √ Luminance of room surfaces
- √ Light distribution on room surfaces
- √ Light distribution on the task plane
- √ Modeling of faces and objects
- √ Sparkle/desirable reflected highlights
- √ Points of interest
- √ Surface characteristics of room or area
- √ Daylighting integration and control
- √ Appearance of space and luminaires
- √ Shadows
- √ System control and flexibility
- √ Horizontal illumination
- √ Vertical illumination

SOME NEW APPROACHES

"Understanding the importance of light quality is one thing but achieving it in your own environment is something else. To get there, you need to understand what it means to have quality lighting, and how to plan for it."
—"Seeing the Difference, The Importance of Quality Lighting in the Workplace," Steelcase, 1999

Following is a list of the top ten factors that a quality lighting solution should deliver for the automated workplace. It should:

1. Support the task at hand
2. Accommodate the individual
3. Integrate lighting controls
4. Be energy efficient and environmentally sensitive
5. Be maintainable and sustainable
6. Be well integrated with the architecture
7. Reinforce an organization's image and culture
8. Consider both initial and lifecycle costs
9. Integrate natural light
10. Be re-evaluated periodically

While none of these factors, individually, would constitute a new approach, when you run through the entire list and then remind yourself that the list has been developed by a furniture manufacturer, the list takes on heightened importance. Quality office lighting must be the result of an integrated approach and process, one that includes all of the stakeholders in a new design project.

With all this in mind, what follows are a few areas where many of the stakeholders concerned with lighting quality for the automated office have decided to put forth effort. None of these is a "solution" in and of itself, but when combined, they begin to suggest some interesting design directions for lighting the automated office.

LAYERING THE LIGHT

It should come as no surprise that a highly dynamic office environment would require a lighting solution that was as dynamic as the environment itself. This said, it should also be obvious that any singular lighting solution would fail to meet several of the above listed factors. Thus, successful lighting for the automated office should incorporate several levels or layers of lighting, combinations of which would more fully meet the diverse needs of the workers. This concept is not new. Combining an ambient lighting system with a task lighting system has been advocated for years. Combinations of ceiling-mounted downlighting, ceiling-mounted indirect lighting, furniture-mounted uplighting, panel-mounted task lighting, furniture-mounted task lighting and movable task lighting have all been tried in varying combinations.

Historically, however, task lighting packages—especially those that dwelt with movable task lighting—have been especially susceptible to either direct budget cuts, or the more subtle kind where the client cut the task lighting with the "promise" that it would be added later. Recent offerings from companies such as Knoll and Steelcase are attempting to mitigate these problems by providing task lighting fixtures

that have high-quality photometrics and are aesthetically compatible with current office furnishings—thus ensuring that they remain in the design package.

INDIVIDUAL LIGHTING CONTROL

Whether it's adjusting the height of a desktop, or deciding where to hold the next team meeting, office workers share more control of their work environment than ever before. The reasons may be economic or altruistic, but the reality is that today's companies are more willing than ever to recognize that people are individual in their work needs and are more willing than ever to provide them the tools for that individuality.

Companies that purchased Lutron's "Spacer" hand-held individual lighting control report both increased worker satisfaction and reduced energy costs. Steelcase's new "Canopy" fluorescent task lighting fixture has a dimming control permitting each individual to control the relationship of ambient and task lighting for their workstation. How soon will it be before a company combines these two systems and permits their employees almost total control of their workstation lighting?

COMPUTER SCREEN TEST

In 1999, the IESNA Office Lighting Committee organized a workshop to study the interaction between three different types of computer screens and ten recessed parabolic fixtures. This study has pointed to the fact that the computer screen itself is a very important factor in the acceptability of a lighting system for VDT use. In summarizing the work, Naomi Miller, chair of the IESNA's Quality of the Visual Environment Committee (QVE), provided the following:

"The acceptability of a recessed parabolic louver luminaire for VDT use seems to be very strongly related to the type of computer screen being used and to the photometric intensity of the luminaire toward the computer screen. For offices with poor computer screens or in offices where the screen quality is unknown, the Office Lighting Committee is considering using a maximum limit on the luminaire's intensity (in candelas) above 55 degrees from nadir for VDT-intensive spaces and above 65 degrees from nadir for normal office spaces.

In our tests, an active matrix LCD screen in negative contrast mode (black characters on white background) proved to provide good screen visibility even under excessively bright luminaires. It is important for designers to know that when good-quality screens are used, the lighting system is much less critical. Computer screens that are bright (high luminance display), and have either anti-reflection coatings and/or a good quality diffuse finish that preserves display image clarity, are the best 'lighting' investment a company can make."

THE MAN/MACHINE INTERFACE

Technology rushes along, seemingly, at its own pace. As technology changes, so too must the spaces that house that technology. Lighting exists at the delicate interface between the machines of technology and the people that utilize those machines. People must use the machines, but the machines always bring along their own unique idiosyncrasies that impact the relationship. Design, and by extension lighting design, must constantly react to the man/machine interface. As the interface is more completely understood, the design result produces a better fit. And that fit, is what quality lighting is all about. ■

Fred Oberkircher, LC, IESNA, IALD is associate professor at Texas Christian University and director of the TCU Center for Lighting Education.

NCQLP QUIZ

1. According to the Steelcase Workplace Survey, what percentage of those responding indicated that they had experienced serious physical problems associated with a poorly lit workplace?

A. 47 percent
B. 57 percent
C. 67 percent
D. 77 percent

2. For an individual with bifocals, an additional area of brightness concern is:

A. Contrast between the screen and the immediate surround
B. Contrast between the screen and adjacent windows
C. Contrast between the screen and the keyboard
D. Upper walls and ceiling

3. Lighting Quality Issues:

A. Must be dealt with in numerical order
B. Impact the design of any lighted space
C. Remain the same for all projects
D. Provide a process for lighting design

4. Lighting that specifically relates to the use of computers is essential in which of the following spaces?

A. Education
B. Office
C. Retail
D. All of the above

5. Which of the following is not a factor identified by Steelcase as being important to a quality lighting solution?

A. Fast track design
B. Lighting controls
C. Energy efficiency
D. Natural light

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.

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METAL HALIDE—ADVANCES & IMPROVEMENTS

BY DAVID HOUGHTON, PE, CONTRIBUTING EDITOR

Of all the lamps in the high-intensity discharge (HID) family, the metal halide family of lamps has the brightest future. These lamps offer much higher efficiency than mercury vapor lamps and better light quality than either mercury or sodium lamps. Metal halide lamps, however, have historically had limitations. They take up to five minutes to start and up to 20 minutes to restart after a power outage. They can only be dimmed to about 50 percent of full output (and generally don't save much energy when dimmed). The lamps can shift color erratically by as much as 400K, may fail by exploding, and emit significant amounts of ultraviolet (UV) radiation. Finally, metal halide lamps are fairly expensive because of their complex construction.

Nevertheless, for a bright, white point source of light, metal halide lamps are the best thing we've got. Recent technology advances are tackling the operating limitations and improving overall performance, which in turn creates new opportunities for specifiers.

More than any other lamp, metal halide lamps must be considered as a complete system—lamp, ballast, ignitor, fixture and controls that must work together to get the best performance. The halide lamp is a finely tuned device with precise doses of chemicals and carefully calibrated thermodynamics (see sidebar "How Halide Works"). "Every lamp is different," said Jerry Flauto, senior product specialist/HID at GE. "You have to design each one individually. They don't scale as easily as incandescents or fluorescents."

PULSE-START TECHNOLOGY

Lamp manufacturers are bringing pulse-start technology—already used in metal halide lamps 150W and smaller—to their entire product lines. The advantages of pulse-start are subtle but significant. In a conventional metal halide system—sometimes called "probe start"— there are three electrodes inside the arc tube (see Figure 1). To start the lamp, a spark is initiated across the short gap between the "probe electrode" and the operating electrode—like the spark plug of a car engine. The ions created by this spark then jump across the arc tube to start the lamp. A small bimetal switch pulls the probe out of the circuit as the lamp heats up.

In a pulse-start system, there is no starter electrode (see Figure 1). An ignitor sends a high-voltage pulse (about 3000 volts or so) across the main electrodes, kicking the lamp into operation.

"By eliminating the probe and bimetal switch-components that often caused the lamp to fail, we can

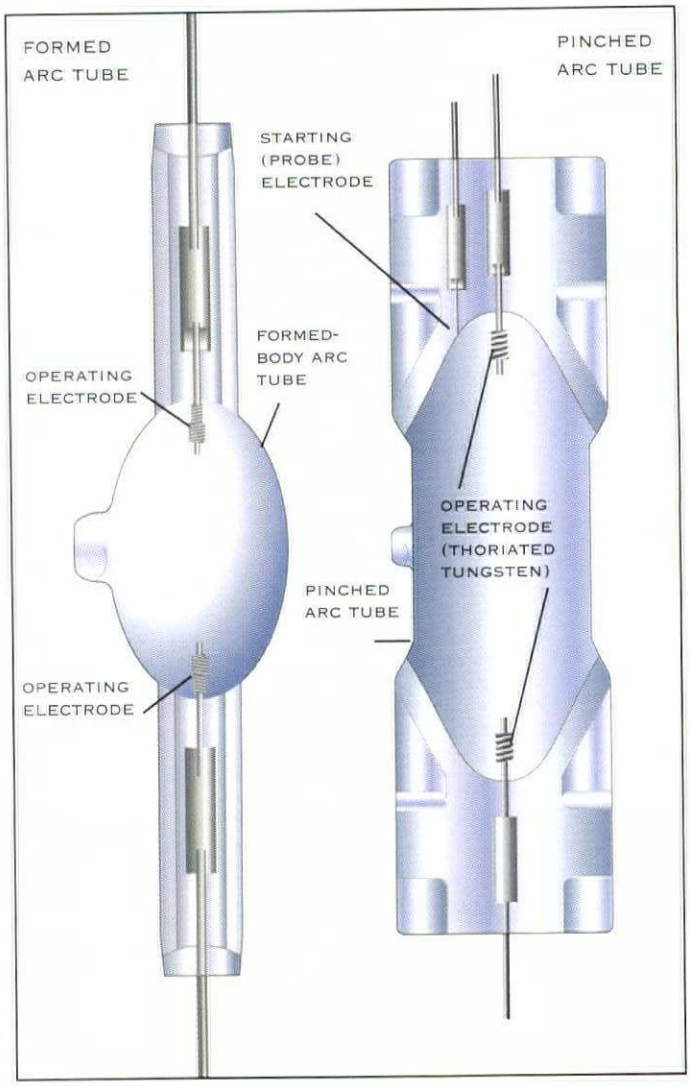


FIGURE 1
FORMED VS. PINCHED ARC TUBE

make metal halide lifetime nearly as long as high-pressure sodium," said Gary Smith, director of product management for Venture Lighting. Smith noted that pulse technology has boosted lifetime of mid-size halide lamps from 10,000 hours to 15,000 hours and that continuously burning 400W metal halide lamps can last up to 30,000 hours (about three and a half years).

Pulse starting also improves lumen maintenance, color stability, restrike time, lamp life and system efficiency. According to Venture, conventional systems with 400W lamps and 60W ballasts can be replaced by pulse-start systems using 320W lamps and 30W ballasts. Other substitutes for the widely used 400W halide probe-start systems include 360W pulse-start lamps. Jim LaPointe, HID group product manager at Osram Sylvania, sees the potential for significant energy savings in warehouse applications. "Across the country we're seeing lots of new warehouse spaces being built to service Internet companies," said LaPointe. "We've got a chance to light these more efficiently with the new metal halide technology."

ARC TUBE IMPROVEMENTS

Lamp designers have also been tinkering with the arc tube itself. The first breakthrough came a few years ago when Philips engineers borrowed a ceramic arc tube from a sodium lamp and stuck it into a metal halide lamp, creating the ceramic metal halide (CMH).

"We call them 'halogen killers' because their color is so good they can tackle retail applications like spots and tracks," said Bill Ryan, HID product manager at Philips. The other manufacturers soon followed suit.

"We're very excited about CMH," said GE's Jerry Flauto. "It gives us great color stability, good efficacy and long life." Today, most metal halides 150W and lower are available as CMH lamps.

The formed-body arc tube has been pioneered by lamp manufacturer Venture—a company that specializes in metal halide technology. While conventional arc tubes are made by pinching a tube of quartz glass, the formed-body tube is carefully blown from a hollow rod. "The formed body tube has a number of advantages," said Venture's Gary Smith. "It gives us more uniform geometry and a smaller, lighter arc tube. Because the tube has only one-third the mass of a conventional pinched tube, it heats and cools quickly, which makes for faster ignition and restrike." Smith also noted that the pulse-start revolution made the formed-body tube possible, since it would be difficult to insert a probe electrode into the new design.

ELECTRONIC BALLASTS

Like all arc lamps, metal halide lamps need a ballast to provide starting and running voltage to the lamp and to control the arc current. Traditional core and coil ballasts for metal halide lamps are relatively bulky and heavy. Several companies now offer solid-state electronic ballasts for metal halides that provide better performance in smaller, lighter packages. Electronic ballasts always use pulse-starting and are generally used for smaller metal halide systems (150W and below).

Delta Power Supply builds electronic metal halide ballasts that operate at 100kHz and above. "Starting an arc lamp is usually a destructive event," said Denny Beasley, VP of engineering for Delta, referring to the sputtering of electrode material that accompanies conventional startup. Beasley said that high-frequency ignition reduces electrode deposition on the arc tube wall, which gives much better lumen maintenance (90 percent at 15,000 hours, versus only 60-70 percent for conventional), better color stability, longer lamp life and the potential for near-instant strike and restrike.

An additional benefit is deeper dimming. "We can bring metal halides down to 33 percent of full output, while maintaining the efficiency of the lamp" said Beasley. Conventional ballasting can only dim metal halides to about 40-50 percent of full output, with a significant reduction in system efficiency.

Electronic ballast manufacturer Aromat takes a different approach. "We believe in solid-state ballasts, but we use a low-frequency square wave to avoid possible problems with acoustical resonance and electromagnetic interference," said Wayne Letwink, national sales manager for Aromat. Letwink noted that electronic ballast features such as compensating for changes in input voltage help solve problems such as color shift. "Together with CMH arc tubes, electronic ballasts have cut the color drift of metal halides from 1000K to about 100K. That's a major improvement, and that's why metal halides are now competitive for applications such as retail track lighting."

SEEING YELLOW

One key application for metal halide systems is outdoor lighting, where they often compete with high-pressure sodium (HPS) for use in streetlights, security lights and pedestrian-scale fixtures. These days, specifiers are shunning the yellowish sodium lamps in favor of the whiter light of metal halides, even though the former has a higher lumen-per-watt efficiency.

Lighting researchers are finding, however, that the blue-rich light of metal halides and fluorescent lamps provides better "seeability" under the low illumination levels of parking lot and roadway lighting (2 fc and less). Some observers don't need research findings to see which way the wind is blowing.

"I think a sociological change is underway—people just don't like yellow sodium light much anymore," said Philips' Bill Ryan, who has seen metal halide lamp sales rise relative to HPS sales. Jim LaPointe of Osram Sylvania noted that industry-wide, metal halide lamp sales are growing by 12 percent per year, while HPS sales are only growing by about four percent.

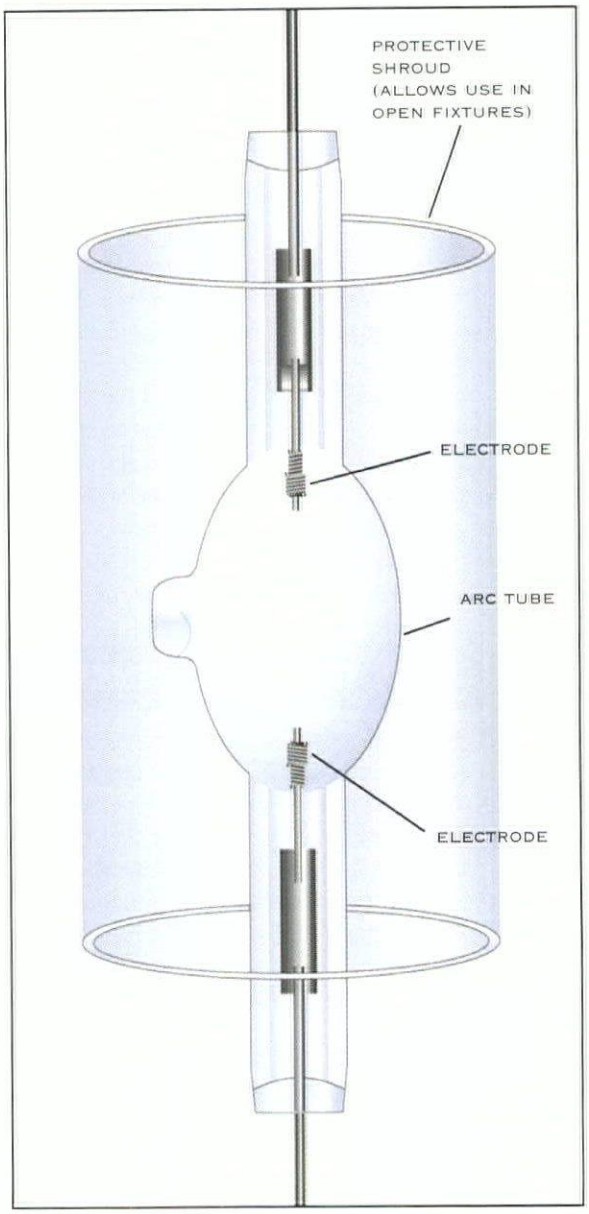


FIGURE 2
SHROUDED ARC TUBE

METAL HALIDE SAFETY

An unfortunate reality is that metal halide lamps have the potential to "fail non-passively" (that means explode). In such an event, hot chunks of the arc tube could come raining out of the fixture, which is why many halide fixtures include a tempered-glass or acrylic enclosure to contain any possible explosion.

Lamp manufacturers have tackled this problem by enclosing the arc tube with a protective glass shroud. These lamps carry an "O" designation (for Open fixtures). Figure 2 shows this type of lamp. Another lamp rating, the "S" lamp, does not include any protective shroud, but is technically allowable for use in open fixtures if operated according to certain parameters (mounted base up, turned off for at least 15 minutes each week, and group relamped at 70 percent of rated lifetime). There is some controversy about this lamp type. On their website, Venture noted that the insurance industry is concerned about the use of "S" lamps in open fixtures, and said "it is increasingly clear that the 'S' rating may become a liability to the metal halide lighting industry."

However, "The risk is very low if the operating guidelines are followed," said Jerry Flauto of GE.

HALIDE HOUSE?

A couple of years ago, manufacturers announced plans to build a "Metal Halide House" to demonstrate the flexibility and variety of halide sources and fixtures. However, the house has failed to materialize and primary sponsor Venture says that the plans have been scrubbed.

Some of the fixtures that were destined for the halide house are doing well, however. Venture's Micro-Sun product line currently consists of a torchiere and a table lamp, both illuminated by 68W metal halide lamps.

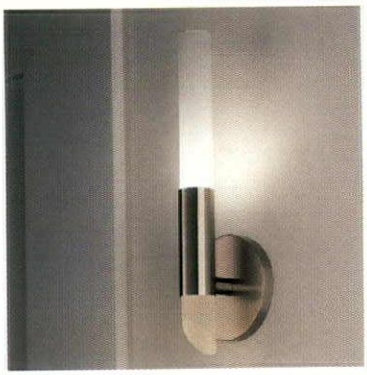
"Because we design and manufacture all parts of the Micro-Sun line—lamp, ballast and fixture—we can integrate the technology and create a product that works really well," said Venture's Gary Smith. One key to the product line is the solid-state ballast, which is small enough to fit in a table lamp base and quiet enough to operate in residential living rooms. ■

HOW HALIDE WORKS

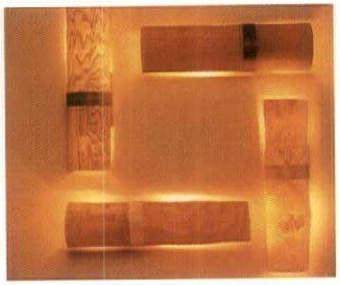
The core operating components of a typical metal halide lamp include three electrodes within an arc tube that contains mercury and other metals in iodide from. The arc tube is constructed to withstand the internal high temperatures and stresses of HID operation. The tube is enclosed in a borosilicate glass bulb that is also highly heat resistant. The entire assembly is capped by a base that is most often of screw-shell design, although medium bases are available for lamps operating on 100 or fewer watts, and mogul bases are featured on most high-wattage lamps.

When a metal halide lamp is activated, the ballast applies starting voltage to the three electrodes. Although electrical resistance is too high at this time to initiate an arc between the two main operating electrodes, the starting electrode is located near enough to one of the operating electrodes to initiate an arc between them. Metals are vaporized by this heating action and circulate through the arc tube.

As the arc produces more heat, more vaporized mercury and metallic halides enter the arc stream, reducing electrical resistance and increasing the flow of current. An arc is then initiated between the two main operating electrodes, further vaporizing metals and increasing pressure. As the amount of vaporized metal in the arc stream and pressure builds, mercury and metallic halide atoms collide with free electrons in the arc stream, producing radiant energy.



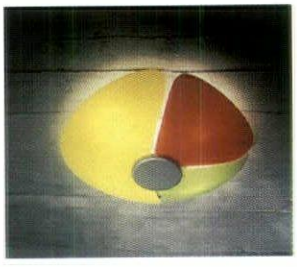
Boyd Lighting's Mercury wall sconce measures 13 7/8 in. high and 4 3/4 in. wide. Mercury I has a projection of 3 7/8 in. and Mercury III (shown), 3 1/4 in. Both models are ADA-compliant, use one 20W incandescent lamp and sport shades of sand-etched Pyrex. Measuring 11 1/2 in. high x 6 in. wide with a projection of 6 5/8 in., the Mercury II wall sconce features a clip-on or screw-on linen lampshade and uses one 60W incandescent lamp. Brass components are offered in polished brass, polished nickel or satin finishes. UL-listed. **Circle No. 40**



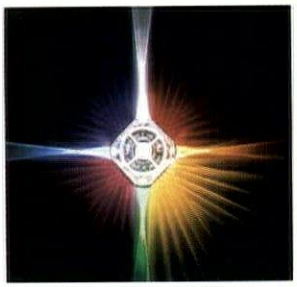
From **Studio Q**, the Sushi wall sconce is constructed of sculpted wood veneer mounted on a matte stainless steel plate. The flame-retardant shades are offered in a variety of non-endangered woods and measure approximately 3 1/2 in. in diameter and 10 in. high. The brushed aluminum base backplate can be mounted horizontally or vertically. Each sconce is original and varies slightly. Sushi uses two 40W candelabra incandescents. UL-listed. **Circle No. 41**

R. Jesse & Co. introduces the VN-119 iron, three-light pendant fixture. Measuring 40 in. in diameter with an adjustable drop, the VN-119 is available in black iron, bronze, gunmetal, platinum and antique iron (shown) finishes. Shades are offered in oiled parchment (shown), rawhide, fabric and metal treatments. The pendant uses three 60W incandescent lamps for rawhide and metal treatments, 100W for oiled parchment and fabric. VN-119 can be designed to custom configurations. UL-listed. **Circle No. 42**

A single polycarbonate globe poised atop an aluminum structure characterizes **D. S. Batcheller Designs'** Luna 2000 torchiere and Luna 2000.5 table lamp. Both fixtures are illuminated by light sources concealed in the base. In the Luna 2000.5, light from a 12V 20W MR16 halogen is projected upward into the conical diffuser located in the globe. The Luna 2000 torchiere uses a 6V 30W PAR36 concealed by six aluminum discs and covered by a grate. The table lamp measures 26 1/4 in. x 7 1/4 wide and the torchiere stands 75 in. high x 12 in. wide. Eight colored gels are offered as accessories. UL-listed. **Circle No. 43**

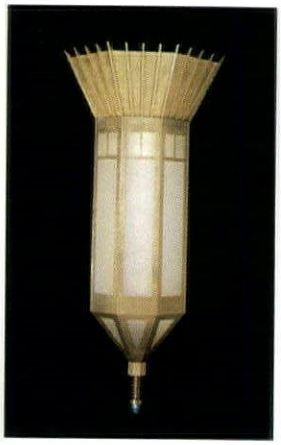


Designed by Design Studio Kairos, the Alea 3 from **Murano Due** is a wall and ceiling fixture with a curved cast glass diffuser in a satin finish. Diffuser colors include orange, white, primary yellow and apple green. Alea has a projection of 5.2 in. and a diameter of 20 in. Alea uses four 60W E14 lamps. **Circle No. 44**

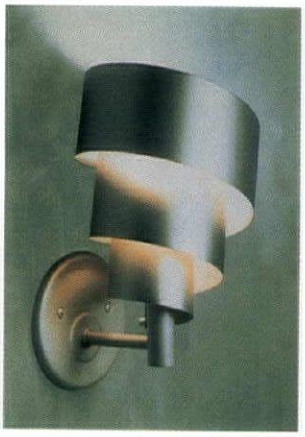


D'ac Lighting's Radial Tapestry is an ADA-compliant decorative radial wall sconce designed by Jerome Simon. When mounted flush to walls, the sconce emits light through eight precision-cut internal slots to create a starburst pattern that reaches outwardly on the wall to 6 ft. from the housing. Dichroic color filters for eight or four alternating slots produce rainbow or solid color effects. Radial Tapestry projects less than 4 in. from wall and features a cast crystal glass lamp body with a machined brass perforated front grill. Polished chrome or custom grill finishes are available. Illumination is provided by a 60W T-type incandescent lamp. ADA-compliant and C/UL-listed. **Circle No. 45**

Designed by **Norwell Mfg.**, the Fossati Family chandelier measures 34 in. wide x 38 in. high and is illuminated by 15 60W lamps. Models in the series include a one-light sconce and six-, 12- and 15-armed (shown) chandeliers, all with candelabra sockets. Finishes offered are satin and Flemish brass. UL-listed. **Circle No. 46**



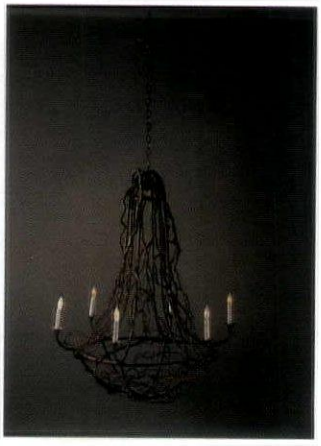
The Rocket custom wall-bracket lighting fixture from **Starfire Lighting** was originally created to provide ambient lighting for the renovated exterior of an office building in Cincinnati, OH. Measuring 9 ft. long x 30 in. in diameter, Rocket features solid brass construction with sandblasted glass lens panels along its sides and top. Multiple incandescent lamps inside the housing provide ambient area illumination. An MR16 halogen lamp at the nose of the fixture provides direct downward illumination. UL-listed. **Circle No. 47**



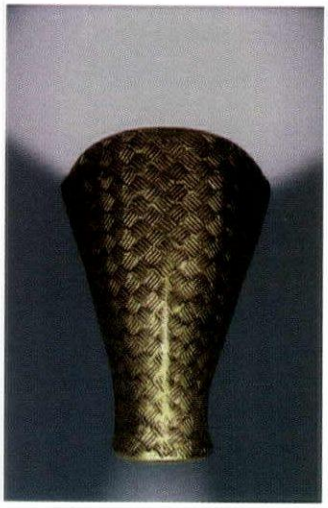
Ron Rezek's Spiral sconce features an open spiral shade and is available in a matte nickel or white finish. Lamping options include a 75W incandescent or a 13W fluorescent with a magnetic ballast. The 12 in. high Spiral has a 6-in. diameter and 7½-in. projection. UL-listed. **Circle No. 48**

From **Hampstead Lighting**, the Orseolo chandelier by Vistosi measures 39 in. in diameter and 39 in. in height and is constructed of blown Murano glass and chrome metal. Designed by Gianpaolo Canova, the fixture is illuminated by six MR16 lamps. A wall sconce model is also available. UL-listed. **Circle No. 49**

Joan Sherman Decorative Arts introduces the Branch chandelier. Branches cast in bronze and welded together create the organic form of the chandelier. The branches are then attached to a tubular brass frame. Measuring 43 in. x 36 in. x 36 in., the Branch chandelier uses seven 15W lamps. UL-listed. **Circle No. 50**



The Amon wall sconce by **Derek Marshall Lighting** features a textured basket weave pattern available in a variety of finishes, including gold leaf (shown). ADA-compliant, Amon measures 10 in. wide x 10 in. high with a 4-in. projection. The fixture is lighted with one 100W incandescent lamp and provides both up- and downlight. UL-listed. **Circle No. 51**



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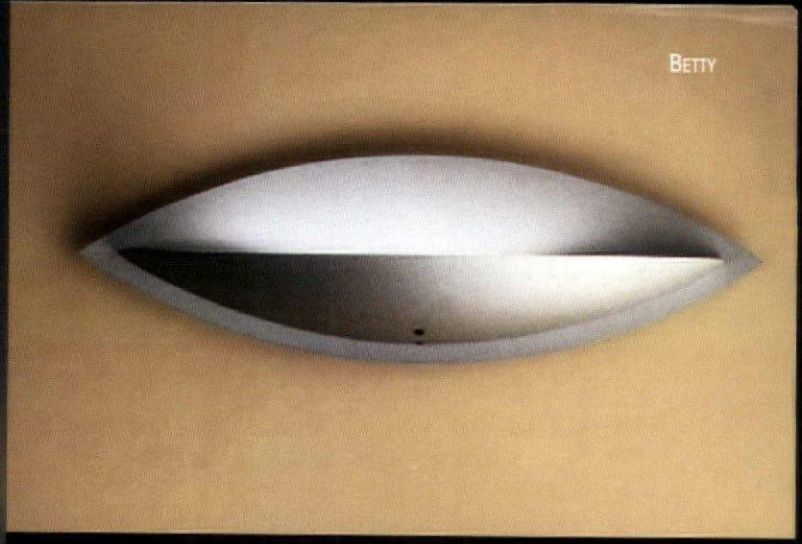

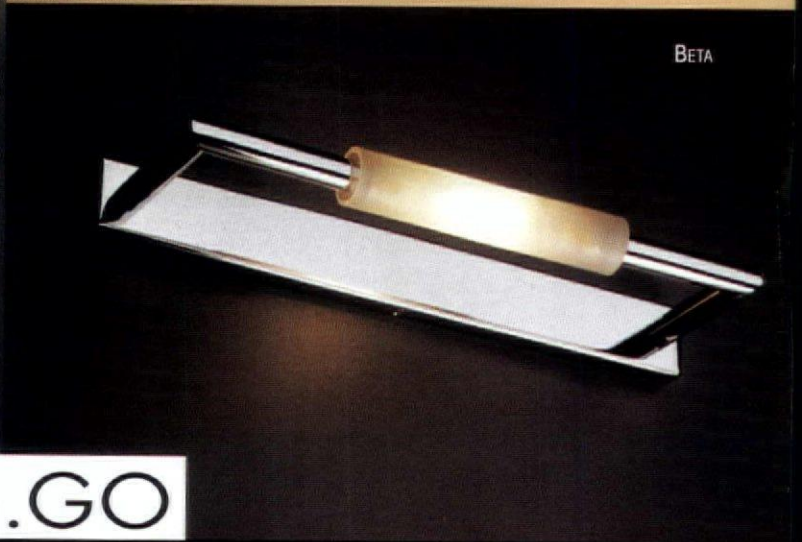

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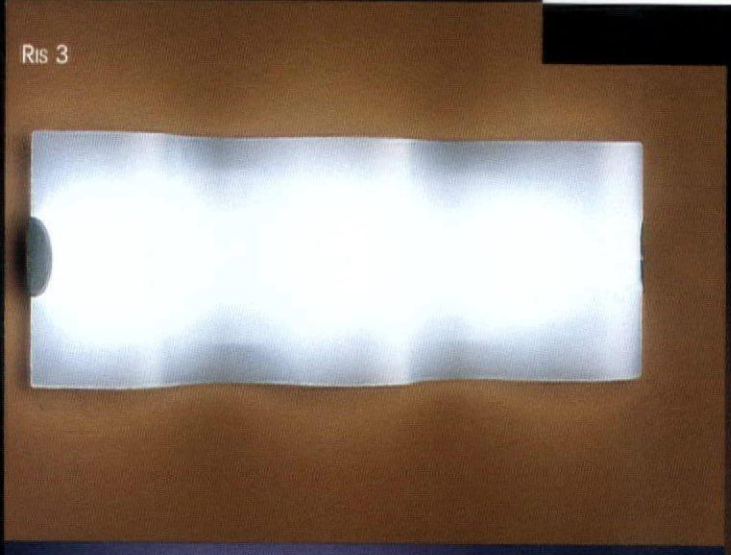

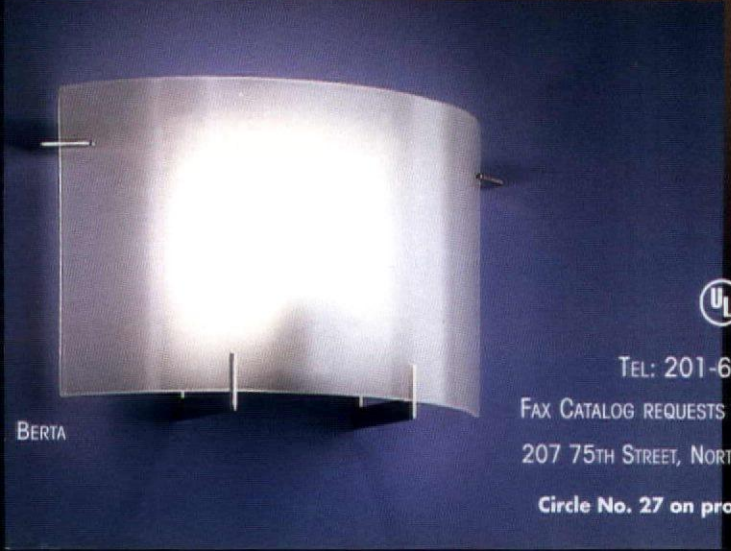

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LIGHT @ THE SPEED OF BUSINESS

BY PAUL DOHERTY, AIA

How fast is your business?

Funny how the rest of the world is paraphrasing the age-old phrase "at the speed of light" as an analogy for describing our New Economy. Lighting is a perfect metaphor for our age that evokes images of velocity, quickness and sleekness...of being fast.

Welcome to the New Economy of the fast Dot Com world. It's a world where the convergence of clicks and mortar creates a new way of doing business, meaning you cannot run your business for the online world offline. If you are not running your business by at least thinking about how a Dot Com does it, you will be at a competitive disadvantage.

The lighting industry of the New Economy is no longer about just delivering CAD details or shop drawings, product samples or cut sheets. This new world is not about embracing technology because it doesn't hug back. Computers are not about computing, they are about communicating. Today's world is about bucking conventional wisdom and embracing the velocity of change. Technology tools like email and the Web have provided this change of focus from technology to information, making access to information easy and transparent. Our new digital challenge is to create valuable information content and provide it in comprehensible packages of knowledge for others to use. This creates not just information resources but knowledge models that we can connect into a growing system from which we can learn. It's not about just designing fast or manufacturing faster but how fast a business can understand its decisions and learn something new. This puts a larger emphasis on post-mortem project meetings, sales analysis and customer feedback—in essence, creating a mix of atoms and bits that emerges into a knowledge management system.

What is fascinating about the lighting industry is its rapid innovation in product design and procurement. But this is no longer the end game. Creating inventory-based products and waiting for someone to purchase them is an industrial-age business model that will soon fade. The New Economy asks you to look beyond the traditional supply chains and find new digitally interconnected two-way paths to your suppliers, vendors, installers, consultants and customers.

Before there was a New Economy, slowness protected market segments. Today, the difference between those who use speed and those who don't is no longer incremental—it is a quantum leap. By viewing all digital information in the form of speed and time, you are creating the environment to operate in the realm of velocity. Velocity collapses the traditional market segments that we are comfortable with and challenges us to find where we fit in as new market segments and professions are created in unpredictable ways. If you don't make this leap to digital speed, your business will end up with a customer base that will spend the least and cost you more to serve.

Interconnecting yourself into global markets through Web-based e-commerce marketplaces is a beginning step to understanding the changing role you and your business will play. Another step is to understand that simply faxing schedules or shop drawings back and forth between the office and the outside is no longer enough. Project team members in every part of the project information supply chain need to be able to peer into one another's information so they can share and make accurate and smart decisions in real time. The emerging industry (US$1 Billion as of January 2000) of outsourced, subscription-based project extranets (sometimes referred to as project communication/management systems) is an example of this type of speed enabler. Project extranet leaders include Buzzsaw.com (www.buzzsaw.com), Bricsnet. com (www.bricsnet.com), Bidcom. com (www.bidcom.com), BuildNet (www.buildnet.com) and Cephren (www.cephren. com). An interesting convergence is happening with these Web-based project communication systems, as they are all integrating an eMarketplace system to help speed up the process of designing, specifying and purchasing products all in one place.

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Another emerging development is in the world of CAD. CAD should no longer be thought of as a drafting tool for designers. In addition to design functions, new companies like Web-based Revit Technology (http://www.myrevit.com) are creating 3D visual containers for data items like manufacturer information (specifications, cost, bills of lading, etc.) to reside. This information can also drive the geometry of the visual container. These visual containers are actually called Parametric Object Oriented (OO) CAD Models and are becoming a smarter way to use CAD, thus interconnecting information in unique ways. OO CAD is providing designers the opportunity to not just create the 3D experience of moving through a virtual space, but also provides a graphic container for project information that can be used further into the life-cycle of the facility (like having the lighting seamlessly linked into energy management system after installation).

A business that can harness its output of digital data to speed up its operations is going to beat the competition, set new standards and be very successful in the New Economy. When the dust from the transition to the New Economy settles, the architectural lighting landscape will be strewn with carcasses of firms and business that were unable to adapt. Don't let yours be among them. ■

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