

APRIL
2001

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Strip Show: Lightfair in Las Vegas

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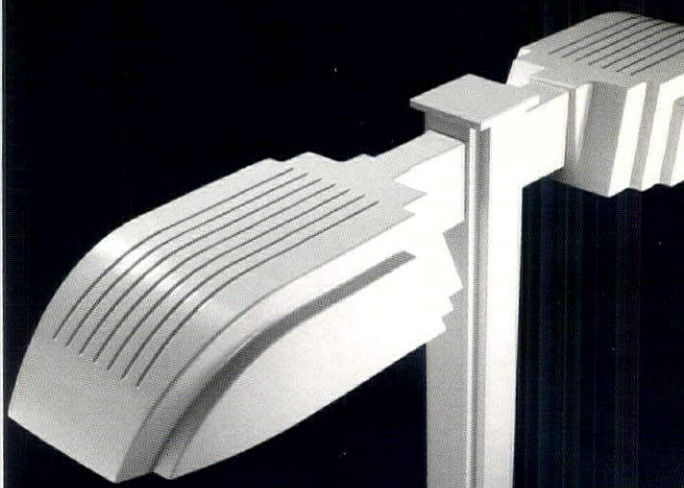
Lighting Strategies



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T5 SURFACE MOUNT

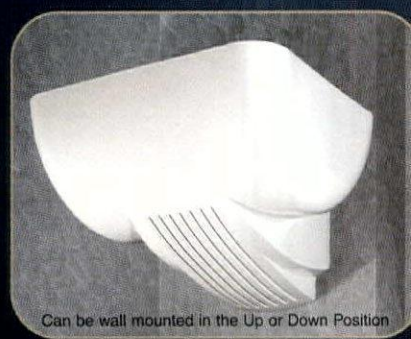
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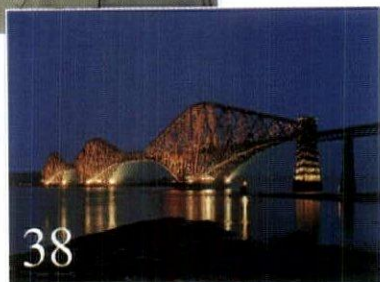
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34

BROWNSVILLE
FEDERAL COURTHOUSE



38

FORTH BRIDGE

DESIGN FEATURES

- 30 Altered States**
A high-tech center in the UK plumbs the depths of scientific exploration
- 34 Court of Appeal**
The lighting design of this courthouse puts a positive spin on the legal system
- 38 Steel Pulse**
Lighting designers shed light on the history of a bridge that spans 100 years
- 42 Trading Place**
Streaming data and stock market antics take center stage at this New York City venue

LIGHTFAIR 2001

- 46 Events, Schedule & Las Vegas Projects

IN FOCUS

- 60 Going to Market: Creating an Online Image That's On-Target

TECHNIQUE

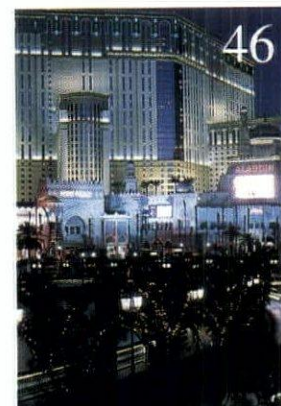
- 66 In-office Procedures (*NCQLP Recertification Quiz*)
- 74 Back to Basics: Daylighting

TECHNOLOGY

- 78 Future Light—Emerging Sources

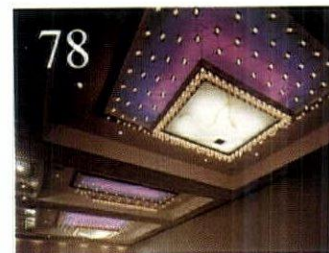
DEPARTMENTS

- 8 **Editor's Note**
- 10 **Feedback**
- 12 **News**
 - 12 The Inbox
 - 16 People
 - 18 Datebook
- 24 **Profiles** William Lam, FIALD
- 82 **Architectural Lighting Product Guide**
- 92 **EndPoint** Lighting Education



46

LIGHTFAIR ATTRACTIONS



78

FUTURE LIGHT

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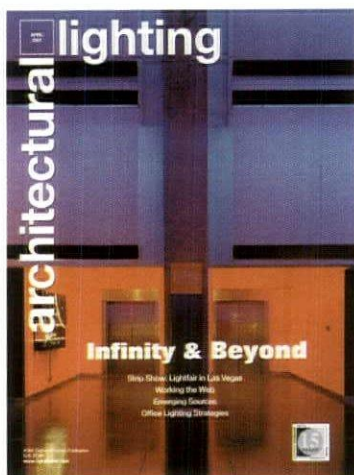
REALLY COOL LIGHTING

As *Architectural Lighting* prepares to head out to Vegas for Lightfair, I know the staff, aside from catching up on industry news, visiting with familiar faces—and let's admit it, soaking up the glitz of "Sin City" (after all, it *is* Las Vegas)—anticipates the new, or improved, product technologies and designs that await us. As do you. Lightfair offers you the chance to discover the innovative forms of technology that will enable you to create, invent and apply new ways of delivering light to the spaces you design. And there are exciting things happening. Specifically, in the area of solid-state lighting.

On this note, I recently had the opportunity to head to Danvers, MA to experience first-hand just how fascinating the future of this technology will be. It was there that I was introduced to Sheila Kennedy, AIA, who has been avidly researching the architectural potential of technologies such as OLEDs (organic light-emitting diodes) with Osram Sylvania to explore the reality of luminescence and "cool light" applications—the ability to incorporate these sources into construction materials. The implications are compelling, as this technology has the ability to truly transform the architectural aesthetic—the very nature of physical elements we thought we already knew, whether a floor or ceiling. Contributing editor Dave Houghton touches upon this topic in the Technology story on page 78. But we hope this only whets your appetite as we plan to offer you in-depth coverage of this revolutionary phenomenon in our next issue...See you at Lightfair.



Christina Trauthwein,
Editor-in-Chief



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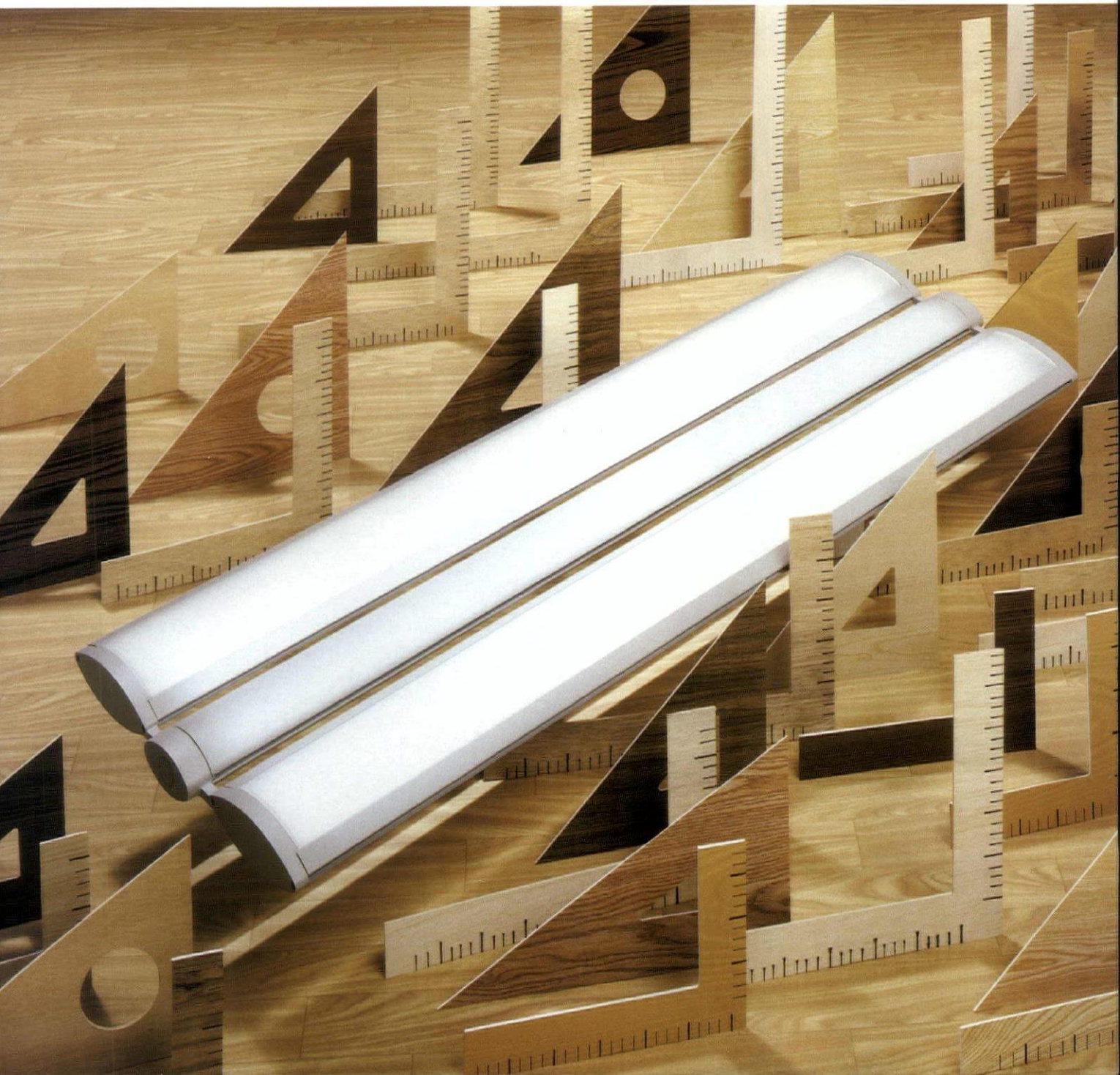
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feedback

To the Editor:

I enjoyed reading the article on CRI by Ruth Beals in the January/February issue of *Architectural Lighting*. However, I noticed two small errors that might hinder understanding of the concepts by someone who is new to this topic.

1. The caption for the blackbody radiator contains the sentence, "While it is not a continuous spectrum ..." The word "not" should not be there, and then the sentence will read correctly and will be in agreement with the text of the article (middle of the 5th paragraph under the heading, "CRI Test Procedures").
2. In the third paragraph under the heading, "CRI Test Procedures," the last sentence lists the colors that a blackbody radiator will change through as it heats up, but the order is wrong. The corrected sentence would read, "... turning from black to red, orange, yellow, white and then to blue-white, ..."

Keep printing the great design articles and keep the technical articles coming as well.

Dawn De Grazio, LC
Lighting Affiliates
Minneapolis, MN

To the Editor:

We (wife Monica & me) are big, loyal fans of your magazine. Having started our architectural firm 10 years ago, we have seen many things—and products—come and go since, but the great quality and fine taste in projects shown in your magazine, combined with quality products, make *Architectural Lighting* a collection we've treasured since 1992 (Mill Race Park) in our office.

Our firm has developed from small housing design to commercial and business architectural design, working for clients on the Mexican border of California and Arizona, and many times we use your magazine as an "eye opener" for clients who refuse to see light fixtures as important to our project as furniture or windows; most of the Mexican companies don't care for good product catalogs or showrooms, so lighting design is in our hands.

We think that many of the projects your magazine has shown in the past have served as our inspiration in what we were doing then, and the constant of better quality in every new issue makes our future goals step out to the light...

We are celebrating 10 years of being in business and wanted to share what we feel for your work.

Muchas gracias (thanks so much).

Mario Dominguez C.
Monica Fritz V.
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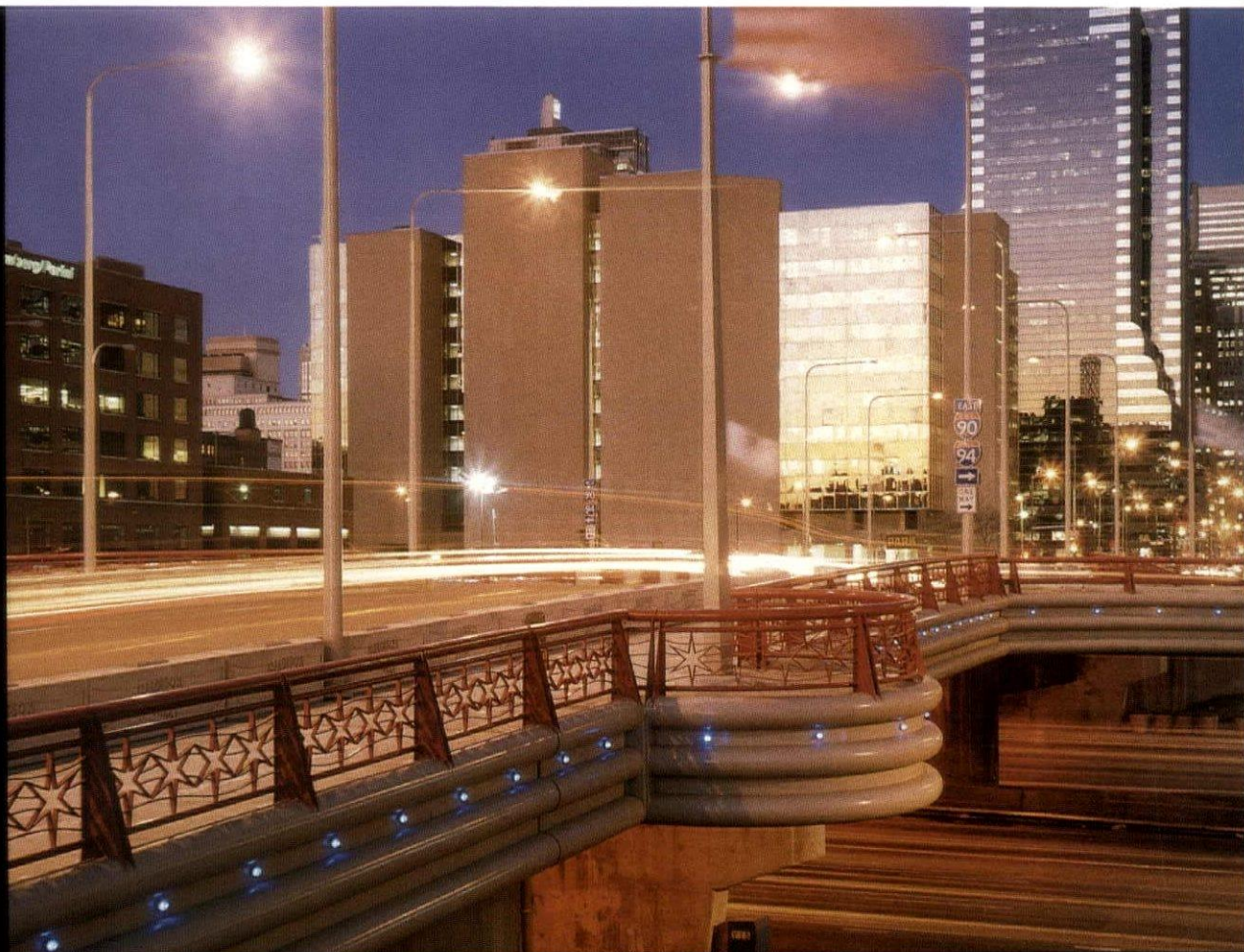
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FEMP OFFERS ONLINE COURSE ON EFFICIENT LIGHTING

The Office of Federal Energy Management Programs (FEMP) is now offering its lighting efficiency training course online. The class will address lighting efficiency in the workplace, including offices, institutional, industrial and warehouse spaces. While designed to allow participants to complete training at their own pace, the course requires 30 to 50 hours to complete. Following course completion, participants will have access to a free lighting advisory service for six months, in which course instructors will respond to questions related to the application of the principles learned. Participants passing the course can also earn 36 credits for National Council on Qualifications for the Lighting Professions (NCQLP) recertification. Tentative course dates are May 7-July 13 and September 24-November 30. For details, visit www.femplights.com or phone (425) 640-1390.

LIGHTOLIER & STEELCASE ANNOUNCE MARKETING ALLIANCE

Lightolier has announced an agreement to jointly market lighting solutions for the workplace with Steelcase Inc. Through their alliance, Lightolier and Steelcase will address the need for appropriate levels of ambient, task and accent lighting that work in concert with the architecture, furniture and technology in the workplace to reduce eye strain and improve productivity. In addition, the alliance aims to ensure that a comprehensive lighting solution can be addressed in the critical initial stages of the design process.

NCQLP UPDATE

With 198 of 228 candidates having passed the NCQLP exam last November, the total number of Lighting Certified professionals has risen to 996.

LC testing began four years ago, drawing applicants from all segments of the lighting industry. Those having earned the LC designation hail from a wide range of educational and professional backgrounds. Over the past three years, 39 percent of those who have sat for the LC exam identify themselves as lighting designers/consultants. The two next largest groups are sales representatives (20 percent) and electrical engineers (16 percent). Thirty-nine percent list experience levels at six to 10 years with another 39 percent listing 11-20 years of experience. An average of 49 percent of exam takers holds bachelor degrees; 21 percent hold advanced degrees. Sixty-eight percent identify themselves as members of the IESNA and another 19 percent belong to the IALD. Four percent are primarily affiliated with the AEE, IEEE or the AIA. Three percent are affiliated with the DLF.

This year also marked the first time in which graduate and

CALL FOR ENTRIES

Submissions are being accepted for the Richard Kelly Grant, which was established in 1980 to recognize innovative work in the art or science of illumination and to encourage such endeavors. Judging criteria are based on the utilization of light in its most challenging, innovative and resourceful way. Winning submissions will receive up to \$4,000 cash award.

Applicants should be 35 years of age or younger at the time of submission and studying or working in the field of illumination in North America. Current or completed projects may be submitted in the form of slides, photographs, manuscripts, video tapes (VHS, 10 minutes maximum) drawings, models or text that illustrates the work to be considered.

Entries should be addressed to: Richard Kelly Grant, c/o IESNA, 120 Wall Street, 17th Floor, New York, NY 10005, Attn: Adalisa Machado. For more information, contact Sharon R. Carey at (212) 343-9400 or email scarey@elssoho.com. The deadline for submissions is June 15, 2001.

JUNO CELEBRATES 25 BRIGHT YEARS

The year 2001 marks Juno Lighting's 25th anniversary in the lighting industry. Headquartered in Des Plaines, IL, the company is a manufacturer of recessed, track, exit, emergency and fluorescent fixtures. To contact Juno, phone (847) 827-9880, fax (847) 827-2925 or visit its website at www.junolighting.com.

undergraduate lighting students had the opportunity to sit the exam as participants in the NCQLP Intern Program. Ten lighting students from Penn State University and one from Rensselaer Polytechnic Institute sat for and passed the exam, earning the title Intern LC. The pilot program, based on an examination-and-experience model, is open to undergraduate and graduate students attending an accredited college or university offering a minimum of 12 credit hours in lighting or lighting-related courses. Successful candidates may waive one year of their experience requirement for full LC status. The initiative is partially funded by two grants from the Nuckolls Fund for Lighting Education and additional grants from the Lutron Foundation and the Golden Gate Section of the IESNA.

Additional information on these programs can be found in the NCQLP's *LC Candidate Handbook*, which contains registration information, test sites locations, eligibility requirements and a syllabus. Copies may be requested by fax at (703) 706-9583 or email at info@ncqlp.org.





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TCU DESIGN STUDENTS LIGHT UP CAMPUS

This spring semester, lighting designers Paul Gregory of Focus Lighting and Jonathan Speirs of the Lighting Architects Group shared their experience and expertise with the design students at Texas Christian University (TCU) in a week-long design seminar and workshop that culminated with the lighting of

TCU's visual arts and communication facility, Moudy Building. The special event was organized by Fred D. Oberkircher, VP of educational activities at TCU and director of the university's Center of Lighting Education. The final installation remained on view for a week.

Working with students to light an

exterior structure is not a new experience for Gregory and Speirs. In July of 1999, they worked with 25 students from nine countries in Bochum, Germany to light the Bunker monument on Universitätsstrasse. The result was a colorful display enjoyed by the students and the community as well.

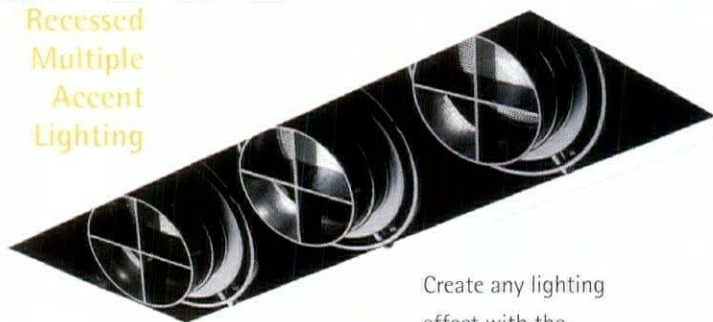
For this year's seminar, TCU students spent their mornings and afternoons in lectures, classes, group brainstorms and reviews of the previous night's work. In the evenings, students applied the day's lessons and ideas to lighting the exterior of the building, using more than 200 fixtures, six control desks, six technicians and one mile of cable. One-half million dollars worth of equipment was on loan to the project for no charge from several manufacturers.



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COLOR KINETICS JAPAN LAUNCHED

Full spectrum digital lighting specialist Color Kinetics, Inc. has announced the formation of Color Kinetics Japan Inc. A joint venture with native distributor ALS, the new company cements a fruitful year-long relationship that saw the successful introduction of the Color Kinetics brand in Japan. ALS president Kiyoshi Otsuki will head the company, whose office officially opened early April in Tokyo. For more information on Color Kinetics Japan, visit www.colorkinetics.co.jp.

ON THE MOVE ...

B-K Lighting has relocated to 40429 Brickyard Drive, Madera, CA 93638. To contact the company, phone (559) 438-5800, fax (559) 438-5900 or visit www.bklighting.com.

The **IALD** has relocated its headquarters to Suite 9-104 in the Merchandise Mart in Chicago. The new address is: Merchandise Mart, Suite 9-104, 200 World Trade Center, Chicago, IL 60654. To contact them by phone, call (312) 527-3677.

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people

NEWS

JJI Lighting Group has named **Richard J. Crossland** company president. Robert N. Haidinger, whom Crossland succeeds, remains as CEO.

Paul Ericson, IALD and **Martin Peck, IALD** have been named professional members of the International Association of Lighting Designers.

Con-Tech Lighting has appointed **John D. Ranshaw** president and CEO; **Glenn Konieczny**, VP of engineering and design; **Tim Brennan**, VP of sales; **Steve Micek**, operations manager; and **Olga Dragunsky**, manager of communication and training.

John McRandal is VP of sales at Leucos.

Bulbrite has named **Keith Deutsch** national sales/marketing manager and **Isabella Cirilli** national customer service manager.

Lightolier has appointed **Russel Hall** VP of distributor marketing.

Candice Kling and her firm, C.M. Kling & Associates, are celebrating 20 years in business. The company can be contacted at 1411 King Street, Alexandria, CA 22314; phone (703) 684-6270; fax (703) 684-6273.

HOK Chicago has named **Helen Cohen** interior project manager; **Naomi White**, **Lauri Allen** and **Darwin Alejandro** join as interior design technicians and **Colleen O'Neill** joins as marketing coordinator for the General Architecture and Interior Groups.

John Decker, IALD has launched his own practice, Decker Studio LLC. The new company is located at 23334 Timberlane Drive, Valencia, CA.

KA, Inc. Architecture has appointed **Richard Pichola** project architect.

Scott Bruner, PE has been appointed VP at CRS Engineering & Design Consultants; the company has also named **John Gill**, EIT secretary.

T.Y. Lin International has appointed **John Haussmann, PE** president of the firm. Haussmann served previously as COO of the company.

DFD Architecture has named **Jamie D. Moore** principal director of operations.

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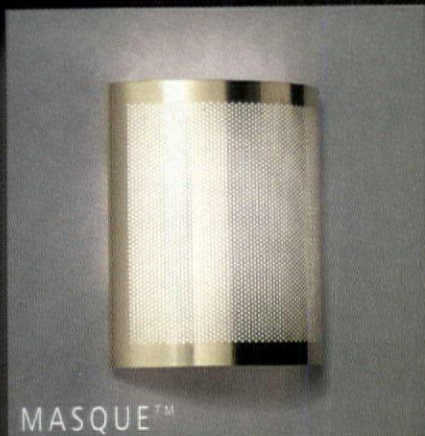
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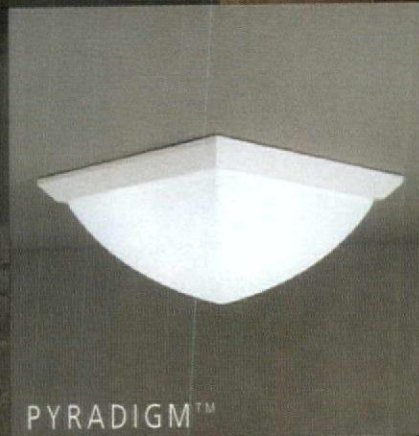
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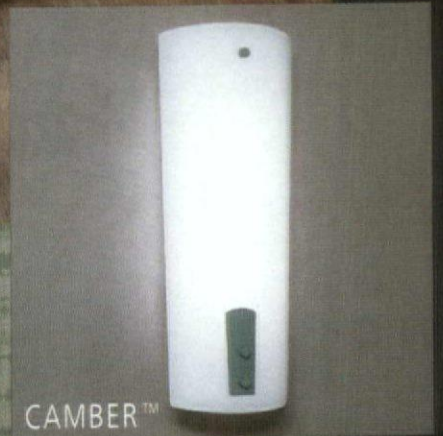
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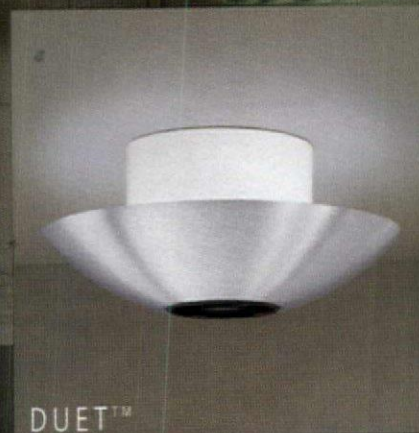
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2001 SCHEDULED EVENTS

May 30-June 1 Lightfair International, Las Vegas Convention Center, Las Vegas, NV. Contact: (404) 220-2221, www.lightfair.com. (Visit Architectural Lighting at booth 414.)

June 7-10 IESNA Maritime Regional Conference, Halifax, Canada. Contact: Lee Hiltz at (902) 484-3008.

June 18-20 LUX Europa 2001: the 9th European Lighting Conference, University

Cinema—Conference and Cultural Center, Reykjavik, Iceland. Contact: (354) 585 4309, conference@icelandtravel.is.

June 18-20 NeoCon World's Trade Fair, The Merchandise Mart, Chicago. Contact: (800) 677-6278, www.merchandise-mart.com.

June 18-22 Laser 2001, Munich Trade Fair Centre, Munich, Germany. Contact: (312) 377-2650, fax (312) 377-2660, www.munichtradefairs.com.

June 20-23 IESNA Northeastern Regional Conference—Beacon of Light, Boston Park Plaza Hotel, Boston, MA. Contact: dmadden@luxlightingdesign.com, www.iesnewengland.com.

June 21-22 AEE Seminar: "Fundamentals of Energy Management," Memphis, TN. Contact: (770) 925-9633, www.aeecenter.org.

August 5-8 2001 IESNA Annual Conference, Ottawa, Canada. Contact: Valerie Landers at (212) 248-5000, ext. 117.

September 5-9 CEDIA Expo 2001, Indiana Convention Center & RCA Dome, Indianapolis. Contact: (800) 669-5329, www.cedia.org.

September 11-14 China International Lighting Exhibition 2001, Shanghai Everbright Convention & Exhibition Center, Shanghai, China. Contact: (301) 424-7060.

September 13-14 IIDEX/NeoCon Canada, The National Trade Centre at Exhibition Place, Toronto, Ontario, Canada. Contact: (800) 528-8700, www.merchandisemart.com.

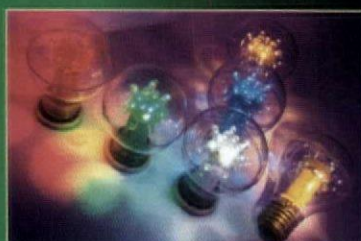
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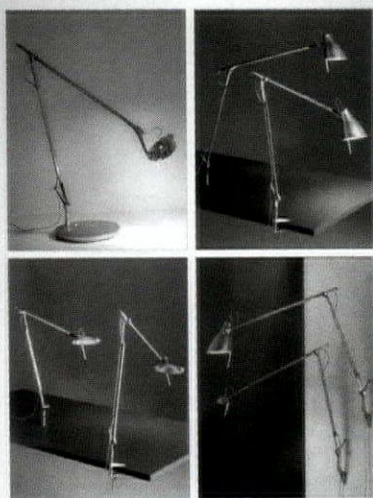
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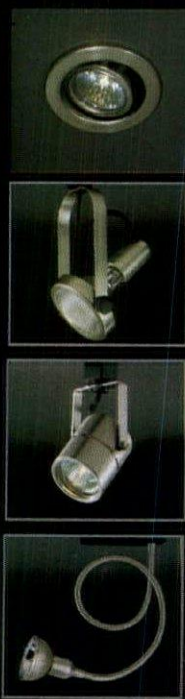
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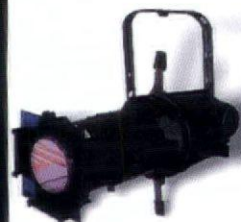
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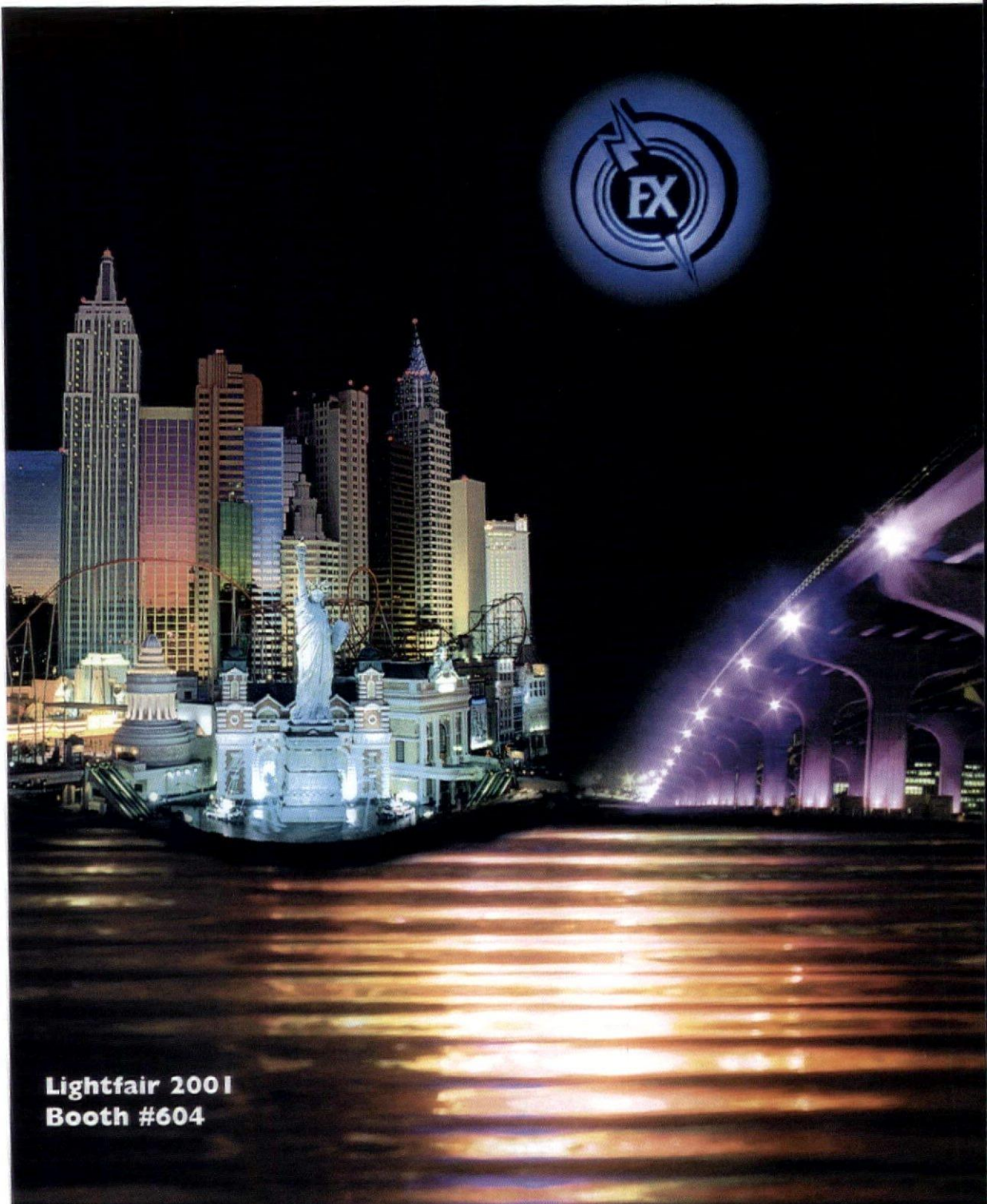
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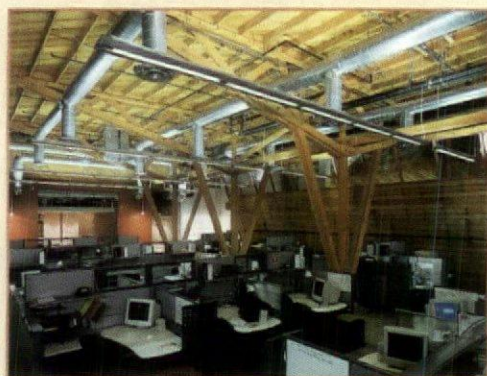
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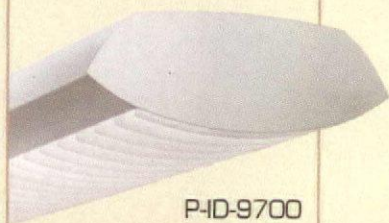
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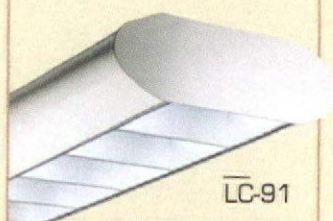
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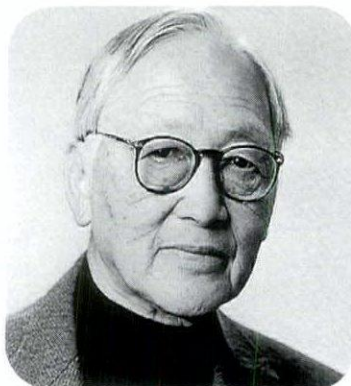
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Architectural Lighting interviews William Lam who launched Lam Inc. in 1951, which later became Lam Lighting Systems. In 1959, he left the manufacturing company to pursue his first love—architecture—and founded William Lam Associates, a lighting consulting firm. During the next 40 years, the firm would collaborate with some of the world's greatest architects on some 2,000 projects, winning acclaim for such notable buildings as the Tennessee Valley Authority Headquarters complex; restoration of Union Station in Washington, D.C.; the Washington, D.C. transit system (METRO); and the San Diego Convention Center. Lam has taught at Harvard, MIT and Yale University and has lectured extensively on four continents. Many of his writings have become definitive references for students of architecture and lighting design. Although he is the recipient of numerous professional awards, including the AIA 2000 Institute Honors for Collaborative Achievement, Lam considers his long and public battle with the IES over standards for light levels to have contributed greatly to the practice of lighting design as it is today.

—Christina Trauthwein

Q: I'm sure you have many stories to tell when it comes to "fighting the standards," as you've called it. Can you share one with us?

A: I had been warned about the IES influence at my first class on lighting at MIT, but I really became aware of it when I began designing lighting for projects. It seemed that on every project, the power companies would always get in the way; they were just everywhere. For example, early in my career, I had worked on an innovative school in Colorado that featured continuous curving spaces with partitions to divide them. I chose to indirectly light the space. The next thing I knew, an article appeared in the magazine *Better Light—Better Sight* with the headline, "Greeley School Fails to Meet IES Code." The article quoted IES members—an electrical contractor who did not get the job and a salesman from the electric utility—but the last paragraph of the article stated, "Nothing is apt to be done about the lighting in Greeley School because everyone loves it." Probably not many readers realized that the magazine was published by Edison Electrical Institute, a public utility marketing group.



Q: And thus began your crusade. How did you get your message across?

A: I took advantage of any invitation to educate the architects and public about my criteria for good luminous environments. My hope was to get the architects to take back control over the way their buildings were rendered by light.

One of my first chances was a lecture to the AIA School and College Architecture Committee at the 1964 national convention. I told the architects it was time to wake up and realize just where the lighting criteria (which were ruining their buildings) were originating—that 14 of the 19 members of the national officers, council members and regional VPs of the IES were employees of public utilities or lamp manufacturers. To believe their "codes" were objective was like asking the dairy industry to decide how many glasses of milk we should require children to drink each day. I urged them to have faith in their eyes, brain and common sense, and if their quality classroom lighting design continued to be challenged, to build a mockup to compare it with existing classrooms that meet the "code," reminding them, "You only pay for the mockup once; you pay for a bad design for the whole life of the building."

Over the years, I lectured at universities and industry events, helped with the Massachusetts lighting energy code

and also testified before the Federal Trade Commission. In 1966, I was hired by the State Construction Fund of New York to help write lighting standards for New York's university buildings. The project was funded by the Educational Facilities Laboratory of the Ford Foundation. After a year of reviewing existing lighting research programs worldwide, I collaborated with MIT on putting together a really first-class, international multidisciplinary committee to write lighting guidelines. The results, published in 1976 as "An Approach to the Design of the Luminous Environment," concluded that numbers from a chart would not be of much value, but instead provided guidelines for design judgments. The report emphasized the greater importance of quality over quantity.

Q: The reaction from the IES?

A: Well, it seemed that often when I gave a lecture, someone from the IES would appear uninvited. I remember speaking at MIT to an audience of college presidents. When the time came for answering written questions to the panelists, the chairman announced an unusual request, that someone wanted to make a statement instead of asking a question. The director of research at the IES stood up and said, "I don't know where you found this guy, but obviously he has never read our reports." The funny thing is my comments had discussed exact quotes and figures from IES reports.

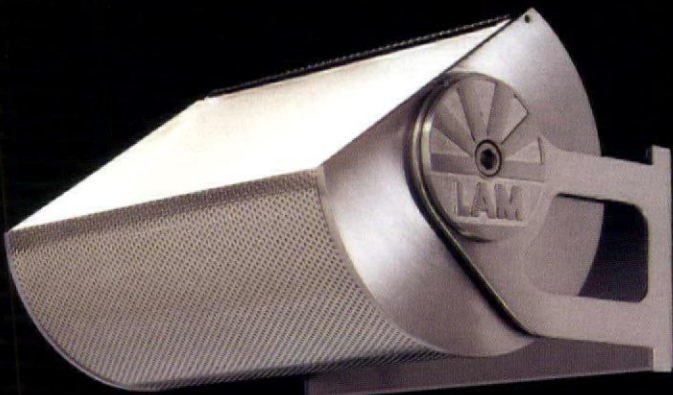
This type of confrontation happened frequently. They had big stakes. They were doubling the recommended light levels every 10 years. Their magazines would brag about their marketing achievement in increased light levels and energy sales and I would use excerpts from the articles in my lectures. I remember one industry publication that graphed the per capita increase in lighting energy up to 1963. The caption said that it was interesting to note the increase in lighting in the last year was more than all lighting that had existed before that time.

Q: Bill, it's been said that your career first took off after receiving notice on a light fixture you had designed upon graduating from MIT. Tell me about that design.

A: It was a floor lamp with a wood base, brass stem, goose neck and a fabric shade that featured a clip-in diffuser to minimize glare from the lamp. This was a novel feature at the time—the best known contemporary

(Continued on page 26)

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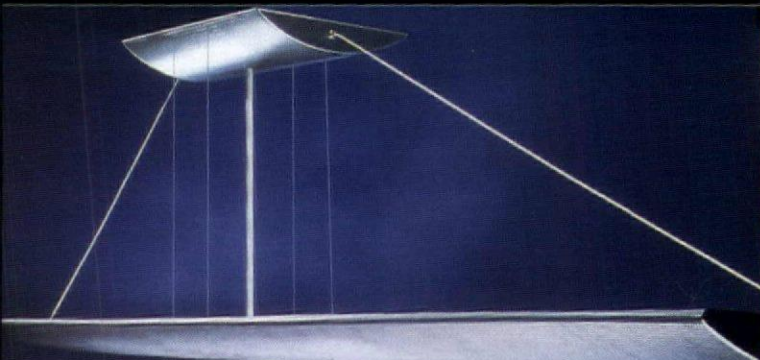
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(Continued from page 24)

model had a metal shade with a bare bulb sticking out at the bottom.

Q: And your company was born...

A: When some friends wanted to know where they could buy the lamp, I made three sales calls in Boston and got three orders. I made five sales calls in New York and got five orders. I went out the next day, rented some space, hired one employee and started making these lamps. That lamp and a coffee table were selected for a "Good Design" award by the Museum of Modern Art and exhibited in museums across the U.S. That really got things off to a great start.

When I started the company, I innocently fantasized that I would run the business for only a year and then go back to being a designer, combining product design with architecture in the footsteps of Alvar Aalto and Charles Eames. Getting out of the

help them with other parts of the project including daylighting.

The time was ripe to do what I was waiting to do. I sold control, hired a wonderful executive VP to take over running the company and planned that over a few years, I would leave the company and go back into architecture.

Q: And what about lighting design?

A: When I started consulting, I already had established contacts from free consulting that I was doing as part of the company's services. Through articles I had written and teaching I was doing, people heard about me and consequently, I became the lighting consultant on some major projects. That's what got it started. I'm very fortunate. My projects came from word-of-mouth and the few people I had consulted for.

designed from the inside out. What motivates me is helping to create spaces that people would want to live and work in. I'm always looking for total integration of lighting with the architecture. To do that, you have to understand the principles involved as well as the equipment. But I can't sit down and design lighting by just looking at drawings or a reflective ceiling plan. I need to understand and collaborate with others on the whole building. The best design comes when we start as early in the process as we can with the schematic design of the building. If the building's already designed, you're just decorating it with light.

Q: Where do you think the lighting design profession will be heading in the future?

A: It's great that we now have a professional

"... too much of the publicity goes to the conspicuous rather than the good."

business took a lot longer. I had acquired stockholders and gotten involved with designing around new manufacturing processes. My lighting diffusers and shades were among the first consumer products made from fiberglass-reinforced plastic. The 1953 institutional ads for Owens Corning Fiberglass showed one of my lamps, an Eames chair and a fiberglass shower base. I also began making shades and globes with vacuum-formed plastics and eventually developed a machine to blow small and large seamless globes from extruded tubing. Two carloads a week of these products were marketed through Lightolier.

Q: But you went back to your true love...

A: After a while, I realized that I needed to get out of manufacturing and get back to architecture. In doing so, I approached a potential manager/investor who advised me, "The products you're making now are in a style market. As soon as you're not creating new designs, we won't own anything. To attract investors, you have to make products that get specified in buildings." That's why I started making prefabricated forms of indirect lighting. That meant that I had to provide free consulting services to show the architects how to use the products most advantageously—like how to integrate them with the space and other elements within the space. After a few years of showing how to use our prefabricated indirect lighting in classrooms, offices and other types of spaces, some of the architects began to ask me to

Q: What is your design philosophy?

A: Lighting design is about design and not engineering. Fixture selection and calculations should be the last thing you do. You have to understand the engineering principles behind it. You have to understand about light and the physics of it, but mainly, it's about having a vision. If you know what a good environment is, you can create it. Lighting is applied perception psychology. You have to know what makes a good environment. In fact, in the teaching I do, that's what I emphasize. If I teach 14 classes at Harvard, only one or two are about calculations. The rest is about observing. You have to understand the principles in relation to what makes something appear bright or dark, cheerful or gloomy—what makes a good or great luminous environment. It's not enough to have enough light and to avoid glare. Every room should be a positive experience for the activity with all elements of the space integrated.

Q: What are your sources of inspiration?

A: I have always been very aware of my environment, whether in buildings or on the street. I am inspired by beautiful spaces, bothered by the ugly. My mind cannot help thinking about what should or could improve the situation. I went into lighting design because I observed that almost every space was ruined by the electric lighting—spaces filled with visual noise. I needed to develop theories on what makes a good luminous environment.

Too many buildings were not being

lighting organization—the IALD—as a counterweight to the industry-dominated IES. I think we're heading in the right direction, although I'm afraid that in lighting design, as well as in architecture, too much of the publicity goes to the conspicuous rather than the good. It's not the best buildings that get the publicity, it's the ones that are flashy or different. Similarly, in lighting design, there's room for show biz, but that shouldn't be the crux of lighting design. Special effects are *sometimes* required, but good lighting is *always* essential.

I'd like to see architects and interior designers receive enough lighting education so they really know what a good luminous environment is and really want it. Then I'd like to have lighting consultants who have a solid background in design help them in the technical end of achieving those goals. A sound design background is so critical because you can't be good lighting designer if you're not a good designer. Get as much experience and education as you can and then specialize. By having a common background in design, you have the means to communicate and work most effectively in the team.

Q: How about some good advice?

A: At the conclusion of my lectures I say, "Don't believe anything I've said. I've given you my thoughts, but if you can't prove to yourself what I've told you, don't believe it." ■

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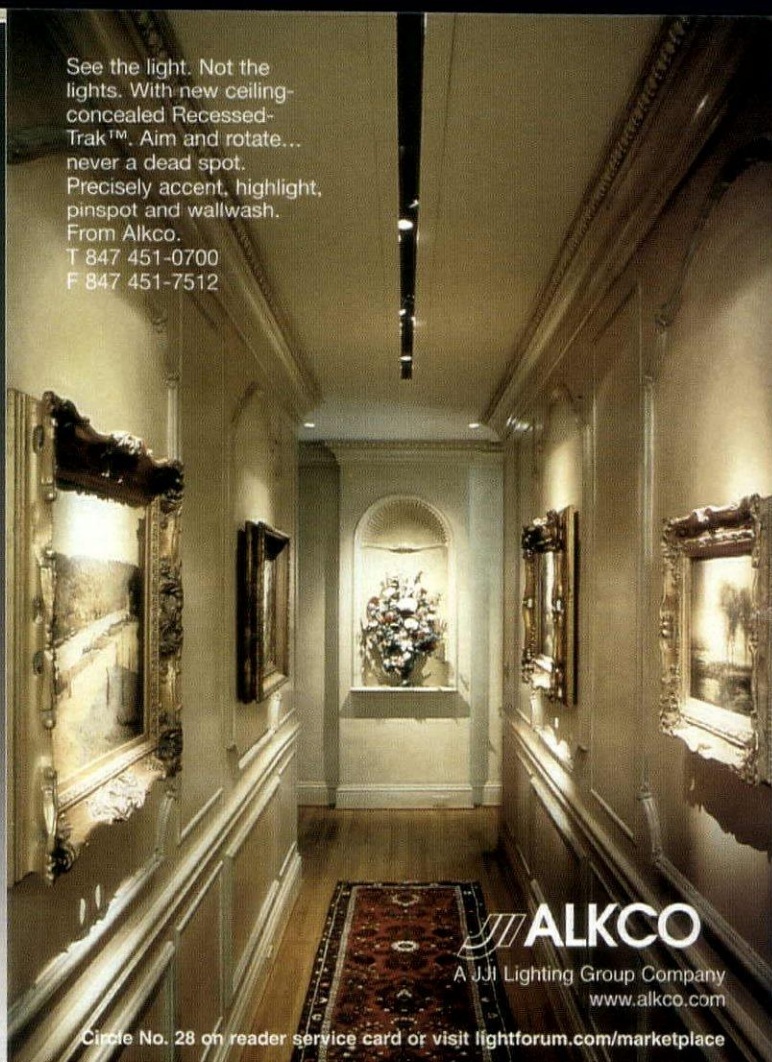


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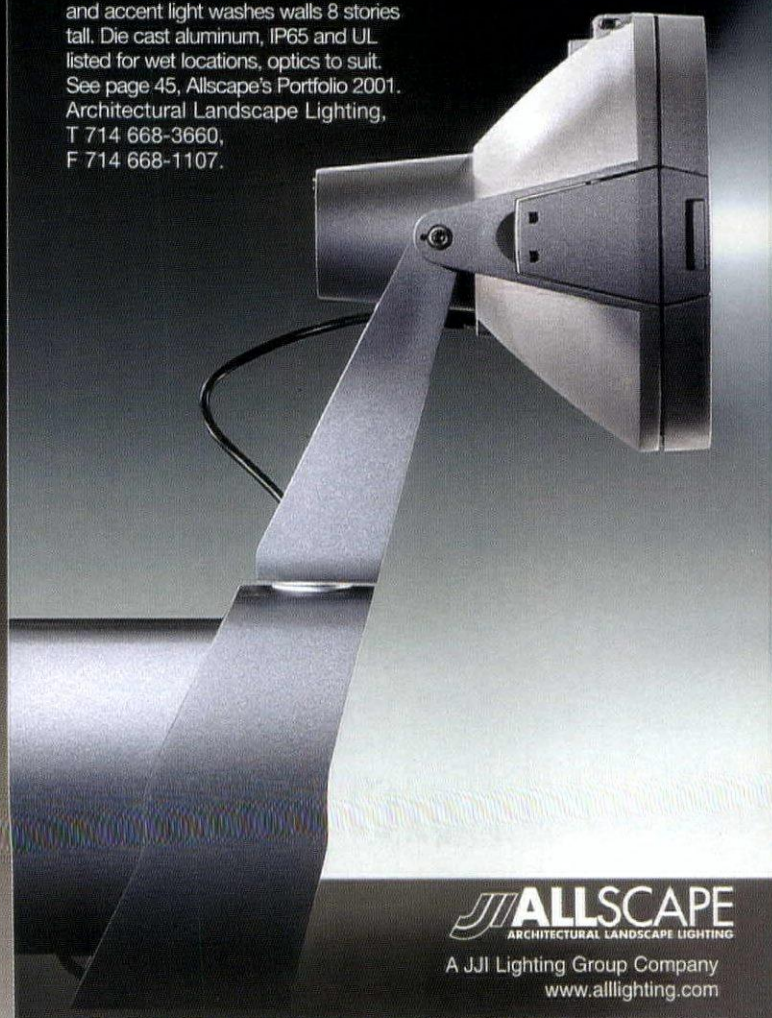
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MISSION ACCOMPLISHED

This district theater gives new meaning to “screen play” with its kinetic & colorful facade as the main attraction

BY PHIL TAMULONIS, CONTRIBUTING EDITOR

CHALLENGE San Francisco’s new Sony Metreon wasn’t designed to be a landmark. But at 350,000 sq.ft., the four-story Mission district theater-retail-entertainment complex would stand out on any city block, presenting homegrown lighting designers Auerbach + Glasow with *the* dilemma of urban renewal: Help revitalize a city center without bringing in the worst aspects of suburban-style sprawl. “While we wanted to establish a presence in the neighborhood,” said Patricia Glasow, principal and lead project designer, “we definitely didn’t want to dominate it by being too flashy. The idea was to stay true to the area while still promoting entertainment.”

METHOD Regardless, neon seemed a natural choice. “We did consider other options, but in the end, neon was just the best fit,” said Glasow. “The architectural integration of the subtle blue and turquoise neon against the gray-green building gives a refined appearance to this often garish medium.”



Above: The IMAX tower, situated on the street corner, is a strong draw for visitors—the lighting is simple, yet effective. Glass screens that reflect the sky during daylight hours and splashes of dynamic colors at night line the facade (right).

concealed neon to backlight three architectural building “fins.”

The main entries, terrace and pedestrian pathways are illuminated by 3000K ceramic metal halide downlights. Depending upon soffit height, the downlights range from 50-100W and use both ED17 and PAR38 lamps. The downlighting provides an even light level at the pedestrian pathways and seating areas and emphasizes the graphics and window displays. Transformers are remotely located inside theater and stairwell ceilings.

The most impressive accomplishment remains the main street facade, where 40-x-40-ft. glass screens reflect the changing sky during the day. At night, the screens reflect splashes of continually changing color. The programmed color sequence fades between screens of solid colors, cascading colors and chasing colors; sequences change in 20-second intervals.

The building transforms as dusk falls, serving as a beacon that encourages people to come enjoy the nightlife that the area now offers.

Five color-changing fixtures—each featuring a narrow distribution lenses and housing a 700W metal halide lamp—are mounted 15 ft. from the screens. A cantilever pole was designed to arch over the vehicle drop-off lane to achieve the specified fixture distance from the facade. The designers exposed the fixture and designed the pole to complement the building design. Ballasts are remotely located inside the building. ■

DETAILS

PROJECT

Sony Metreon

LOCATION

San Francisco

OWNER

Millennium/WDG Partners

ARCHITECT

SMWM and Gary Edward Handel +Associates

LIGHTING DESIGNER

Auerbach + Glasow—Patricia Glasow, IALD; David Orgish

PHOTOGRAPHER

Timothy Hursley

LIGHTING MANUFACTURERS

Irideon; Superior Sign Systems; Lithonia Lighting; Sterner Lighting; Bega; Poulsen Lighting

Photos: ©Timothy Hursley



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Altered States

The lighting of this British museum sets the psychological stage for the theater of science

BY ALICE LIAO, ASSOCIATE EDITOR

It seems as if it was only yesterday that we were introduced to Dolly, the first successfully cloned sheep, and that the prospect of human subjects loomed as a vague possibility in the all-too-remote future. Yet just last month, as discussions raged to ban human cloning, one Italian doctor claimed that he was but weeks away from undertaking the endeavor. Such is the quicksilver nature of science, whose thirst knows no bounds and whose dramas are inevitable. Such is the metaphor that informs the architecture

and lighting design of the Wellcome Wing in London, UK.

"It was Richard MacCormac, the architect, who came up with the idea of doing a theater of science," said lighting designer Rogier van der Heide of Hollands Licht. "He considered the construction of the exhibitions as well as the architecture as all part of the show. This was a major decision." Housed in a dramatic 10,000 sq. m., the Wellcome Wing opened last year as the newest addition to the Science Museum and a state-of-the-art tech center devoted to cutting-edge developments. The "show,"



as designed by MacCormac Jamieson Prichard, consists not only of an open view of three floating floors but also of the renovation on each of the individual galleries as exhibitions are disassembled and changed. Exposing visitors to the rotation of displays helps to immerse them in the experience of science as an ongoing process. Hence, the metaphor. "The building is a metaphor for science itself in that it's saying that science is endless," said van der Heide. "Today's inventions are outdated tomorrow. Scientists are never satisfied."

NO BOUNDARIES

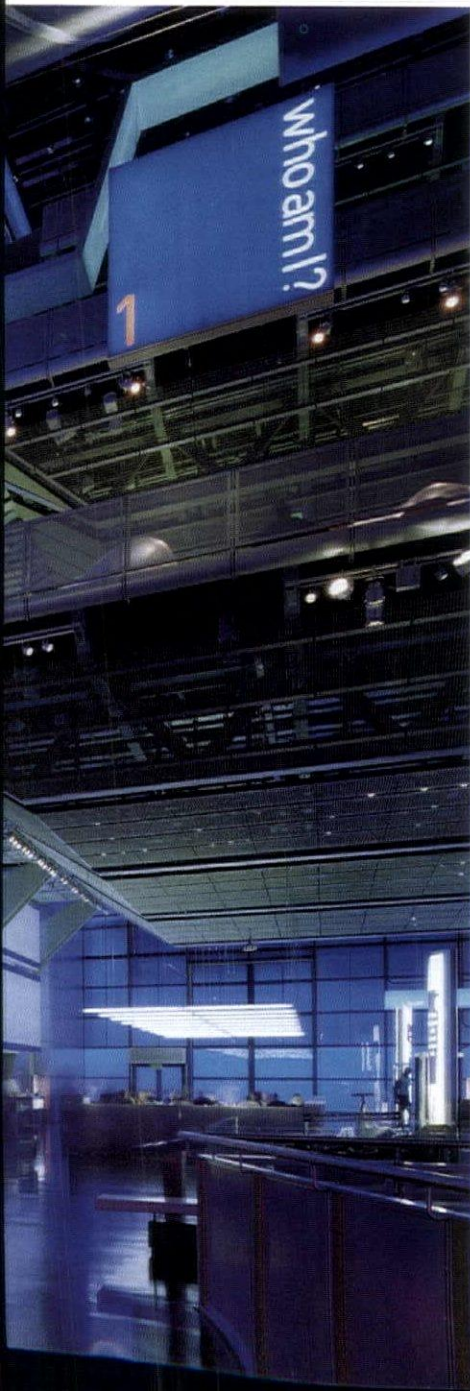
The expression of endlessness is key to the lighting of the Wellcome Wing, which attempts to suggest a state of mind rather than just decorate the interiors. "We wanted to give people a special mood when they're in the space," said van der Heide, who, working closely with the architect, opted to infuse the space with a subtle blue. "It's really a building that dissolves in the blue glow. There's a sense that the physical boundaries have vanished, emphasizing the mercurial character of science." That the effect appears effortless and the lighting integral to the architecture can be attributed to van der Heide's early involvement with the project. "I became involved with the

project when Richard was only just sketching," said van der Heide. "He wanted to give light a very big role within the space, so together, we ended up fabricating architecture out of light."

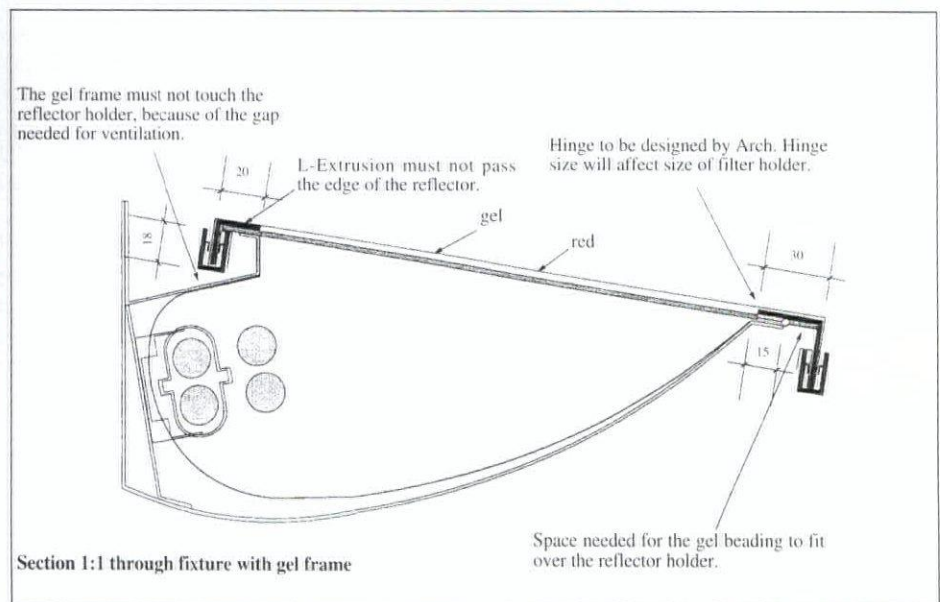
Emanating from the north and south walls of the main hall, the blue glow is produced by

custom washlights equipped with 55W biax lamps and a deep-dyed polyester gel. The design team conducted extensive research to pinpoint a shade that would evoke a psychological response and a manufacturer that could provide a corresponding filter. Commented van der Heide, "We developed the theory first and then we found the right color." The selected blue—described by van der Heide as "electric"—possesses a very narrow bandwidth and specific wavelength and consequently, is difficult for the eye to perceive. "Usually, a color is a blend of a set of wavelengths and they make the subtle hues, but this one is very monochromatic and the wavelength is in a part of the spectrum where your eye is hardly sensitive, making it hard to focus and see contrast," he explained. "Looking at this blue produces a very strange, unfamiliar feeling. It's almost as if the blue plays tricks on your eyes." Although a filter was located in the exact color required, it carried a transmission factor of only 3 percent. However, the resulting illuminance levels, though low, were sufficient. "There are no additional fixtures in the main exhibition hall except the display lighting, which uses primarily narrow-beam spotlighting," he said. "We really didn't need that much light, just the exact wavelength. It was a fascinating discovery."

Vertical scrims on the side walls enhance the sense of dissolving boundaries by reflecting the blue light and adding a visual barrier to the concrete walls behind. According to van der Heide, the layering of different light intensities and hues confuses the eye, rendering it unable to judge the distance between the scrim and the wall and thus creating what he calls, "a sort of infinity." Woven from thin glass fibers, the scrim panels roughly measure 20 ft. x 12 ft. and conceal the custom washlights affixed to the frame. "We were able to create an amazing integration in this project, because everyone listened to each other and we were all on the project at the same time," noted van der Heide. "We would never have been able to

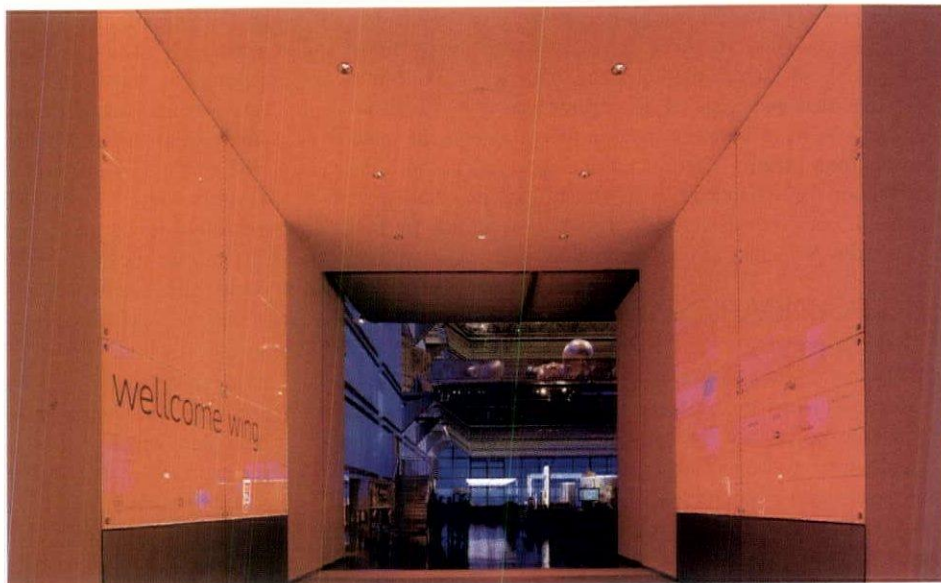


Concealed behind scrim panels, custom washlights with fluorescent sources and blue gels evoke an atmosphere of endlessness creating in visitors a state of mind that transcends all boundaries.



Photos: ©Roos Aldershoff

The entrance into the Wellcome Wing, lighted by DHA in London, transports people on their journey to the beyond (right). White light and color-saturated paint produce an effect similar to the "electric blue" light found in the main exhibition hall (below).



provided a shell, a condition fostering the atmosphere of the museum. And the blue is strong and not easily disturbed."

Visitors wishing to travel to the upper levels pass through an elevator lobby, also enveloped in an orange glow. Although the initial impulse was to combine downlights, white stucco walls and orange glass filters, instead, the design team chose to paint the walls in a saturated orange and then bathe the entire space with white light. "The walls wonderfully pick up the light, but they reflect only the orange component of the whole spectrum, because the paint is so saturated," added van der Heide. Creating the effect, washlights are mounted in the ceiling and lamped with compact fluorescent sources.

The pairing of white light and saturated scenic paint is continued in the stairwell where metal stairs cascade through the space and act as a conduit to the upper galleries. With walls standing 100 ft. tall and 20 ft. wide, the stairwell is



integrate the fixture with the frame and fabric otherwise."

To heighten the effect of the blue, contrasting colors were employed in key transitional areas such as the main entrance and elevator lobby. Although illumination of the entrance and exhibitions was designed by DHA in London, van der Heide provided the initial idea to use the color orange in some fashion for the gateway that greets visitors to the Wellcome Wing. He said, "We always wanted to have an orange, self-illuminated entrance to emphasize the blue and DHA did a great job." Backlighting with white fluorescents contained in a light box, sheets of orange Lexan line the glowing gateway to the main exhibition hall and serve as a dramatic opening to the blue within. As with the entrance illumination, van der Heide supplied general guidelines for the display lighting, which were incorporated in the final execution. "The client decided to leave the exhibition lighting to the gallery designers," said van der Heide. "We really

dramatic in sheer dimension alone. However, painted to echo the blue of the main exhibition hall and lighted by surface- and track-mounted spotlights lamped with low-voltage tungsten sources, the walls form a "deep-blue cocoon" in which metal passerelles, stairs and handrails painted in aluminum for maximum reflectivity appear to float. "I think the staircase is remarkable," said van der Heide. "When we presented the concept, the client replied, 'This sounds like a good idea, but what would it look like?' We were unable to model it in a computer, because it was too complex. So we decided to build a model in our scale studio on a 1-to-10 scale. We had all of the fixtures in miniature form and the scenic paint on the walls. Everything was there." Photos were taken of the model that, in the end, turned out to be extremely accurate. Van der Heide added, "Sometimes, we mix up the pictures of the model with those of the actual staircase—it's unbelievable."

The use of models and van der Heide's "scale studio" proved critical in the success of the project, especially in the development of its *pièce de résistance*, the massive 12,000-sq.-ft. glazed wall comprising the Wing's west facade. "I badly wanted to have the sun in this building, because I consider the sun the source of everything," said van der Heide. "Since Richard called this a theater of science, I said, 'Well then, the sun is your main actress.'" While the team was in agreement on the inclusion of sunlight, only low levels would be permitted to protect the light-sensitive artifacts on display. "It was only a small step, of course, to a blue wall," said van der Heide. "Because we already had the blue side walls, Richard decided that the glazed wall would also be blue."

STUDIO MODEL

Initial testing of blue glass was conducted at the scale studio with a light source producing light levels approaching sunlight. The results were shocking. "The light levels were so incredibly high that the whole space would be flooded with blue light and nothing would appear in its natural color," explained van der Heide. "And the museum said, 'No way.'" Unfazed, the team persisted and after additional testing, determined that the maximum amount of blue light that was allowed in the space without affecting color rendering was a very low 0.3 fc. "In my more hopeless moments, I thought that perhaps we should just construct a blind wall," said van der Heide, "because after all, what's 0.3 fc? That's nothing compared to the 15,000 fc projected by the sun in the summer."

Nevertheless, in a spirit not unlike that which drives scientific exploration, the team continued its effort, employing numerous models, mockups and tests and at one point, eliciting the help of scientists to chart the changing light levels produced by the sun throughout the year. A theoretical model was then created to predict the illuminance levels for each area of the building. "So we could say on June 27, 2:00 PM, on floor 3, the light level will be 0.2 fc, and it would be true," said van der Heide. "In fact, it was more accurate than any computer calculation, because we based it on actual measurements within a physical model that had exactly the same properties as the real building." While the model, built on a scale of 1 to 10, represented but a portion of the facade, it enabled the designers to calculate the light distribution on the floors, which was their main concern, and granted them the creative freedom to test different louvers and glass in a multitude of arrangements.

With literally hundreds of measurements taken and recorded, the design team arrived at a final solution that combines perforated metal, static louvers and a layer of optical glass to produce the required 0.3 fc. "From the outside in, the perforated metal sheet takes out 60 percent of the light," explained van der Heide. "Then there's the building's own steel structure, which we also accounted for in our calculations." Inside the structure, a 8-mm-thick layer of glass treated with a low-emittance coating reflects the UV and IR wavelengths and prevents heat buildup within the museum. The glass is then followed by thousands of tiny louvers extending a mere 15 mm in length and angled at 38 degrees.



The glazed wall provides a stunning backdrop to the individual galleries and presented the biggest challenge to the lighting design team.

The static system was chosen over one that tracks the movement of the sun to allow the natural drama of daylight play out within the museum space. "In most standard systems, the movement of the louvers only has one aim, which is to attenuate the sun's effect and provide a more uniform illuminance throughout the day," said van der Heide. "But I wanted a louver system that would dim down the light levels of the sun, but still show the different ways in which the sun lights the building. A static system clearly reveals the difference." The final component of the glazed wall is a sheet of body-tinted blue glass, primarily used by the optical industry or in science laboratories. "We tried sheets of glass with blue resin in between, which turned out to be too milky, and then glass paint, which didn't work at all," said van der Heide. "The scientific glass we found was so close in color to the blue that we were looking for that we couldn't visually distinguish between the two."

Although at first, van der Heide felt hesitant to see the Wellcome Wing in its completed state, since its opening, he has visited and been able to verify light levels in the actual building. "The project became so complex with so many variables and factors," he said, "but it all turned out perfectly." In fact, when the sun is shining in the afternoon and a cloud passes, the event, said van der Heide, "is like a performance." ■

DETAILS

PROJECT Wellcome Wing at the Science Museum
LOCATION London, UK **OWNER** National Museum of Science and Industry **ARCHITECT** MacCormac Jamieson Prichard—Richard MacCormac **LIGHTING DESIGNER** Hollands Licht—Rogier van der Heide, IALD; Juliette Nielsen; Maaïke Duijzer **EXHIBITION LIGHTING** DHA London—Jonathan Howard **PHOTOGRAPHER** Roos Aldershoff **LIGHTING MANUFACTURERS** Desag; Okalux Okasolar; Architen; Great American Market; Erco Lighting; Kreon; Osram

Court of Appeal

Justice is served in a new light in Texas as the lighting team raises the bar on federal design

BY MARK NEWMAN, CONTRIBUTING EDITOR

Photos: ©Jud Haggard

At the U.S. Federal Courthouse in Brownsville, TX, the halls of justice are awash in a new glow, both inside and out. The new 198,000-sq.-ft. building occupies almost four acres that were once a railyard and border the city's central business district. The new courthouse is a catalyst for a revitalized civic gateway in this city on the Texas/Mexico border.

The history of south Texas is a rich tapestry that weaves together the Anglo, Spanish and Mexican cultures. The result can be found in the region's vibrant mix of architecture, which celebrates the melting pot that this part of Texas has become over the centuries. The charge of designing a courthouse that would look official without being foreboding fell to the Houston architectural firm of Pierce Goodwin Alexander and Linville. PGAL approached the design of the courthouse to celebrate Brownsville's heritage as well as the integrity and fairness of the Federal Judiciary system. The result is a magnificent Mission-style structure clad in a reddish tan-faced brick, as well as areas of dimensional stone consisting of Texas Limestone in both shell and cream and Texas Pink Granite and Texas Black Granite. The generous use of materials from the Brownsville area celebrates a sense of social and judicial values to convey feelings of hope, comfort and reconciliation to those who enter the building's hallowed halls.

The exterior illumination of this federal building reinforces its function as a place of order, dignity, ceremony and importance. The lighting design team wanted to present the courthouse, from its initial view, in a positive light, rather than as a place with a sense of foreboding.



Lighting both the interior and exterior of the courthouse fell to John Bos and Becky Bowen of Bos Lighting Design in Houston who were brought in by PGAL's lead architect on the project, David Epstein. This newest addition to Brownsville's changing cityscape was to be a major structure for the city of Brownsville as well as major base for the federal government. "This was going to be one of the most noticeable federal buildings in the state," John Bos said. "We wanted it to be dignified but not distancing."

Budgetary and energy constraints were of top concern, typical of many government projects. Not only did the designers have to take into account the cost of the fixtures, but they also had to choose fixtures that would be appropriate while also requiring minimal maintenance. So lamp life and fixtures that utilized standard lamps were a must for the designers. "We were first asked to review the federal government's standards for lighting," said Bos. "We had to look at the various ways to achieve the lighting goals while also keeping it easily maintainable—and we also had to keep the color temperature consistent throughout."

Bos added that adhering to the hard metric rules of the federal government and reconciling those rules with available fixtures were sometimes a daunting task. "Government projects are always a bit of a challenge," Bos said. "But the restraints that the government implements are absolutely correct regarding energy consumption. It just makes us work a little harder to come up with the appropriate fixtures to create the right look." Bos added that as a client, the federal government is more concerned with the long-term effects of the design, whereas many private clients want it done "right away for the here and now."

FEDERAL CASE

As dusk descends upon the Rio Grande valley, the lights of the Brownsville Federal Courthouse cast a reverent glow, appropriate for such an important civic building. While the lighting had to be referential, it couldn't be too off-putting; those approaching the courthouse at night should not feel a sense of foreboding. "We wanted it to be welcoming while still maintaining the grandeur and stature deserving of a federal building," Bos said. "After all,





Natural light plays an important role in the public areas of the courthouse. When not available, due to design or time of day, the lighting designers created daylight effects through the use of faux skylights and carefully selected lamps.

this is a place where disputes are settled and problems are solved rather than a place where problems are created. We wanted to present the courthouse to the public in a positive way.”

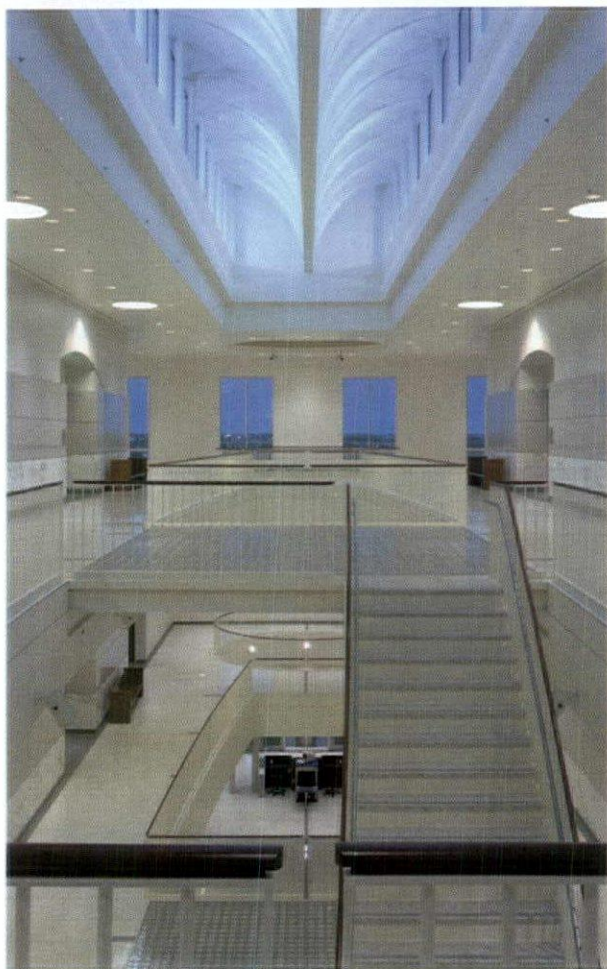
The courthouse’s vertical elements are emphasized through color-corrected 150W metal halide adjustable uplighting, which serves to raise the spectator’s eye so that the true splendor of the building can be appreciated. “We chose the uplighting to push the size of the building upward,” Bos said. “Downlight would have compressed the space while the uplight accentuates the building’s height.” Although the courthouse is only four stories at its tallest point, the lighting helps manifest the building’s stature and importance in the city.

The Civic Plaza outside the courthouse is filled with foliage, benches and fountains and serves as a ceremonial area for citizenship ceremonies and other occasions. “We used low-voltage incandescents for the ascecia fountain, both to move light down the length of the trough as well as uplight the falling water,” Bos said. “The long linear element of the fountain really worked well for the courthouse as this style of water feature almost sneaks up on you. It’s not until you get right up to it that you realize it’s water. And it added another creative element for us to illuminate.”

To make the approach to the courthouse as inviting as possible, the designers installed a series of bollards equipped with low-glare 70W metal halide lamps. These bollards illuminate the pedestrian walkways effectively without overpowering the tones of the lighting on the courthouse itself. “We wanted to give the pedestrian traffic a comfortable place to congregate,” Bos said. “The lighting helps not only in a security sense, but also in a friendly sense in that it helps tie the building to the community.”

The foliage in this part of Texas is fairly tropical so the lighting had to take that into account and effectively play off the natural colors provided by nature. Lavender filters in 75W mercury vapor fixtures cast light onto the greenery surrounding the courthouse as warmer tones from 100W metal halides are aimed upwards along the trunks of the palm trees, thus effectively linking the exterior lighting to the color temperatures of the courthouse’s interior. “The warmer tones bring out the orange in the bark of the palms,” Bos said. “We deal with these types of palm trees constantly and we’ve often tried different things but it seems best to let the foliage go a little bit and use a yellow filter and highlight the linear quality of the trunk.”

Aside from the paths on the courthouse’s premises, there is also an arched walkway along the north side of the building that is illuminated with warmer-toned sconces containing low-wattage metal halide sources, which also provide an inviting area for pedestrians and echo the tones from the low-wattage metal halides on the building’s majestic facade.



INSIDE INFORMATION

Although the exterior lighting makes a strong impression at night, the building's interior scheme is where the designers' concepts for lighting a federal building truly shine. The Great Hall, a massive multi-story lobby, serves as a central hub dividing the two sets of paired courtrooms. During the day, this majestic space is filled with sunlight due to a clerestory that allows a plentiful amount of natural light into the lobby.

"We wanted the space to be used the same way at night as it was during the day," Bos said. To accomplish this, the designers used color-corrected 250W metal halide floodlights on the roof to mimic sunlight in the lobby at night. The floodlights are made even less conspicuous as they are hidden back far enough from the roof's edge that they can't be seen from the street, according to Bos.

To allow the natural light to filter from the top of the lobby down to the ground floor, glass-block bridges span the space, and Bos was gratified with the result. "The glass bridges helped more than we could have imagined," he said. "We didn't light the bridges so much as we used them to transmit light."

The corridors mimic the natural light from the lobby through the use of fluorescent "skylights" that are equipped with sources having the same color temperature as natural daylight. These faux fenestrations designate vital entrances and exits and consist of a 4-ft. circular fluorescent "skylight" surrounded by six 6-in. compact fluorescent downlights.

COURTROOM DRAMA

The courtrooms have a more traditional look than the building's majestic lobby, yet they are no less impressive. In these rooms where justice is doled out, the lighting is even and accentuates the architectural forms. Although, the courtrooms did not have the same energy limitations as the building's exterior, a full range of dimming capabilities was needed. Individual dimming systems accompany each courtroom to allow for scene changes with the simple touch of a button.

Once in the top floor courtrooms, sunshine is not left behind. Daylight harvesting was brought into court via large light wells spanning the front wall, effectively washing the judge (or judges) in a natural glow courtesy of the Texas sun. These skylights also come equipped with full blackout shading so as not to interfere with vital audio-visual presentations.

Dimmable fluorescent covelights provide glare-free ambient light while compact fluorescent wallwashers and recessed compact fluorescent fixtures provide ample task lighting for the courtroom participants. "The lighting levels in the courtrooms are pretty high," Bos said. "At one point they wanted 150 fc on the prosecuting attorney's table, but the



Downlights and wall washers are used in all of the courtrooms to provide ambient and task lighting and to accentuate the spaces' architectural forms and traditional finishes.

overall ambient light levels are in the high 50s."

In areas where the ceilings are higher, color-corrected metal halide ED17 lamps provide generous illumination, which is the courthouse's trademark. Pendant fixtures above the courtroom galleries provide ample downlight/uplight, giving the courtrooms a reverent yet comforting atmosphere. Areas that needed to be lit a bit more dramatically, such as courtroom entrances and the main staircase, are equipped with metal halide PAR38 lamps. Courtrooms without skylights feature a barrel-vault ceiling with dimmable T8 fluorescent fixtures that cast a clean white wash across the ceiling. As with the other courtrooms, additional ambient and task lighting is provided by compact fluorescent downlights and wall washers.

From the traditional architecture gloriously enhanced in the courtrooms through the grandiose space of the Great Hall and out onto the comfortably illuminated landscape, the U.S. Federal Courthouse in Brownsville is truly a landmark case that celebrates a new age for civic buildings. This elegant structure flourishes in a rich combination of cost-effective and beautiful lighting that celebrates color at night and welcomes in the sun during the day. ■

DETAILS

PROJECT Brownsville Federal Courthouse **LOCATION** Brownsville, TX **LIGHTING DESIGNERS** Bos Lighting Design—John Bos and Becky Bowen **ARCHITECT** Pierce Goodwin Alexander & Linville **PHOTOGRAPHER** Jud Haggard **LIGHTING MANUFACTURERS** Hydrel; Lutron; Omega; Prudential; Linear; Halo; Capri; Stonco; American Glass Light; Phoenix; Kim; CW Cole; Metalux

Steel Pulse

Freshly painted and masterfully relighted, this Victorian landmark is enjoying a new life as one of the world's longest steel cantilever bridges

BY ALICE LIAO, ASSOCIATE EDITOR

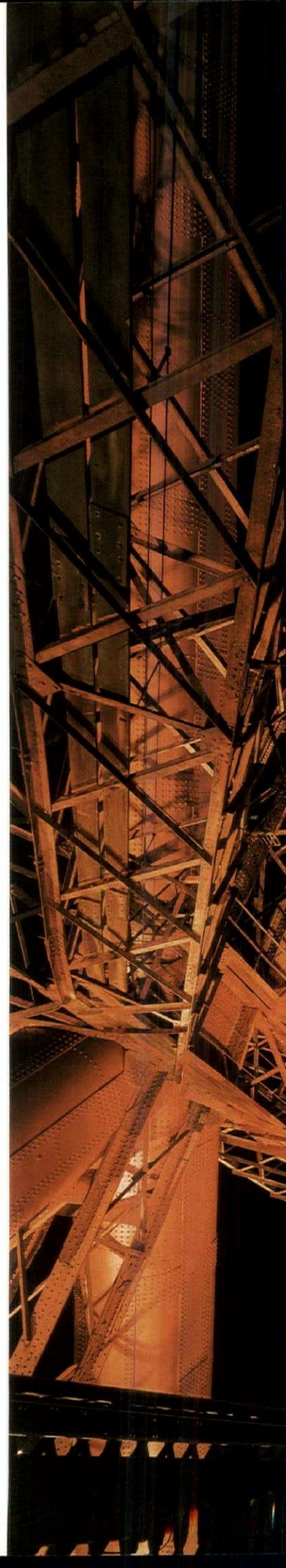
Early November 1880, as the body of bridge engineer Sir Thomas Bouch was transported to Edinburgh for burial, workshops for his latest project—a suspended span bridge across the River Forth—lay abandoned, their fate seemingly sealed forever. Such a bridge would have served as the missing railway link between Dover and Aberdeen, but the calamitous 1879 River Tay Bridge collapse, which killed 75 people, and the ensuing report finding Sir Thomas guilty of poor design squelched any possibility of another Bouch bridge. This and other subsequent bridge disasters fed public consternation and provided the uneasy backdrop to the 1881 redesign proposed by John Fowler and Benjamin Baker. Nevertheless, construction began, and in 1890, the Forth Bridge on the Firth of Forth officially opened. Now, over a century later, the rail-only bridge still stands as the world's second longest steel cantilever and a glowing symbol of the triumph of technology over the forces of nature and the wear of time.

It glows, of course, because it has been relighted in concert with the world's largest paint job. "The bridge very much needed cleaning, painting and repair—it really needed some TLC," said lighting designer Ross De Alessi, IALD, LC, MIES, principal of Ross De Alessi Lighting Design. "Railtrack, which owns the bridge, decided that since it was repainting the bridge, it would also put in the infrastructure and lighting to feature the bridge." The entire effort cost £40 million and included the removal of an old lighting system that produced more light trespass in the neighboring environment than actual illumination on the bridge itself. "Although floodlights were placed at the bottom of steel intersections, the bridge wasn't really floodlighted," said De Alessi. "The only way I can describe it is that they were used almost as festoon lighting, so there was this dotting of the structure." Adding little aesthetic value, the points of light, "glare bombs" as described by project manager Trish Connor, interfered with boat traffic on the Forth and were difficult to access. Connor said, "We wanted an installation that would avoid these problems and be easy to maintain."

The result is a solution that not only showcases the rejuvenated bridge in its "Forth Bridge Red" glory, but celebrates its rich history and monumental design. "The client didn't really present any specific goals or challenges," said De Alessi. "They basically just said, 'Give us your best ideas.'" To prepare, the lighting design team assiduously researched the history of the bridge as well as the region in which it is located and studied the details of its construction, shape and style. "We learned about why the bridge was built and why it looks the way it does," said De Alessi. "In doing all of that research, I realized one day that there are a lot of aspects that people take for granted about bridges. That's where the four concepts came from."

Each developed to recognize a different aspect of the bridge, the concepts are titled, "the Dawn of Steel," "the Achievement of Engineering," "the Honor of Construction" and "the Accomplishment of Transportation." Because the Forth Bridge is the first all-steel bridge, the Dawn of Steel pays homage to that material by illuminating the base and creating a fire-like quality. The Achievement of Engineering emphasizes the 12-ft.-diameter struts and the Honor of Construction acknowledges the internal architecture of the bridge. The Accomplishment of

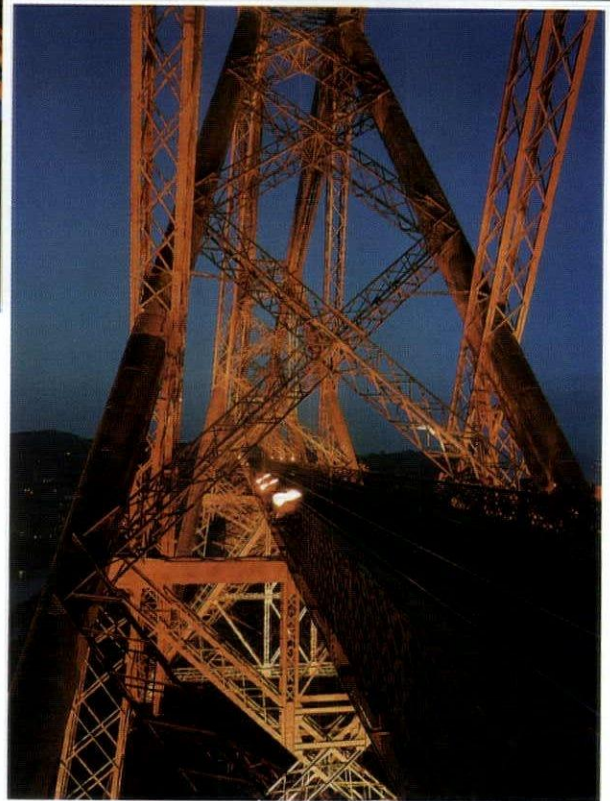
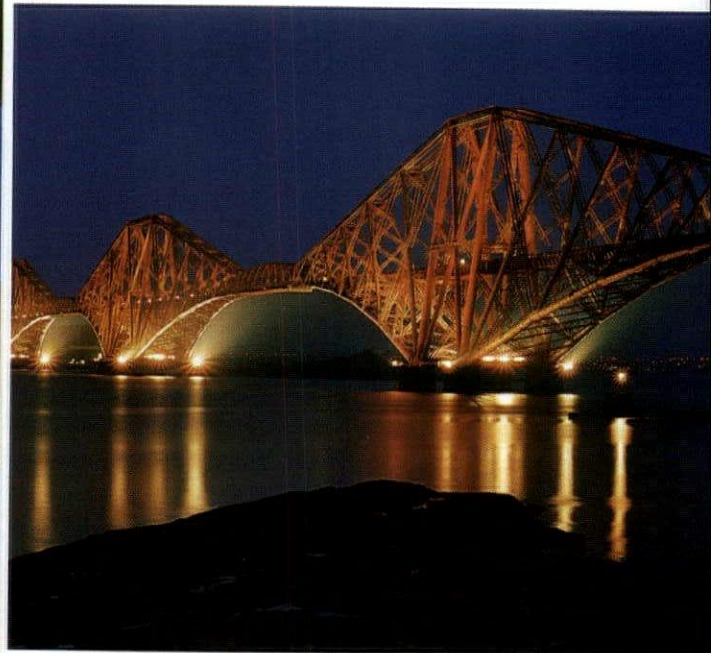
This rail-only bridge in Scotland is a physical testament to the power of technology and engineering: Neither the forces of nature nor time would collapse the structure that began as a redesign of the ill-fated vision of Sir Thomas Bouch.







Photos: ©Douglas A. Salin



The bridge is illuminated primarily with a combination of spot and linear fixtures equipped with improved-color sodium sources to enhance the historic red color, accentuate its undulant form and create striking depth against the Scottish skyline.

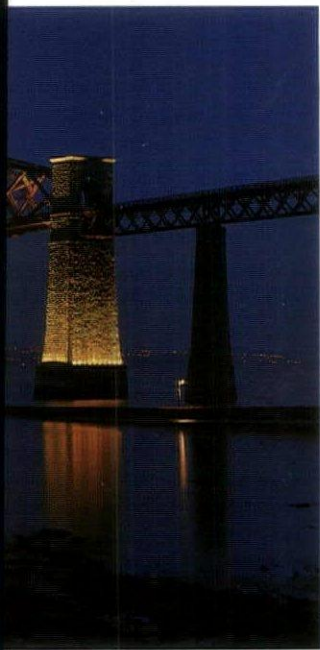
Transportation highlights the trackside windscreen. “The original intent was to burn one concept per night Monday through Thursday, combine the four Friday and Saturday and then go to dark on Sunday,” said De Alessi. “We did a mockup on one-sixth of the bridge to demonstrate the different concepts and the owners and electrical engineers were impressed.” However, in the end, only two—the Achievement of Engineering and the Honor of Construction—were chosen and combined. “It wouldn’t have made sense to separate just the two,” noted De Alessi, “but it was a good aesthetic choice on their part.”

SUPPORT SYSTEM

Although the poet William Morris once declared the bridge “the supremest specimen of all ugliness,” the key to the Forth Bridge’s longevity lies in its famous undulant structure and internal support system of girders, both of which were conceived to resolve two problems: First, they provided the long spans required to extend across the twin channels of the river and secondly, allowed boat traffic in the channels to continue during the seven years of construction. Tapering off at the ends into two short-span viaducts at the north and south shores, the bridge

consists of three pairs of balanced cantilevers and two central girder spans, which together total 1,700 ft. in length. Towering at 342 ft., each cantilever is grounded in a quartet of masonry piers and composed of 12-ft.-diameter struts. The bridge derives its strength from a geometrical bracing system based on the triangle, the only straight-sided polygon whose shape cannot be altered other than by changing the length of one or more sides.

The selected design concepts honor the engineering wizardry behind the bridge’s architecture by accentuating in light its undulant form and illuminating its steel skeleton. However, because of the openness of the architecture, mounting conditions were restrictive. “The angle of light can really work against you in this type of application where you’re grazing something,” said De Alessi. “We had to find places where the reflected light



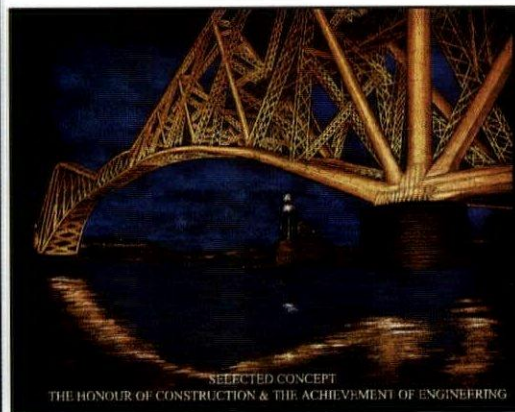
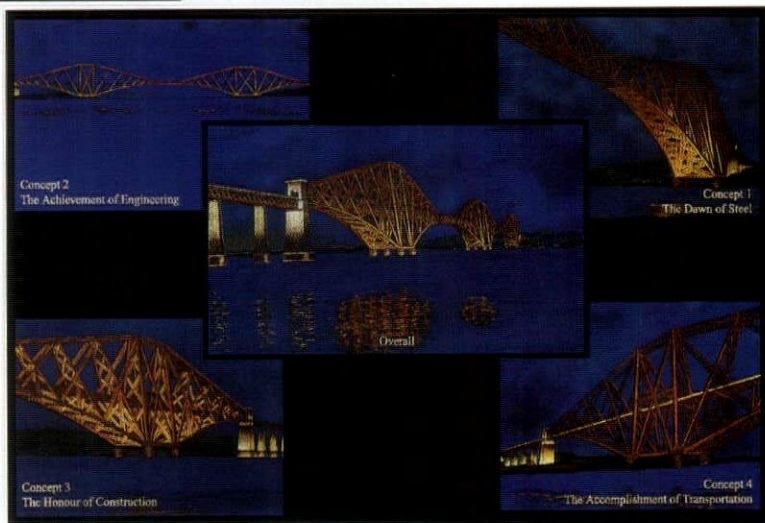
would be used to its utmost efficiency.” Compounding the problem, fixtures also had to be easily accessible for maintenance. Said Connor, “With the previous installation, you accessed the fixtures by rope and harness, so as you can imagine, maintenance was very difficult.” In fulfilling these requirements, fixtures were mounted in only three locations: on gantry structures, braces connecting the piers and on the windscreen next to the track. Because locations extended no more than 30 ft. from the structure, precise aiming became critical.

“That was a stinker,” said De Alessi, “because in order to go trackside, you have to get permission. Trish actually is certified to go up there. She’s one of the only Americans with a PTS.” Connor received

fixtures, while 70-250W spotlights, some equipped with linear spread lenses, delineate the girders. Linear lenses used on the central girders are backblasted to soften the light and increase beam spreads for shorter throws. Minimizing glare, fixtures are equipped with louvers, shields and half-shields. The shields are positioned to face oncoming trains.

All of the fixtures are lamped with improved-color sodium sources to enhance the historic “Forth Bridge Red.” “Other lamp sources wouldn’t look good on this bridge,” commented De Alessi. “Metal halide, for example, would just destroy this color.” Further integration with the architecture was achieved by painting all fixtures and accessories the historic red color.

“The project was remarkable because the bridge truly is an engineering marvel,” said De Alessi. Connor added, “It’s such a national treasure to the Scottish people.” Although both credit their Scottish counterparts for the ultimate success of the project, convincing them at first to trust the lighting of their landmark to an American team was perhaps one of the most difficult aspects of the entire endeavor. “That was a little bit of a tough pill to swallow,” said De Alessi. “The perception was: Why is an American telling us our aesthetic?” However, the experience proved positive for all



Four concepts for the Forth Bridge celebrate the material, construction, architecture and transportation of this century-old structure. For the final lighting plan, two of the four original concepts were selected and merged to result in what is seen today.

her “Permission Trackside” after taking a course on track safety and passing the exam. “It’s quite an experience the first time a train comes rushing by,” said Connor. “The train is about 3 ft. away from you and the whole structure tends to shake a little, too.” Certification allowed her to spend three weeks fine-tuning the aiming of fixtures. Connor said, “The aiming was crucial to lighting the structure evenly and keeping most of the light on the bridge.”

SEEING RED

The approach to the Forth Bridge is marked by the Jubilee Tower. Its stonework facades are grazed by spotlights equipped with 150W lamps and secured by custom steel brackets hammered into the base. To dramatize the swell of steel from suspended span to cantilever, light boldly bathes the central struts of the cantilevers and gradually fades as it approaches the central girder spans, which are illuminated primarily from inside. The massive 12-ft.-diameter struts are uplighted with a combination of 150-400W spot and linear

and the results were acknowledged by Historic Scotland. “The director of electrothermal, Les Grant, kept saying, ‘chalk and cheese,’ as in ‘would you rather eat chalk or cheese?’ ” said De Alessi. “He called the old system chalk and this one cheese—it was really very sweet.”

DETAILS

PROJECT Forth Rail Bridge **LOCATION** Firth of Forth, Scotland **OWNER/CLIENT** Railtrack **ARCHITECT** John Fowler and Benjamin Baker **LIGHTING DESIGNER** Ross De Alessi Lighting Design—Ross De Alessi, IALD, LC, MIES; Trish Connor, MIES **ELECTRICAL ENGINEERS AND INSTALLERS** Electrothermal, a division of Rigblast—Les Grant, director; Garry Shand I.E.I.E., L.C.G.I., electrical project manager **PHOTOGRAPHY** Douglas A. Salin **LIGHTING MANUFACTURERS** Bega; Osram



Trading Place

High tech meets high drama at this stock theater venue

BY WANDA JANKOWSKI, CONTRIBUTING EDITOR

What is Nasdaq? That's the question lighting designer Ted Mather and project manager, Seth Frankel had to answer before the concept for the Nasdaq Theater could even begin to unfold. Understanding Nasdaq and honing in on its image became easy, however, when they compared it to the traditional N.Y. Stock Exchange. "Visitors to the N.Y. Stock Exchange stand behind glass to view the trading floor and are separate from the process," said Mather. "And the professionals down on the floor, in this age of technology, use pieces of paper to carry information." The Nasdaq computer-trading network, on the other hand, stands for connectivity, speed and accessibility and is linked with some of the most dynamic companies in the market. The client wanted to establish its brand as a driving force by creating a theatrical environment that makes visitors feel as if they are part of the Nasdaq.

"The client wanted visitors to sense that they are inside the computer, in with the data stream and have access to it," Mather explained. "The theater experience would project the essence of Nasdaq without being specific about the companies involved, because they are always changing. The presentation also had to

be accessible to an international audience."

While the triangular form of the Nasdaq Tower contributes to its striking presence in the hustle and bustle of Times Square, the "pie-wedge-shaped" space that houses the theater experience presented the design team with difficulties. Said Mather, "We wrestled with what to put in the space, particularly because the space is not conducive to traffic flow." The design team set the video screen at the narrow end of the "pie wedge" with access tunnels to and from that holding area, filling out the widening triangle.

TUNNEL VISION

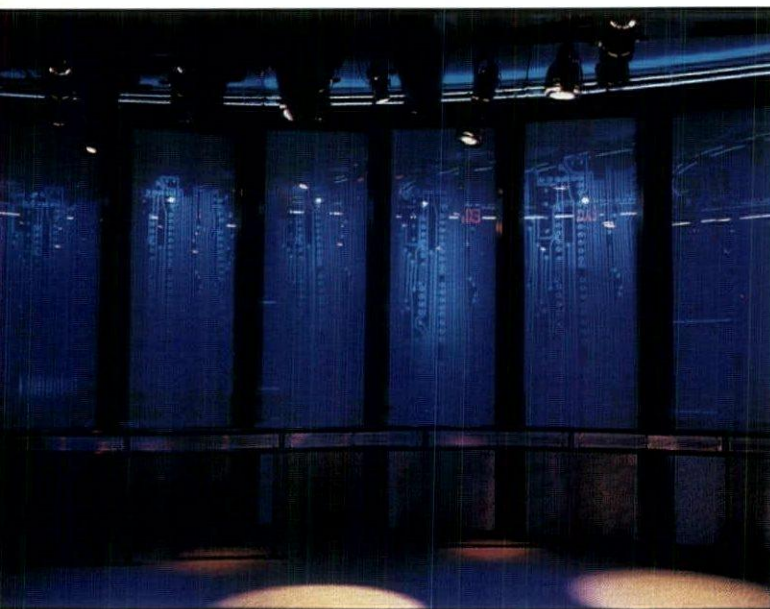
After ascending an escalator, the guided tour begins when visitors trip a motion sensor that sets off a kinetic light display in the Information Stream Tunnel. Light and sound represent the constant stream of data that forms the basis of Nasdaq. The sides of the tunnel are lined with curved, perforated metal panels that sparkle with fiber-optic points of light. Bordering the rows of panels are 4-ft. sections of blue neon that graduate in tone from darkest blue at floor level to lightest blue near the ceiling. "The neon sections all pull from the back to the front like waves and draw visitors visually into the tunnel," said Mather. There are 79 sections of custom DMX-controlled neon. The ceiling of the tunnel is like "a warm spine of flowing energy." Made with translucent fiberglass, it glows, backlit by PAR36 fixtures.

The visitors leave the tunnel and gather in an open area with swirls of blue and green neon above their heads. As the lights dim, the large screen before them comes alive with rear-projected video. Eight minutes of overlapping vignettes demonstrate how the Nasdaq operates and the real-life impact of the trades made on the stock exchange. As the video ends, visitors go through the next part of their journey, directed by stationary pools of light on the



At the Nasdaq Theater, the world of streaming data and high connectivity is evoked through the use of colorful neon, fiber optics and moving lights.

Photos: ©Bill Stanton



Left: Rectangular glass panels come alive with projected circuitboard patterns. Right: A tunnel studded with fiber-optic light transports visitors into the heart of the Nasdaq network.

floor. The pools vary in size, created with “junior” fixtures fitted with irises that change the diameter of the light circles.

Through this next passageway, the message involving the constant flow of information through the Nasdaq network is reinforced through light and motion again. The sense of being in a data stream is created in several ways. Rectangular laminated glass panels that allude to flat-screen technology are enlivened with projections of circuitboard patterns. Technobeam automated mirror fixtures project words, such as “unlimited technology” or “growth opportunities,” onto the panels. The words move up, left and right.

As visitors pass the panels, they catch glimpses of fiber-optic tips on the edges of the panels that brush the glass with color. The rectangular panels are mounted on stand-alone frames and consist of dichroic-coated glass laminated to translucent plastic and tempered safety glass. The dichroic coating shimmers and changes its colors and appearance as the guests pass by. The visitors leave the Nasdaq Theater with memorable sensory images that reinforce the knowledge gained, making the learning experience a lasting one.

Mather explains that in a project such as this, in which the exhibit design is so closely tied with the lighting, the collaborative effort between him and Frankel had to coincide with the beginning of the project itself. Though the exhibit is designed to be low maintenance, a technician monitors the installation and replaces lamps as needed every few months.

THAT’S ENTERTAINMENT

The Nasdaq Theater is an example of architectural entertainment lighting. Mather explains, which has been evident in retail for some time and is growing in popularity in other venues. “Consumers are a more visual audience today. To get people to come to a venue, you have to offer something active or interactive. People won’t go in droves to static museum exhibits,” Mather said. “The Nasdaq Theater presentation includes more than 100 cues. It’s an event.”

“The budgets, of course, for this type of architectural

entertainment lighting are larger, but it comes down to invest or die for some clients. The clients like the results in the end, but companies like these often look to do this once, unlike a franchise or a retail chain,” Mather explained. “It’s hard starting over on every project educating a new client. But building client trust is essential. That’s a slow process.”

What does architectural entertainment lighting have that architectural lighting doesn’t? According to Mather, cueing and more color, but there’s something else. “Architectural lighting is lighting you live and there’s something else. “Architectural lighting is experience you says, ‘Look at it now!’” said Mather. “It’s a different mindset to take through the design process. In this environment, you are taking over the visitor’s time.”

Mather’s background includes theatrical lighting experience, collaborating on transferring of U.K.-debuted productions of *Les Misérables*, *Starlight Express* and *Miss Saigon* to the American stage and with U.S. designer Natasha Katz on the lighting of Broadway’s *The Scarlet Pimpernel* and *Beauty and the Beast*. Mather balances his theatrical background with architectural knowledge gained from his partner, architectural lighting designer, Anita Jorgensen. A valuable pairing. Just like the seamless blending of high-tech lighting techniques with high-tech materials in the Nasdaq Theater experience. ■

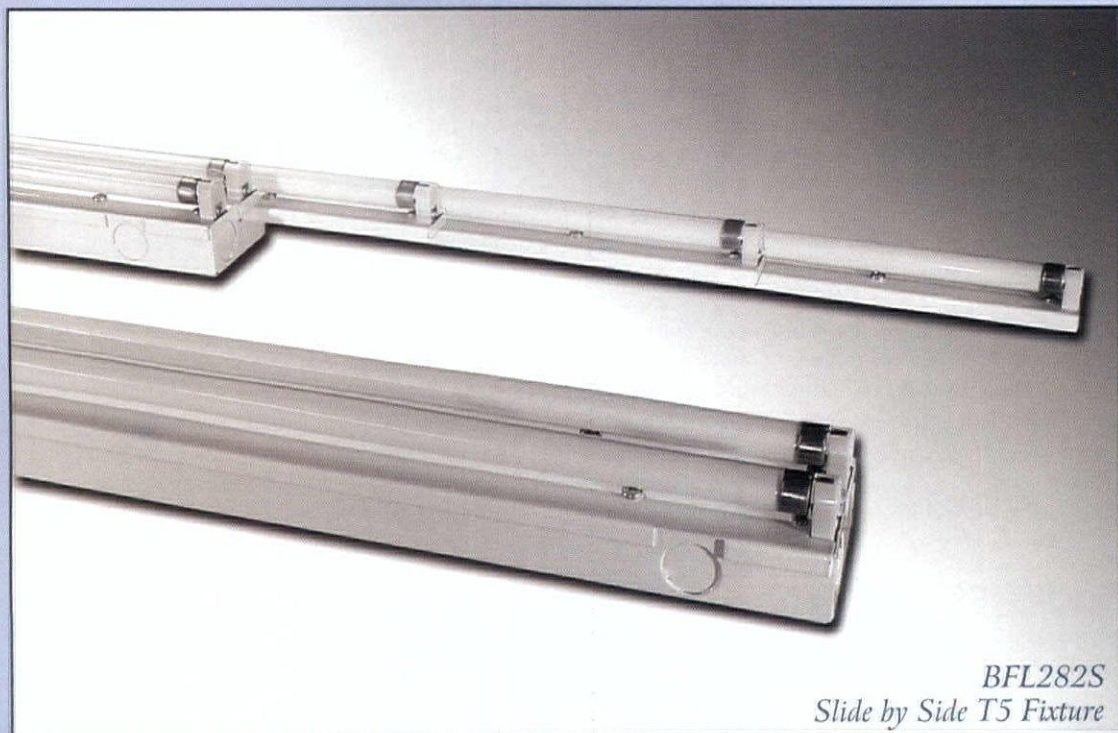
DETAILS

PROJECT Nasdaq Theater **LOCATION** New York City **EXHIBIT DESIGNER** Douglas/Gallagher Washington—Seth Frankel, senior project designer, project manager **LIGHTING DESIGNER** Mather Jorgensen Lighting—Ted Mather, Anita Jorgensen **PHOTOGRAPHER** Bill Stanton **LIGHTING MANUFACTURERS** ETC; Strand; Thomas; TPR; Legion; MultiNeon; Rosco

BARTCO

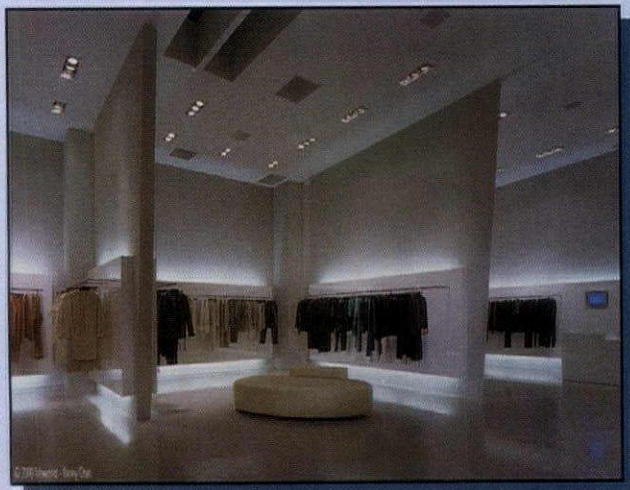
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lightfair

More than 17,000 architects, engineers and design professionals are anticipated at Lightfair 2001, which will be held May 30-June 1 at the Las Vegas Convention Center in Las Vegas, NV. This year's event embraces an expanded exhibit space of more than 135,000 net sq. ft. dedicated to the latest in lighting technology and information and will be occupied by more than 450 domestic and international manufacturers who plan to showcase cutting-edge products in 1,300+ booths. A comprehensive conference consisting of 27 seminars will be presented in seven different tracks, including "Lighting Design of the Built Environment," "Energy & Technology," "Lighting of Exterior Spaces," "Building Blocks for Professional Development," "Designing for the Future," "Controlling the Source" and "Lighting & Health."

Architectural Lighting highlights some of the scheduled events and previews some of the special features planned for this year's show. For more information on any of the following events, visit Lightfair's website at www.lightfair.com. Information about attending, exhibiting, conference programs, workshops and seminars, travel, current exhibitors, special events, registration and more is included.

And don't forget to stop by and visit **Architectural Lighting** at **booth 414**. See you there!

IALD Awards Presentation and Celebration

The IALD 18th Annual Lighting Awards Dinner will be held June 1 from 6:30 pm-12:00 midnight at the Paris Hotel. Join the industry in honoring this year's winners at the gala event cosponsored by the International Association of Lighting Designers (IALD) and *Architectural Lighting Magazine*. Continuing in last year's tradition, proceeds from the event will benefit the IALD Education Trust fund.

Judging for the IALD awards took place March 1-2 at the IALD headquarters in Chicago. Respected professionals from the architecture and lighting design communities judged 175 entries on their aesthetic and technical merits. Complete coverage of the winning submissions will be featured in the July issue of *Architectural Lighting*.



Exhibit hours

Wednesday, May 30: 10:00 am-6:00 pm

Thursday, May 31: 10:00 am-6:00 pm

Friday, June 1: 9:00 am-3:00 pm

Showtime

Special Events

May 30

Kick off Lightfair by attending the multimedia **New Product Showcase & Awards Presentation**, sponsored by *Architectural Lighting* and lightsearch.com at 8:30-10:00 am. This much-anticipated presentation offers an exciting glimpse of what will be on display in the exhibit halls and the products that will create a buzz at this year's show. Find out which manufacturer submits the Best New Product of the Year and which products will be recognized for technical innovation, energy management and savings and design excellence. Judges for 2001 include Rosemarie Allaire, IALD; Denise Bruya Fong, IALD; Dawn Hollingsworth, IESNA; Ronald D. Kurtz, Jr., IALD, IESNA; and Russ Owens, IESNA.

The Nuckolls Fund for Lighting Education Luncheon/Seminar, "How Lighting Practitioners and Educators Can Work Together," will be held at the Las Vegas Convention Center from 12:15-1:45 pm. Jeffrey Milham, president of the Nuckolls Fund for Lighting Education, will announce the recipients of two annual \$20,000 grants. One \$20,000 grant will be used toward the expansion of an existing lighting program and the second will support an introductory lighting program at a college or university currently with minimal or no lighting design offerings. Milham will also announce the winner of the \$7,500 Edison Price Fellowship, which is given to a lighting educator to further develop his/her teaching skills in lighting. Pamela Horner, president-elect of IESNA, and Ruth Beals, the Year 2000 Edison Price Fellow, will give a presentation on how lighting practitioners and educators can work together to benefit sponsoring companies, educators and lighting design students.

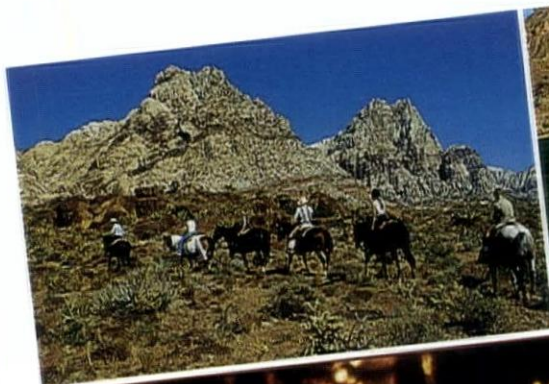
May 31

Join Belfer Lighting from 7:00-8:00 am at the **Desert Walk in Memory of Craig A. Roeder**, which benefits the Nuckolls Fund for Lighting Education. Bring your running shoes, walking boots, rollerblades or bicycles for this sunrise stroll down Paradise Road, which ends with breakfast at the Las Vegas Hilton. For more information, visit the Belfer website at www.belfer.com.

Join NCQLP president, Tom Scott, LC and NCQLP board members in recognizing the LC Class of 2001 during the **National Council on Qualifications for the Lighting Professions Lighting Certified Luncheon** from 12:15-1:45 pm. Russ Leslie, AIA, LC, FIES will discuss the Intern LC program and introduce the first class of Intern LCs. Arthur Rosenfeld, California Energy Commission Commissioner, will present "E-Lighting: the Internet, Lighting Controls and Real-time Prices."

June 1

The International Association of Lighting Designers/Lighting Industry Resource Council (**IALD/LIRC**) **Semi-Annual Meeting** will be held at the Las Vegas Convention Center from 12:15-1:45 pm. The meeting will feature an update on activities and a status report on the ongoing research by the LightRight Consortium, which will be presented by Carol Jones, program manager, Battelle/Pacific Northwest National Laboratory. LightRight is working toward proving the real value of lighting by performing research on the relationship between lighting and productivity in office environments. Non-members are welcome.



in Vegas!

While Lightfair might just be the best game in town, you can bet the following projects will deal you some memorable experiences. After all, you'll be in America's version of the "City of Lights." Odds are you'll need a little R&R. So, for some good eats with good lighting, try out some of these winning combinations ...

Accentuate the Positive

Lutèce

In a piercing study of positive forms within negative space, the architecture of this internationally renowned restaurant, located in the Venetian Hotel, and its uncompromising illumination leave patrons with only fine food and architecture to contemplate. "In every other restaurant we have done, diner comfort and the rendering of the food, followed closely by the articulation of the decorative theme elements, have been the most important lighting objectives to the restaurateur," explained lighting designer Patrick Quigley. "Expressing the architectural volume itself has many times seemed a minor consideration."

Paralleling the architecture's exploration of spatial manipulation, the lighting strategy uses highlight and shadow to monumentalize the massive white forms that float between a reflective black floor and absorptive black ceiling. The design required that no fixtures be outlined in or on the white walls or ceiling, strengthening these shapes against their dark, infinite surround and resulting in a truly powerful visual experience for the patron.

The restaurant's architectural form spins lazily around its "fulcrum" (a large-scale chandelier featuring 24 adjustable fixture heads) located just off-center within the main dining room. The reception, wine rack and bar are arranged around non-concentric ellipses with additional dining "spoking" off the main space.

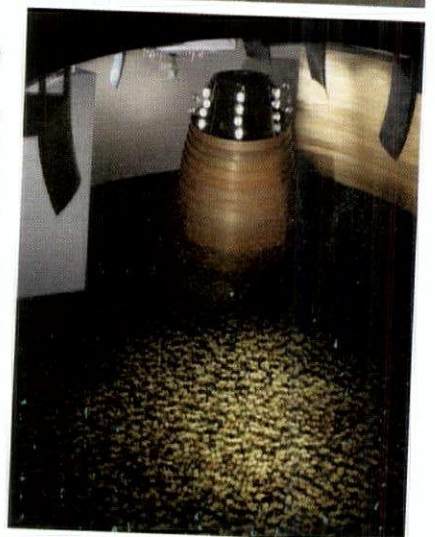
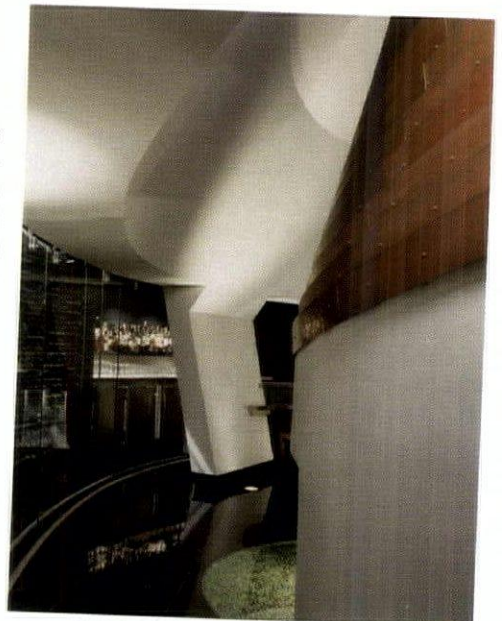
In the elliptical passage around the main dining, the simple reception area is lighted with one counter-mounted uplight and one truss-mounted MR16 adjustable spot. Reflection is used deftly as a design tool, giving presence to otherwise unlit surfaces. Bottles are raked with a front accent of MR16 narrow floodlights and backlit with side-lit fiber optics.

Floor-mounted MR16 uplights sculpt the "positive" white forms through the interaction of light and dark. Again, reflection enriches the composition by revealing additional planes of materials. Fiber optics illuminates the floor sculpture while traditional MR16 downlights enunciate the bar.

The hands of 19,000 cast figures support the elliptical glass disk covering the counter-sunk sculpture. Blue fiber-optic coils below provide both depth and counterpoint to the warm downlighting from above. A reflection in the lens shows the fulcrum chandelier and the fixtureless black void of ceiling above.

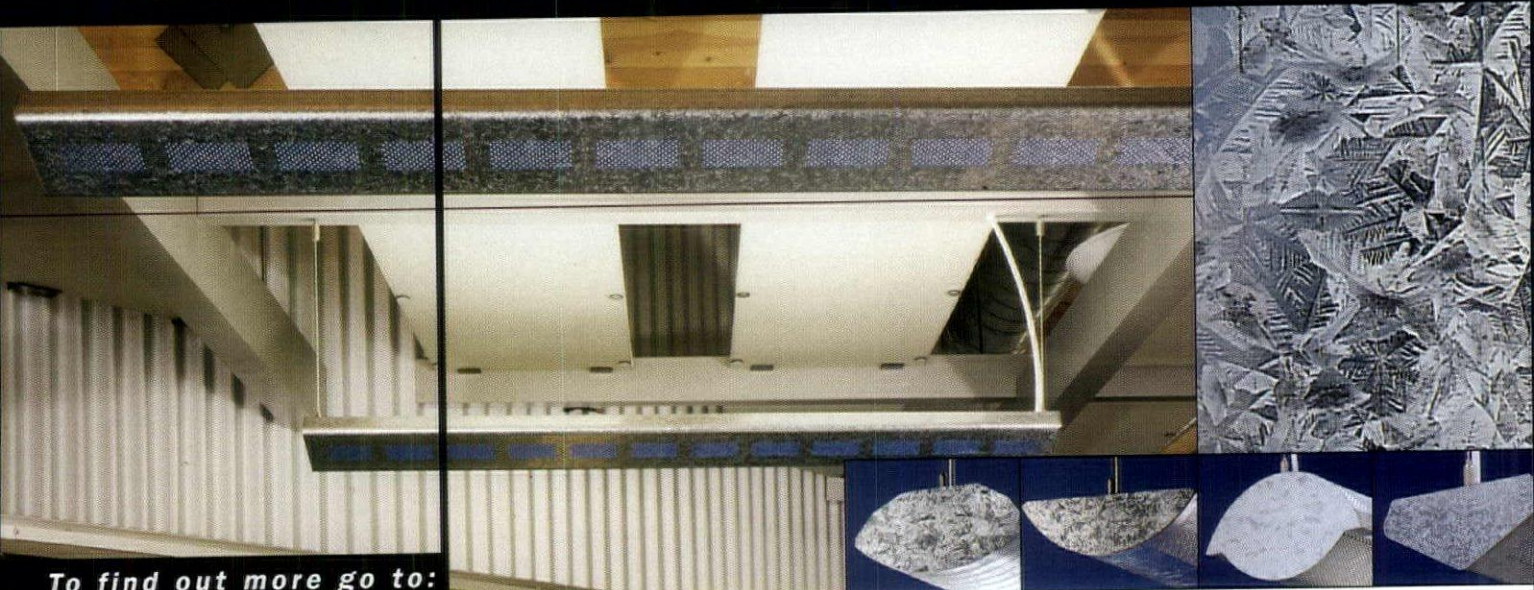
Warmth is infused into the austere environment through the use of table candles, framed art pieces uplighted with MR16 direct burials and a band of overlapping bronze panels wrapping around the space. The brightness of the band rises and ebbs as it moves closer or further from its source of illumination and design counterpoint—the fulcrum chandelier.

Lighting designer: Patrick B. Quigley & Associates—Debra Fox, Patrick Quigley
Architect: Morphosis—Tom Mayne, Kim Groves, Brandon Welling
Photographer: Fashid Assassi **Lighting manufacturers:** Halo; Targetti-Tivoli; Fiberstars; Tech Lighting; Hydrel; GE Lighting



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Graphic Display

Tsunami Asian Grill

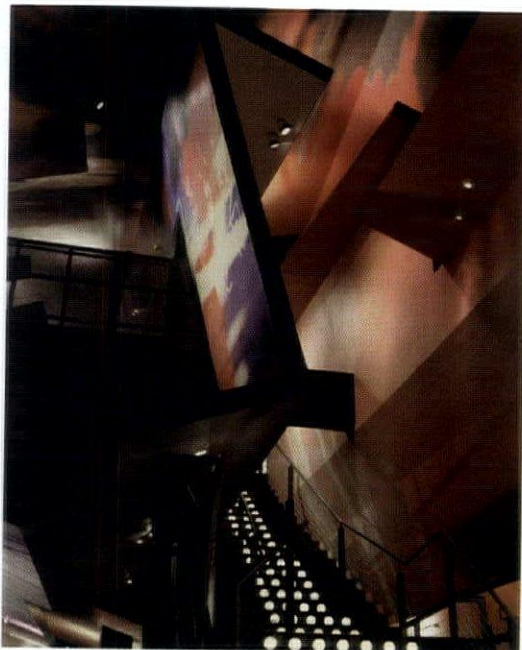
Housed within an incredibly dynamic architectural environment, this trend-setting pan-Asian eatery, located in the Venetian Hotel, called for a design solution that would reinforce the architect's intellectual exploration of overlapping folds and planes. The result is a highly flexible lighting system that:

- Creates a compelling sequence of visual events, enticing movement through the space
- Offers an array of interesting dining experiences
- Expresses the rhythms and textures of large-scale pixelated graphics

The complex system of folded walls and angled planes layered against one another made the space unusually difficult to comprehend in plan and section, according to lighting designer Patrick Quigley. Therefore, specific fixture locations, aiming angles and MR16 beam spreads were determined through the use of a detailed architectural model. Consequently, the architectural design directive that the lighting should add drama to the architecture without dominating it was achieved largely by placing fixtures in discreet locations.

A mix of MR16 and T3 adjustable downlights is integrated into the graphics by aiming fixtures where they would best reinforce selected patterns and forms depicted on the folded walls, adding texture to the otherwise two-dimensional surface. The resulting variation of intensity accentuates the rhythms, depth and movement of the graphics.

A monumental steel staircase dominates the entry; each riser is punched with 4-in. circles of frosted glass and backlit with



with low-voltage linear light strips, beckoning visitors to ascend. In contrast to these rigidly organized luminous cutouts, an adjacent enclave of tables offers patrons the subdued comfort of dining in candlelight. "While this project offered a refreshing reordering of priorities—there was a tremendous emphasis placed on articulating the architectural elements of the space, which is not typically the primary lighting requirement when illuminating a restaurant—we as lighting designers still must try to make patrons look good to one another and their food appetizing," said Quigley. "And candlelight plays a critical role in this regard."

A cool fluorescent glow emanates from a luminous glass panel at the back of the mezzanine and provides a contrasting backdrop to the warm foreground of MR16 accent light. "This helps to

exaggerate the perceived depth of the space and draws patrons into the restaurant," said Quigley. "In this restaurant, the client has allowed the architectural volume itself and the exploration of its form to set the theme and create the ambiance."

In addition to visiting the dining area of the restaurant and sampling its fine fare, Quigley recommended making one other stop: "Though I have no photos to prove it, one of the best spaces in Tsunami is the restroom—don't miss it."

Lighting designer: Patrick B. Quigley & Associates—Debra Fox, Patrick Quigley **Architect:** Morphosis—Tom Mayne, Kim Groves, David Rindlaub **Photographer:** Fashid Assassi **Lighting manufacturers:** Targetti-Tivoli; Halo; Hubbell; Prudential; GE Lighting

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Cuisine Art

Nobu

If you haven't been to the one in New York yet, why not take a breather from Lightfair by stopping in at Nobu in Las Vegas for a bite of yellowtail with jalapeños, red snapper with chili paste or new-styled sashimi flavored with garlic, ginger and sesame seeds. The food is still hip—a lively improvisation on traditional Japanese cuisine with South American accents—the atmosphere friendly, but the dress is more casual, reflecting its location in the Hard Rock Hotel.

The decor, of course, mirrors the eclectic mix of the cuisine, featuring elements that also appear in its New York predecessor, including the black Japanese river-stone enclosure over the sushi bar, seaweed wrapper panels and pale green mat sculptures hanging on a back wall. According to Focus Lighting's Paul Gregory, who illuminated both restaurants, one of the key differences between the two is the generous 20-x-60-ft. shoji screen that extends across the entire ceiling of the Las Vegas venue and consequently figured prominently in the lighting design. "Concept-wise, the goal was to light the different design elements," said Gregory, "to create a multiplicity of gem-like views capped by a luminous shoji-screen canopy."

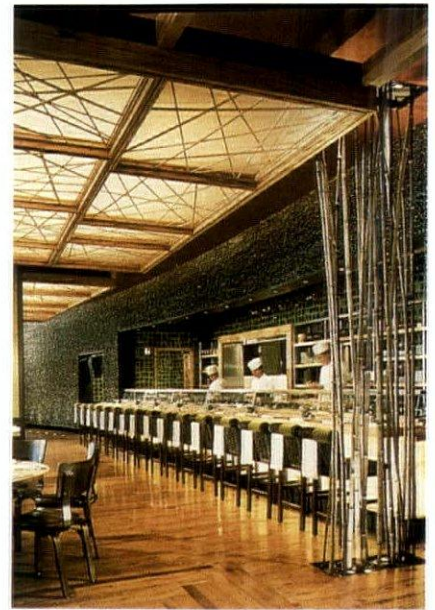
Luminous, the canopy infuses the space with a glow while adding its own distinctive accent to the Asian theme. The screen is backlit by tracks of incandescent striplights mounted on the wood mullions, which are in turn supported by a hanger system designed by Focus. Aimed at the ceiling, the strips are lamped with 75W PAR30 incandescent floods, selected for their warmth and complete dimmability. "It's difficult in a restaurant to have such a large backlit area, because it can take on the appearance of an overcast sky," said Gregory. "To fight that, you have to bring up the accents around it and you need to have full control. Many people would suggest dimmable fluorescents in a ceiling like this, but we decided to use incandescent lamps because we wanted the light to be soft and even, as well as totally dimmable." Individual screen panels can be lifted to facilitate relamping.

Accent lighting is used throughout the space to highlight different areas of the decor and contribute elements of sparkle. Hidden between the two sections of the shoji screen, MR16s illuminate the tables under the canopy to add dimension to diners' faces, while stalks of bamboo shoot into the ceiling and are grazed by MR16s tucked in a cove and recessed in the floor. In-ground MR16 accent lights also streak the ends of the black river-stone wall and work with a festoon-lamp strip concealed above to heighten the rough texture.

A total of 45 MR16s in recessed and track fixtures light the sushi counter, preparation area and a back wall of green tiles. Mounted in and behind the black river-stone enclosure and recessed in the ceiling, they provide the brightness necessary to counterbalance the lighted onyx bar dye below the counter. "We needed sources on 9-in. centers in order to give the sushi area sufficient punch," said Gregory. "Because the onyx bar dye measures 30 ft. long and 30 in. high, it required a huge amount of light. We had to increase the brightness where the sushi chefs work or else by contrast, that area would have looked very dark." The onyx bar is backlit with dimmable fluorescent strips spaced to produce an even glow and controlled with settings for day and night.

A feature carried over from New York, a seaweed wall in the private dining area is accented by a PAR-lamp strip hidden above in a cove. The cove also contains additional MR16s to light the tables below and add sparkle. Narrow spotlights highlight a trio of fabric sculptures suspended against a wall and are tucked in a ceiling slot with wide-flood PAR lamps that bathe the wall in light. Diners waiting for a table can refresh themselves at a bar area where shelving is backed by a sheet of Lumaticite. The Lumaticite is backlit by low-voltage strips to provide a luminous backdrop to the colorful rows of bottles and glasses.

Lighting designer: Focus Lighting—Paul Gregory, principal; Kim Donahue, senior designer **Architect:** The Rockwell Group **Photographer:** Paul Warchol **Lighting manufacturers:** RSA; CSL; A+L; Lumiere; Lucifer; Litelab; Halo; LBL; Legion; Lightolier; ALM





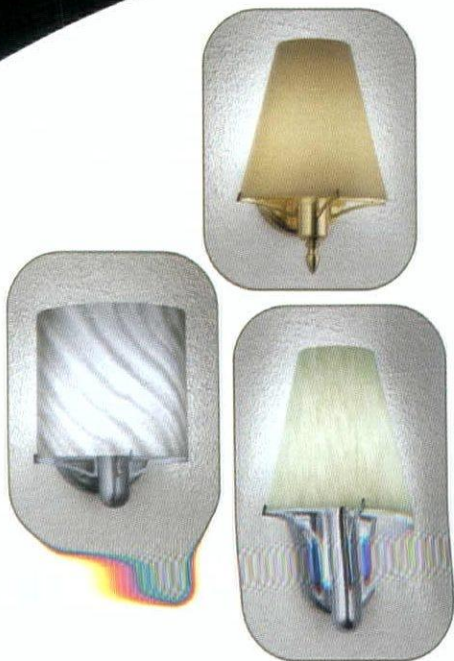
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Dinner & A Movie

WB Stage 16

Housed inside the Venetian Hotel, which lies on the site of the old Sands Hotel and '60s Rat Pack flick *Ocean's Eleven*, the WB Stage 16 restaurant capitalizes on its Hollywood connection to serve up a taste of Tinseltown glamour with four themed dining areas based on Warner Brothers' hits: *Batman*, *Casablanca*, *Golddiggers of 1933* and *Ocean's Eleven*.

"The idea was that the Venetian was built around this old soundstage—which it isn't—and that soundstage is Stage 16," said project manager Lynn Rosenbaum of Fitch Inc. The dining areas are actually reproductions of the original Hollywood sets from stills and blueprints—or rather, real rooms made to look like sets. Authentic studio lights mounted on greenbeds handle the bulk of the lighting throughout the restaurant. The vintage fixtures were gutted and replaced with UL-listed incandescent sources (150-250W) in the 3200-3600K range to eliminate their characteristic glare. "What I did in all of the spaces was to get actual old studio fresnels," said New York-based lighting designer Marsha Stern. "We retrofitted the inside of the fixture because we wanted the realism of using the actual studio fixtures, but people really couldn't sit under hundreds of thousands of watts of light and have dinner."



To light Rick's Café—a dead-on reproduction of the 1942 *Casablanca* set—Stern employed four greenbeds, roughly 20 modified studio 2ks and an assortment of PAR washlights and ellipsoidal spotlights. "Everything was done with warm rich tones—pink actually," said Stern, who was lucky enough to find a new "Moroccan Pink" filter for the room. "Everything was supposed to be softer, warmer." Templates and breakups are used on the ellipsoidals for texture and to project palm fronds on the walls. Battery-operated table lamps were custom-designed based on the movie.

With a 65-ft.-high ceiling and 80-guest capacity, The Golddiggers of 1933 is the largest of the four spaces. The decor is lifted from the "We're in the Money" song and dance number in the movie and features several large coins flanking a mock stage. In this area, larger retrofitted 10K studio lights

are hung from greenbeds to reflect those in use at the time of filming. Again, PAR washlights and ellipsoidal spotlights also contribute to the effect. Three-circuit mini-strips provide downlighting on the coins and stage.

The Gotham room borrows its iconography from the *Batman* series of films. The room's fantastic theme presented an ideal venue for creative lighting, but also imposed several restrictions due to structural elements in the space. Working from artists' diagrams, Stern tackled translating brushstrokes into real lighting. "That was my dilemma: How do I make it look like what the artist wants when I don't have any obvious place to put lights?" commented Stern. "Plus, the plans kept changing on what seemed like a daily basis—beams moving around, etc."

Lighting several of the space's unique design elements demanded special attention and a touch of theatricality. Contributing dramatic dimension to a Medusa relief, fiber optics powered by two metal-halide illuminators are combined with gels to add softness and color. In-grade exterior bronze fixtures, lamped with 50W MR16 sources, illuminate a second, larger relief and a pair of gargoyles. An open-grate staircase lined with neon descends against a cityscape of Gotham painted by Warner Brothers' scenic art department and backlit with a series of three-circuit mini-striplights. Splashes of color from dichroic filters are used throughout Gotham to enhance the darker, more somber atmosphere, while automated units project the "bat signal" on the walls.

Ocean's Eleven has a loungey '60s hipster feel upstairs, where the main challenge was to avoid glare from the room's many mirrors. As a result, this was the room with fewest fixtures. According to Stern, "This was a very hard room to focus because no matter where you aimed a light and positioned it how you wanted it, if you walked to another part of the room, there'd be a horrific glare—it was a nightmare." Undaunted, Stern was able to light the room successfully, using modified studio 2Ks and a few PAR fixtures. Downstairs at Ocean's Eleven, where Dean Martin does his lounge-lizard show in the film, scoop fixtures wash the center of the room and provide textured lavender and purple light. Special care was taken with the stage lighting, which was recreated with distressed PAR cans mounted to an overhead pipe.

Lighting designer: Marsha Stern Lighting Design & Consulting—Marsha Stern **Interior designer:** Fitch Inc.
Photographer: Mark Steele **Lighting manufacturers:** ETC; 4Wall; L&E; Altman; Architectural Details; Kim Lighting; Fiberstars; High End Systems; Lee Filters





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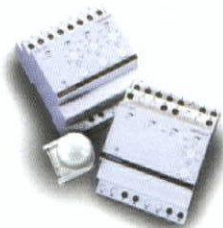
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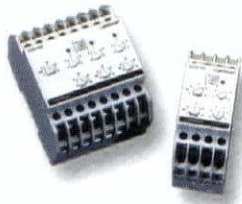
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Lamp Magic

Aladdin Hotel & Desert Passage

It seems like in Vegas all you have to do is rub two chips together to call yet another themed mega-resort into being. Certainly that was the case with the new 34-acre, \$1-billion-plus Aladdin complex, which rose, genie-like, out of the dust of its predecessor in a scant two years. The new Aladdin carries over and extends the Arabian Nights theme of the original with its domed tower, minarets and parapets.

As such, special care was taken with the facade lighting, which like that of all resorts on the Strip, plays a crucial role in attracting passersby to the hotel's casinos. The lighting scheme, designed by LA-based Kaplan Partners Architectural Lighting, plays off the dialogue between the warmly illuminated majestic tower icon and the cool-colored Colossus structure anchored on the Strip. The tower is flooded with 400W and 1000W HPS fixtures and highlighted with compact linear fixtures, creating horizontal accents at each cornice line. Internally illuminated blue and green fluorescents simulate a jeweled crown at its apex.

In contrast, floodlighting on the low-rise Colossus is accomplished with cooler pole-mounted 250W and 400W clear metal halide fixtures. The 50-ft. poles are hidden by palm trees. Cove-hidden incandescent-colored neon and 3000K fluorescent sources and backlit windows provide accents. Light intensity at pedestrian level was restrained to avoid defeating smaller scale lighting effects. Wall-mounted fluorescent uplights graze stone walls, while decorative post lights, sconces and pendants create human scale and image.

Kaplan also designed the lighting for the Aladdin's enclosed 750,000-sq.-ft. Desert Passage Mall. Keeping with the theme, the architecture and lighting change subtly to reflect Aladdin's literary journey from Gibraltar to North Africa. The heart of Desert Passage is the Lost City area with its 85-ft.-high sky ceiling and hourly sunrise-daytime-sunset lighting scenes. Sky ceilings constantly morph into sunrise, daytime, sunset and rainstorm scenes with dimming and color.

For the Desert Passage, the owner wanted to use fluorescents because of their lower energy footprint and long lamp life, a challenging design constraint, given the uneven mall facades, built to mimic an ancient village. The difficulty inherent to directing these sources added to the task.

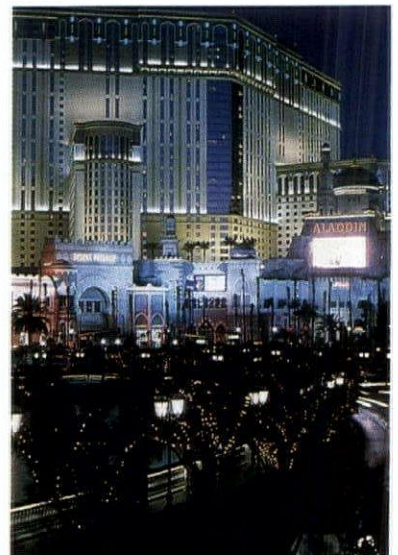
"In most projects you see with sky ceilings, a facade is pretty uniform in plan and in section—it's a pretty constant relationship to the sky above," said Kaplan's Michael Gehring, AIA, LC, IALD, lead designer on the project. "But in Desert Passage there's so much articulation in the facades. In order to avoid shadows up on the ceiling, we had to locate the cove-lighting for each building specifically."

Chosen for its flexibility, small section and availability, neon is used throughout the mall to backlight elements, reinforce plane changes, create gradients of light for added depth and graze materials to call attention to their texture and finish. In the Hall of Lamps, it is combined with PAR lamp downlights to articulate architectural forms.

In lighting the mall, the design team also aimed to create the feel of a living village. Faux windows are back- and uplighted with 3000K fluorescent single-lamp strips to give the mock buildings a sense of depth and suggest that people are working behind the luminous fronts. And fluorescents lining the sky ceiling's perimeter recreate the drama of a changing sky. Continuous two-lamp strips, fitted with amber, pink and blue color sleeves, emphasize the sunrise and sunset scenes and 1000W dimmable metal halide flood

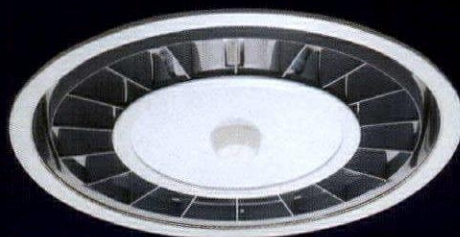
uplights, hidden in mountainous rockwork, emulate the daytime lighting scene. "We had fluorescent on the perimeter to get some color and movement and changing on the perimeter," Gehring said. "But to get enough light to make it look like daylight, we needed to use 1000W metal halide fixtures and make them dimmable."

Lighting designer: Kaplan Partners Architectural Lighting—G. Michael Gehring, AIA, LC, IALD; Joe Kaplan; Michael Ball **Architect:** RTKL Associates, Inc. **Photographer:** Gregg Photographic **Lighting manufacturers:** SPI; Sterner Lighting; Wide-Lite; Lutron; NSI; Prudential; Day-Brite; Architectural Cathode Lighting; Portfolio



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WILA

Conference Program

The conference program will have AIA, ASID, IIDA and IESNA accreditation and will provide NCQLP LEUs.

Wednesday, May 30

8:30-10:00 am

- New Product Showcase & Awards Presentation, sponsored by *Architectural Lighting* and *lightsearch.com*

2:00-3:30 pm

- "God is in the Details—What Did Mies Van Der Rohe Know?"; speaker: Charles G. Stone II, LC, IESNA, IALD
- "ASHRAE/IESNA 90.1/1999 Standards"; speakers: Joseph G. Howley, IESNA; Eric E. Richman, IESNA
- "Lighting for Safety, Security, Identification and Beautification"; speakers: Alan Hart, AIBC

4:00-5:30 pm

- "The Magic Behind Cirque du Soleil's 'O' at Bellagio"; speakers: Luc Lafortune, Claude-André Roy
- "Lamp Color, Visibility, Safety and Security"; speaker: Ian Lewin, Ph.D., FIES
- "Dark Sky—What is it? Why is it so Important?"; speakers: Nancy Clanton, IESNA, IALD; Adrian Nestor; Reginald R. Wilson, IESNA, IES Australia/NZ

Thursday, May 31

8:30-10:00 am

- "Merchandising the Retail Environment with Light"; speaker: Helmut O. Paidasch, IESNA
- "Energy Efficiency, Energy Effective Lighting at the Edge of the Envelope"; speakers: Lisa Hescong, LC, IESNA; Terry McGowan, FIES; Francis Rubenstein, FIES
- "Dramatic Facade Lighting—Lighting that Facade"; speaker: Robert Daniels, CSI

10:30 am-12:00 pm

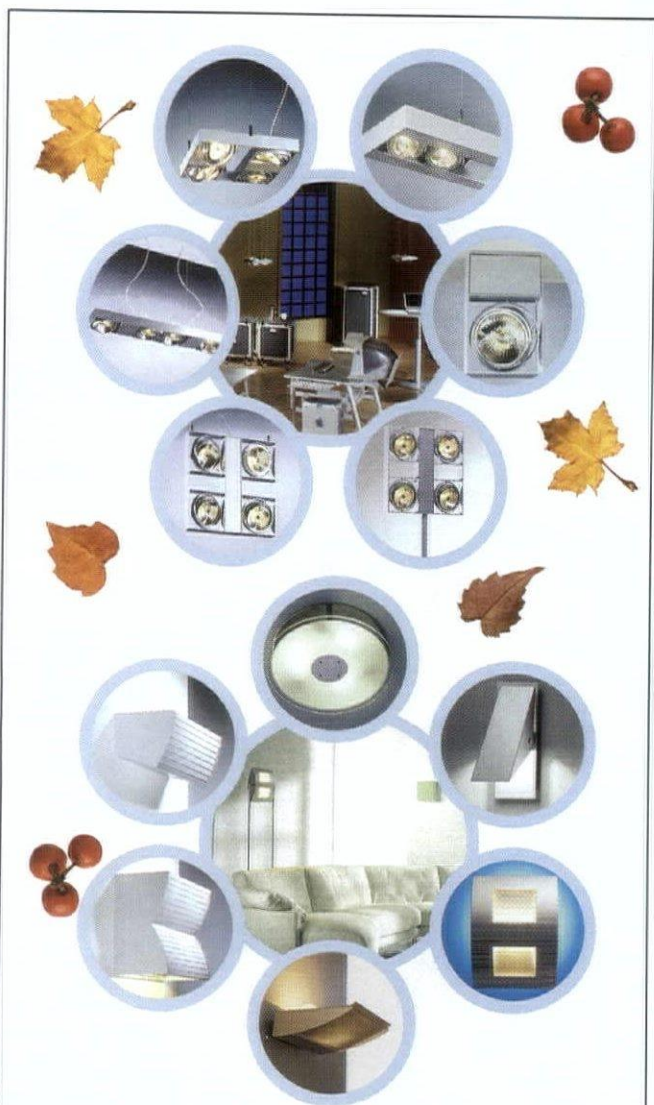
- "Power of Color in Light"; speaker: Fred Oberkircher, LC, IESNA
- "The Great Debate: 'Competitors or Complements: Will LEDs Replace Fiber Optics?'; moderator: Earl Print, IESNA; speakers: John M. Davenport; Ihor Lys; Joseph Manning; Jeff McDonald
- "What is Going On in the International Scene: Events, Products, Technology"; speakers: Roger van der Heide, IALD; Edward Effron, IESNA, DLF

2:00-3:30 pm

- "Poetry in Lighting Design"; speakers: Vesa Honkonen, SAFA; Julie Oksanen, ELDA, DISTAS, IESF, CIE
- "Annual Lamp and Ballast Update"; moderator: Earl Print, IESNA; speakers: Wendy Kaplan, IESNA, IALD; Clara D. Powell, IESNA, IALD; Roy D. Sierleja, IESNA; Erich Bockley
- "Impact of E-Commerce and E-Business on the Electrical Industry"; speakers: William Astary, IESNA; Mike Rioux, IDEA; Jim Worth

4:00-5:30 pm

- "Sleep Disorder and Nightshift Work"; speakers: Bob Venning
- "Control Me!"; speakers: Harold Jepson, PE, IESNA; Leslie North, PE, LC, IESNA; Sandra Vasconez, IESNA
- "\$70 Billion Market: Lighting Designers Wanted"; speakers: Stanis Smith, MAIBC, MRAIC; Nancy Stern, MAIBC, MRAIC



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Pre-Show Conference

Tuesday, May 29

- "Understanding New and Emerging Light Source Technologies"—Dawn DeGrazio, LC, IESNA; Makarand Chipalkatti, Ph.D.; Homer Antoniadis, Ph.D.; Leslie Levine, Ph.D., IESNA; John Kesselring, Ph.D.
- "LEDs...What the Technology Delivers Today for Architectural Applications"—Dr. Nadarajah Narendran, Ph.D.; Alfred Bellows; Chris Bohler, Ph.D.; Bill Ryan; Mathew Tullman
- "Why Write Specs If No One Reads Them?"—Randy Burkett, LC, FIALD, IESNA
- "Lighting Certification: LC Review Workshop"—William Daiber, LC, IESNA; Fred Oberkircher, LC, IESNA; Lori S. Roper, LC, IESNA
- "Daylighting: Accident or Technology?"—Marc Schiler, IESNA
- "Residential Lighting—Unplugged!: A Wry and Revealing Look a Lighting for Homes"—Randall Whitehead, IALD, ASID
- "Exterior Environmental Lighting for Residential Applications"—Derek Porter, IESNA, IALD
- "Thinking Photometrically, Part I"—Kevin Houser, Ph.D., LC, IESNA
- "Thinking Photometrically, Part II"—Ian Ashdown, LC, FIES
- "Casino Lighting."—Jason Cooper, LC, IESNA; Chip Israel, LC, IALD, IESNA
- "Lite Bytes 2001: Lighting Software Review"—Emlyn Altman

Friday, June 1

8:30–10:00 am

- "Photoreceptive Systems and Elderly & Others with Low/Poor Vision"; speakers: Alan Lewis, O.D., Ph.D., FIES; Mark Rea, Ph.D., LC, FIES
- "Digital Protocols: Language of Architectural Lighting"; speaker: S. Pekka Hakkarainen, Ph.D., IESNA, APS
- "Liability for Designers: Lighting and the Law"; speaker: Susan E. Farley, Esq., AIPLA, INTA Partner

10:30 am–12:00 pm

- "Research on the Influence of Lighting on Developmentally Disabled Children"; speaker: Gad G. Giladi, IESNA
- "Reflectors, Refractors, Louvers and Lenses...Oh My!"; speaker: Kenneth Mackenzie IV
- "Communicating at the Speed of E"; speaker: Anthony Long

2:00–3:30 pm

- "Physiological Health Issues: Melatonin & Breast Cancer, Alzheimer's and SAD"; speakers: Mariana Figueiro, IESNA; Mark Rea, Ph.D., LC, FIES; Richard Stevens
- "Building Management Systems & Controls...How It will Benefit Your Building"; speakers: P. Brian McKiernan; Paul H. Trively, IESNA
- "Things That Went Wrong and 11th-Hour Fixes"; speakers: David Apfel, IESNA, IALD; Addison G. Kelly, LC, IALD, IESNA



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Going to Market: Creating an Online Image That's On-Target

BY DAWN HOLLINGSWORTH, LC, IALD

We all use the Internet for business more and more everyday—for product information, general research, project management and communications. Today, the Internet is a double-edged marketing sword that lighting design firms can employ to serve existing clients and reach new ones. However, there has to be a good reason for people to visit any site. And once they do, it had better be a positive experience.



Lighting design is a custom service. Often, site design techniques that work for product-based businesses don't necessarily cross over to the service industry. Your site is the face that your company presents to the World Wide Web and you must set

will recommend it to colleagues and bookmark it for reference.

To add depth to your site, pick a passion and present it to viewers. For example, your site might reflect a corporate commitment to education. Principals of your firm may contribute regularly to trade magazines; post their articles on the site—with permission, of course. Maybe you've unearthed some interesting photos and diagrams from lighting history, which could then be posted with captions in a rough timeline. And as always, humor can be incorporated. For example, a timely story written during an election year on lighting for voting booths could present a comical view of the election process while genuinely calling attention to lighting-quality parameters.

The ever-expanding online brochure is always a key element and may include drawings and renderings. Printed brochures are extremely costly and demand expensive photography for quality reproduction. The flexibility of the Internet can display your most recent work very economically. Missed links or misspellings are fixable; content is easily updated. Nothing on the web is really permanent.

Websites also have immediacy. Potential clients who call for information can find it in just a few keystrokes. This exploits what Internet gurus call the teachable moment or "seducible" moment: That magic instant when the client is lighting-focused, seeking the exact services you offer.

Visitors to a lighting designer's website should experience the breadth of the firm's expertise and

Your site is the face that your company presents to the world—you must set strategic goals to offer more than a portfolio.

strategic goals to offer more than just a portfolio. To become a worthwhile destination on the information superhighway, you should post general lighting information along with technical articles written by members of your firm—or even those about your firm.

Rich content will inspire visitors—potential clients—to explore a site. It also prompts the search engines to direct traffic there—students and others interested in lighting. Beyond company news and information about services, feature and technical articles encourage repeat visits. If your lighting site is not only comprehensive, but also interesting, people

creativity. Information should be useful and easy to navigate. Right up there with stationery, deliverables and response time, the website is a direct reflection on your firm as a whole. The site must be perpetually maintained because poor graphics and dead links leave frustrated users with a very negative impression.

Keeping a site fresh does require considerable effort. What impression does a client have reading "news" that's two years' stale? Content is king, because a great-looking site that no one sees is practically useless. A website can be a valuable marketing asset that your target audience sees again and again.

The primary goal should be to create a site to which people will return—particularly clients.

GETTING STARTED

Like any marketing tool, the purpose and goals of a website should integrate into the company's business and marketing plans. The primary goal should be to create a site to which people will return—particularly clients. You want their first visit to be useful and informative.

There are hundreds of decisions to be made about the look of the site. The web is not all that different from print graphics with regard to readability. Even on a monitor, red text on a black background lacks contrast. Color is great, but typefaces should be simple and easy to read. Try to create pages rather than making the viewer scroll to get all the information.

If you've got a good designer working on the site, give him or her freedom to be creative. A standardized approach might look good in print, but a real snooze on the web. A good idea is to look at your clients' sites to see what they like.

Clients like to see themselves on your site, so provide project descriptions with complete credits with links—kind of a value-added service—and some product information. A lighting design is essentially intellectual property, so respect copyrights and always seek permission to post an article or photo. Publishers usually ask for a link back to their site in exchange, or they may only allow a link to the article on their site, which is quite logical for Internet media. Reciprocal links can increase traffic to your site (see Editor's note).

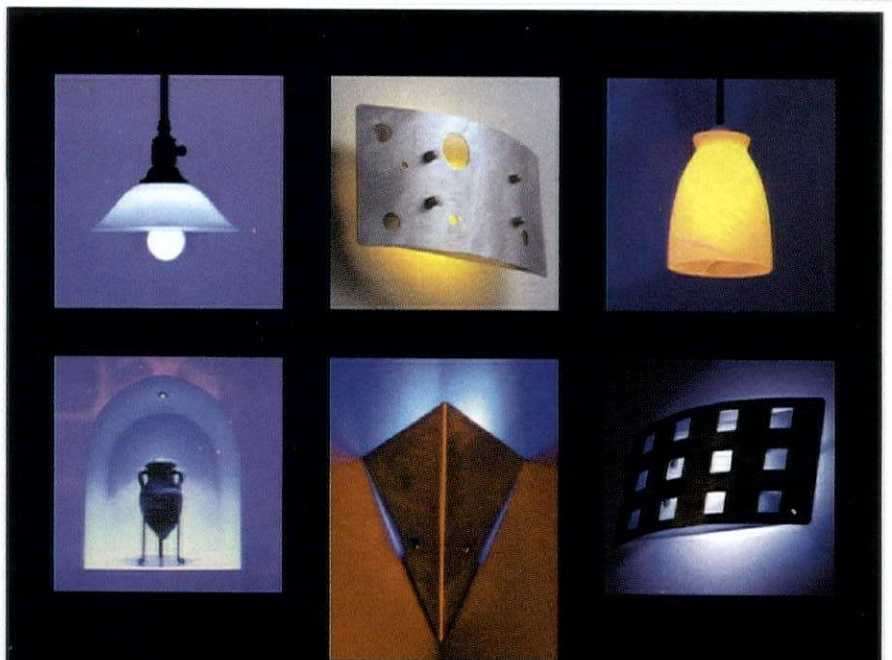
After planning and budgeting, register your carefully chosen domain name. The cost is about \$35/year. Companies like www.register.com can help register or purchase a domain name. Two million names a year are registered, so it's likely the name you want is no longer available. You may have to look at other extensions besides ".com." There are some new extensions such as .firm or .la, but be wary. These domains require a plug-in for browsers to be able to access them, which could limit your exposure.

Choosing whether to develop the site

using in-house time and talent or through outsourcing can be difficult. The answer lies in cost analysis. Maybe one of your employees has expressed a strong motivation to work on developing your site. Even if the person lacks web design or construction experience, their aptitude, organizational skills and design sense could

make them a perfect candidate to consider.

The investment in their learning curve will continue to pay off. Outsourcing requires a continual outlay of cash, as sites are updated so often. Because the employee remains on staff—that's the key to amortizing the investment—they continue to contribute creatively

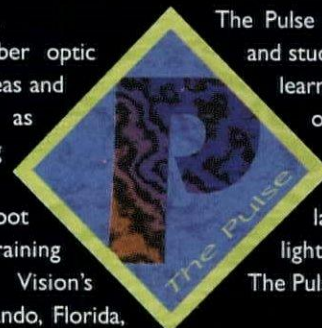


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INTERNET MARKETING TIPS

- Every business is different. A lighting designer may choose their website as a place to market books and seminars they've authored or presented. A company doing energy-efficiency work might have a quotations page.

- If you don't currently have a web presence, *run*—don't walk—to your ISP to get your name and address posted.

- Notify the search engines and use meta tags to elevate your site in results rankings.

- A slick website can level the playing field and allow small lighting design firms to compete with larger ones.

- Set a schedule for updates and stick to it. Web time moves four times faster than real time; six months is an eternity.

- Evolve the look of your home page so people look to see what's new.

- If you build it, they won't necessarily come. Cross-market your site in correspondence, publicity, marketing and during sales contacts.

- Small firms should outsource web design and construction (not content) if it will cut into billable time.

- Plan carefully—scope and site maintenance can snowball out of control.

- Contact information is vital! Address and phone number should be on the front page or on a "Contact" page.

- Use a "for further information" form that when filled out automatically emails the request. If your business is consumer-based, offering a prize drawing may help you build your mailing list.

- Email links are nice but be sure to spell out email addresses.

- Add directions to your office especially in large metropolitan areas. An easy way is to link to Yahoo maps or Mapquest.

- Digital cameras let you tell stories about construction administration services and track progress.

- Visit your own site frequently and make sure all the links are working. View the site in several resolutions and on different browsers and platforms.

- Remember that for design services, a website cannot replace the face-to-face sales call.

SITES TO CHECK OUT ...

See how some lighting designers are marketing their firms:

- www.randallwhitehead.com
- www.rosslight.com
- www.lightingdesignalliance.com
- www.mrhldi.com

and proactively to your site. Updates are extremely fast and mistakes quickly corrected.

"I analyzed my own behavior to see how I was using the web and what I liked about other sites," said Francis Mepin, office and web content manager for Moody Ravitz Hollingsworth Lighting Design, Inc. He read some Internet

magazines and a how-to book and was off and running.

Mepin had three things in mind that he wanted to accomplish:

- 1) Simplicity. Less is more.

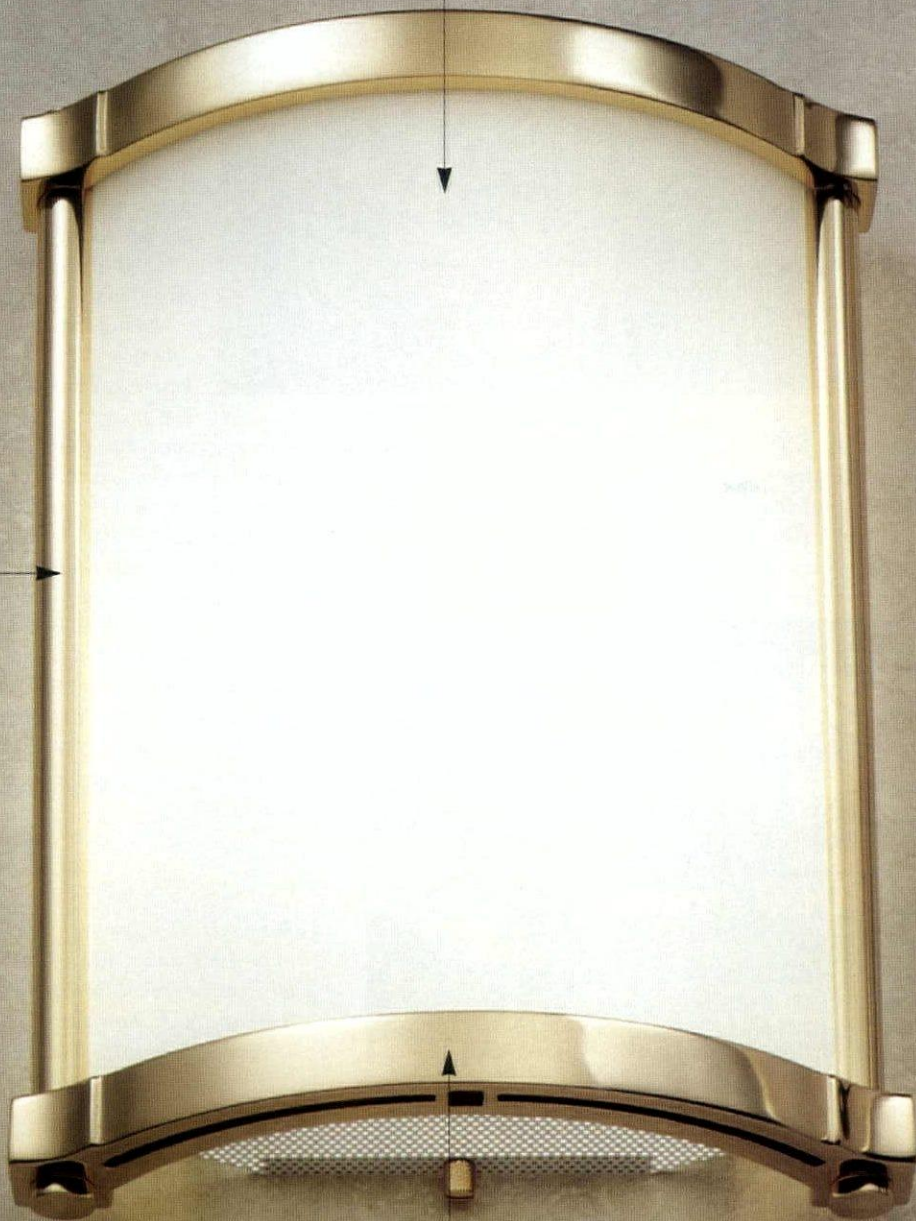
- 2) Clarity. Both content and its presentation should be easy to understand. Make sure that people hitting the site find the information they are looking for right

(Continued on page 64)

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(Continued from page 62)

away and that it's clear to them. "The three-clicks rule applies 100 percent," said Mempin. "Everything on the site should come up within three clicks from any page."

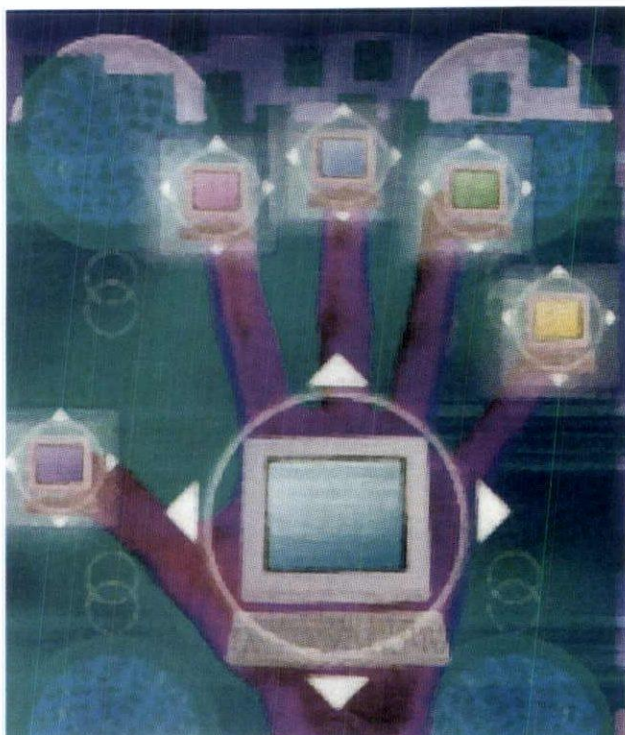
3) Speed. How fast does each page load? "We've got DSL now," said Mempin, "but a lot of people still dial-up. We didn't want a slow connection to discourage hits."

Flash animation can add to a site, but too much makes the site load slowly and can be a negative. If you have an animated introduction, give the visitor a way to opt out before they jump ship. Don't waste clicks with a home page design that doesn't convey immediate information about your company.

PROGRAM SELECTION

Mempin researched off-the-shelf programs and chose PageMill software (no longer available) from Adobe for building the site—and the price was within the budget. "As a first-timer I wanted something really easy to

use," he said. "PageMill has its limitations, so to compensate, I use a lot of colorful text. I'm definitely ready to move on. I'm looking at new, fully loaded programs, because there will be a



complete redesign of the site this spring."

If you don't require financial transactions over the Internet and your site is fairly simple, it makes sense to learn how to do it yourself. Programs such as Adobe's Go-Live or Macromedia's Dreamweaver cost about \$300 for the full version. It is best to outsource time-intensive animation. Despite the 2001 dot-com graveyard, web design is actually one of the few business models on the Internet that generates real profits. So query several providers to get the best deal; tailor services to your budget and don't buy more than you need.

Using motivated in-house talent is still a cost to the business. Don't forget to include that in your budget models. If you decide to outsource your website hosting, you may be charged per megabyte. These costs can vary widely, so shop around. An average price for a 10MB site is about \$25 to \$35. Ask questions about service and call other clients. If the site is frequently down, \$15 a month is still a bad deal. Internet service providers (ISPs) should have critical 24-hour maintenance, T1 lines and redundant power supplies to ensure sites stay up reliably. ISPs can also offer other services such as off-site storage for large drawing and project files. ■

Dawn Hollingsworth, LC, IALD, is principal and CFO of Moody Ravitz Hollingsworth Lighting Design, Inc. Burbank, CA. You can visit the firm's website at www.mrhldi.com.

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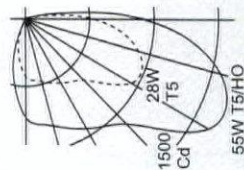
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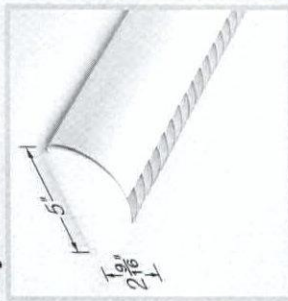
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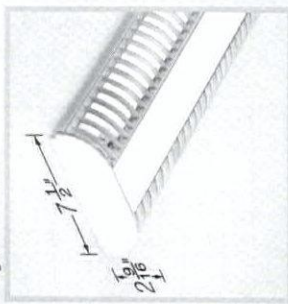


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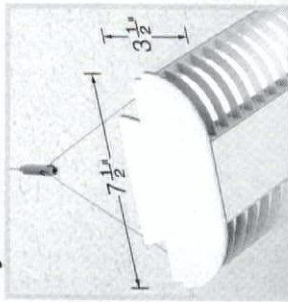
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IN-OFFICE PROCEDURES

technique

BY STEPHEN MARGULIES, IALD

Designing lighting for the office of the future means *designing for change*. Every bit as much care must be taken to build flexibility into the lighting system as is taken to make the other systems—HVAC, telecommunications, power, furniture—capable of easily accommodating organizational change. It's important to remember, too, that flexibility doesn't just mean the flexibility of the overall workspace—the ease with which it can be reconfigured as needs and strategies change—but also the degree of control that the individual employee has over his or her workspace. Good, forward-looking office lighting design is flexible in both senses.

Regarding the first of these dimensions, be advised that flexibility does *not* mean being able to do whatever you want, whenever you want to do it. Instead, workable flexibility results when specific organizational goals are developed early on. Instituting a set of space-planning "rules" at the initial planning/programming stage; making sure that those rules are followed in the design process and that the work of the various disciplines—including lighting design—is carefully coordinated to produce a functional module; and "staying on module" throughout the life of the facility are the best ways of ensuring and sustaining flexibility. Figure 1 shows one modular option, with full-height demountable walls.

Regarding flexibility for the individual worker, task lighting has long been favored not only because it erases shadows that might be cast on the work surface by overhead shelving or cabinets, but also because it allows each employee to adjust desktop lighting to suit his or her own visual acuity and/or the particular task being performed. But lately another exciting method for enhancing individual lighting control has emerged—addressable ballast technology. Going hand in hand with technologies that make full dimming in office spaces more feasible and affordable, addressable ballasts permit individual workers—using handheld remote control devices or a control window that

appears on their computer screens—to make adjustments to the ambient light conditions in their own area. (In a well-designed system, these adjustments will not unduly affect ambient light conditions elsewhere in the space.) Addressable ballasts are the ultimate lighting tool for a flexible office environment. Individual dimming gives the user a full range of light-level options—not just on-off control—and reconfiguring can be accomplished without rewiring fixtures simply by reprogramming to change a fixture's address or zone of control.

WEIGHING THE OPTIONS

There are currently three basic approaches to office lighting design—recessed direct lighting, ceiling-mounted indirect lighting and furniture-mounted indirect lighting. None of these options will be unfamiliar to any lighting designer, and the future isn't likely to bring any truly fundamental changes regarding when and where to implement one strategy rather than another. What's surprising, though, is how seldom the three ways of lighting an office are clearly laid out and their respective advantages and disadvantages compared and contrasted.

Recessed direct lighting. Recessed direct lighting is often the first office-lighting option considered, especially in low-ceilinged spaces. The reasons making recessed lighting an attractive solution aren't hard to discern: Fixtures are generally easy to install; they're generally relatively inexpensive; they come in a great variety of sizes suitable for numerous different ceiling conditions; and recessed lighting can confer a degree of flexibility that may be harder to achieve with either of the indirect lighting strategies discussed below. (In fact, an extremely flexible—and inexpensive—design can be devised using the very familiar 2-x-2-ft. fixtures in a 2-x-2-ft. dropped-ceiling grid.)

Moreover, it's somewhat easier to achieve an aesthetically neutral lighting design with recessed lighting than with the other options. Designing lighting for the future office does not mean designing *futuristically*. Experience has taught lighting designers to aim for neutrality in the work area itself and to reserve dramatic lighting effects for public areas and circulation zones. If the circulation zones are within sight of the workspace, all the better, since dramatic or interesting lighting at the periphery of the workspace can serve the same function as a window, providing workers with visual relief from repetitive design within the workspace itself.

Not only does dramatic lighting limit workspace flexibility, but it also tends to "date" an installation, identifying it too closely with the fashion of a specific year or decade. (That's why, even in public areas where you want the lighting to be visually exciting, the lighting should serve the architecture, not vice versa. "Exciting," "interesting," and "dramatic" do *not* mean "trendy.") Neutrality should be a goal no matter which of the three basic office-lighting solutions is selected, but

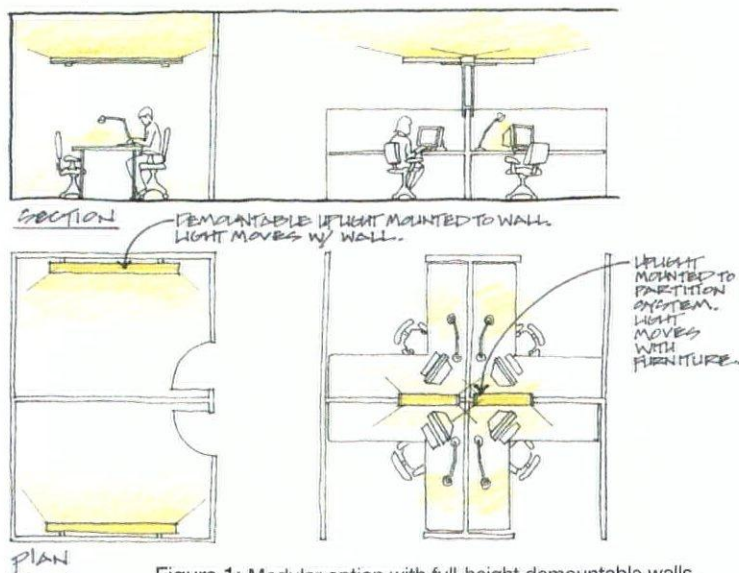


Figure 1: Modular option with full-height demountable walls.

it makes sense to introduce the principle here, since recessed lighting fixtures, in their plainness and simplicity, naturally lend themselves to a neutral design.

So given its relatively low cost, flexibility and neutrality, what could possibly be wrong with the recessed direct-lighting option and why do clients again and again express a preference for indirect solutions? There are two reasons—one obvious, one not quite so obvious. The first, of course, has to do with the glare that direct light sources, even when shielded by lenses or louvers, can create on computer screens, although this is much less a problem than it used to be since screen technology has gotten so much better lately at combatting glare. (So much so, in fact, that there are now some screens that are legible even in full sunlight.)

The second, not-so-obvious drawback is actually the more important one to consider. Recessed direct lighting can have a negative effect on the *perceived brightness* of a space, which, somewhat paradoxically, may be more critical than the number of footcandles being delivered to the desktop in determining the visual comfort of the work environment. Most office lighting projects can support a wide range of light levels: With task lighting, anywhere from 20 to 35 fc; without task lighting, anywhere from 40 to 50 fc. Perceived brightness—whether task lighting is used—is created through the selection of appropriate finishes and the illumination of vertical surfaces, particularly in circulation areas.

Ceiling-mounted indirect lighting. Clients generally prefer indirect lighting because they know intuitively that spaces seem brighter, more alive, when ceilings and walls function as light sources—and this, of course, is extremely difficult or impossible to do when only direct lighting is employed. With indirect lighting systems, which typically conceal the light sources, ceilings and (in some cases) walls become the “luminaires” illuminating the room. This can be done correctly using proper spacing ratios that create appropriate ceiling uniformity ratios (20:1 is often acceptable, depending on the application).

That said, indirect solutions generally work better if the occupant has *some sense* of where the light is actually coming from—some glow or brightness from the fixtures themselves. It's perfectly possible to disguise the light source completely and, by doing so, create a lighted environment that's clean, even and handsome. The trouble is, such environments tend to produce a slightly eerie, unreal or disoriented feeling in the occupant. So, in general, an indirect solution that orients the occupant by providing at least a minimal sense of the light's origin provides a very high degree of visual and psychological comfort. On many fixtures, this “minimal sense of origin” is provided by diffusers, lenses or perforated metal panels.

The more common indirect-lighting strategy, of course, relies upon ceiling-hung or pendant fixtures. An extremely wide variety of such fixtures is available—different shapes and styles that enable different kinds of light distribution. Among all of these choices is a good number of fixtures designed to have a minimal presence in the space and that therefore permit the neutrality discussed above.

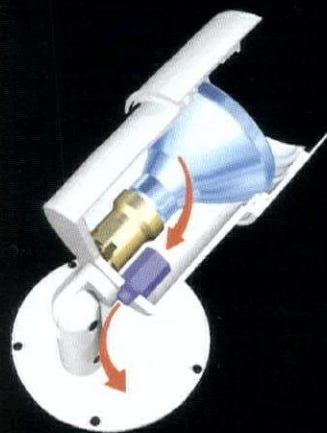
So, if it's so psychologically and visually comfortable, and if an acceptable degree of neutrality is achievable, what could be wrong with ceiling-hung indirect lighting? Again, there are two drawbacks—one having to do with space, the other with flexibility (although the latter issue does promise to become less of a problem in the near future).

The space issues are simple. Ceiling-mounted fixtures don't work well in low-ceilinged spaces—anywhere, basically, where the ceiling height is less than 9 ft. And they don't work well in extremely long spaces, even where ceilings are high enough to easily accommodate them. Now, it is true that there's been a slight increase in the number of higher-ceilinged spaces (though 10-ft. ceilings are still very much the

(Continued on page 69)

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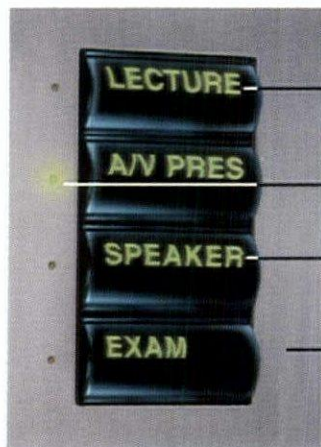
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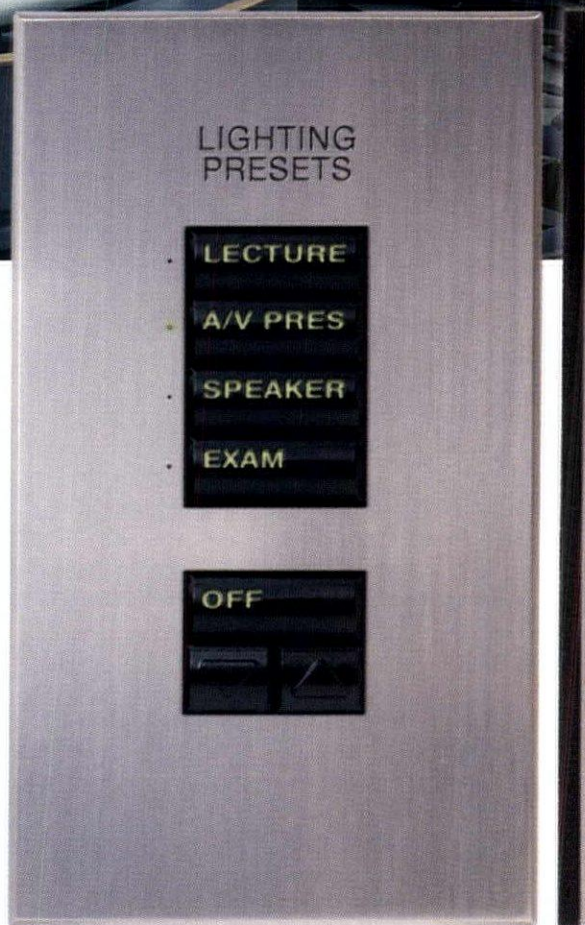
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(Continued from page 67)

exception in office facilities). And it's also true that ceiling-hung fixtures can be *made* to work in low-ceilinged spaces—without creating the impression that occupants might bang their heads on them—by, for example, aligning the fixtures with the splines of the furniture system.

But even if you hang the fixtures away from circulation areas, in places where they won't be perceived as impeding traffic, a basic aesthetic problem remains. An array of ceiling-hung fixtures will inevitably create the visual impression of a second ceiling plane below the actual ceiling and perhaps intensify the feeling of confinement and claustrophobia in a low-ceilinged space. This perceived second ceiling plane also

produces an unpleasant effect in especially long spaces (even ones with higher ceilings) because visual perspective makes us "read" the ceiling as lower than it actually is. What might seem an obvious solution—placing the fixtures closer to the ceiling—won't work, because doing so would create "hot spots" and an uneven pattern of light distribution, defeating the whole purpose of indirect lighting.



Top: Fixed-mounted direct/indirect fixture.
Above: Furniture-mounted semi-portable indirect fixture.

clusters of light fixtures—a "neighborhood of light"—around workstations. Note, however, that uniformity ratios do not provide a good measure of performance for such designs. The only way to evaluate performance is to create a mock-up and see what happens.

As indicated already, the second drawback of ceiling-mounted indirect lighting—that it has tended, historically, to be relatively inflexible—is becoming less serious. Until very recently, changing the pattern of ceiling-hung fixtures to accord with reconfigurations of the furniture has been a load of trouble, involving the re-hanging of each fixture and a lot of rewiring. Eager to satisfy prospective customers who desire *both* the even ambient light that's only possible with indirect lighting *and* genuine flexibility, some manufacturers have now begun offering systems in which pendant fixtures can be moved about more or less at will. Fixtures designed to hang from the grid are extremely lightweight and have integral mechanical and

(Continued on page 71)

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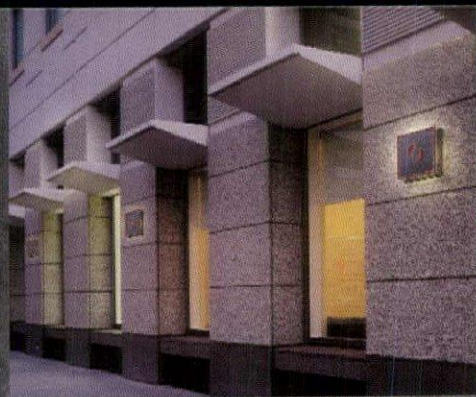
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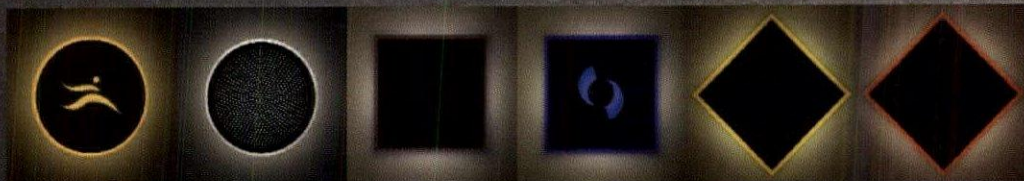


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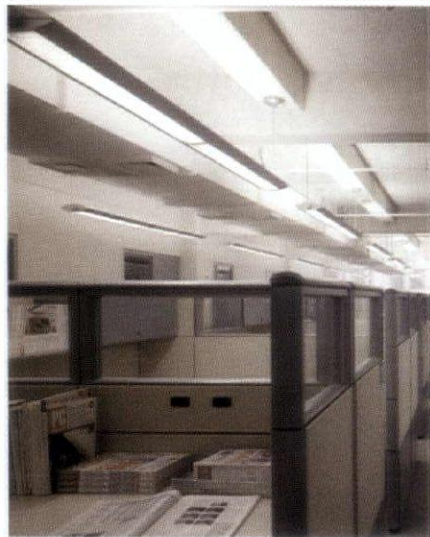


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(Continued from page 69)



Top: Ground-based permanently installed indirect fixture.
Bottom: Fixed-mounted direct/indirect fixture with modular layout. Walls move around fixtures, sprinklers and air diffusers.



electrical connections as well as "smart" wiring to accommodate addressable ballasts. These features allow for easy day-one installation and easy relocation for day-two moves.

One such system was specified for a bank headquarters in Amsterdam. In this project, a modular arrangement of power supplies throughout the installation permitted luminaires simply to be plugged in to

the electrical connections at the appropriate places—and changed more or less at will. The Netherlands' code requirements made it somewhat easier to accomplish there than it would have been in the United States, but perhaps more such projects will be possible on this side of the Atlantic in the very near future.

Furniture-mounted indirect lighting. On the face of it, furniture-mounted indirect-lighting systems seem to offer solutions to both of the problems associated with ceiling-hung fixtures. When fixtures are attached to the wall or partition systems (at a height of, say, 5½ or 6 ft.), there's plenty of room to achieve reasonable light distribution and avoid hot spots even in very low-ceilinged environments. And what could possibly be more flexible than a lighting system that moves *as the furniture moves*?

Well, not so fast. Although furniture-mounted indirect lighting systems are used in a number of installations, they're not really as flexible as it might at first seem. The problem is that, as things stand, codes generally require that these fixtures be hard-wired and that like other office lighting systems, they be powered at 277V and therefore, are a far cry from the "plug 'n' play" technologies that have so enhanced flexibility in desktop power and telecommunications delivery.

This is a complex problem that cries out for a solution. One way to solve it would be to develop—and win regulatory approval for—a plug mechanism for 277V power delivery. The alternative, of course, would be furniture-mounted lighting that would run on 120V, but in truth, most buildings are simply not designed to accommodate this. Distributing more 120V power throughout a building requires the addition of more transformers, more electrical closets—and the cost can quickly become prohibitive.

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However, while this is true in most municipalities, it isn't true everywhere: In Chicago, for instance, local codes require office buildings to be wired at 120V, which means that a truly flexible furniture-mounted lighting system is more easily achievable there. It's also true that, in cities throughout the country, there are plenty of older buildings wired at 120V, and in these buildings, too, a flexible furniture-mounted system may be a real option. Figure 2 shows one way of incorporating furniture-mounted indirect lights into a modular system.

It should be clear by now that the answer to the question, "How do I provide my client with the best lighting solution—for now and for the future?" is "Well, it all depends." So many variables—space, specific flexibility needs, budget, energy concerns, and so on—bear on lighting

design that a general recommendation cannot be offered. Even a project's schedule can have a dramatic impact on what is and is not possible. Recessed lighting is currently the quickest to implement and

furniture-mounted systems are the most time-consuming, in part because we now have to "Rube Goldberg" such systems into modular designs. But these aren't hard and fast rules, good for all time. In five years, you may be able to pick a furniture-mounted system that's right for a particular modular design right out of a catalogue.

What *is* clear is that office lighting design must, in each individual case, be integrated with every other aspect of architectural and engineering design. On that point, lighting designers must be utterly inflexible.

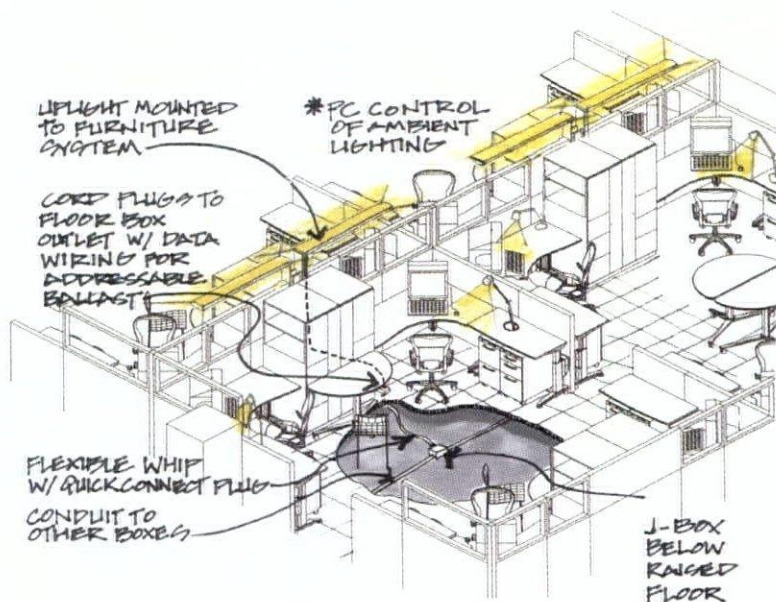


Figure 2: Furniture-mounted indirect lights incorporated into a modular system.

REMEMBER THE SUNSCREEN

Everyone's jumping on the "green architecture" bandwagon and in general, that's a very good thing. One concern is that there can be *too much* of a good thing and that the current enthusiasm for maximizing natural daylighting may be just that.

After all, the reason for increasing the availability of natural daylight in the workspace is to enhance employee comfort and hence, productivity; the irony is if daylighting strategies are pursued too aggressively or are carelessly implemented, they can have the opposite result—flooding a workspace with so much sunlight that visual comfort suffers or in the worst case, work becomes virtually impossible during certain periods of the day. It is astonishing that some architects, in their passion for daylighting, give too little thought to simple matters such as a window-wall's orientation, thereby creating interiors that at certain times of day at certain times of year, are at the mercy of the sun.

Blinds or shades are the obvious solution to too much sunlight—and a good daylighting strategy carefully incorporates blinds or other shading systems into the interior design. But it's important to point out that blinds and shades may exact a price when it comes to a building's overall aesthetic. When blinds are individually, manually controlled, the appearance of a facade—with blinds raised or lowered to different heights from window to window to window—may suffer.

Moreover, as a practical matter, it's unreasonable to expect that employees will adjust blinds in precise synchrony with the movement of the sun, which means that the evenness of ambient light within a partially daylit space may be

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NCQLP QUIZ

1. Ceiling-hung indirect lighting

- A. can work well in office spaces that are especially long.
- B. may be workable where ceiling heights exceed 9 feet.
- C. is generally more flexible than recessed direct lighting.
- D. is incompatible with modular office design.

2. In the office, dramatic lighting effects

- A. should be limited to corridors and public areas.
- B. serve no purpose whatsoever.
- C. can compensate for lack of good architectural design.
- D. should be achieved through natural daylighting.

3. Furniture-mounted indirect lighting

- A. gives office lighting systems "plug 'n' play" flexibility.
- B. is the most flexible approach to office lighting today.
- C. overcomes problems associated with "too much" natural daylighting.
- D. must usually be hard-wired.

4. Recessed direct lighting

- A. always creates glare on computer screens.
- B. is a relatively inflexible approach to office lighting design.
- C. creates a perceived "second" ceiling plane below the actual ceiling.
- D. lends itself to neutral office-lighting design.

5. In general, indirect lighting solutions

- A. enhance the perceived brightness of a space.
- B. intensify visual discomfort.
- C. eliminate the need for task lighting.
- D. are more flexible than recessed direct lighting solutions.

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

spoiled—too dark in some areas when blinds are not raised quickly enough, too bright in others when blinds are not drawn as soon as they should be. The seemingly obvious solution to this sort of situation—an automatic motorized shading system that responds to sensors and constantly adjusts the amount of daylight entering the space—is usually impractical in all but the highest-end installations because of its substantial cost. (In addition, because automatic shading relies on good old-fashioned motors, any significant drop in the prices of

these systems seems unlikely.)

A daylighting strategy, just like any of the artificial lighting strategies discussed above, must be developed in an integrated way—one that takes into account its effects on all the other components of design. Otherwise, one runs the risk of subverting the goals of maximizing comfort and flexibility. ■

Stephen Margulies, IALD is director of Cosentini Lighting Design, Cosentini Associates in New York City.

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BACK TO BASICS: DAYLIGHTING

BY CHRISTINA TRAUTHWEIN, EDITOR-IN-CHIEF

Architect Mies van der Rohe (1886-1969) said, "The history of architecture is the history of man's struggle for light—the history of the window." Today, that struggle goes on and with the new choices in technology and design techniques, it appears to be increasingly winnable for the architect and lighting specifier. Of course, we're talking about daylighting, the technique that uses direct, diffused or reflected daylight to provide general or supplemental lighting for building interiors.

Daylighting is employed to achieve the benefits of a more satisfied workforce by helping occupants feel connected to the outdoors; to reduce ongoing energy costs; and to potentially increase the lease or capital value of the building by offering a more pleasant environment. In some spaces, dramatic aesthetic effects are possible. However, to be successful, the daylighting scheme must allow daylight to provide maximum penetration into the building; ensure that it will work with an overcast sky and a clear sunlight sky (unless one of these conditions predominates in the given region); and avoid undesirable heat gains, direct and reflected glare, veiling reflections, creation of unwanted shadows and excessive brightness and light uniformity ratios.

A simple way to look at daylighting is to break the design problem down into its static and dynamic components. We have the sun—the most powerful and dynamic light source of all—whose useful daylight must be captured and distributed. With a clear sky, daylight can be captured as a direct (excellent CRI, cool light source) and reflected element; with an overcast sky, it can be captured as a reflected element. We have the stationary shape and form of the building itself and its electric lighting system. To harness direct and reflected daylight and get it into the building where it's needed, we have transmission media, which include windows, glazing, skylights, light shelves, baffles, blinds, interior surfaces and other media that directs, diffuses and reflects the sunlight. Another component is controls, which can be employed to make the electric lighting system interact with ambient sunlight via dimming or switching.

In this article, we will focus on transmission media, which can be further broken down into two types, passive and active.

PASSIVE DAYLIGHTING

Passive techniques include:

Building design. The more exterior surfaces the building has, the greater the opportunity for sunlight penetration on top of the building and on its sides, such as windows, clerestories, skylights, atria, domes, structural composite panels, translucent membrane roofs and roof monitors.



At Hasbro's Global Corporate Headquarters in Pawtucket, RI, daylight is as plentiful as the toys that are displayed throughout the building. Traveling through skylights, windows and fretted glass, the abundance of daylight helps transform what used to be home to an A&P supermarket into a viable corporate facility for a Fortune 500 company.

Multistory buildings pose special challenges for lighting interior spaces from daylighting devices at the top of the building. Another consideration is that the southern side of a building receives sunlight most consistently. The northern side gets the least, but the quality of the light is more consistent. In addition, the building design will determine obstructions such as structural members and how much floor area can access sunlight. Examples of building design solutions include atria, which can be used to bring large quantities of sunlight down into building interiors, and light wells, smaller spaces that can also be employed with skylights, clerestories or window walls.

For windows, ideally they will be large windows that reach close to a high ceiling, as the higher the window is, the deeper the penetration of daylight into the building. Ideally there will be more than one window and these will be spaced properly to enhance uniformity of light distribution.

Interior design. Tall objects can obstruct light and dark surfaces will absorb it. The ceilings and walls are part of the lighting system itself, helping daylight penetrate deeper into the interior space by acting as diffuse reflectors. The ceiling, therefore, should be highly reflective and wall surfaces should be light-colored. Brightness uniformity ratios can be more comfortable by avoiding very dark furniture. Similarly, outside the building, ensuring that light-colored ground surfaces predominate around the perimeter will improve the amount of light that is reflected upwards towards the windows and the interior space's ceiling—and affect the color of the light.

(Continued on page 76)



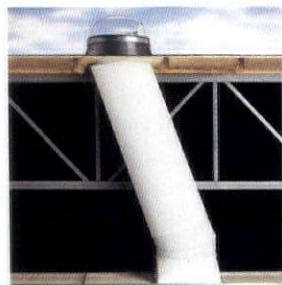
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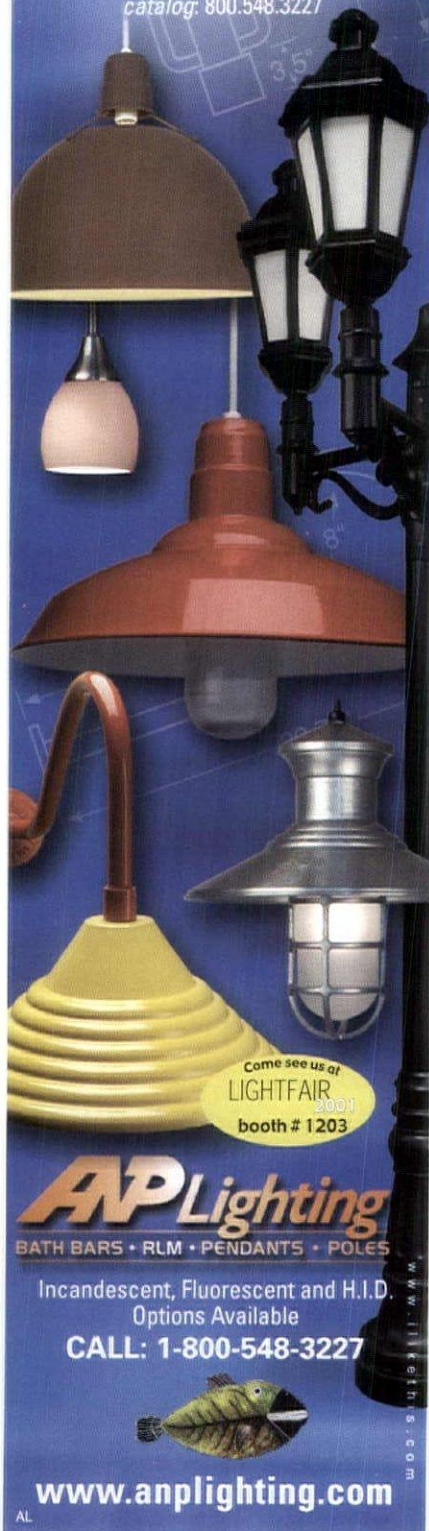
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AL

W O O S T I E H I L L I W A W

(Continued from page 74)



A common approach to bringing daylight indoors incorporates a light-shelf system into the architectural design. This facility in Canada utilizes curved glass to bounce light from exterior to interior.

Window coatings and films. These media are used to control the intensity of daylight and heat transmission into the space and hold them to a constant value. Most new commercial glazing now uses insulated glass, which consists of two pieces of glass with an airspace between them. Inside this airspace, louvers, prisms and light-transmitting fibers diffuse or direct sunlight up to the ceiling, which redirects it down to the workplane. The angle of reflection can be specified according to local conditions. In warm climates, spectrally selective glazings can be used to let in visible light while reflecting unwanted infrared wavelengths; in cool climates, windows with low-e coatings can be considered, which reflect heat back into the building.

Direct glare is a major consideration for the specifier, who generally should eliminate the direct beam from the point of view and select the right level of transmittance to reflect a desirable quantity of light and heat away from the interior. For a large window, for example, diffusing glazing material with a low transmittance can turn it into a large low-brightness light source.

Transmission media. A special challenge inherent in daylighting multistory buildings is to get the light deep into the interior of the building, ground floors and northern exposures, if desired. A wide variety of materials is available to help perform these tasks. For example, reflective blinds in the upper two feet of the window can angle light upward towards the ceiling; reflective shelves at the base—inside or outside and angled to prevent dirt buildup and people putting things on them—can

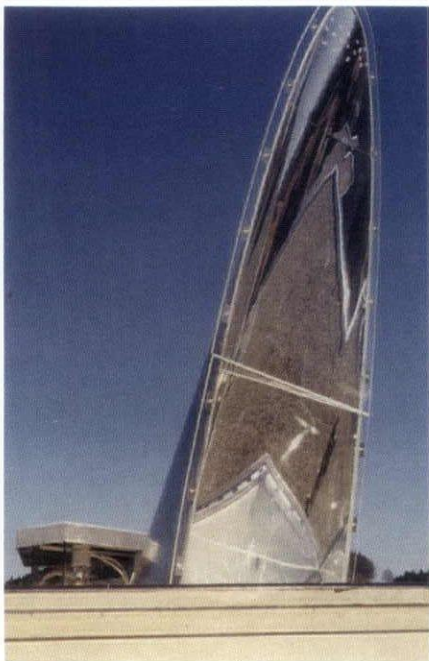
enable light to penetrate the room to a depth of 30-40 ft. Reflective overhangs with a downward facing can be used to capture and transmit light reflected from the ground or other structures.

Inside the building, light can be controlled with drapes, blinds, baffles or custom fixtures that can be quite beautiful. Outside the building, exterior features can diffuse or block sunlight such as overhangs, shrubs, baffles, screens and trellises. Another type of transmission is the light pipe: These devices can provide "skylights" for the lower floors of homes or multistory buildings and are also useful in areas that are difficult to light or pose special requirements.

ACTIVE TECHNIQUES

Now that we've seen what's possible with passive daylighting techniques, let's review active techniques:

Heliostats and tracking devices. A heliostat is a dish-shaped mirror device that focuses sunlight onto a stationary second mirror. It dynamically readjusts the primary mirror to track the sun and maximize the capture and use of sunlight at all times of the day. The heliostat accomplishes this with the help of light sensors, pulse motors and a computer program that tracks all of the variables involved in following the sun. Once the light is captured, it is distributed, often with a light pipe. The downside to this device is that it must be maintained to prevent dirt and dust accumulation from affecting its performance. A fresnel lens can be used similarly to the mirror, concentrating daylight for



The Heliobus is a new heliostat technology that uses a collector (left) to gather sunlight, direct it into a vertical light pipe and bring it indoors.

distribution using optical cables or other media and through small glazing areas.

A relatively new heliostat technology was developed by Heliobus AG of St. Gallen, Switzerland, called Heliobus, a complete daylight guidance system. Heliobus is comprised of a static heliostat on the roof of the building, which gathers sunlight and directs it into a vertical light pipe that reaches into the interior of the building. A highly reflective, transparent foil and white, light-diffusing extractor inside the light pipe distribute the daylight over its entire surface. Three-dimensional extractors provide light ejection. During nighttime or twilight hours when illumination is needed, specialty metal halide lamps are activated, which provide light for distribution by the light pipe. This system, which was awarded the European Environmental Prize at the MUT in Basel, Switzerland in 1997, was first installed in a pilot project at the Boppartshof School in St. Gallen. The light pipe penetrates three floors into the basement, where it terminates in a light dome that lights the entire basement floor.

Transmission media. Venetian blinds, louvers and other media, manually or computer-operated, can automatically control the amount of light and heat entering the building.

"Smart windows." Smart windows are being developed that include photosensitive coatings, which are microlaminated coatings on the glass that actively control the intensity

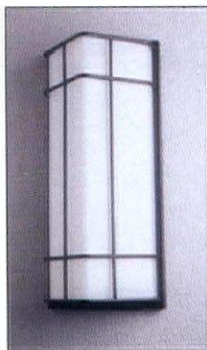
of daylight and heat transmission into the building—changing tint in response to light intensity, heat or electric current.

MAKING IT WORK

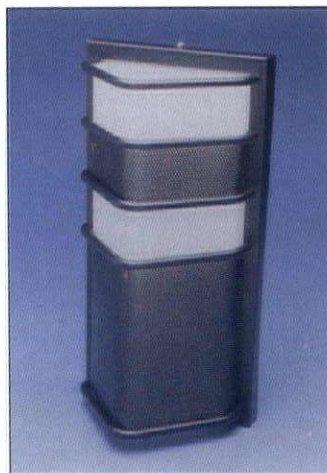
Which is the right solution? It depends on the client's goals, budget and the local geography. Regardless of which solution will work best for a given building, since daylighting involves the sun and is the most visible light source in the building, success will depend greatly on planning and foresight. Large amounts of data must be collected and after installation, controls must be calibrated and tested. RADIANCE, the Lawrence Berkeley Lab's lighting modeling software program, is getting much more user-friendly and interfaces are available for it, including Rayfront from www.schorsch.com. Lightscape, VisualDOE, Leso-DIAL and other visualization and analysis software programs are good sources to help plan the daylighting design. In addition, scale models can be useful as well as that old reliable design tool, the full-scale mockup. ■

Editor's note: This primer is intended to introduce the reader to the topic of daylighting. There are many excellent sources available. For more information, visit www.lightforum.com, click on the Search option, and type in "daylighting" for a list of relevant articles and projects.

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FUTURE LIGHT—EMERGING SOURCES

BY DAVID HOUGHTON, PE, CONTRIBUTING EDITOR

The most popular light bulb in the world—the incandescent—is essentially a first-generation lighting product. Over the decades since the first filament incandescents, arc-discharge lamps appeared in a variety of forms and now solid-state sources are finding their way into many applications. Let's take a look now at the emerging light technologies that will be making their mark in the 21st century.

The sulfur lamp—first introduced several years ago by Fusion Lighting—has not completely disappeared, although the company is not currently offering any products. The sulfur lamp is a 1-in. globe containing a tiny amount of sulfur and other trace elements that emit light via direct molecular discharge when bombarded by microwave energy. Kent Kipling, Fusion's VP of sales, said that the company is refocusing its efforts on developing products for niche high-output applications such as projection devices.

However, Fusion hopes to offer sulfur lamps for illumination as follow-ups to the VBL-3400 and the Solar 1000, the earlier products that are still operating in installations such as a Swedish post office complex. Kipling noted that some sulfur lamps have now been operating continuously for 30,000 hours. When a new illumination product emerges, it will likely be in a similar configuration to the 1000W lamps that produced about 90,000 lumens. The company has also taken over research on the so-called



Although Fusion Lighting's sulfur lamp is not currently in production, many units are still operating successfully.

"low-power" sulfur lamp—a nominal 100W lamp that was being developed at the Lawrence Berkeley National Laboratory. This smaller lamp would be more suitable to indoor lighting applications, while the 1kW lamp is for applications such as stadium lights.

The three commercial varieties of electrodeless fluorescent lighting—GE's Genura, the Philips QL Induction lamp and the Osram Sylvania Ictron—are still available, although they have not exactly taken the lighting world by storm. Philips has added a new larger model to its QL line: a 165W lamp that emits 9,600 mean lumens over a rated lifetime of 100,000 hours.

Research continues toward a long-sought goal for fluorescent lamps: the two-photon phosphor. Fluorescent lamps work by getting mercury atoms to emit UV photons that each energize a single visible photon from the phosphor coating on the lamp wall. "If you can figure out how to get two visible photons from each UV strike, lamp efficacy could go as high as 200 lumens per watt," said Francis Rubinstein, staff scientist at Lawrence Berkeley National Laboratory. (That would be nearly double the current top efficacy for fluorescents, which is about 105 lumens per watt.) Researchers at Utrecht University in the Netherlands have created a europium-based compound that absorbs a UV photon from a xenon gas arc (rather than a mercury arc) and does indeed emit two red photons. The next goal is to develop similar phosphors to emit blue and green photons. The U.S. Department of Energy (DOE) is also funding an effort at the Electric Power Research Institute to develop two-photon phosphors.

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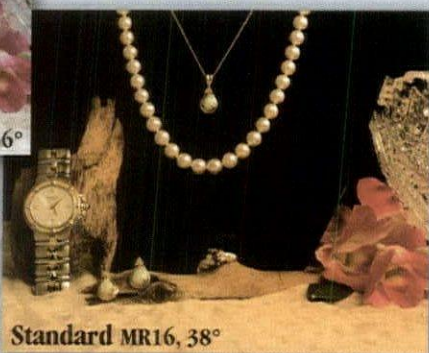


These images were taken without the use of filters, extra lighting or color adjustments.

Only the indicated light source was used.



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SOLID OPTIONS

The most activity in new light sources is in the area of solid-state lighting. Light-emitting diodes (LEDs) have made spectacular advances in the last few years and the pace of innovation is only increasing. One of the most enthusiastic adopters of this new lighting technology is Color Kinetics, a company that produces nothing but LED-based fixtures and controls. Many of Color Kinetics' products can be found in theatrical environments such as the Rain Forest Café, but they also offer products that fit into more mainstream lighting environments, packing high-output color and intelligent control into cove lights, MR16 replacements and wall-washing uplights. For color applications, LEDs are much more effective than filtered white light, which is a "subtractive" method of achieving color. "While we share the belief that there is tremendous potential for white LEDs in the future, we are focusing on bringing the technology to market today using multicolored LEDs for a variety of applications," said Kathy Pattison, VP of marketing. "LEDs are highly controllable and we have true saturated reds, greens and blues right now."

An entirely new means of creating light from solid-state devices is shaping up: organic LEDs, also called OLEDs, polymer LEDs or light-emitting polymers (LEPs). These devices sandwich organic semiconductor materials (such as poly-phenylene vinylene) between anode and cathode substrates to produce light. Unlike electroluminescent (EL) products that use relatively high voltages to extract light from phosphors—also in a sandwich configuration—OLEDs operate at only a few volts, just enough to stimulate photon discharge from some very carefully designed molecules. Different colors can be created with different organic compounds.

Because OLEDs can be created and controlled as pixelated devices, they are creating a lot of excitement in the world of information display; some third-generation Japanese cell phones and other specialty items such as stereo faces are already shipping with small OLED screens. According to industry observers, OLEDs are superior in just about every way to liquid crystal displays (LCDs)—speed, color, intensity, and viewing angle. They use a fraction of the power of LCDs since they emit light rather than having to be backlit, and the basic simplicity of their construction indicates that they will be much less expensive to manufacture.

It is this last fact—combined with the possibility of super-thin and flexible construction—that most fascinates observers in the lighting community. Applied to a plastic substrate, OLED material could be used to create luminous wallpaper, glowing furniture or nearly any other imaginable intersection of form and light. Current devices can operate at brightnesses of up to 100 candela per square meter, with efficacies of about 3 lumens per watt. The development of such sheet-based products could truly revolutionize the lighting industry. From the current paradigm of intense point and linear



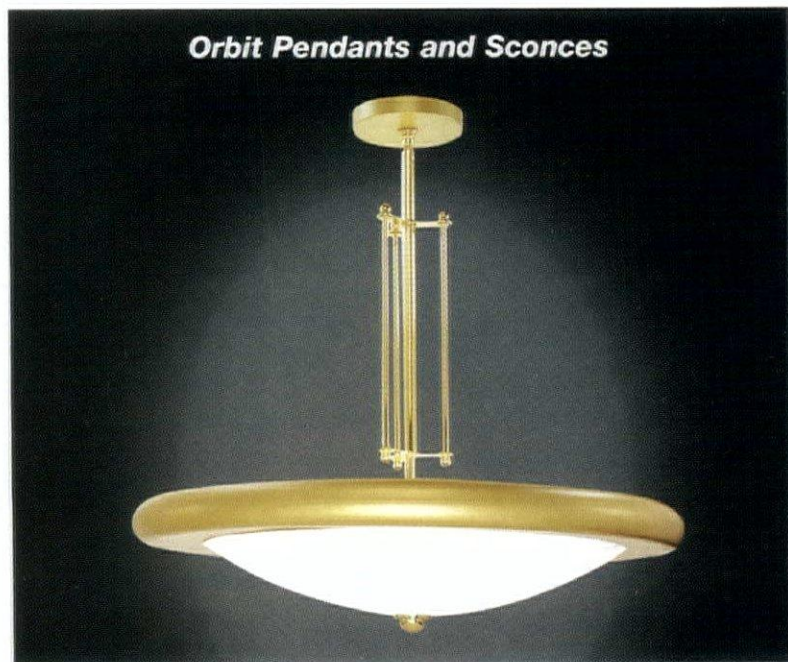
Color cove lighting from Color Kinetics washes ceilings at the Seattle Sheraton—an application of solid-state lighting.

sources, the norm could shift to large areas of relatively low brightness. For example, the familiar table lamp could ignore the bulb and just use a conical "shade" of luminescent material, variable in color and intensity.

Sheila Kennedy, a Boston-based architect, is an early adopter of this approach and is already using electroluminescent material to create glowing surfaces in her indoor and outdoor designs. "Electroluminescent is a bridge technology that is available to create these effects right now," said Kennedy. She noted that EL technology has also made substantial advances over the last several years, with improved light output and lumen maintenance and reduced cost.

Among the obstacles to overcome for OLEDs are color stability and longevity. It will be interesting to see how quickly this nascent technology develops—the main players right now are not the "big three" lighting companies, but innovators in the fast-paced world of consumer electronics. One thing that most of the forward-looking people interviewed for this article agreed on: Although it will take many years, the future of lighting will be solid-state. ■

Editor's note: For more on Sheila Kennedy's innovative work, look for our story in the upcoming May issue.



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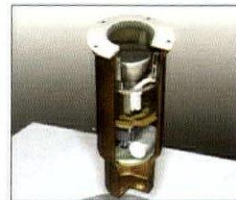
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Aromat announces its new "Slim Lite" metal halide electronic ballasts. These streamlined ballasts allow manufacturers to build smaller, more aesthetically pleasing fixtures. "Slim Lite" ballasts come with all the features and benefits of Aromat's "standard" ballasts. Slim Lite ballasts are available for 39W and 70W applications. For more information, call Aromat at 1-888-4AROMAT.



Circle No. 71

Bartco Lighting

Bartco Lighting introduces the adjustable staggered Slide By Side fluorescent fixture. Offered for T5 and T8 linear fluorescent lamps, the design is a two-lamp linear fixture that can be adjusted to various lengths, still providing a continuous glow. The Slide By Side offers an extensive number of variations from 0 in. to 20.5 in. for the 4-ft. T8 model and 0 in. to 21 in. for the nominal 4-ft. T5 model.



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The Italian translation of "window," the ADA-compliant Finestra sconces by Doyle Crosby provide a warmly glowing window of illumination from the translucent diffusing material that is housed in a frame of anodized, etched aluminum. The Arco sconce measures 11 in. high by 17 in. wide and is available in finishes of clear etched aluminum or bronze etched anodized aluminum. Visit Boyd Lighting's entire collection at www.boyd.lighting.com.



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Bruck Lighting Systems introduces the arrival of the Orion M Series with LEDs. Upgrade your MR16 display lighting system with the Orion M Series lamp, which offers a variety of static colors—amber, green, blue, red and white—and up to 100,000 hours of lamp life.



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Circle No. 79

Color Kinetics

Color Kinetics, the pioneer of full-spectrum digital lighting, manufactures a line of award-winning products powered by the company's patented digital Chromacore technology, which uses microprocessor-controlled LEDs to generate over 16.7 million colors and a number of dynamic colored lighting effects. Chromacore-powered products are compact, use little power, have an ultra-long life and produce little heat and no noise or UV emissions.



Circle No. 77

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Circle No. 80

Con-Tech Lighting



Con-Tech Lighting introduces Accentuate, a recessed lighting system with adjustable, multiple accent luminaires for either re-

model construction, new construction or lay-in grid mounting. All of these models are designed for installation into accessible and non-accessible ceilings in lay-in grid applications. Adjustable light heads are available in white, black and silver colors to match interior finishes. Wing-type mounting brackets allow for vertical height adjustments. The bracket will accept optional HB-24 flat hanger bars or HBC-24 C-channel/grid ceiling mounting bars.

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Circle No. 81

Dreamscape Lighting

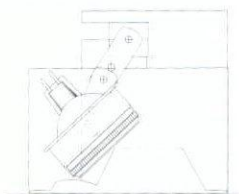
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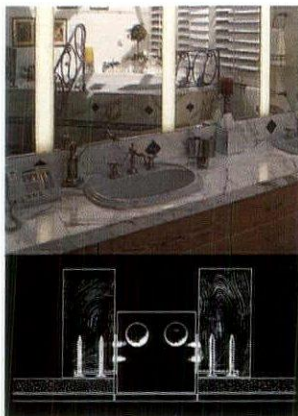
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Dreamscape Lighting

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Light emanates from the acrylic or glass panels set flush with the mirror. The T5 fluorescent light source provides a soft but powerful illumination.

For more information, visit www.dreamscape-lighting.com or phone (310) 838-7043. These products will be on display at Lightfair booth 446.



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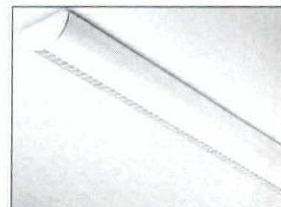
The ETC Irideon AR500 exterior luminaire turns light into living color and buildings into dynamic architecture. With each cross-fade of color moving smoothly through the full spectrum, the AR500 transforms not only buildings but our perceptions of their power. And the AR500 goes beyond—to light up monuments, fountains, statues and themed environments as well. It's even used indoors. For more information, call (608) 831-4116 or visit www.etcconnect.com.



Circle No. 84

Elliptipar

Elliptipar introduces low-profile compact fixtures in one- and two-lamp styles for lighting vertical surfaces and a three-lamp style to add uplighting. The precise optical control of the T5

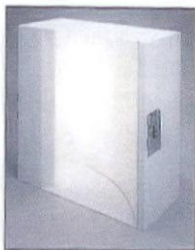


or T5/HO fluorescent lamp in Elliptipar's asymmetric reflector projects maximum peak candlepower down a vertical plane with exceptional uniformity. The one-way Style F144 (shown) features matte white finish, adjustable aiming, rugged matte gray aluminum baffle, integral electronic ballast, all aluminum and stainless-steel construction. For more information, visit www.elliptipar.com.

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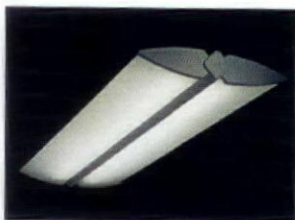
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Circle No. 91

Focal Point LLC

Slide and Smile (shown), imported from European design leader Regent Beleuchtungskörper AG, Basel Switzerland. Designed by Ayal Rosin (Slide) and Renato M. De Toffel (Smile), both offer a unique aesthetic when looking for alternatives to the generic norm. These new indirect/direct fixtures are intended primarily for conference rooms, lobbies and private offices, but also perform well in large, open environments. Go to www.focalpointlights.com for more information.



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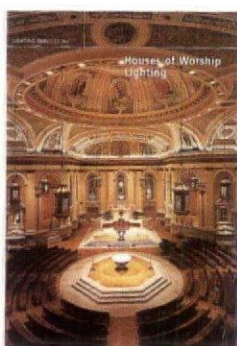
Ledtronics, Inc.

DécorLED direct incandescent replacement lamps combine today's advanced Indium Gallium Aluminum Phosphide (InGaAlP) and Silicon Carbide/Gallium Nitride (SiC/GaN) light-emitting diode (LED) technology, standard bases (e.g. 25-mm Edison screw base) and a design that maximizes illumination with a power draw of just 1.0-1.7W, an 11-year LED operating life and six sunlight-visible colors.



Circle No. 93

Lighting Services Inc



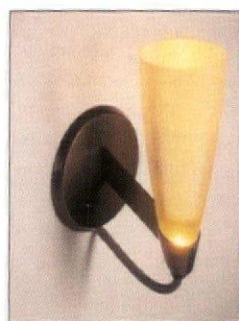
Lighting Services Inc's new four-color brochure, "Houses of Worship Lighting," presents designs from classic to contemporary. The brochure features distinguished houses of worship to illustrate the versatility of LSI products. For further information, please contact your local Lighting Services Inc representative or log onto to the LSI website at

www.LightingServicesInc.com.

Circle No. 94

Lucifer Lighting Co.

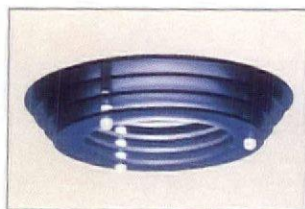
Calyx is a fiber-optic wall sconce from Lucifer Lighting Co. with a frosted acrylic "florete." One illuminator up to 50 ft. away is designed to accept as many as 52 glass or solid-core polymer fibers outfitted with Calyx fittings. An optional color filter or wheel within the illuminator allows the sconce to glow up to eight colors. It is suitable for indoor and wet locations that benefit from its softly alluring ambiance. For further information, phone (210) 227-7329 or visit www.luciferlighting.com.



Circle No. 97

Lightolier

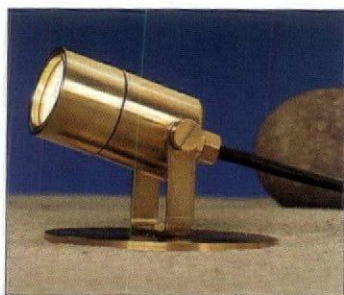
Lytecaster Lytegems is now available in seven new styles. These downlight accessories combine functional illumination with decorative design. Lytegems, often used in multiples, create visually expressive downlighting and enhance spaciousness. The seven styles include: Ice Cube, Alabaster, Tier Ring II, Taper Tier, Contemporary Disk II, Bed Molding/Round and Bed Molding/Square. For more information, call us at (800) 215-1068 or visit www.lightolier.com.



Circle No. 95

Lumière

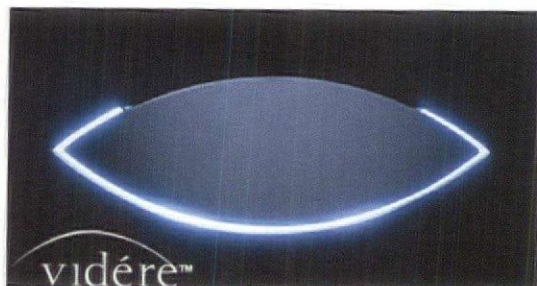
The Lumière Atlantis 1407 solid brass underwater fixture accepts 12V MR16 lamps up to 75W. Its adjustable base allows for easy and secure aiming, and its quick release system enables convenient relamping out of the water. The fixture can be completely or partially submerged.



Circle No. 98

Litecontrol Corp.

To See!



Phone (781) 294-0100

Circle No. 96

Lutron Electronics Co.

Lutron's LCD-based Viseo display lighting control offers direct access to Lutron lighting control systems without the need for computers or other plug-in-devices. Featuring a large-button design, Viseo is fully functional out of the box and allows users to monitor and operate the lighting in any room of a facility from one or more locations. It is ideal for multi-room lighting control applications such as ballrooms or conference centers.



Circle No. 99

Nemo Italiana Luce



Designed by Mario Barbaglia and Marco Colombo, Draco is an opal white glass fixture that can be mounted on ceilings or walls. The fixture is accented

by a chrome ring and provides excellent general illumination. Available as incandescent or fluorescent. Two sizes: 11-in. diameter and 15-in. diameter. Both sizes are ADA-compliant.

Circle No. 100

Osram Sylvania

Available in every major product line, including fluorescent and compact fluorescent, HID and halogen, the Sylvania Tru-Color family provides excellent lamp-to-lamp color consistency and minimal color shift over time.



For example, Tru-Color Metalarc Ceramic pulse-start metal halide lamps feature a revolutionary "bulgy" ceramic arc tube design for improved reliability and performance, and Tru-Color Tru-Aim IR & Titan low-voltage MR16 lamps are manufactured with a hard-coated dichroic reflector to provide consistent color over the life of the lamp.

Circle No. 103

Orbit North America Ltd.

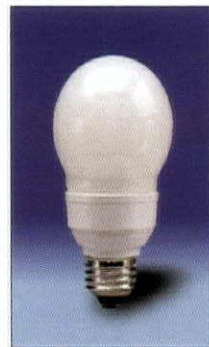
Orbit North America Ltd. is proud to introduce a line of breathtaking crystal creation panels from the House of Swarovski for its recessed downlight series. The House of Swarovski is known for its design excellence, innovation and unparalleled crystal quality. We also offer a customizable projection crystal panel for use in restaurants, bars, clubs, corporate offices or retail environments. Housings are available for remodeling, new construction or IC-rated applications. For more information, visit Orbit North America Ltd. at www.orbitlight.com.



Circle No. 101

Panasonic

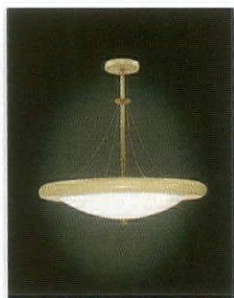
70 Percent Energy Savings! Panasonic's GEN-IV compact fluorescent lamps come in 14W and 23W—yet their light output is equivalent to 60W and 90W incandescents, so you'll save up to 70 percent on energy! GEN-IV fits any conventional screw-type socket. Incandescent color quality (2800K) and a 10,000-hour operating life make GEN-IV your all-encompassing lighting solution. Learn more: www.panasonic.com/lighting or (866) 292-7292.



Circle No. 104

Original Cast Lighting

ORX-30-7-XB-6BQ-1-ORBIT. Distinctive in shape, the Orbit profile has an ultra-shallow diffuser that allows for use in low ceilings. With a sleek, contemporary trim, this energy-efficient fixture is available in a variety of painted finishes including sun gold, camel, black and white. The Orbit enhances any room with style and grace.



Circle No. 102

Prudential Lighting

"Miniature size." "Graceful forms." "Outstanding performance." Performance is the driving factor behind these four all new T5 and T5/HO direct/indirect luminaires. With an admirably wide indirect distribution, ceilings appear evenly lit. Downlight is precisely controlled through parabolic louvers and an optional acrylic overlay reduces lamp brightness when T5/HO lamps are used. With a full range of both metal and paint finishes, these graceful forms complement almost any architecture. See us at Lightfair booth 2230. Contact Prudential Lighting at (213) 746-0363 or www.prlite.com



Circle No. 105

Se'lux Corp.

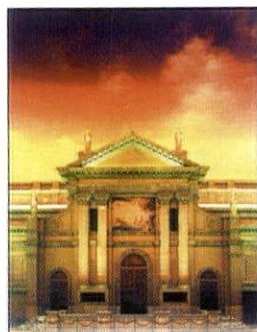
QH2 expands the Selux Quadro product family by offering a reduced scaled Quadro with full cutoff optics for HID lamps up to 175W. The 28-in.-diameter QH2 fixture is appropriate for pedestrian scale mounting. With sealed optics, integral ballasts and a choice of symmetrical or asymmetric reflectors, QH2 can be applied to parking lots, roadway, pathway and front of building applications. Call us at (800) 735-8927 and be sure to visit our website at www.selux.com/usa.



Circle No. 106

Special FX

Special FX manufactures permanent color lenses, glassware, light bulbs and polycarbonate for every lighting design application. Our Dichro-X architectural lens is tempered, bonded and completely weather-proof. The award-winning Dichro-X design is the most durable and cost effective permanent color lens available for all architectural lighting applications.



Circle No. 108

Sentry Lighting



Sentry Mediterranean Bollard is an ornately decorated bollard incorporating vine and scallop patterns. This distinctive bollard is available in many colors and light sources including metal halide, HPS and compact fluorescent. Ideal for seaside or tropical resorts applications.

Circle No. 107

Sunnex, Inc.

The new SoHo Collection by Sunnex adds style to any home or office. The lights come in a choice of different-size lamp heads, wattage and a variety of colors. The small base takes up very little space, allowing more for documents and other desk accessories. For more information, contact Sunnex at 3 Huron Drive, Natick, MA 01760; phone (800) 445-7869; or visit us at www.sunnex.com.



Circle No. 110

Solatube International Inc.

Solatube International Inc., the innovator of the tubular skylight, introduces the SolaMaster Series. The flagship product is a 21-in. unit, specifically designed for all types of commercial configurations. This revolutionary product presents an affordable and versatile lighting solution for architects.



Circle No. 109

Super Vision International

Super Vision International introduces Flex-LEDs, a linear lighting system designed specifically for custom interior or exterior applications, like cove lighting, building outlines and edge lighting glass. The energy-efficient, low-voltage system boasts a 100,000-hour lamp life. Available in red, clear red, amber, blue-green or white LEDs. For more information, phone (407) 857-9900 or visit www.svision.com.



Circle No. 111

THHC Lighting

The Xelogen 120V Series is now available in three different base designs: E11, E12 and BA15D base. Xelogen gas-enhanced lamps hold several very attractive benefits: Up to 20,000 hours of lamp life (5,000 hours for 120V); no UV; low-pressured; may be handled with bare hands; and no shielding required. Low-voltage Xelogen lamps are also available in G4, GY6.35, wedge base, festoon and rigid loop socket configurations.



Circle No. 112

Trend Lighting

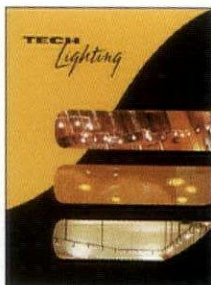
Drawing on our 20 years experience, Trend Lighting, St. Louis, MO has created a new concept in contemporary design. This sleek 50-in. square pendant with four FT40 fluorescent lamps utilizes smooth white acrylic for optimum illumination. To provide maximum downlight, each of the four outriggers is equipped with one FT40 and an Alzak reflector. For further information, visit us at www.trendlighting.com or call us at (800) 325-9532.



Circle No. 115

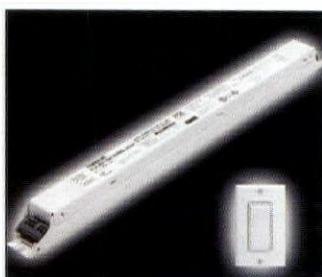
Tech Lighting

Tech Lighting's new 132-page color catalog was designed to simplify the world of low-voltage lighting. From product showcase selection to order writing, we have incorporated many of our customers' comments to create what we believe to be an entirely new approach to the presentation of low-voltage lighting systems. This catalog also introduces our new products, including sleek architectural heads, radiant glass pendants, chandeliers and display fixtures. For more information, phone (847) 410-4400 or visit www.techlighting.com.



Circle No. 113

Tridonic

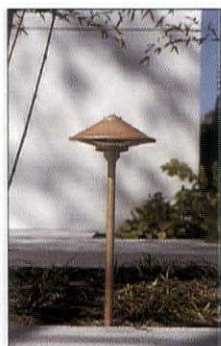


Tridonic digital fluorescent 1-to-100-percent dimming ballasts, available for T5 and T8 lamps, allow users full dimming range control using a standard momentary switch. One of three integrated ballast control functions,

switchDIM simplifies design and reduces installation cost. For details on this and other Tridonic products contact us toll-free at (866) 874-3664.

Circle No. 116

Teka Illumination



Teka Illumination introduces the Projector Path Light, manufactured with all natural materials, pure copper, brass and stainless steel. Utilizing patented advanced technology, the glass lens optics system more efficiently harvests and reforms lumen output than conventional reflector systems. Light is collated and aimed in a narrow angle to maximize spacing criteria and minimize unwanted brightness. UL-listed suitable for wet locations. Photometry report available.

Circle No. 114

Ushio America, Inc.

At only 1 in. in diameter, the new MR8 lamps from Ushio allow for even smaller fixture design than competitive MR16 and MR11 lamps. Applications include decorative lighting, accent lighting, display lighting and low-voltage lighting. The MR8s are available in 20W and 35W in narrow and wide beam spreads. For more information on Ushio's line of lamps for general lighting, please contact our customer service department at (800) 838-7446.



Circle No. 117

W.A.C. Lighting

A manufacturing/design leader of state-of-the-art recessed housings/trims (featuring new Multiple Recessed Spots) and five innovative track systems, including a new 2-circuit track system and a 12V/24V linear system designed for task, accent, cove and general lighting, undercabinet, toe spaces and hard-to-light areas. Also available: miniature fixtures, surface mounts, pendants, rope lighting, Button Lights, display lights, track extensions/suspensions, accessories. For more information, phone (800) 526-2588, fax (800) 526-2858, email sales@wacighting.com or visit www.wacighting.com.



Circle No. 118

Wila Lighting LLC

Cirelet utilizes the new circular T5 fluorescent lamp shielded by radial louvers or diffusers, which is available in 10- and 14-in. diameters. The center-free space can be occupied with low-voltage accent light, security camera, speaker, smoke detector and motion sensor modules to reduce ceiling congestion and create a clean uniform look. Visit us at Lightfair booth 3431. For more information, phone (714) 546-8999, fax (714) 546-8998, email wila@wila.net or visit www.wila.net.



Circle No. 121

The Watt Stopper

The Watt Stopper's LightSaver LCD dimming controls provide independently adjustable daylighting control for up to three different lighting groups via one photocell. Users can accommodate preferences with innovative features such as adjustable dimming rates and optional manual control via override switches.

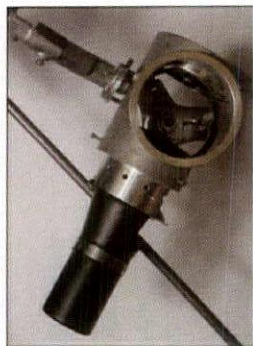


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Wendelighting



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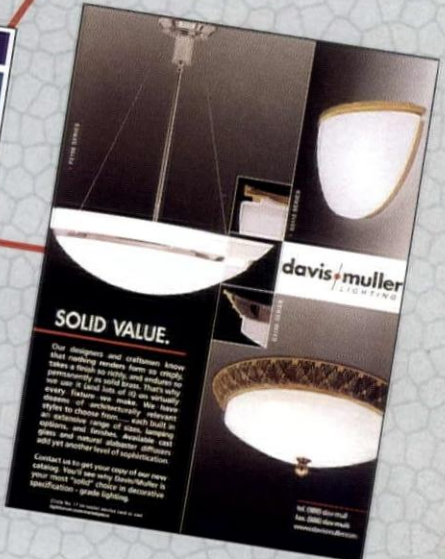
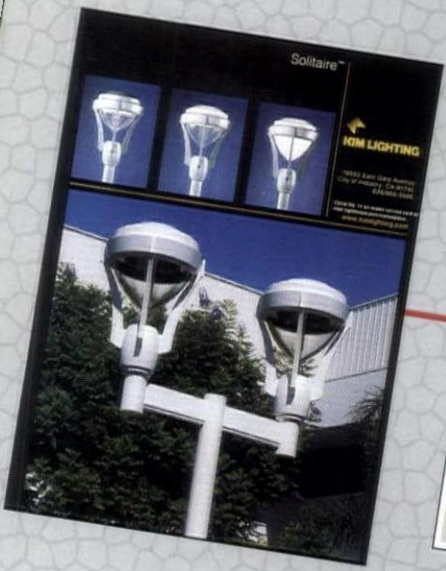
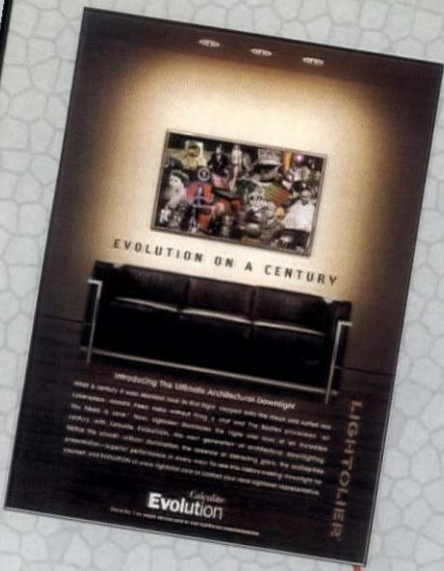
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Lighting Education: Looking Back, Stepping Forward

BY HOWARD M. BRANDSTON, LC, FIES, FCIBSE, FIALD

Education is a passion of mine, particularly lighting education. But to borrow from Mark Twain, "Everybody talks about education; few do anything about it."

I am the product of a remarkable education. I started out in theater lighting at Brooklyn College, apprenticed with Stanley McCandless—one of the pioneer figures in lighting—and from there went on to do some work on my own. It is education with mentoring that makes successful careers—along with drive, ambition and a certain amount of luck.

Lighting and illuminating engineering are relatively new fields. Education in both is equally new, underdeveloped and in need of nurturing. The first mention in public print connecting illumination with engineering was in the report of a paper entitled "The Utilization of Artificial Light," read before the New York Electrical Society in the winter of 1897 by E. Leavenworth Elliott (later to be the first editor of *The Illuminating Engineer*). In 1902, Dr. Louis Bell brought out his book titled *The Art of Illumination*. It was the first work to deal exclusively with the subject of man-made illumination.

Steinmetz of General Electric, Louis Comfort Tiffany of Tiffany Studios, John B. Watson, professor of experimental psychology at Johns Hopkins and Louis B. Marks, first president of the IES. It is hard to imagine what it would take to get 240 lighting practitioners to take a 36-lecture course today. How the times and our values have changed.

About this same time, the IES was considering another sort of education, namely training for actual practitioners in the field. Professor Charles Scott of Yale University wrote, "There must be specialists for research, invention and development, as well as expert illuminating engineers, but their number is infinitesimal compared with those who apply lamps and use lighting." He was talking about specifiers: This group included electrical engineers, electrical contractors and architects. What followed shortly thereafter was the development of courses on lighting, lighting equipment, manufacturing and applications by lamp companies and associations. The Nela School of Light was started in 1920, the Edison Lamp Works, National Lamp Works and the Westinghouse Lamp Company offered courses. Professional groups such as

"Education in both lighting and illuminating engineering is underdeveloped and in need of nurturing."

From its inception in 1906, the Illuminating Engineering Society (IES) was a "learned" society. Almost immediately, a Committee on Papers was formed to decide the subjects on which papers would be written for presentation to the members. This first list of subjects included: "Principles of Interior Illumination with Special Reference to Cost, Color of Light and Physiological Effects," "Street Lighting" and "Aesthetics vs. Utilitarianism in the Design of Fixtures, Globes, Shades and Reflectors." We are still dealing with the same topics today. Apart from the technology, the issues haven't changed much despite the advances made up to this recent turn of the century.

Right from the start, the IES was concerned with educating its members. The Society's position was that the study of illumination should be part of the curriculum for electrical engineering as well as architecture. In 1910, the IES arranged for a series of 36 lectures to be given at Johns Hopkins University in Baltimore. This lecture course followed the annual meeting and was attended by 240 members. The speakers included such luminaries as Charles P.

the National Electrical Light Association offered "travel training," which included home-study packets, followed by lectures and visits to different manufacturer's facilities.

The IES continued to organize lecture series for its members. The 1925 Cornell lectures featured former IES President Louis B. Marks and Gustave Stickley, designer and inventor. The 1930 "Fundamentals of Architecture" lectures were presented at two locations. In New York, the series was held at the Architecture League and in Chicago, it took place at the Art Institute. Please note the distinction of the speakers named in all of these lectures and the diversity of skills of those selected to be the educators.

During this period, illuminating engineering became a field of study at many technical schools throughout the U.S. First, the private schools implemented the programs, including: Carnegie Institute, Columbia, Cornell, Drexel, M.I.T., University of Pennsylvania, Sheffield Scientific School of Yale University, Stevens Institute of Technology, Case School of Applied Science, Clarkson

(Continued on page 94)

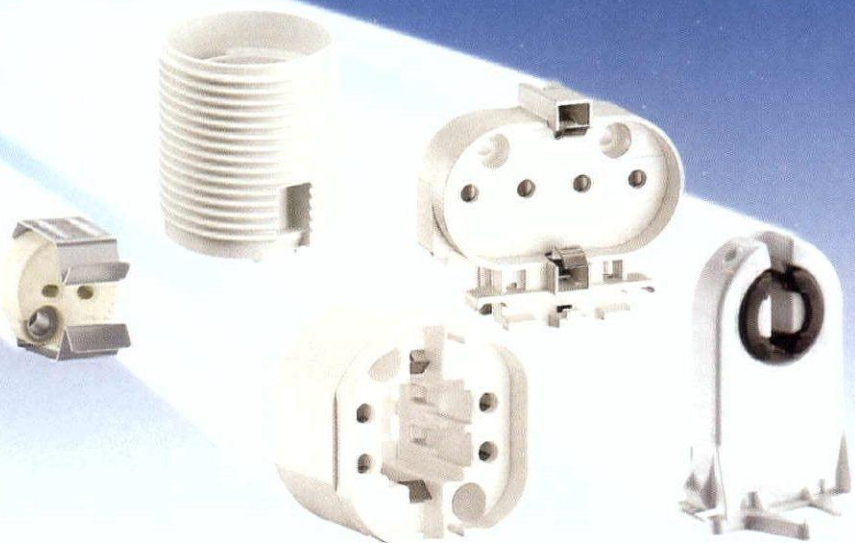
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(Continued from page 92)

School of Technology and Armour Institute of Technology. The earliest state university programs were at the University of Wisconsin, University of Maine, Ohio State and the University of Illinois. The list of lighting education opportunities could continue. The history of lighting education is at once vast and fascinating, but I will now skip several generations and address the current state of lighting education. This passes over a generation when most lighting education became as extinct as the dinosaurs.

The IES continues to be an advocate of lighting education. To this end, the IESNA provides courses, publications, the *Lighting Handbook*, a refereed *Journal* and other resource materials to its members.

The IESNA developed a certificate program and the first Technical Knowledge Exam (TKE) was held in January 1994. A Certificate of Technical Knowledge (CTK) was issued and this credential was an important step in beginning the recognition of lighting practice.

“Education and mentoring are the keys to advancing lighting design as a recognized and thriving profession.”

In 1995, the IESNA joined forces with the National Council on Qualifications for the Lighting Professions, better known as the NCQLP. The TKE is, in part, a component of their examination requirements for certification in the lighting industry. Those who pass the NCQLP exam will be entitled to use the letters LC (which stand for Lighting Certified) after their names. This step fosters a demand for education and establishes a baseline measure for lighting practitioners.

Today there are several regularly offered undergraduate degree programs at schools in the U.S. with a specialty in lighting. Some of these include: Penn State, Texas Christian University, the University of Colorado, the University of Kansas and Kansas State University along with another program at the University of New Hampshire. There are two Masters programs: an MFA at Parsons School of Design and a Master of Science at Rensselaer Polytechnic Institute. And there are many other lighting courses taught in colleges across the country.

The IES and others support education through a number of grants.

- The Robert J. Besal Memorial Education Fund was established in 1983 to encourage committed engineering students to pursue a career in the lighting industry.

- Since 1984, the Golden Gate Section awards the Robert E. Thunen Memorial Scholarship to full-time students interested in lighting who are enrolled in accredited four-year colleges located in northern California, Nevada, Oregon or Washington.

- The Richard Kelly Grant was established in 1986 by the New York Section in memory of Richard Kelly, a pioneer in the field of lighting design.

- The Nuckolls Fund for Lighting Education has provided financial assistance since 1988 to develop university-level lighting education programs in North America.

- The IESNA's Workshop for Teachers of Lighting program has reached several thousands of students through the teachers it has trained in current practice methods.

- The Howard Brandston Student Lighting Design Education Grant encourages schools of architecture, design and engineering to include some lighting as a part of their curriculum.

- The Ad Hoc Committee of Lighting Research Funding Organizations and The Electric Power Research Institute, whose concept of a center of excellence in lighting was funded by The New York State Energy Research and Development Authority, gave birth to Lighting Research Center at Rensselaer Polytechnic Institute with the investment of several million dollars. This center of excellence was intended to be a place beyond the potential of anything the lighting industry could create on its own to serve its needs. And this indeed has happened.

Richard Brinsley Sheridan, an 18th century playwright said, “The burden on the university is to increase the number of those who are willing to undergo the fatigue of judging for themselves.” That quote is the indeed the crux of the problem: Few programs truly educate. They train to meet

standard practices and standards, a thought-free methodology for doing work. This must change in the future. My mentor, Professor Stanley R. McCandless, used to say, “You remain only a practitioner and do not become a true professional unless you are an educator.” *Education* and *mentoring* are the keys to making this change and advancing lighting design as a recognized and thriving profession. To achieve this you need a diverse faculty and a dedicated cadre of distinguished mentors.

Most programs, except perhaps the Master of Science in Lighting of the Lighting Research Center at RPI, lack the large faculty with diverse expertise to truly provide an education. No single faculty member, no matter how dedicated, can have the range of expertise and experience required to provide a high-quality level of lighting education. At best, students are trained in some aspect of light and lighting, the part that their one or two instructors know best. This does not foster the ability to “bear the burden” implied by Sheridan. It is hard to progress beyond standards—the “thought-free” process for lighting design. With the “single teacher” handicap, these graduates must depend on the opportunities they gain through their employment after they graduate for their education. Lack of funding and support is the culprit.

Perhaps all of you reading this article will be inspired by the following quote from the biography of Robert J. Brookings: “Education is the only philanthropic gift that does not impoverish the recipient.” Perhaps you will take it upon yourselves to help support lighting education. Education is a continuous process. It is our obligation to see that the lighting profession replenishes itself with bright new talents who are well educated, ready and able to assume the mantle of professional responsibility. ■

Howard Brandston, LC, FIES, FCIBSE, FIALD is partner of the Brandston Partnership in New York City.

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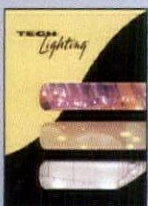
adindex

ADVERTISER	PAGE	CIRCLE NO.
ANP Lighting	76, 82	52, 70
Alcco	27	26, 28
Architectural Landscape Lighting	27	29
Ardee Lighting	27	27
Aromat Corp.	4, 82	38, 71
BJB Electric LP	93	56
B-K Lighting Inc.	67, 69, 71, 82, 44, 46, 48, 72, 73	
Bartco Lighting Inc.	45, 82	31, 74
Birchwood Lighting Inc.	51	33
Boyd Lighting Co.	63, 82	41, 75
Bruck Lighting Systems	11, 83	9, 76
Color Kinetics Inc.	5, 83	4, 77
Con-Tech Lighting	14, 83	11, 78
Cooper Lighting	Cov. 2-1, 83	1, 79
D'ac Lighting	83	80
Davis/Muller Lighting	Cov. 4, 83	59, 81
Dreamscape Lighting Mfg. Inc.	84	82, 83
ETC	15, 84	12, 84
Eclipse Lighting Inc.	77, 84	53, 85
Eiko Ltd.	78, 84	54, 86
Elliptipar Inc.	65, 84	43, 87
Engineered Lighting Products	73, 85	50, 88
Focal Point	3, 9, 85, 2, 7, 89, 90	
Gardeo Lighting	70, 85	91
Guth Lighting	23	21
Hatch Transformers Inc.	85	92
Hessamerica	23	20
Il America Inc.	19, 87	16, 100
Industry+Design Light Inc.	58	37
Lam Lighting Systems	25, 22, 23, 24, 25	
Ledtronics Inc.	18, 85	15, 93
Lighting Services Inc.	59, 86	3, 94
Lightolier Inc.	Cov. 3, 86	58, 95
Litecontrol Corp.	22, 86	19, 96
Lucifer Lighting Co.	13, 86	10, 97
Lumière	8, 86	6, 98
Lutron Electronics Co. Inc.	68, 86	45, 99
Orbit North America Ltd.	87	101
The Original Cast Lighting Inc.	79, 87	55, 102
Osram Sylvania	87	103
Panasonic Co./Lighting Div.	87	104
Prescolite Lighting	6-7	5
Prudential Lighting	49, 87	32, 105
Manning Lighting	53	34
Selux Corp.	29, 88	30, 106
Sentry Electric Corp.	10, 88	8, 107
Solatube International Inc.	75, 88	51, 109
Special FX Lighting Inc.	21, 88	18, 108
Sunnex Inc.	88	110
Super Vision International	61, 88	39, 111
THHC Lighting	64, 89	42, 112
Tech Lighting LLC	96, 89	57, 113
Teka Illumination Inc.	72, 89	49, 114
Trend Lighting Co. Inc.	89	115
Tridonic Inc.	62, 89	40, 116
Ushio America Inc.	16, 89	13, 117
Visa Lighting Corp.	17	14
W.A.C. Lighting Co.	20, 90	17, 118
The Watt Stopper Inc.	55, 90	35, 119
Wendelighting Inc.	90	120
Wila Lighting Inc.	57, 90	36, 121

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