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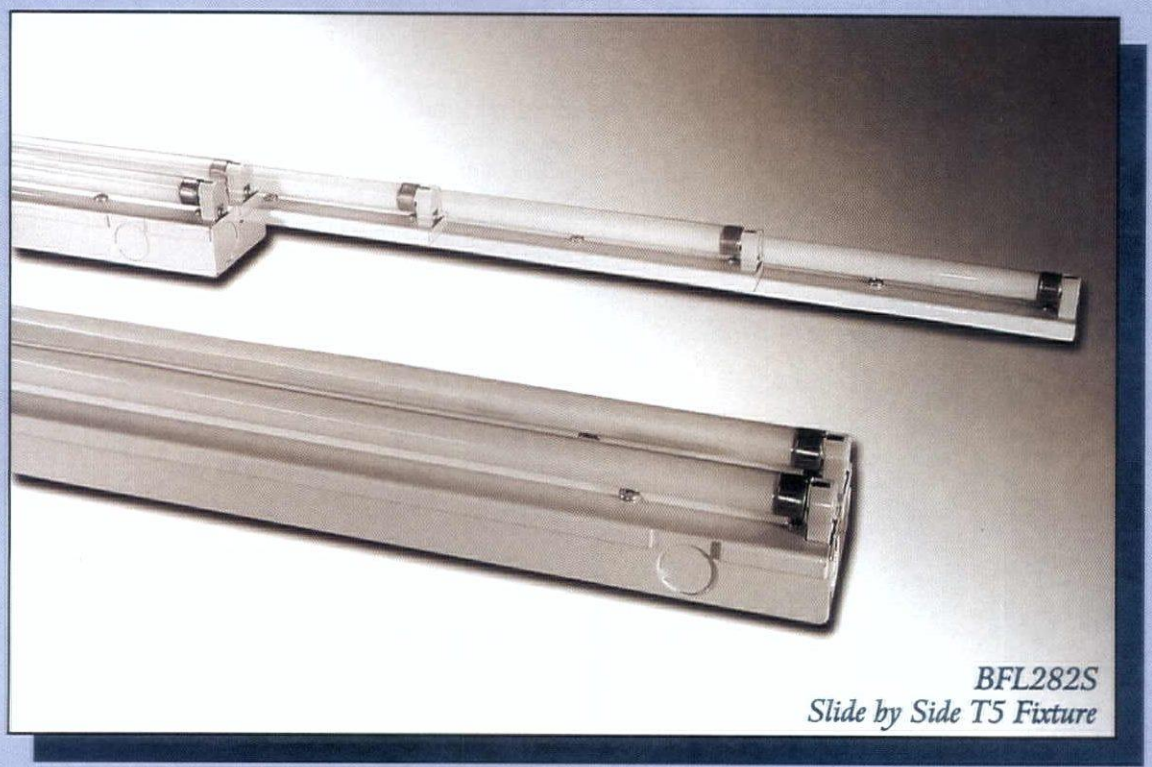

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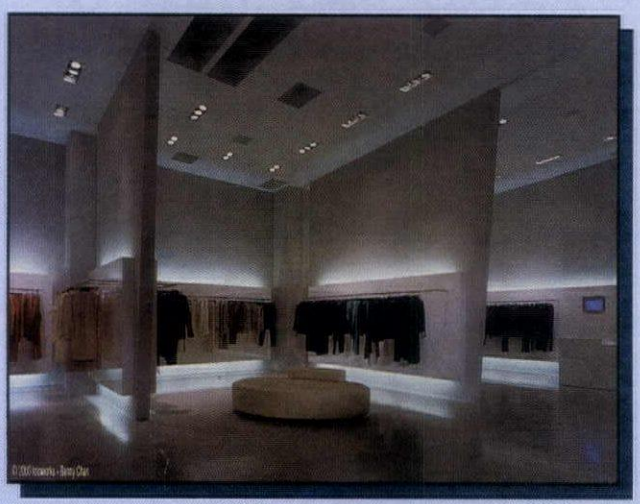

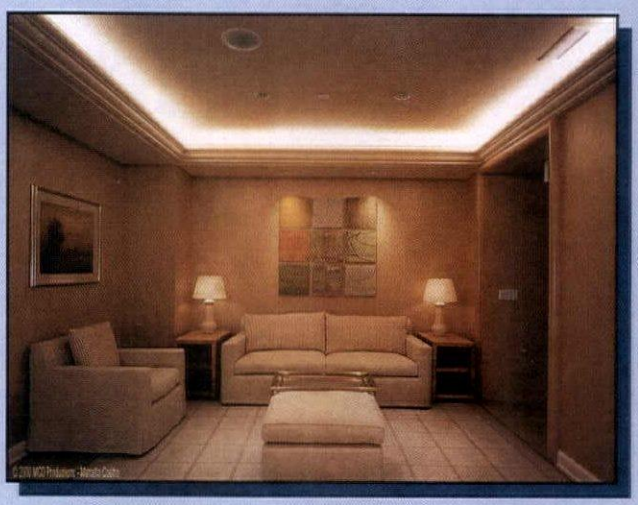

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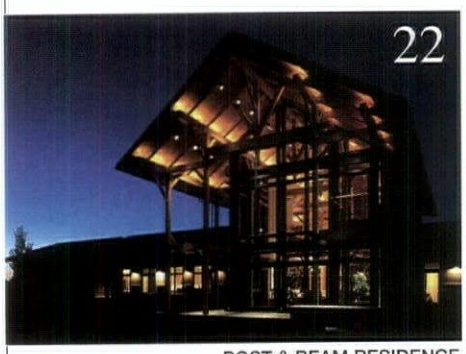
OCTOBER/NOVEMBER 2001 VOL.16, NUMBER 7

contents



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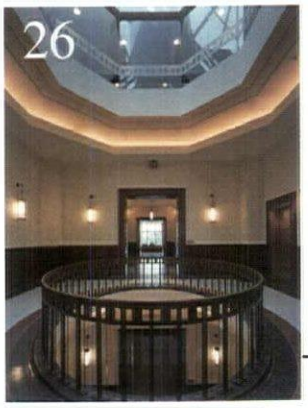

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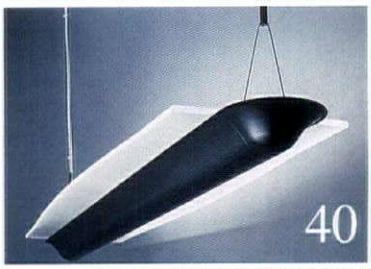

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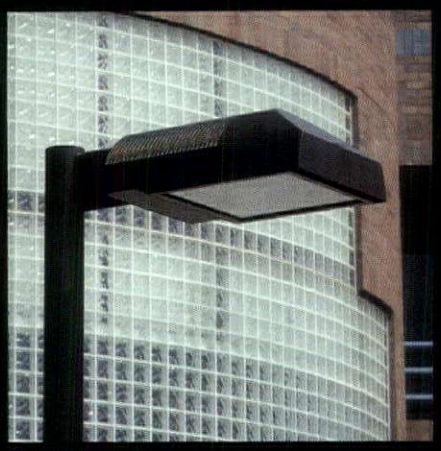

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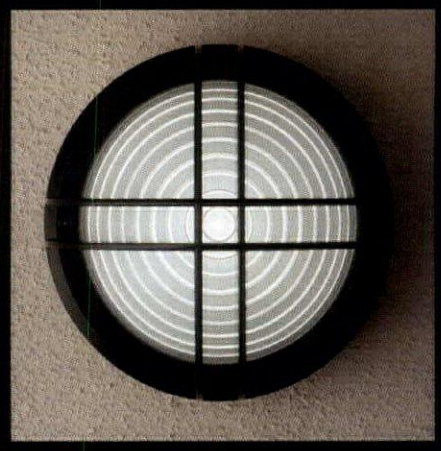

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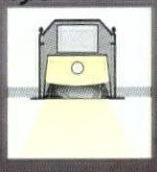

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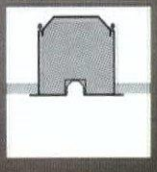

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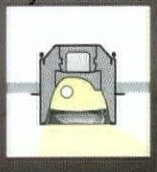

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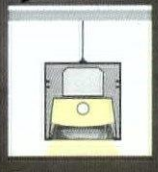


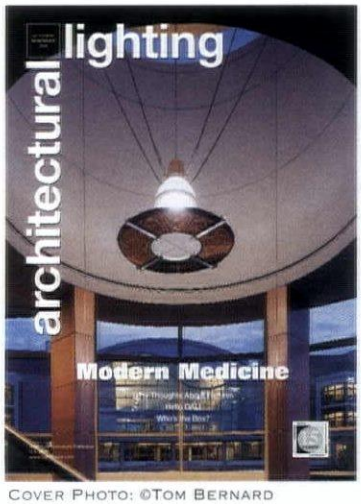
editor'snote

"In a New York minute, everything can change."

Christina Trauthwein, Editor-in-Chief

A somewhat prophetic refrain in a familiar song, I borrow it here as a simple—yet haunting—line that in many ways sums up the incomprehensible events of the past couple of months.

You know, it's interesting. We've received so many positive comments about our last issue: "What timing." "How appropriate." "What a well-planned effort to restore a feeling of patriotism." Even, "Your cover story captures the essence of 'America the Beautiful.'" But it wasn't planned that way. Not at all. If you'll recall, our most recent issue featured the Jefferson Memorial front and center, proudly declaring in print and pictures the spirit of American democracy and the celebration of our freedom—and the enormous amount of pride felt by all of those involved with the project in illuminating a strong and solid symbol of our nation. Festivities, including the official lighting of the Memorial, were to be held on the 12th (the lighting did take place more than a month later), as the article clearly states. And they are words now that mark a moment in time ... and time then just seemed to stand still. You see, our magazine was already at the printer that week. So our decision to run the story wasn't in response to the tragedy. But the timing, in some strange way, was right.



COVER PHOTO: ©TOM BERNARD

Since this is our first issue post-September 11, this is the earliest opportunity I've had to say publicly to our readers how grateful we were here, in lower Manhattan, to hear from so many of you. The staff of *Architectural Lighting* expresses a very heartfelt thank you to each of our readers who took the time to call and email us to inquire about our safety, extend their support, share encouragement and say a prayer. The concern for our well-being was truly overwhelming and we were all so deeply touched by our many friends in the industry. ■

the inbox NEW

ACQUISITIONS & MERGERS

Varon Lighting, Inc. has acquired Rockscapes Inc., a manufacturer of brass low-voltage landscape lighting fixtures for high-end residential and commercial applications. Based in Canoga Park, CA, Rockscapes is Varon's fifth acquisition in two years. Bruce Dennis, president of Rockscapes will continue with the company and report to Perry Romano, president of the Varon Outdoor Lighting Group, Inc. Ilene Dennis will continue as VP and treasurer of Rockscapes.

Genlyte Thomas Group LLC has reached an agreement to acquire the assets of Rosco Entertainment Technology, a subsidiary of Rosco Laboratories of Stamford, CT. Rosco Entertainment Technology manufactures entertainment lighting equipment and controls, including the Intelligent Power System (IPS) line of theatrical dimming equipment and Horizon lighting controls. Genlyte Thomas Group plans to operate the business under the name, Entertainment Technology.

Lithonia Lighting Group's parent company, NSI, has agreed to acquire the assets of the American Electric and Dark-To-Light product lines of the Thomas & Betts Corp. in an all-cash deal. The American Electric and Dark-To-Light product lines include outdoor lighting products sold principally to the commercial, industrial and institutional markets. After the acquisition is completed, both lines will become an operating unit of NSI's Lithonia Lighting Group.

LRC AWARDS COLOR KINETICS SCHOLARSHIP

The Lighting Research Center (LRC) and Color Kinetics have announced that Insiya Shakir, a graduate student entering her second year in the MS in Lighting program at Rensselaer Polytechnic Institute, is the recipient of the 2001 Color Kinetics Scholarship in Lighting. The Graduation Education Committee of the LRC chose Shakir, who holds one of the highest grade-point averages in her class, after she submitted a detailed thesis proposal focusing on the use of light emitting diodes (LEDs) in landscape lighting. Her research will combine the investigation of LED capabilities in landscape environments with a study of the human factors—including perception—surrounding this new type of lighting. Originally from Pune, India, Shakir holds an undergraduate degree in architecture.

SEMINARS TACKLE ARCHITECTURAL LIGHTING DESIGN AND LEDS

Paul Gregory of Focus Lighting and industry veteran, Sonny Sonnenfeld have announced the launch of the **Architectural Lighting Master Classes**, which will take place in New York City's John Jay College on February 21-22, 2002. The classes will address architectural lighting philosophies and are open to professionals who are interested in creating architectural lighting environments and learning about the value of lighting design in architecture. The seminar will not discuss lighting sources and fixtures or lamp and ballast combinations, but will include a manufacturers showcase of new products. For more information, phone (212) 769-2751 or fax (212) 769-4983.

The Lighting Research Institute at Rensselaer Polytechnic Institute conducted its first **LED Lighting Institute** on September 20-21. The event, which was attended by 25 lighting designers, engineers and other professionals, provided in-depth training and hands-on experience in working with the latest LED technologies for a variety of applications. LRC director of research, Dr. Nadarajah Narendran, developed the curriculum, which covers subjects such as state-of-the-art technology, lighting design and human factors, and led the seminar. For information on the Institute, contact Dan Frering, director of education at the LRC at (518) 687-7149, email frerid@rpi.edu or visit www.lrc.rpi.edu. The next LED Lighting Institute is scheduled for March 2002.

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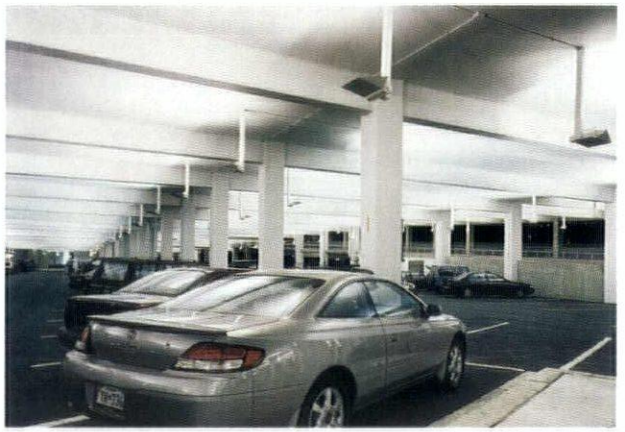

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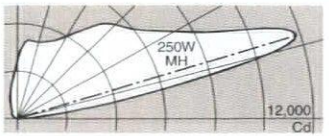

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people

Color Kinetics has appointed **William J. Sims** president and COO.

Schuler & Shook, Inc. has promoted **Emily Klingesmith, LC** and **Giulio Pedota** to senior lighting designer.

Leviton has appointed **John T. LaMontagne** north eastern regional manager for the lighting control division.

Martin Professional has appointed **Gorm Teichert** international sales director, architectural segment.

Warren K. Hecht has been named president and CFO for Varon Lighting; **David R. Walsh** has been appointed president and COO of Varon subsidiary, Malcor.

Holophane Corp. has promoted **Diarmuid McSweeney** to VP of marketing and product development; **Keith W. Keller** has been named VP of sales.

Frank Fitzgerald has joined Waldmann Lighting Co. as national sales manager.

Phyllis C. Eckstein and **Chad Groshart** have joined the New York office of Horton Lees Brogden Lighting Design; **Emily Koonce** has joined the firm's Los Angeles office.

Jody C. Salsig and **Josie K. Lawrence** have joined the design team at J S Nolan + Associates Lighting Design; **Maggie Hosmer** joins as office manager.

Robin Conway has been named VP for marketing and sales at Stingray Lighting.

Beacon Lighting has appointed **Robert Hemple** to VP of marketing and sales.

Philips Lighting has named **Jim Anderson** fluorescent category manager and **Pat Mikucki** marketing communications manager.

The New York Foundation for the Arts has appointed **Leni Schwendinger** a 2001 Fellow in the area of Performance Art/Multidisciplinary Work.

Hadco has named **Chris Hammelef** general manager.

Robert Romeo has been named marketing manager for Westek Lighting, division of American Tack & Hardware Co.

Libby Morley and **Renee Gable** have been named VP of AMC, Inc., which produces and manages Lightfair International. **Danielle Gibbs** has been named trade show manager and **Tiffany Wiederhold** conference and marketing manager.

Canon Design has appointed **Edward J. Muck, RA** to associate VP.

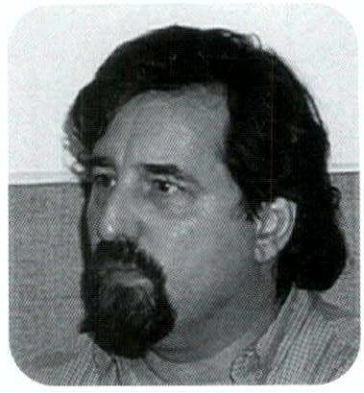
T.Y. Lin International has named **Jack Waldron** chief operating officer.

Architectural Lighting interviews John F. Bos, IALD, IESNA, LC, principal of Bos Lighting Design in Houston, TX. His professional experience has encompassed many aspects of design from architectural lighting design to theatrical scenery and lighting to industrial design to theatrical consultation. Bos teaches at both the University of St. Thomas and University of Houston Downtown, both in Houston, TX and has received numerous International Illumination Design Awards (IIDA) for his work on such projects as the Axxiss in Monterrey, Mexico, Riverbend Church in Austin, TX and the U.S. Federal Courthouse in Brownsville, TX.
—Christina Trauthwein

Q: Who is John Bos?
A: I'm a designer. That's how I define my professional persona. Whether that means I'm designing children's toys, shoes, clothing, light fixtures, theater sets, whatever, I am a designer. To me, that means someone who can apply an aesthetic problem-solving mentality to what they do day in and day out.

Q: Quickly, a couple of words to describe you?
A: Humorous. Patient. In fact, my wife often tells me: "I can go into a room and say 'hello' and people can be mad at me. You can go into a room and say 'go to hell' and they'll thank you."

Q: If someone had asked you, "What do you want to be when you grow up?" you would've answered:
A: I probably would have said a whole list of things. And maybe I'll just get to them all before I retire. Seriously, though, I started off in pre-med, went into creative writing, then went on to the theater, then to industrial design—and now this. I was heavily focused on math and science in the beginning and then met a man, who turned out to be a mentor, who got me into theater design in my junior year of college. And once I started on that track, I was fortunate enough to have a second mentor at SMU—Bill Eckhardt—to help me continue with it. Bill was a top-notch theater designer/producer in New York City—responsible for discovering Carol Burnett and giving Angela Lansbury her role as Mame on Broadway—who really solidified a lot of ideas about design and taught me to focus on the broad definition of design rather than its division into disciplines.



Q: What captured your interest about theater design?
A: The ability to design things and the opportunity to see them quickly. The idea that you put something up, see what you've done, find your mistakes, find your successes and then move to the next project is both thrilling and gratifying. It's an incredible learning experience because of the rapidity of the projects.

When I came out of graduate school, scenery design was my main focus. And when I moved to Houston, I became the scene designer for the Alley Theater. I only thought I'd be there two or three years—and that was in 1979. I went from there to another small theater, worked with them for a number of years, opened an industrial design studio for a while, then moved back into the theater again thinking I would stick with that path. Well, the guy I was working for really wasn't creating the right opportunities for me and one day, a local rep firm offered me a slot to go to work for them, assuming I could sell dimming. Through this position, I called on architects and interior designers. And after about five years, it paid off: A couple of the architecture firms got together, said they wanted me as an independent consultant and even gave me a couple of years' worth of work to entice me. And it sure did. That's how I became an architectural lighting designer.

Q: What experiences accompanied you on your new career path?
A: In the theater, I learned about reflectors and actual lamps and the ways to manipulate light rather than more engineering-based lighting applications. I was also taught about the concepts of light and space, providing me a perspective on using light creatively versus using light to achieve a purely technical solution. It's all about thinking *in* light rather than thinking about *applying* light—it's like learning a foreign language. They say the key to mastering that is to actually think in that language instead of thinking in your native tongue and translating in your head.

Q: What learning experience has had the most impact on you?
A: Probably my graduate work, working with Bill Eckhardt. He had a wonderful vision and the ability to express it. More than that, he possessed great confidence in knowing and accepting that other people often have different solutions to the same problem. Other ideas did not threaten him. What an admirable trait and how lucky I was to witness it firsthand. He showed those of us who studied with him a valuable lesson in professionalism and set this wonderful example that taught us it's okay to have firm ideas and strong beliefs—in fact, he'd encourage that—but to allow other people's ideas to flow around you, to listen to them and pull what you need from them. I carry this into our studio every day.

"It's all about thinking *in* light, not thinking about applying light."

Q: What's your favorite type of project to work on?
A: I love residential work. I really enjoy the fact that you're constantly challenged to be creative on your feet and that the basis under which the project is born inevitably changes five or six times—and you're expected to have answers to those as you go. "Yes, John, you've solved this problem three or four times, now what's your fifth and sixth solution?" For me, it's great fun.

(Continued on page 14)

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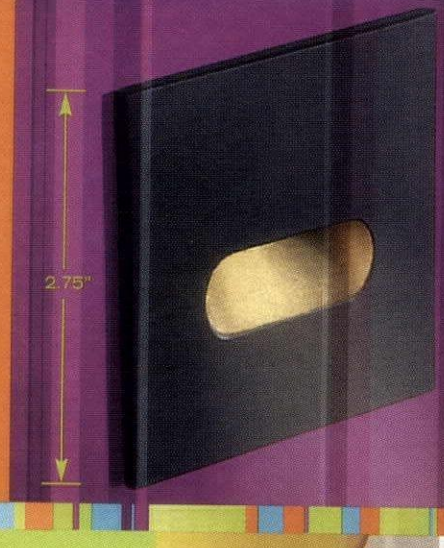

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(Continued from page 12)

Q: What do you think is the biggest misconception about lighting designers?
A: In terms of the construction industry, that they inevitably make a project cost more and the value derived is not in line with that.

Q: What's one thing you wish architects already knew about your job?
A: Lighting designers look at space differently from architects. And our vision—how we're trained to view a space compared with the way they are trained, brings us to a different set of conclusions about how the space develops. Architects are trained and all of their tools are rooted in 2D models. Very rarely do you find an architect, or especially a client, who thinks in terms of volume of space and how that volume is subdivided. Architects deal with typical rectilinear volumes and they don't usually consider how to emphasize or de-emphasize parts of those spaces. People inhabit the space, intersect the space and move through it, and lighting plays a significant role in creating their experiences—whether good, bad or indifferent. This is an idea I try to express most but is understood least. We try to work with architects on a peer-to-peer basis and hopefully, there are no subjects considered "off limits."

Q: Is there a motto you live by?
A: I have a quote that I keep near at all times. It's by Mark Twain: "When in doubt, tell the truth. It will astound your friends and confound your enemies."

Q: What's one thing about your job that you've found extremely rewarding?
A: The opportunity to have created a studio for 10 designers to work in and to be able to make a good living doing what they love to do. One of the things in theater that I didn't like was that designers were constantly creating large amounts of value for various producers and were wooed by the story of loyalty—you know, the "we're all family here" line—and that was fallacious most of the time. The opportunity here to put that ethos into practice and to form and maintain an environment for creative people to thrive is by far the most rewarding—even though the most challenging—aspect of my job.

Q: If you were to pen an article on any professional topic, what would it be?
A: I would want to somehow hone in on the topic: Design is design. It's not lighting design, it's not art design, it's not architecture design, but that design is a universal language and a universal system of solving day-to-day problems. Something else I'm passionate about: The lighting industry has forever had a bad rap about honesty and integrity. Virtually every architect we work for has horror stories about lighting and how terrible the project pricing has gone on a job. I'd express that irregardless of how sleazy we've been told lighting is in the construction industry because it doesn't have to be that way. We do not need to go to meetings with chips on our shoulders and assume that the reps, the wholesalers or the electricians are the bad guys. We should be able to deal honestly and directly with each other understanding that everybody has to live and make a profit. It does not advance our profession for lighting to have a reputation of an "anything goes" industry; that you can hang the honesty hat at the door and it's a free-for-all. Nor does it advance lighting for us, as designers, to constantly denigrate our reps, electricians and wholesalers.

Q: What's the best thing that's happened in the profession in recent years?
A: I think probably the IALD Vision Conference and the work that Barbara Boyeau and the membership committee at the IALD have accomplished. The new sense of opportunity and level of interest that has accompanied these have moved our profession a giant step forward.

Q: What words describe lighting design in the '80s, '90s and beyond?
A: The 1980s planted the seeds for lighting design; 1990s signaled the growing of the crop; and we're now getting into an era where there's tremendous opportunity to harvest and reap the benefits of our efforts.

Q: What's your outlook on the economy as it relates to the lighting industry?
A: The economy has slowed down, obviously, and when things slow down, we've all done a good job of creating a sense of need for better, more efficient lighting. We'll see some retrenching on that. I think there's going to be more of a sense throughout the lighting and construction industry that integrity and lighting need not be an oxymoron. In a down economy, people are not going to be able to make money as fast and easy as they used to, so more than ever, they'll tend to do business with people they can trust. "Making deals" will slowly be squeezed out.

Q: Who, in your opinion, in the most influential lighting designer?
A: I have a great personal affinity for the work of Motoko Ishii. I think she has a wonderful sense of the spirituality of light and the non-engineering based portion of light. It is not, of course, that she is incapable of doing those things, but that she has an overriding sense of light that is part of her vision that transcends the mechanical underpinnings. She uses those tools to get her from the beginning to her vision.

Q: Are there any examples of architecture that move you, motivate you to design?
A: The Sagrada Familia Cathedral in Barcelona that Antonio Gaudi designed. There is a sense of grandeur, form and detail that is so irregular and so spectacular. The ability to envision something so large yet focus on detail so small—especially throughout an entire project—is truly inspirational and has always amazed me.

Q: Do you derive inspiration from any other disinclines?
A: Well, obviously, my theater background predisposes me to explain and feel in a theatrical design sense, but other than that, I would say that I often explain design concepts from a Jungian-style psychology (what we are aiming towards or what we ought to be aiming for—what archetype) for our clients. We want to involve them in the conceptual targets at this level so that their understanding of our work rings true to their aspirations for the project.

Q: Last question: Do you have any professional pet peeves?
A: I'm not real fond of arrogance being in any part of our profession. We're at a point in our development as a profession where we have a lot of educating to do with our clients and the other people we deal with and we're not in a position where arrogance has a reasonable part in our day-to-day work ethic. We are problem solvers and rarely are we presented with problems that can have only one solution.

"... design is a universal language and a universal system of solving day-to-day problems."

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Program Description

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

2002 Eligibility

Anyone may enter a project for an award. The project must be a permanent architectural lighting design solution, interior or exterior, for which construction was completed after June 1, 1999. Lighting products, lighting equipment and lighting design for theatrical performances are not eligible.

All design professionals who worked on the project must be recognized in the credits, even if the designer is no longer in the employ of the submitting firm, no longer practicing, retired or deceased.

Judging

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

Awards

There are two types of awards, Awards of Excellence and Awards of Merit. Special recognition may be given for certain unique solutions. Award winning projects will be recognized at the IALD Awards Dinner and Presentation on June 4, 2002, in conjunction with LIGHTFAIR INTERNATIONAL in San Francisco, California. Winning projects will be published in leading architectural and design publications and included in the IALD slide library.

Submission Requirements

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

iald.org

architectural lighting

Please include all of the following for each entry:

Cover Page: Please provide the IALD with the following information on a cover page to your entry:

- Entrant s name
- Street address, city, state or province, postal code, country
- Phone number
- Fax number
- E-mail address
- Name of project
- Location of project
- Completion date of the project
- Lighting designer on the project
- All other design professionals on the project
- Size of project (in square feet or meters)
- Installation cost of the project
- Watts per square foot or meter

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

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

Slides: A maximum of ten 35mm slides of the project. Originals or high quality duplicates are required. The quality of the photography is important in the judging process. Although the images do not need to be professionally photographed, they should be of sufficient quality to illustrate your work. Please avoid the use of fill light, or, if that is not possible, clearly identify images that include fill light or day light. Digitally enhanced or retouched photographs are not allowed. Please identify any areas in photographs that were not the work of the submitting lighting designer. Entrants are encouraged to include photographs, which show the project in use, in context with its surroundings and from a human vantage point. Smaller scale projects should show more detail rather than reducing the number of slides. The IALD recommends a minimum of six slides per project. If plans and drawings are required to describe the lighting solution, we recommend photographing essential information and including them as slides. If the project is a renovation, an image of the project before changes is recommended. If the project includes exterior lighting, at least one daytime photograph is recommended. All slides must be labeled with project and firm name and numbered to correspond with the keyed description. With slides positioned right reading, number each slide in the upper right corner and place project name in the upper left corner of the slide. Photographs, drawing and/or magazine articles will not be considered. Please do not send glass-mounted slides.

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

Entry Fee: (Per Entry):

- $40 (US) IALD and LIRC members
- $75 non-members

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

Address Entries To: IALD Awards Program, International Association of Lighting Designers, The Merchandise Mart, Suite 9-104, 200 World Trade Center, Chicago, IL 60654 USA Telephone 312-527-3677 Facsimile 312-527-3680 E-mail: iald@iald.org

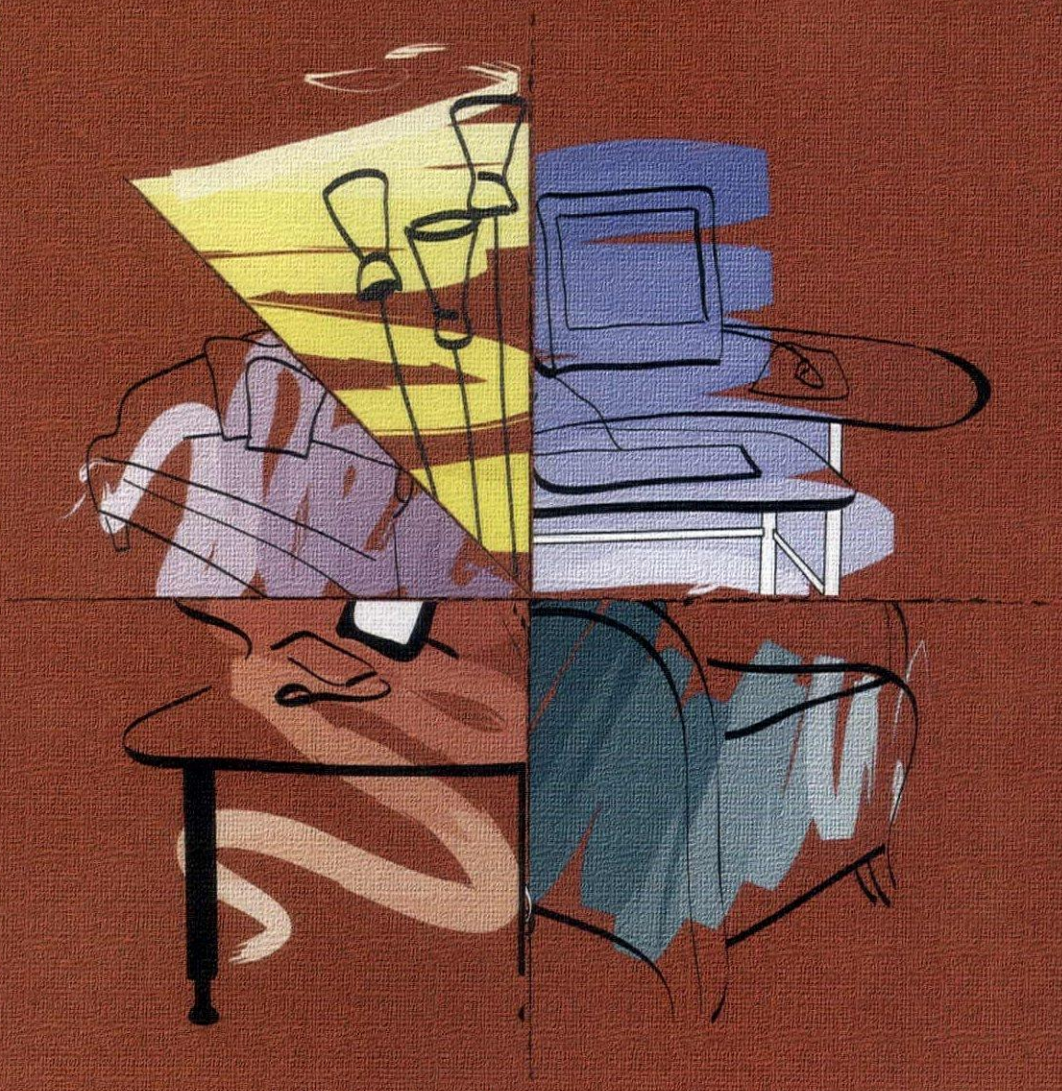
Make sure you include:

- Cover page
- Written brief
- Keyed description
- Slides
- Entry fee

Incomplete entries will not be considered.

Deadline: Submissions must be received no later than February 1, 2002.

CALL FOR ENTRIES COURTESY OF ARCHITECTURAL LIGHTING MAGAZINE



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Prescription Plan

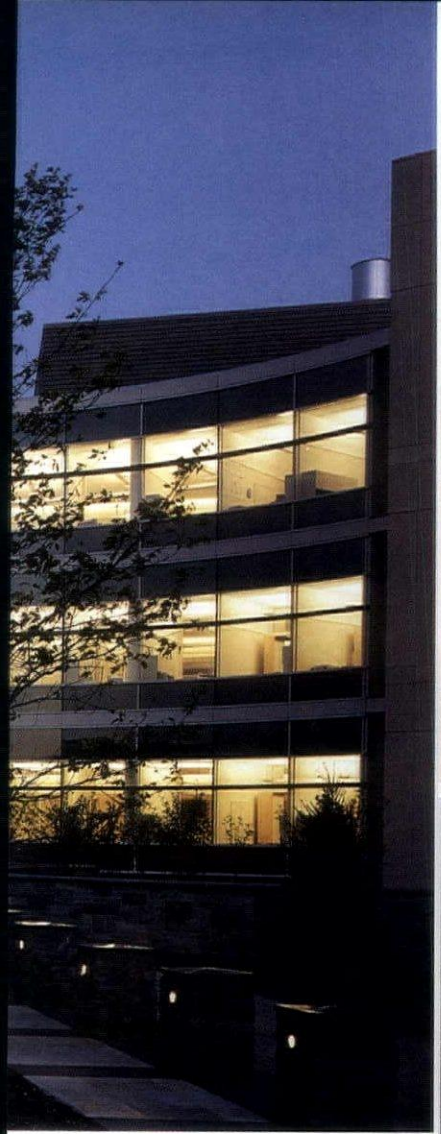
This multi-tasking lighting design gives drug discovery a boost in comfort and a dose of drama

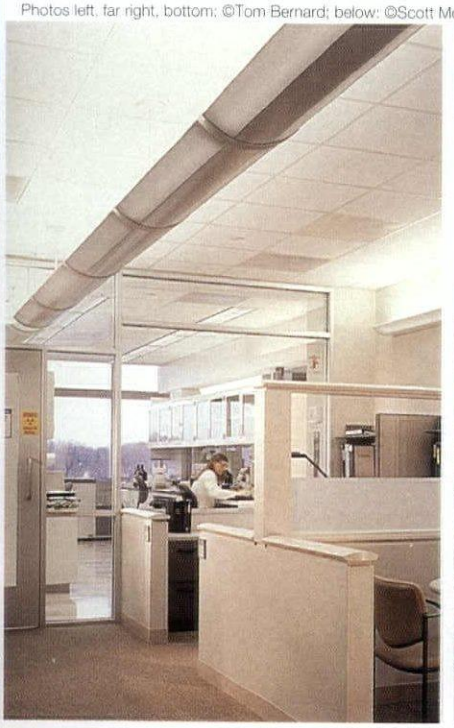
BY ALICE LIAO, SENIOR EDITOR

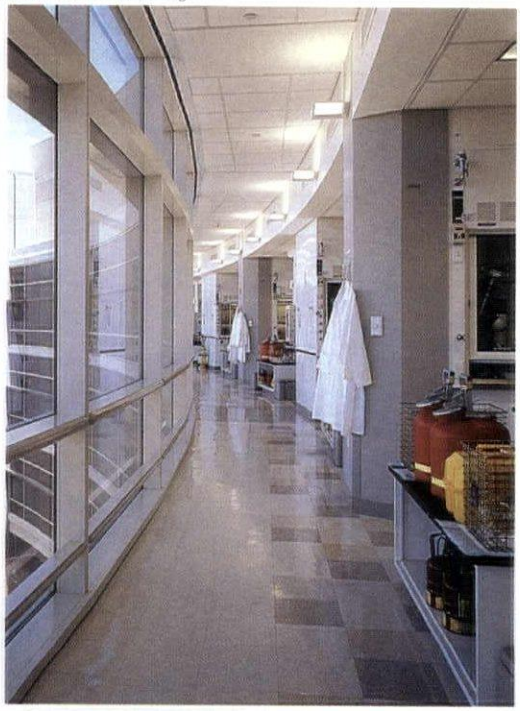
Make no mistake. Although elegantly undulant in form and subtly reverent of the seafaring history of its hometown, Groton, CT, Pfizer's Building 220 is first and foremost a drug discovery building and was primarily designed as such. "We design to meet our client's business goals," said CUH2A's architectural design principal Brian Kowalchuk. "Building 220 goes beyond creating a flagship research facility for the world's largest drug maker. It is a tool to help Pfizer accelerate the drug discovery process." Responding to this charge, the lighting plan developed by CUH2A's lighting design team of Tom Lyman, Karen Murphy and Reynold Territo not only ensures that visibility needs in the laboratories are met, but also furnishes Pfizer employees with a comfortable environment in which to exchange ideas, highlights architectural themes and provides the pharmaceutical leader with a fitting introduction to its research campus.

Consisting of twin sections of laboratories and offices that flank a soaring atrium serving as both campus gateway and multimedia auditorium/conference venue, the three-story structure was designed and lighted using a strategy of "inside-out." "We started with the design of the laboratories—the primary functional spaces—and the tasks being performed there and then played against that in conceiving the outer spaces," said Lyman. "We looked at the labs as a design element. How they are organized and set adjacent to each other and their interrelationships became a critical driving factor in developing

Photos left, far right, bottom: ©Tom Bernard; below: ©Scott McDonald@Hedrich-Blessing







Above: Building 220 serves as a grand gateway to the Pfizer research campus in Groton, CT and is illuminated accordingly. "We wanted to make sure that every office was similarly lighted," said Lyman, "so the whole elevation would appear to have a uniform glow and read as a beautiful wash of light." Pedestrian fixtures and granite bollards reinforce the ceremonial approach to the building.

Right, top: In the labs and offices, issues of visual comfort and promoting communication were key in shaping an appropriate lighting solution. Indirect pendants, which visually link the labs and offices and contribute ambient light to both spaces, also appear in truncated form to illuminate a service corridor. Bottom: Pedestrian fixtures are combined with 32W compact fluorescent downlights to light a circulation zone leading to the atrium.

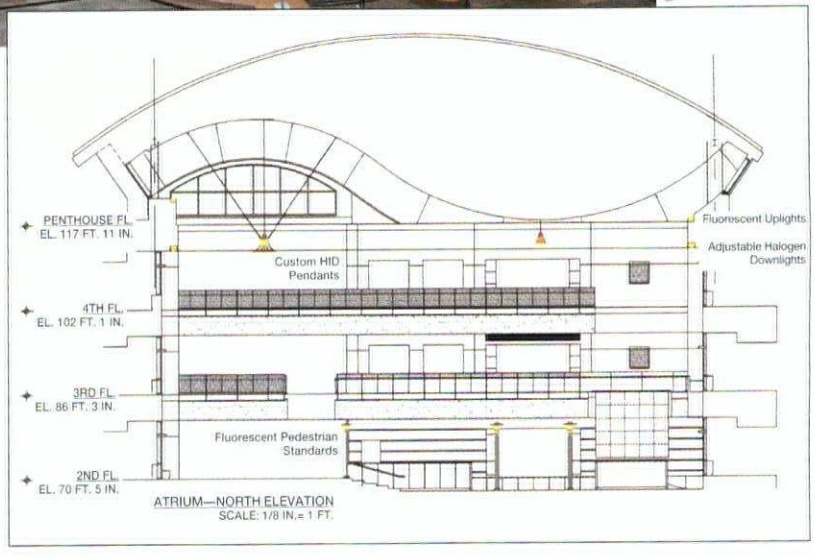
the lighting." Also key was communication among the disciplines. Unlike other research facilities where biologists, chemists and geneticists may be situated in separate wings, Building 220 locates the disparate disciplines on the same floor—and often across a corridor from each other—to promote interdisciplinary collaboration, which in turn can further drug discovery. "An emphasis was placed on the communication between the biologists and chemists and just across the board," said Karen Murphy. "We wanted the building and the lighting to encourage people to communicate."

DISCOVERY ZONES

To this end, CUH2A's solution not only provides comfortable working conditions for lab technicians and staff, but also enhances an architecture that is open and fluid. On each floor, linear pendants work with transparent walls that separate laboratories and offices to create the illusion of a continuous space. "Originally, the design concept was to develop an open space for labs and offices to foster better communications, but from a safety and health standpoint, a barrier was needed to separate the two different environments," said Murphy. "So we designed the full-height glass walls and aligned the indirect fixtures in the offices with those in the labs." In rows, the pendants, lamped with 32W T8 fluorescent sources, appear as single fixtures streaking through the

Photo: ©Woodruff/Brown

The three-story atrium features a complex lighting system that responds to the many functions of the space. The different layers of light are controlled separately for added flexibility and photocells help save energy by balancing daylight with electric light .



offices and laboratories and thus visually connect the two spaces. In the offices, task lights supplement the indirect light light level of 35-40 fc. In the labs, the pendants are combined with ceiling-recessed parabolic fixtures to supply ample horizontal lighting for the lab benches and shadowless ambient illumination. Achieving an illuminance of 80 fc, the blend of direct and indirect lighting ensures visual comfort in the laboratories. "Because issues of visibility are as important as illumination levels in laboratory lighting, utilizing an indirect fixture to help with ambient light was critical," said Lyman. "Not only does it suggest a visual link in the building, but it also improves vertical illumination and balances brightness."

The concern for comfort, communication and architectural continuity is also evident in the location and lighting of a trio of circulation zones. Within the laboratories, a service corridor is illuminated with a series of customized sconces equipped with 32W triple-tube compact fluorescent lamps and mounted to columns. Formed by truncating the linear pendants used in the laboratories and offices, the fixtures produce a soft, indirect light that complements the curving contours of the corridor. "Our experience has taught us that a lot of information is exchanged in these circulation areas," said Lyman. "When you walk down these corridors, you want to be in them. We did that for a reason. We want people to meet in these corridors and exchange ideas that, hopefully, will expedite the drug discovery process."

To promote communication across disciplines, a gradual downshift in light levels helps define a central corridor as a meeting point for biologists and chemists. "Because the laboratory and technicians' offices are generally characterized by difficult visual tasks requiring higher illumination levels, when we came to the circulation zone, we wanted to change the way the lighting reads to differentiate the space," said Lyman. "We wanted to reinforce what's happening architecturally and provide a lower level—about 15 fc—of ambient light." Fluorescent covelighting tucked above large, curving ceiling sections emphasizes the gentle arcs of the corridors and works with recessed 32W compact fluorescent downlights to create a more relaxed atmosphere.

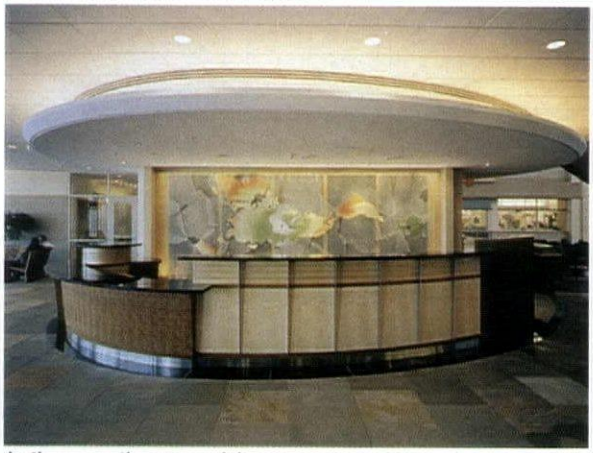
A third circulation zone, connecting the laboratories to the director offices and serving as the main conduit to the atrium, incorporates fixtures from both the laboratories and the atrium to convey a sense of architectural flow. "We wanted to combine the lighting of the lab with that of the atrium," said Murphy. "Through the choice of fixtures, we were able to maintain a kind of continuity throughout the building." Tied into the millwork of

the workstations, small-scale pedestrian fixtures, which also appear in the atrium and on the exterior plaza, punctuate the corridor and establish a visual connection to other parts of the building. Lit with 42W compact fluorescent lamps, the streetlights anchor the workstations, forming mail collection stations at the corners of each island. Built-in task lighting supplements the downlights recessed above each cubicle, while behind the workstations and inside the executive offices, rows of indirect pendants, recalling the laboratory lighting, suggest openness and provide ambient illumination. Across the corridor, subdued light from compact fluorescent downlights underscores the casual feel of a breakout area, while above, concealed covelighting rims its ceiling with light.

USER-FRIENDLY

In the atrium, the pedestrian fixtures are again integrated with millwork benches encircling a dropped seating area. Here, however, in response to the multiple uses of the space, the fixtures can be removed to accommodate large groups of people. "The atrium was a very interesting part of the project because it serves as the main gateway entry into the Pfizer campus, but also provides a space for major meetings and can hold up to 1,200 people," said Lyman. "Consequently, we've designed a lighting system that illuminates the atrium as a monumental space, but also has the flexibility needed for small seminars, presentations and corporate events." Subtle modifications to the streetlights—copper reflectors and pole detailing—reflect the finishes and palette of the interiors.

Photo: ©Scott McDonald@Hedrich-Blessing



In the reception area, visitors are greeted by a glowing map of the world made of sandstone and glass and illuminated from above and below. Above, fluorescent covelighting rings the ceiling soffit with light.

A procession of custom pendants, also sporting copper components and spanning the main axis of the atrium, complements the fabric ceiling, whose wavelike form recalls the Thames River located nearby. Developed from an existing refractor unit to reduce costs, the fixtures are lamped with 400W metal halide sources and hint at the nautical theme as well. "If you look closely at the fixture detail, you can see that it's held together with cabling and turnbuckles," said Lyman. "The materials that we selected—primarily copper and aluminum—reinforce the whole building's aesthetics." A second series of custom fixtures similarly evolved runs parallel to the first and features a perforated metal shroud for glare control. "We chose perforated metal because the fixtures are in direct view from the upper floors," said Murphy. "Simply having a glass enclosure would be too bright for people on that floor, so we shrouded the glass with perforated copper."

During the day, the pendants and pedestrian fixtures are combined with 40W biax covelights located adjacent to the clerestories to produce 25-30 fc of light, which Lyman acknowledges, "is a little on the higher end." "However, we wanted this to be a very bright space," Lyman explained, "so that when people use it for meetings or have impromptu conversations in that seating area, there is sufficient illumination, especially if they want to do a video presentation or transmission." To conserve energy, the covelights and pendants are placed on photocells, which turn off the electric lighting when sufficient daylight is present. Easing maintenance, pairs of lamps in the covelights are split-switched to allow alternate day operation.

SIDE EFFECTS

For special events or multimedia presentations requiring theater-style illumination, PAR38 adjustable downlights recessed in a third-floor soffit and aimed at the center of the atrium provide dimmable "house" light to 15 fc, while six moving theatrical fixtures mounted to the backside of a ceiling rib and downlights in a soffit under the stage highlight speakers and happenings on the stage. A flexible control system enables the different layers of light to be operated separately and for added control, also includes lighting in the laboratories that are visible along the perimeter of the space. "Those fixtures are controlled as part of the atrium, as opposed to the laboratory," said Lyman. "That way, we can turn them off for more serious presentations."

From the atrium, a semicircular, 200-yd.-long connector links the building to other facilities on the Pfizer campus. Lighted by linear pendants, the connector accesses the upper floors via a circular stairway housed in a transparent tower and illuminated from above with the same decorative pendant used in the atrium. The fixture is perfectly aligned with those in the atrium, lending continuity to the more organic layout of the building. "If you look at a dissection of the plan, you'd see that the stair tower is on the primary axis of the atrium," said Lyman. "The pendants reinforce that visually, serving as a landmark in the architectural diagram of the building."

Other highlights of the building include the reception area and exterior plaza, which together form a ceremonial introduction to the building—and the campus—and are lighted accordingly. Outside, a single file of pedestrian fixtures guides visitors to the entrance and into the reception area where behind the desk, a map of the world is recreated with glass and sandstone. Lighted from above and below, the layer of golden stone appears to glow, while in front, halogen accent lights add sparkle to the glass. Indirect lighting above the reception desk contributes to the drama. ■

DETAILS

PROJECT Pfizer Building 220 **LOCATION** Groton, CT **OWNER** Pfizer Inc. **ARCHITECT** CUH2A Inc. **LIGHTING DESIGNER** CUH2A Inc.—Thomas Lyman, IALD, LC, Karen Murphy, LC, Reynold Territo, LC **CONSTRUCTION MANAGER** Gilbane **PHOTOGRAPHERS** Tom Bernard; Hedrich-Blessing—Scott McDonald; Woodruff/Brown **LIGHTING MANUFACTURERS** Winona; Litecontrol; Architectural Area Lighting; Cooper Lighting/Halo; Edison Price Lighting; HE Williams; Philips Lighting

The Good Life

Lighting designer Earl Levin considers all angles to bring livable light to this grand post-and-beam-style house

BY WANDA JANKOWSKI, CONTRIBUTING EDITOR

"Drama is the artistic relationship between light and shadow," said Earl Levin, LC, IALD, principal and senior lighting designer at Pacific Lightworks. Levin and his design team created the dramatic, yet livable and functional lighting, for what he calls a "small job"—a 7,040-sq.-ft. project set on 45 acres in Ridgefield, WA with lighting installation costs totaling $280,000. "The concept for the lighting design started with the architecture," he explained. "There is a cathedral-like quality about the angled beams and it wasn't appropriate to put fixtures on them." The post-and-beam residence and adjacent barn are set in an isolated rural area. The tall, airy structure of the main house is impressive by day as well as against a night sky.

Levin believes in using light to relate people to architecture and interior spaces to the exterior environment. He also believes in bringing people into the process. "We show clients examples of how it could look and feel," he said. Levin's client presentations include hand drawings. "Computers aren't a substitute for personal experience and sensitivity," he said. "The clients don't see the texture of surfaces or the color of light on the computer. You can try to create an image on the screen, but it can be distorted."

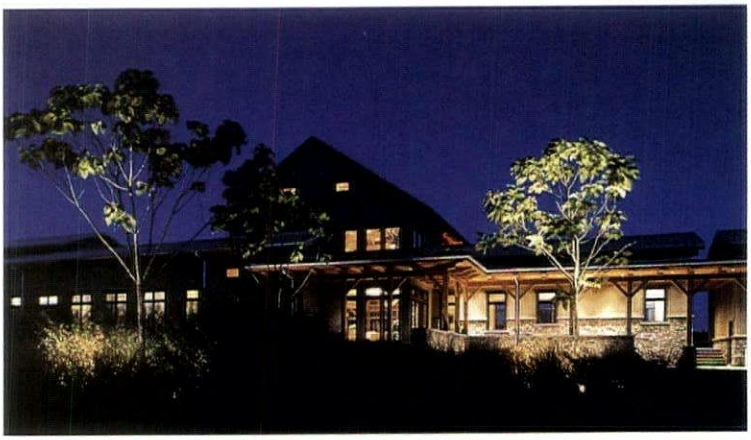
"We even explain the primary and secondary focal points to the clients," Levin explained. He achieves layers with light by focusing on varied surfaces. Though his schemes may be complex in large and structurally challenging homes like this one, Levin likes to keep the controls simple. "Two buttons," he said, "high and low, with more options in certain locations that deal with setting up the lights and other automated systems in the whole house. Control systems are only as good as the value of the lighting design."

After he achieves agreement on the design concept from the client, Levin and his team put the data into CAD format, so details can be communicated easily and accurately to other professionals, such as contractors. Levin fine-tunes the lighting 60-90 days after it is installed, "after the clients have a chance to see what they like and don't like about the system," he said.

DETAILS

PROJECT Post-and-beam residence **LOCATION** Ridgefield, WA **OWNER** Bruce Crockett **ARCHITECT** Sienna Architects—Michael Marx **LIGHTING DESIGNER** Pacific Lightworks, LLC—Earl Levin, LC, IALD, Marianne K. Maloney, LC, Veronika Batho-Demelius and Mark S. Godfrey, LC **ELECTRICAL CONTRACTOR** West Side Electric Co., Inc. **PHOTOGRAPHER** Earl Levin, LC, IALD **LIGHTING MANUFACTURERS** Prescolite; Starfire; Regianni; Bartco; Engineered Lighting Products; Flos; Visa; Bega; Kim; Vista; Osram Sylvania; GE; Ushio; THHC; Custom fixtures designed by Veronika Batho-Demelius, Pacific Lightworks, LLC & fabricated by George Batho Glass and Eric Miller Metal

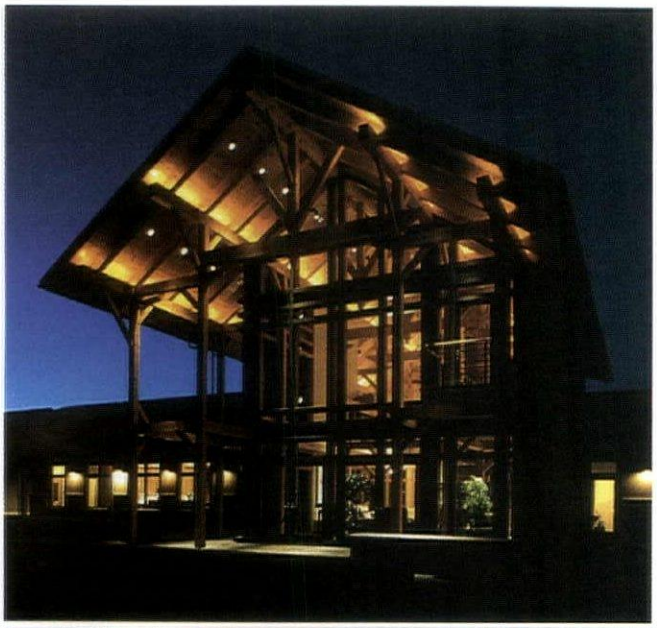
Photos: ©Earl Levin



Landscape Art. Setting the tone for the interior of the home is the carefully chosen exterior lighting. The effect is revealing, but not overwhelming to the natural landscape. "The night sky is beautiful and you don't want too much lighting—that would distract from it," Levin said. "The home is a significant structure and you need to take into account how light spills out onto the landscape from it and not just consider the landscape in a vacuum." Levin also uses light to identify key landscape elements, which in turn, serve as navigation points, help delineate the approach to the house and provide a dramatic segue to the post-and-beam structure.

At night, the house, elegant and luminous, appears to rise from a darkened stage punctuated by an occasional uplighted tree or highlighted greenery (right). "You can't light everything—that would be boring," said Levin. "And you must consider the surfaces involved—whether it's stone or wood. Uplighting is important outdoors because it's dramatic, but it's important to think it through—and not to visually float canopies of trees in mid-air, for example." In the front of the home, halogen uplights, wall washers and downlights are used to emphasize textures and the most significant landscape features. The illumination from the fixtures is balanced to render the structure and clearly define the entrance.

At the back of the home, lamp aberrations in fixtures that wash the walls are eliminated and smoothed through lamp, lens, louver and focusing choices. To protect the viewing of the night sky, a single line of north-to-south and east-to-west trees are uplighted with

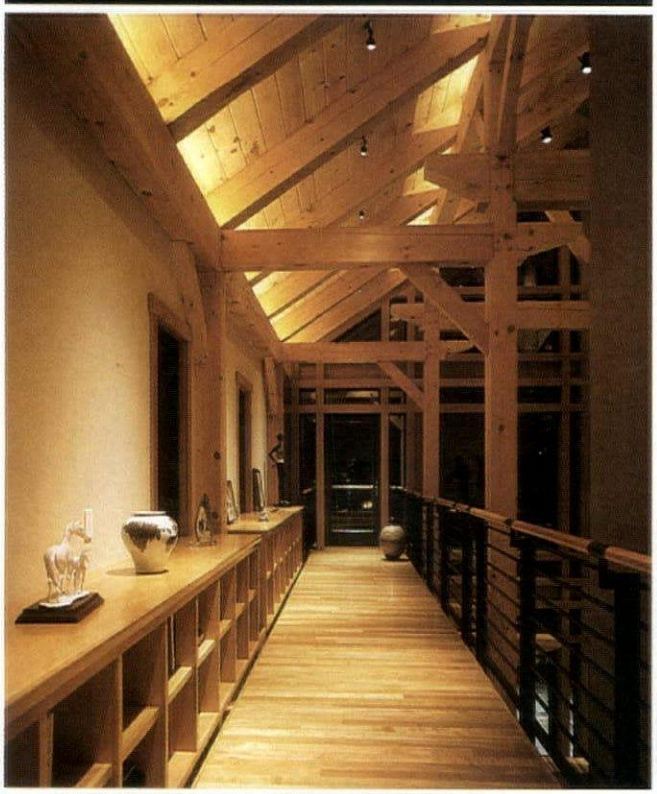


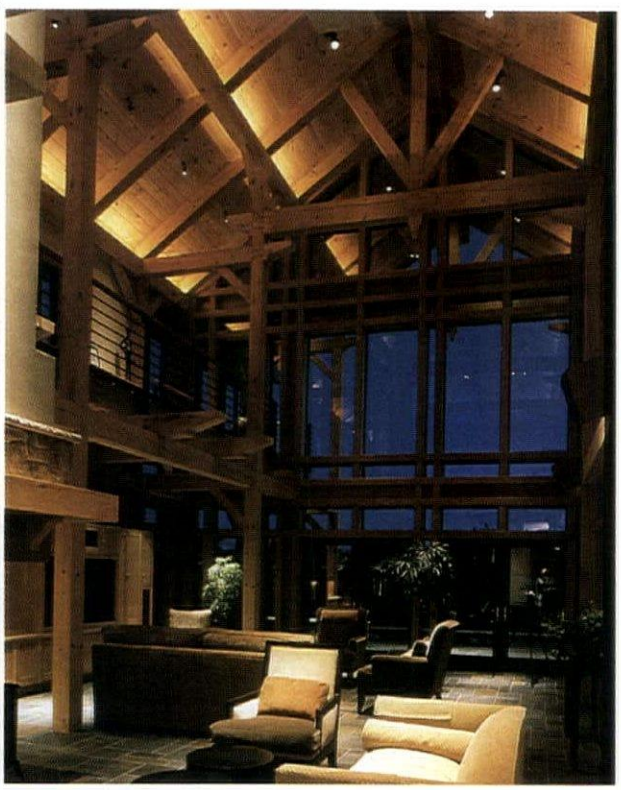
in-ground halogen fixtures fitted with shields on the house side. The back patio is lighted with damp-location, top-mounted xenon fixtures that provide continuity from the home's interior to the exterior. Downlights and shielded exterior decorative wall sconces are used to highlight architectural details and light walkways. A controls system allows the homeowner to set scenes, integrate security systems on the back walkway, extend incandescent lamp life and reduce energy loads through dimming and astronomical time control.

The adjacent barn is equipped with fixtures that match those on the main house exterior. Shielded A-lamp decorative sconces emphasize the architectural details and the entrance portals.

Inner Beauty. Inside the home, rather than compete with the structure, the lighting serves multiple purposes. It enhances the architectural details of the spaces and creates visual drama with layers of light in varying intensities playing on an array of vertical and horizontal surfaces.

The interior entrance portal (left) is lighted with a combination of downlights and an original chandelier





made with hammered iron and slumped art glass. The chandelier, as well interior sconces used in the house, were designed by Pacific Lightworks.

The living room loft (above) is prevented from appearing cavernous by concealed xenon uplights that illuminate the ceiling planes. In addition, where the ceiling could not be penetrated, MR16 and PAR36 monopoints—fitted with appropriate lenses and louvers and carefully focused—light varied vertical and horizontal planes. Installation challenges were presented by the post-and-beam structural design and foam-insulated panels. As a result, wiring has been concealed in custom-cut channels. Above the living room, a walkway (above left) includes hidden xenon uplights that emphasize the beauty of the ceiling without overpowering the post-and-beam details, while MR16 monopoints softly light the cabinet top and floor layers.

In the dining and kitchen areas (left), concealed xenon uplights add ambiance to the back upper chamber. Carefully placed lensed and louvered monopoint MR16s provide both vertical and horizontal layering. Low-profile halogen fixtures are used under kitchen cabinets and in the ventilation hood to furnish task light on counters and range.

A forward look at lighting for traditional homes

BY RANDALL WHITEHEAD, IALD

So much of what we see in current design magazines and books are the ultra-modern, ultra-clean interiors. It's true that progressive design is a hot topic, but it's not for everyone. How does the owner of a more traditionally styled house make use of today's lighting techniques? Can new lighting techniques be applied to non-cutting-edge spaces to enhance the sense of warmth and comfort that these cozy interiors inspire? The answer is a resounding...*Yes!*

The trick is to keep the upgrades subtle so that the old standbys, such as chandeliers and table lamps, give the illusion of providing a room's illumination.

Kitchens—the new center for entertaining. More than ever, the kitchen has become the place people begin the evening's activities. Friends sip on a glass of wine while their hosts make last-minute preparations for the meal. The kitchen needs to have a warm, inviting light like the rest of the house. Careful layering of task, ambient and decorative light will help create a comfortable, inviting space.

Bedrooms—the final destination. We end up spending a third of our lives in the bedroom, and some of us spend a lot of time entertaining there as well. The main thrust, so to speak, is to have good ambient illumination. The bottom line is that you want to look good and that's the main function of ambient light.

Secondarily, task light at the bedside for reading should be unobtrusive. Here, like in all the other rooms of the house, the portable fixtures should not be the primary focus.

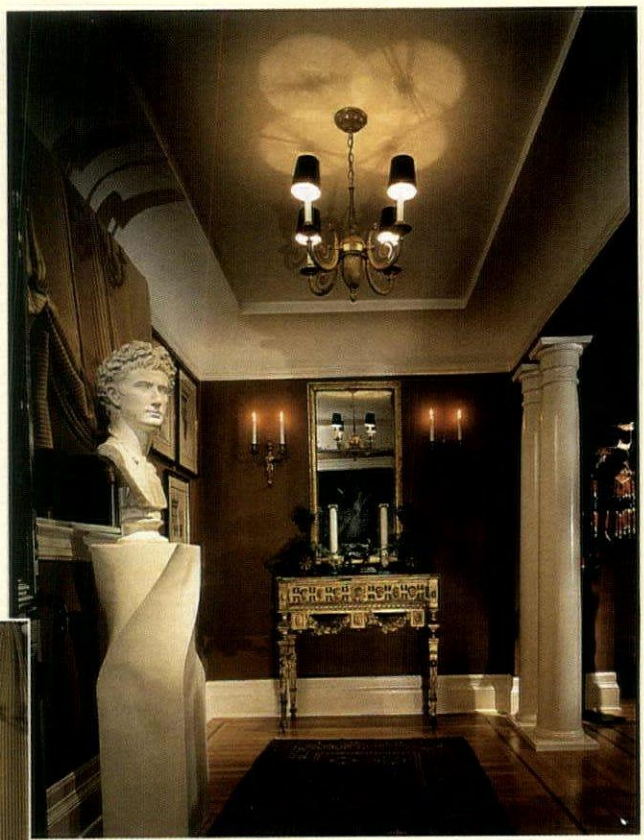
Dining Rooms—the main event. When friends come over for the evening, often the excitement is centered on the meal. Just as in successful restaurants, ambiance is an important factor. If people feel good and comfortable in a restaurant, they tend to subconsciously include that factor in the establishment's overall appeal. Great lighting can make even the most humble meal a star.

At home, the same principles apply. Typically, a chandelier will illuminate a dining room. The problem is that this single light source has to be cranked up so high that its glare overpowers the room visually, eclipsing everything else. The solution is to add fill light and highlighting so that the chandelier can just be a sparkling glow.

LIGHTING TECHNIQUES

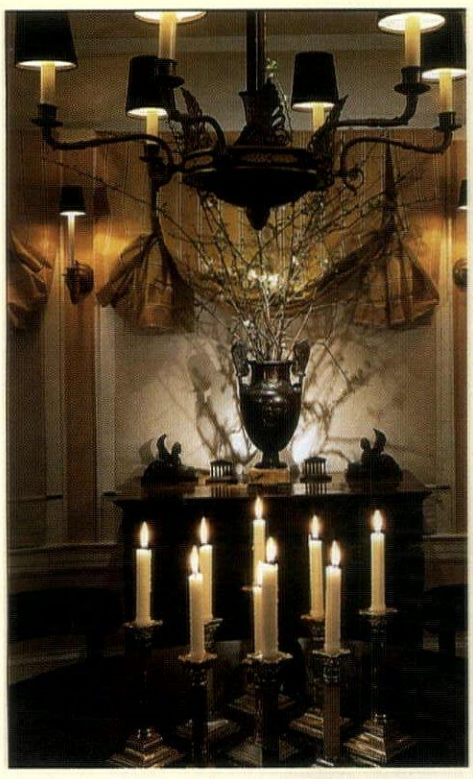
The necessary general illumination can come from wall sconces, torchieres or cove lighting. Some manufacturers include a second source of indirect light inside their chandeliers, which is switched separately from the candle part, so that each can be dimmed or brightened to a pleasant level.

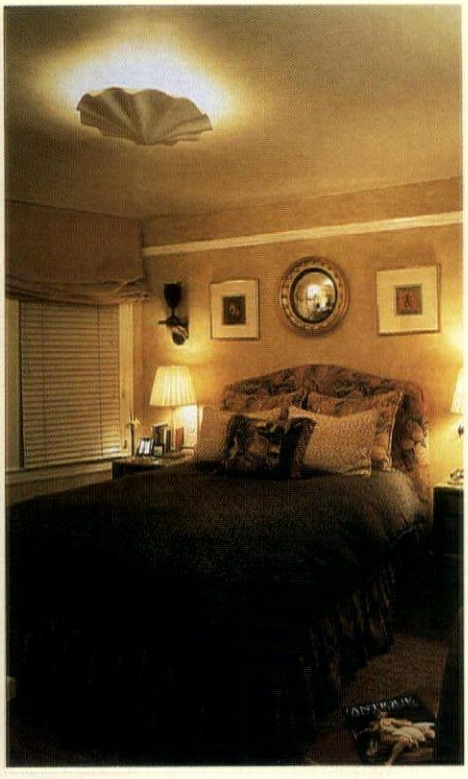
Feature lighting, such as recessed adjustable fixtures or



This entry (above) appears to be illuminated entirely by a hanging fixture and two candlestick wall sconces. In fact, here are two well-placed recessed adjustable low-voltage fixtures located on either side of the center fixture that illuminate the bust and front of the console. The chandelier hides one of these and the other is just out of the frame of the shot. *Lighting designer: Randall Whitehead, IALD, Randall Whitehead Lighting Inc.; interior designer: Christian Wright, Wright Simpkins; photographer: Dennis Anderson; lighting manufacturer: Lucifer Lighting Co.*

Left: The interior designer selected opaque lampshades to keep the fixtures from visually overpowering the room. Three small-aperture, low-voltage fixtures highlight two plants flanking the fireplace and the orchid on the coffee table. These fixtures add depth and dimension to the room, allowing the decorative fixtures to give the illusion of providing the room's light. *Lighting designer: Randall Whitehead, IALD, Randall Whitehead Lighting Inc.; interior designer: Christian Wright, Wright Simpkins; photographer: Dennis Anderson; lighting manufacturer: Lucifer Lighting Co.*





This dramatic dining room (far left) makes the most of the recessed low-voltage fixture by highlighting the arrangement of branches, which cast a striking shadow pattern on the wall behind. Again, the opaque shades keep the chandelier and the sconces from visually overpowering the room. *Lighting designer: Randall Whitehead, IALD, Randall Whitehead Lighting Inc.; interior designer: Christian Wright, Wright Simpkins; photographer: Dennis Anderson*

Left: Ambient light in bedrooms is important since we spend a third of our lives there. Two bedside lamps with translucent shades offer decorative and task light at the bedside. A plaster shell fixture adds another layer of ambient light without glaring into people's eyes when they are lying in bed. *Lighting designer: Randall Whitehead, IALD, Randall Whitehead Lighting Inc.; interior designer: Christian Wright, Wright Simpkins; photographer: Dennis Anderson; lighting manufacturer: Boyd Lighting*

track fixtures, will highlight art and the centerpiece to add a dramatic touch.

In reality, the dining room table often becomes a workspace when the owners are not entertaining. The availability of a bright, indirect light will provide excellent shadowless illumination for when bills are being paid or tax records are being sorted out.

Usually, the dining room table itself was always too big for anything other than a meal for eight or ten people. Tables have become more flexible in size, folding down to more intimate seating for four, or divided in two to make a pair of game tables. Even those who kept their large table want to be able to push it against a wall for buffet dining.

All of these changes set up a need for adjustable lighting, which has forced homeowners and designers to rethink the use of a chandelier.

Chandeliers. For eons, the dining room table has been centered under the chandelier. Many people spent countless hours of their lives making sure that this alignment was just perfect. However, as dining room tables began to move around, the chandelier in the center of the space started getting in the way. For those homeowners who want a traditional feel, but with the flexibility to create a more multifunctional room, specify a decorative fixture that hugs the ceiling so it doesn't look odd when the table isn't in the center of the room. Or select a pendant light on a pulley system that allows homeowners to raise or lower the fixture. There are a good number of European-designed pendants available, primarily in contemporary styles.

A traditional multi-armed chandelier of metal and crystal could be hung in a recessed dome so its visual relationship is linked to the ceiling configuration rather than the table location. In a remodel project where it is too expensive or there is inadequate attic space for a dome, a decorative ceiling medallion will create a similar illusion.

Accent lighting. If recessed adjustable fixtures are installed over the dining room table, they provide accent light for the table itself and the centerpiece. Downlights in chandeliers may also be used to provide accent light for centerpieces.

The next spaces to look at are the walls, side tables or buffets and plants. For art on the wall, don't feel that every piece has to be illuminated. It's all right to let some pieces fall into secondary importance; it lets them be "discovered" as guests take a second look around the room.

Add one or two recessed adjustable fixtures to accent the side table, buffet or console. A silver tea service will sparkle and a buffet dinner will look even more scrumptious when lighted with MR16s.

Plants can be uplighted, downlighted or both. Broad-leaf plants like fiddle-leaf figs are better illuminated from above or backlighted. More airy-leafed plants, such as fichus, can be illuminated from the front, casting leaf patterns on the walls and floor. They can also be uplighted, which creates a pattern on the walls and ceiling. Palms are best shown off when they are lighted from both the top and below. The sculptural quality of cactus calls for lighting from the front at a 45-degree angle and off to one side to help add dimension.

Candles. Candles should be used correctly as well. Typically, at the dinner table, you artfully place candlesticks around the centerpiece. When you and your guests sit down at the table, that candle flame is right at eye level. When you look at the flame for a while, then toward the guests, you'll notice that there is a black hole where their heads used to be—much like the effect you experience after someone has taken a flash picture of you. To solve this problem, use candles that are either lower or higher than eye level. That way, you'll get that soft golden glow, but the candle will not distract from looking at the person across the table.

The overriding criteria of good lighting design for all homes, including the traditional ones, is to have controllable light that lets the various rooms of the house serve whatever purpose is desired. Light layering is the key with a renewed interest in decorative fixtures as part of the cohesive overall design.

Randall Whitehead has been in the lighting design field over 24 years and has written five books on the subject. For sample sections from his books and images of other lighting projects, visit www.randallwhitehead.com.

Photos: ©Timothy Hursley

Landmark Case

The order in this court? To meet strict GSA requirements of energy efficiency & light levels

BY JEAN NAYAR, CONTRIBUTING EDITOR

The recently constructed United States Courthouse in Lafayette, LA—with its symmetrical floorplan, modified cupola, covered loggia and limestone colonnaded facade—stands near the town's center as an emblem of governmental tradition. Designed by E. Eean McNaughton Architects in conjunction with Guidry Beazley Architects, the 198,000-sq.-ft. building was created to serve as a prominent landmark on axis with a proposed park, which is intended to expand the spirit of the building by adjoining it with a civic open square. Having worked with lighting designers Cline Bettridge Bernstein on two other award-winning buildings in this small southern city, the architects once again called upon the New York City-based firm to develop integrated lighting for the structure that would not only complement and accent its design features but infuse its functional areas—particularly the courtrooms—with the latest, energy-efficient illumination.

To this end, the lighting designers created a family of custom decorative fixtures in keeping with the courthouse's classical vocabulary. These fixtures provide both ambient and accent

illumination inside the structure and out. The lighting designers also combined these fixtures with natural lighting strategies, architectural lighting solutions, state-of-the-art lamps and dimming technology to create a lighting design that is as inviting as it is practical.

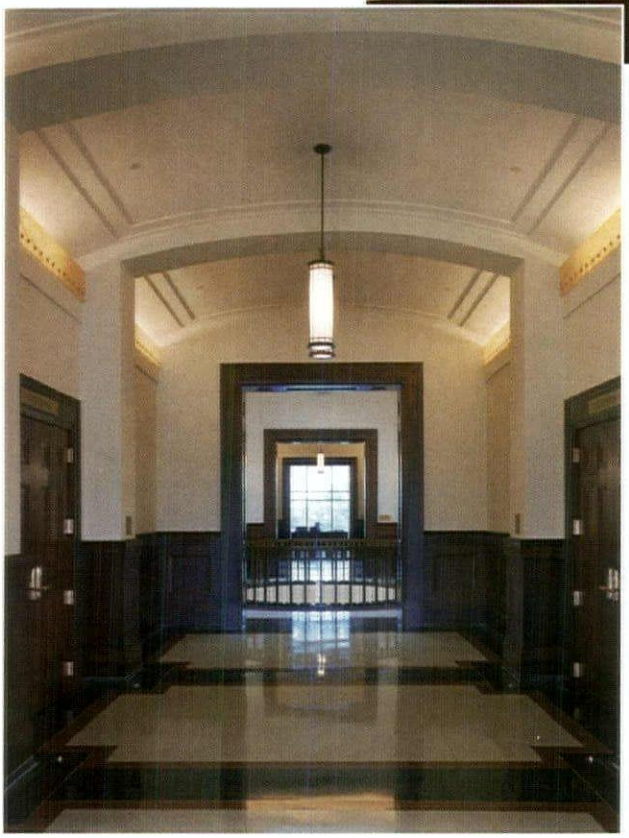
With the General Services Administration (GSA) as client, both the architects and the lighting designers were obliged to abide by the GSA's strict guidelines. For the lighting designers, this meant meeting specific energy requirements and adhering to predetermined light levels in various parts of the building. To produce illumination that's both aesthetically appealing and energy efficient, the lighting designers employed a mixture of mostly color-corrected metal halide and compact fluorescent lamps in predominantly indirect layers of light that provide soft, comfortable illumination. "We didn't want to pummel people with a lot of downlight," said lighting designer Francesca Bettridge. "At the same time, to reach the GSA's high light levels, we needed to reflect a lot of light off the ceilings and walls using energy-efficient sources and to distribute it evenly around the rooms." Fitted in a wide range of custom fixtures, which were all made from a limited range of materials and created with many of the same castings to keep costs down, the lamps provide ample light and

Opposite: The exterior of the new U.S. Courthouse in Lafayette, LA presents an image of stability and tradition with classically inspired architectural elements. Lighting by Cline Bettridge Bernstein blends families of custom fixtures that complement the flavor of the structure with integrated solutions that accent architectural details and create layers of light. Fitted predominantly with color-corrected metal halides, the fixtures provide high levels of energy-efficient illumination required by the GSA.

Below: Inside the two-story entrance lobby, custom bronze powder-coated torchieres with acrylic shades containing compact fluorescents lead the visitor toward the grand stair. Color-corrected metal halide wall washers bathe the space in more light.

Right: 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.

Below: Courtrooms flank both sides of an east-west axis and custom pendants signal their entrances. Compact fluorescents hidden behind alabaster fascias illuminate the arched ceiling and lead the eye toward the natural light coming through the window at the end of the hall.



accent the structure, while the fixtures, which range from sconces to torchieres to pendants, complement the architecture and provide a sense of order by signaling a clear sense of progression through the spaces.

EXTERNAL AFFAIRS

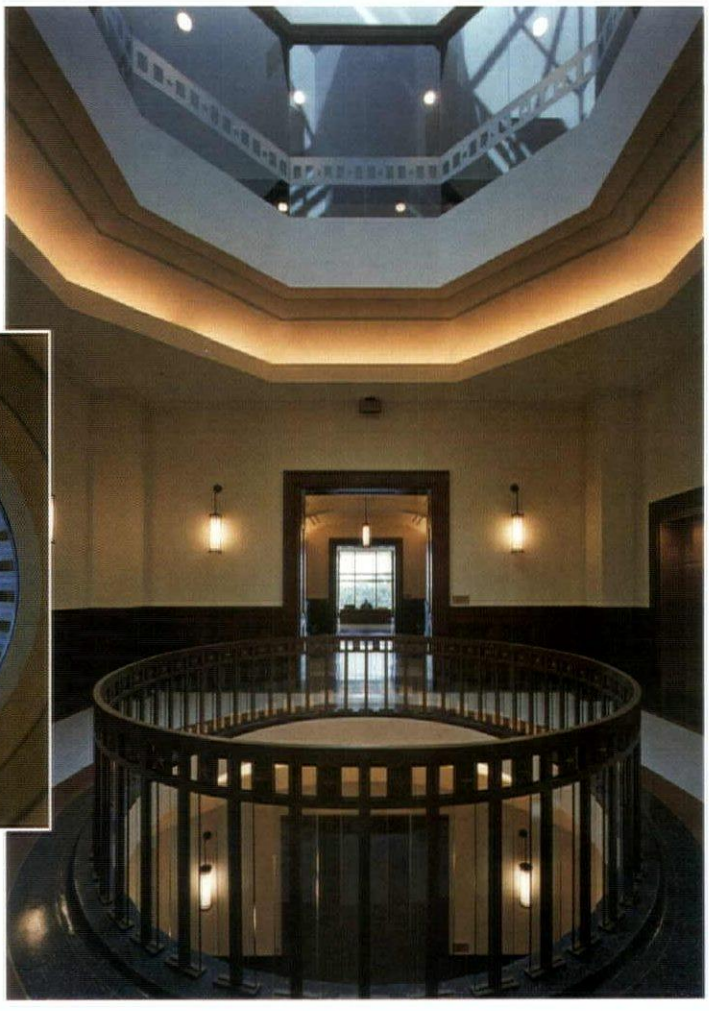
"We wanted to retain the flavor of a southern courthouse on the exterior," said Bettridge, "so we created custom, classically styled sconces to punctuate the loggia." While these bracket-mounted cylindrical fixtures, made of ribbed acrylic and bronze powder-coated aluminum, provide plenty of illumination along the facade of the loggia at night, recessed 70W color-corrected metal halide downlights and wall washers provide a glow beneath the loggia and highlight the entrance. Concealed metal halide uplights at the base of the columns that form the colonnade along the upper half of the facade call attention to the structure's architectural detailing and the curved glass wall behind the colonnade glows from a line of recessed fluorescent downlights with a convex opal diffuser. Additional light is provided by street poles in front of the facade to which the lighting designers added 175W metal halides to accent sculptural urns flanking the entrance.

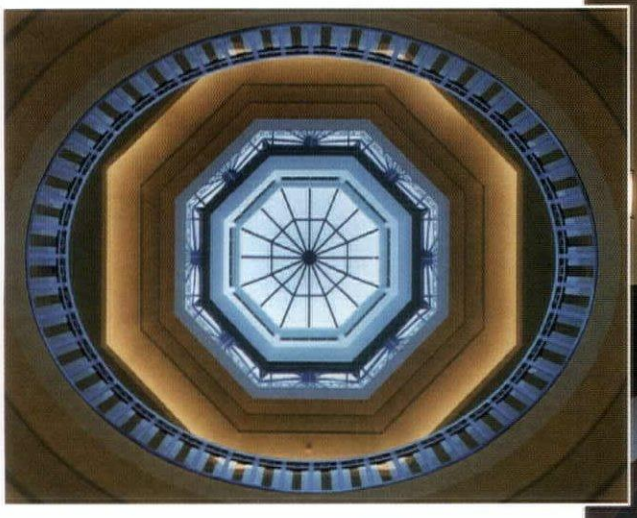
Past these layers of exterior light, indirectly illuminated surfaces glow from within. A two-story public lobby containing a grand double staircase is illuminated with a combination of decorative fixtures and architectural lighting techniques. Massive torchieres—containing compact fluorescent sources and flanking the stairs—lead visitors toward the courtrooms on the floors above. Recessed ceiling fixtures containing metal halide lamps highlight the wall planes of the lobby and the waiting areas on the first floor, while daylight streams down five stories from a cupola beyond the staircase.

On the upper floors, pairs of courtrooms flank an east-west axis punctuated in the center by the shaft of daylight from the cupola. Here, variations on the family of fixtures help illuminate and define the spaces: small sconces fitted with compact fluorescents accentuate the walls around the octagonal core, while double cylinder pendants fitted with the same fluorescent lamps call attention and give dignity to the courtrooms along the axis. Rings of overlapping compact fluorescents in coves around the octagonal core accent the center of the space and draw the eye upward toward the cupola above. Similarly, fluorescent sources behind alabaster fascias in decorative frames near the ceilings of the courtroom halls highlight the arched ceilings and draw the eye toward daylight streaming through windows at the ends of the halls. At night the windows are illuminated by the fluorescent downlights and their diffuse opal lens to create a glow from within.

Right and inset: Natural light pours down five stories through a cupola. On the second floor, custom sconces and coves define the octagonal core beneath the cupola with additional light. The section illustrates the shaft of natural light that penetrates the five stories through the building's core beneath the cupola.

Bottom right: The section illustrates the shaft of natural light that penetrates the five stories through the building's core beneath the cupola. Courtrooms flank this core along east-west axis.



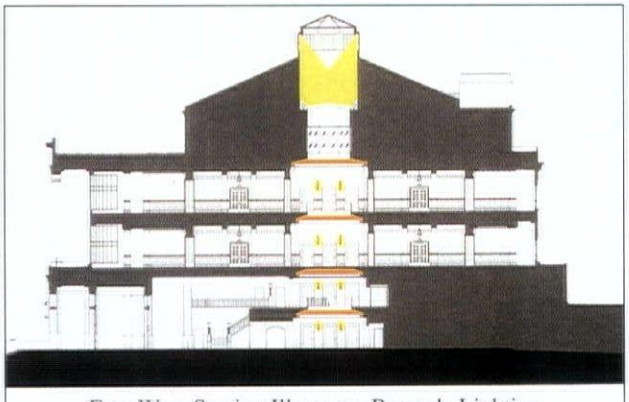


JUDGE & JURY

In general circulation areas, GSA guidelines require illumination levels of 20 fc. In the courtrooms, however, the light level requirement is 80 fc. At the same time, various design features and functional zones require different kinds of light in these spaces. "Judges have a big say in how the courtrooms are designed and are very opinionated," said Bettridge. "Most want a lot of wood and dark carpeting, but high light levels are necessary so the jury can see the defendant well, and for security reasons no shadowy areas are acceptable. It's not easy putting so much light in rooms with dark floors and woods. Furthermore, the light needs to be dimmable so that slides and videos may be shown when needed."

In these rooms, which vary in design and size depending on where they fall in the hierarchy of courtroom spaces, the lighting designers included a mix of direct and indirect lighting techniques. T8 fluorescents in coves along the ceiling provide soft ambient illumination, while recessed linear ceiling fixtures, fitted with T8s and covered with panes of white art glass, provide light near the walls and fill in ambient illumination with more direct light.

Near the judge's bench, a skylight covered with art glass at the base provides a distinct pool of light around the judge. Above the glass are fluorescents, which are on a photocell that turns on the lights when it is dark outside. In addition, two 90W HIR/PAR lamps in ceiling coffers in this area accent the federal seal behind the judge. Finally, along both sides of the central spine of the room, modified pendants recall the traditional architectural qualities of the structure while providing even more ambient illumination and completing a scheme that blends mindfulness of tradition with a common sense approach to contemporary functional illumination demands.



East-West Section Illustrates Rotunda Lighting

DETAILS

PROJECT U.S. Courthouse, Lafayette, LA **CLIENT** General Services Administration **ARCHITECT** E. Eean McNaughton Architects; Guidry Beazley Architects **LIGHTING DESIGNER** Cline Bettridge Bernstein Lighting Design **PHOTOGRAPHER** Timothy Hursley **LIGHTING MANUFACTURERS** Lithonia Lighting; Edison Price; Halo; Wila; Lightolier; Kim Lighting; Philips Lighting; Visa Lighting; Litemakers; Norbert Belfer Lighting; Legion; Neoray; Sterner; GE Lighting

infocus

The Dirt on Dirt: NALMCO Reports on Dirt Depreciation

BY CRAIG DILOUIE, CONTRIBUTING EDITOR

The interNational Association of Lighting Management Companies (NALMCO) recently completed a three-year, EPA-funded study of luminaire (lighting fixture) dirt depreciation that may significantly impact lighting design. Analysis of the results indicates that existing light loss factors related to dirt and dust buildup on fixture surfaces overestimate the extent of light loss. In lighting designs, this offers the opportunity to reduce the number of fixtures required to achieve the target maintained light level—reducing fixture initial and operating costs for the owner.

A recent EPA-funded study—to be incorporated into new IESNA recommendations—revises existing light loss factors and will significantly impact the world of lighting design.

BACKGROUND

All lighting systems provide a higher design light level than maintained light level to take into account deterioration of performance over time. The extent of this "depreciation cushion" is calculated using recoverable light loss factors whose values are determined by the maintenance method. A significant light loss factor is luminaire dirt depreciation (LDD), which represents the fraction of lamp lumens leaving a fixture after some of the light is absorbed by dirt and dust buildup on fixture surfaces.

The LDD factors currently recommended by the Illuminating Engineering Society of North America (IESNA) were produced in the 1950s, a time when environmental conditions of interior spaces were not representative of modern buildings (for example, smoking was the norm and air conditioning was provided by opening windows). In the 1970s, anecdotal reports began to challenge LDD assumptions. This led the IESNA Calculation Procedures Committee and the IESNA Maintenance Committee to authorize a new LDD study, which was conducted by NALMCO from 1996-1999 with funding from the U.S. EPA.

THE STUDY

"This is the first study ever on the subject of dirt depreciation to be completed in both a comprehensive and scientific manner," said Dr. Robert E. Levin, senior scientist for Osram Sylvania and a primary technical advisor for the study. "Data was informally collected in the 1950s on maintenance, not as a controlled study."

The controlled LDD study was conducted in the field and included more than 200 sites at office, retail and school facilities in the U.S. Four popular recessed fluorescent lighting fixture types were used in the study: 2x4 lensed, 2x4 louvered, 2x2 louvered and 2x4 air exhaust louvered—which collectively represent approximately 90 percent of recessed fixtures now installed in the U.S. The split between lensed and louvered fixtures in the study was about 50/50. The technicians at 10 lighting management companies gathered the test data using a Fluxometer, an instrument specially designed (and validated by the Independent Testing Laboratory in Boulder, CO) to capture the total peak fixture lumen output (flux) emerging from the fixture. After six months, eight fixtures at each site were tested to record flux values: 1) when dirty and 2) with the lamps and fixture cleaned. After 12 months, the test was repeated for a different group of fixtures and again after 18, 24, 30 and 36 months.

Figure 1 reveals the LDD function as it is currently presented. Figure 2 (opposite page) illustrates a comparison of the new LDD function, as tentatively determined by the test results, and lensed and louvered fixtures in clean conditions (assumes better than

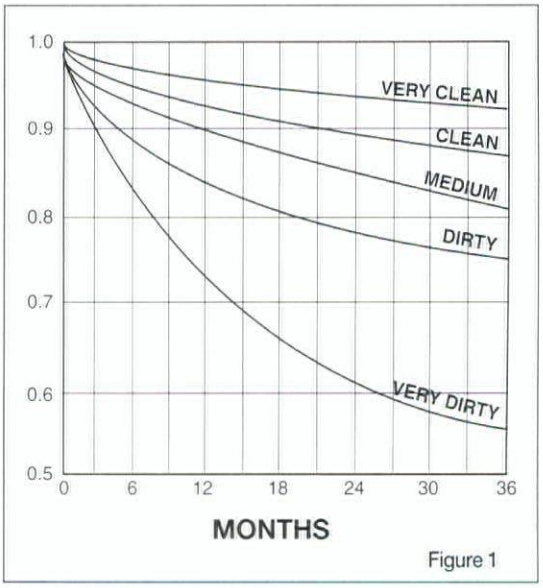


Figure 1: LDD data as it is currently presented in the IESNA Handbook. The curves estimate the amount of light reduction due to dirt accumulation on fixture surfaces.

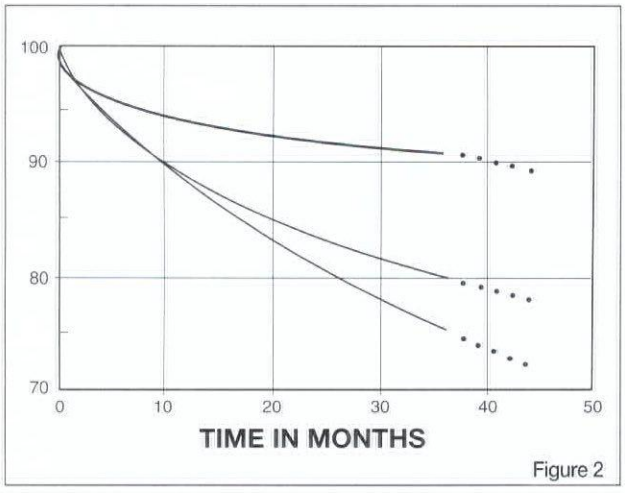


Figure 2: The tentative LDD function for both louvered and lensed fluorescent fixtures determined by the preliminary analysis of the LDD study test results (top curve). Current IESNA procedures place louvered fixtures into Maintenance Category IV and lensed fixtures into Maintenance Category V, with their LDD curves shown for comparison.

average air filtration and some generated or ambient dirt). At 18 months, the LDD factor is 0.93 versus 0.85 using the traditional IESNA procedure, and at 36 months, the LDD factor is 0.9 versus 0.8. Lensed and louvered fixtures show virtually identical dirt depreciation and variable operating hours per year indicated little change, according to the study.

DESIGN IMPACT

The new LDD data can significantly impact lighting design of commercial facilities where fluorescent, flat-bottomed and either recessed or ceiling-mounted fixtures are installed. In a new installation, fewer fixtures can be specified, installed and operated to generate initial and operating cost savings. In existing installations, the system can be redesigned or retrofitted to generate operating cost savings.

"Test results indicate that in very clean locations, about 8-10-percent fewer fixtures are required to provide a specific light level compared to using design calculations with earlier LDD values," said Norma Frank, CLMC, chair of the IESNA Maintenance Committee and vice president of Colorado Lighting. "Renovation projects in older facilities would result in the order of 15-20-percent fewer fixtures if this new data is utilized."

"It's reasonable that the applicable scope of fixtures may be somewhat greater than those specifically used in this study," said Dr. Levin. "For example, the effect of dirt is likely to be similar between completely open-bottom fixtures and those with louvers. There is no reason to expect that performance of surface-mounted fixtures, including certain fixtures with luminous sides, will differ. Good judgment should be used to avoid extrapolating the results beyond reasonable bounds, however."

For new installations, the required number of fixtures is determined:

N = [(Lighted Area) x (Desired Light Level)] ∏ Lumens/Fixture x CU x LLF

Assuming there is a three-year cleaning cycle, the LDD factor for a louvered fixture in an open office plan using the new LDD procedure is 0.9 and the LDD factor using the old procedure is 0.8. Figure 3 (below) illustrates a design problem that assesses the new LDD impact. In this early design phase, 15 fewer fixtures are required to achieve the desired maintained light level of 50 fc in the open office. This saves the owner initial costs and also operating costs in perpetuity.

In existing spaces, lighting designs can be reevaluated using the new data and on-site testing to retrofit or redesign to generate operating cost savings. Retrofits include replacement of 40W lamps with 34W T12 lamps, 32W T8 lamps and ballast upgrades.

"With more states mandating specific watts-per-sq.-ft. limitations for new and renovated facilities, more accurate LDD factors will help achieve improved designs and lower capital expenditure and energy usage," said Dr. Levin. "With this scientific data to support a change in design and maintenance standards, commercial facilities that collectively spend $27-$36 billion per year to operate their lighting systems can realize cost savings of 10 percent—potentially as much as $3.6 billion annually."

"Another benefit that goes beyond tangible initial and operating cost savings is increased confidence in cost-benefit evaluation and lifecycle cost analysis," said Frank. "By providing LDD values that are the result of scientific study, building owners and lighting specifiers can demonstrate the economic value of frequent maintenance procedures with greater certainty."

The LDD study results are being incorporated into a new IESNA Recommended Practice (RP) on maintenance and future *IESNA Handbook* chapter by the IESNA and NALMCO Joint Committee, with an anticipated release by late 2002.

FIGURE 3: A DESIGN PROBLEM

Area:	8,000 sq. ft.
Target light level:	50 fc
Other light loss factors:	Assume coefficient of utilization (CU) of 0.62 and the product of all other light loss factors (LLF) to be 0.65
Fixture type:	4-lamp louvered fixture producing 9,000 lumens

The number of fixtures required to achieve the target light level is:

Old LDD (0.8):	No. Fixtures = (50 x 8,000) ∏ (9,000 x 0.62 x 0.65 x 0.8) No. Fixtures = ~138 fixtures
New LDD (0.9):	No. Fixtures = (50 x 8,000) ∏ (9,000 x 0.62 x 0.65 x 0.9) No. Fixtures = ~123 fixtures

MESOOPTICS: FAQS & ANSWERS

First of all, let's clear up any lingering doubts: It's pronounced MEH-SOH-Optics (short "e," long "o"). Awarded *Best New Product of the Year* at Lightfair International 2001, MesoOptics by Ledalite Architectural Products has continued to garner interest and praise as lighting professionals realize the implications and potential applications of these advanced optical materials. But what about the genesis of this technology?

Well, it seems that the idea for MesoOptics came to Ledalite's head of research, Ian Ashdown, FIES, about five years ago while he was reading a journal article on *lepidoptera* (butterflies and moths). "At a certain angle, I noticed the multicolored, iridescent wings became pure white," noted Ashdown. "I realized there might be a way of using similar principles to create white-light optics that could replicate those properties on plastic, glass or other materials that was between the light source and the viewer."

The long process of researching the practicality of his hypothesis and then learning how to replicate the moth's wing effect in the laboratory using holographic techniques took the best part of five years. The result was a new optical control technology that produced the potential for dramatic impact on the way we illuminate spaces.

The inquiries about this head-turning product have been numerous, ranging from the fundamentals—"What is it?" and "How does it work?"—to queries about its utilization and possible licensing opportunities. *Architectural Lighting* has also heard its share of enthusiasm for MesoOptics from the readers of our magazine. So what is all the fuss about? *Architectural Lighting* asks the questions. Ledalite answers.

—Christina Trauthwein, Editor-in-Chief

Editor's note: *For information on the technology and related developments, visit Ledalite's website at www.ledalite.com*

Figure 3

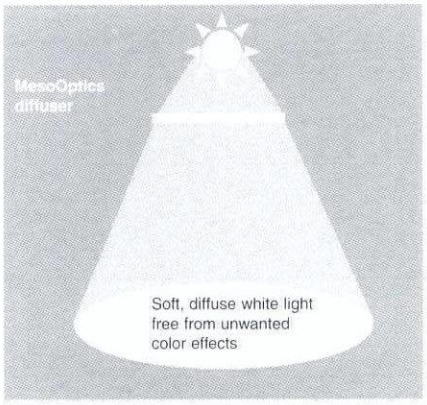


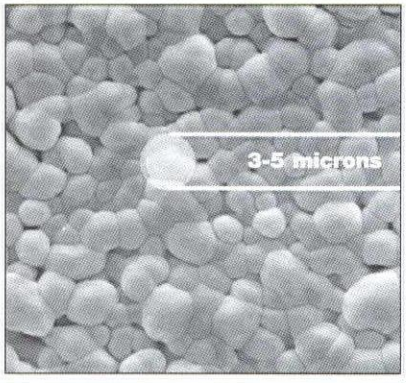
Figure 3: MesoOptics' microstructures provide fine diffusion of light without chromatic dispersion.

Q: So, what are MesoOptics?

A: MesoOptics are advanced, patented optical materials that control and manipulate any kind of visible light via microscopic structures that are created using holographic techniques. There are two types of MesoOptics materials: transmissive (diffusing) and reflective. Both types offer a similar range of optical control properties, including the ability to constrain or disperse light, produce a range of beam patterns—from circular through elliptical to linear—and produce perfectly diffuse beams of pure white light. MesoOptics reflectors also offer the property of diffusely reflecting light back towards the source, irrespective of the angle of incidence. What makes MesoOptics particularly interesting is that they consist of nothing more than minute patterns on the surface of transparent or reflective materials. The potential for reducing manufacturing costs is therefore enormous.

Figure 1

Figure 1 shows a scanning electron microscope (SEM) image of the microstructured surface of a MesoOptics diffuser with circular diffusion distribution characteristics. Each surface feature (called a "pebble") is on average 5 microns in diameter. (1 micron = 1,000,000th of an inch). Figure 2 illustrates application of the microstructure pattern to the surface of the substrate.



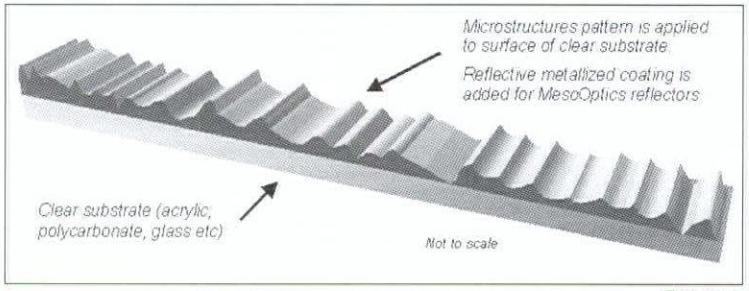


Figure 2

Q: How did the idea evolve?

A: These microstructures occur naturally in the biological world as moth eyes and butterfly wing scales, but have only recently captured the full attention of physicists and optics researchers. Building on the work of other researchers, (in particular, H. J. Caulfield, a researcher at the Sperry Rand Research Center in Sudbury, MA who invented holographic diffusers in 1971), MesoOptics and its holographic manufacturing process were developed by Ledalite Architectural Products over a five-year period beginning in 1996. Researchers Scott Santoro and Melissa Crenshaw conducted the core research and development, with guidance from Ian Ashdown, who brainstormed the initial idea, and from company president, Peter Murphy.

Q: How do MesoOptics work?

A: MesoOptics is a three-dimensional luminous distribution—or optical control effect—recorded holographically and replicated as patterns of

(Continued on page 34)

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(Continued from page 32)

microstructures on the surface of a suitable substrate, such as acrylic, polycarbonate or glass (see Figures 1 and 2, page 32). When light from a source interacts with these microstructures, it is modified and redistributed according to the original recorded distribution. The process is similar to the way a holographic image of a three-dimensional object is created by recording intersecting laser beams in a photosensitive emulsion. This master is then reproduced on a suitable substrate (usually plastic) and "played back" when light hits the surface of the substrate.

Q: What are these microstructures?

A: Microstructures are nothing more than extremely small three-dimensional "blobs" or ridges in the surface of a plastic material. Because they measure only a few microns in size, they both diffract and refract visible light.

Q: How are Meso-Optics manufactured?

A: Much of the technology is adapted from techniques used in the holography industry for high-volume production of items such as credit cards and drivers' licenses. However, new challenges are involved in producing transmissive material suitable for use in architectural lighting where long-term durability is a concern. To meet these requirements, a technique called casting is used which provides the ability to replicate the MesoOptics surface relief structure onto various substrates.

Q: What are MesoOptics used for?

A: MesoOptics were initially developed for use in architectural luminaires, such as the Meso XI concept luminaire introduced by Ledalite at this year's Lightfair 2001. The technology also has potential applications in daylighting systems, translucent wall and other architectural elements, roadway and exterior floodlighting, theatrical and film lighting and many others. It holds the prospect of expanding the use of daylighting as a non-glare light source. MesoOptics could also reduce energy usage by making more effective use of the illumination generated.

Q: What optical control properties do they offer?

A: MesoOptics' optical properties include the following abilities:

Create homogenous beams of pure white light. Because of their microscopic nature, MesoOptics microstructures provide very fine diffusion of the light delivered into the space. This means, no hotspots or sharp gradients, just soft, uniform, pure white light that is completely free of the unwanted, rainbow-like colors—called chromatic dispersion—often associated with holographic images (see Figure 3, page 32).

Create controlled distributions. MesoOptics diffusers are available in a wide range of beam patterns, ranging from circular through elliptical to linear. These distributions are useful in the design of simple and energy-efficient luminaires, such as downlights for hallways and corridors, and also energy-efficient roadway luminaires. They can also be combined to create more sophisticated lighting effects from a single lamp or light source (see Figure 4).

Constrain or disperse light. MesoOptics can create a controlled direct distribution with appropriate "cutoffs" to prevent high-angle glare (in effect creating a virtual louver). They can also disperse light to create a wide, uniform ceiling distribution (see Figure 4).

Reflect light back towards the source, irrespective of the angle of incidence. MesoOptics has the ability to diffusely reflect light back towards the source, even at low incident angles. This creates opportunities for creating new types of luminaires and reflective architectural elements.

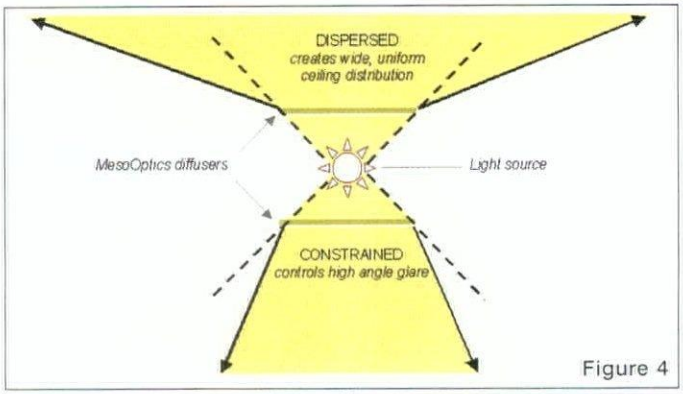


Figure 4

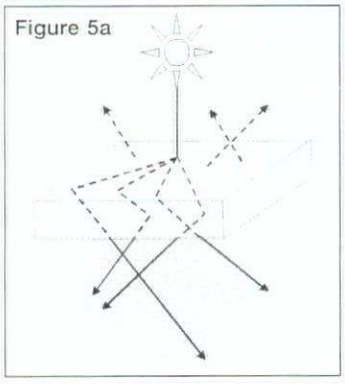


Figure 5a

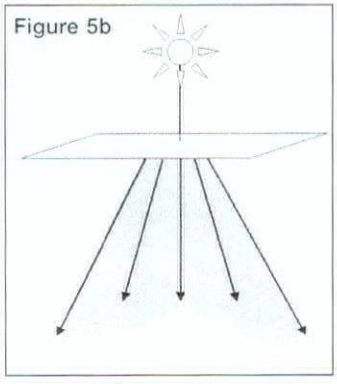


Figure 5b

Figure 4: The range of beam patterns can be used to create sophisticated lighting effects from a single lamp or light source. Figures 5a-b: Standard opal diffusers (left)— light scattered randomly; up to 70 percent back-scatter; no diffusion control; low efficiency (80 percent). MesoOptics diffusers (right)—controlled beam pattern; minimal back scatter; variable controlled diffusion; highly efficient (80-90 percent) .

Q: How are MesoOptics diffusers different from standard opal?

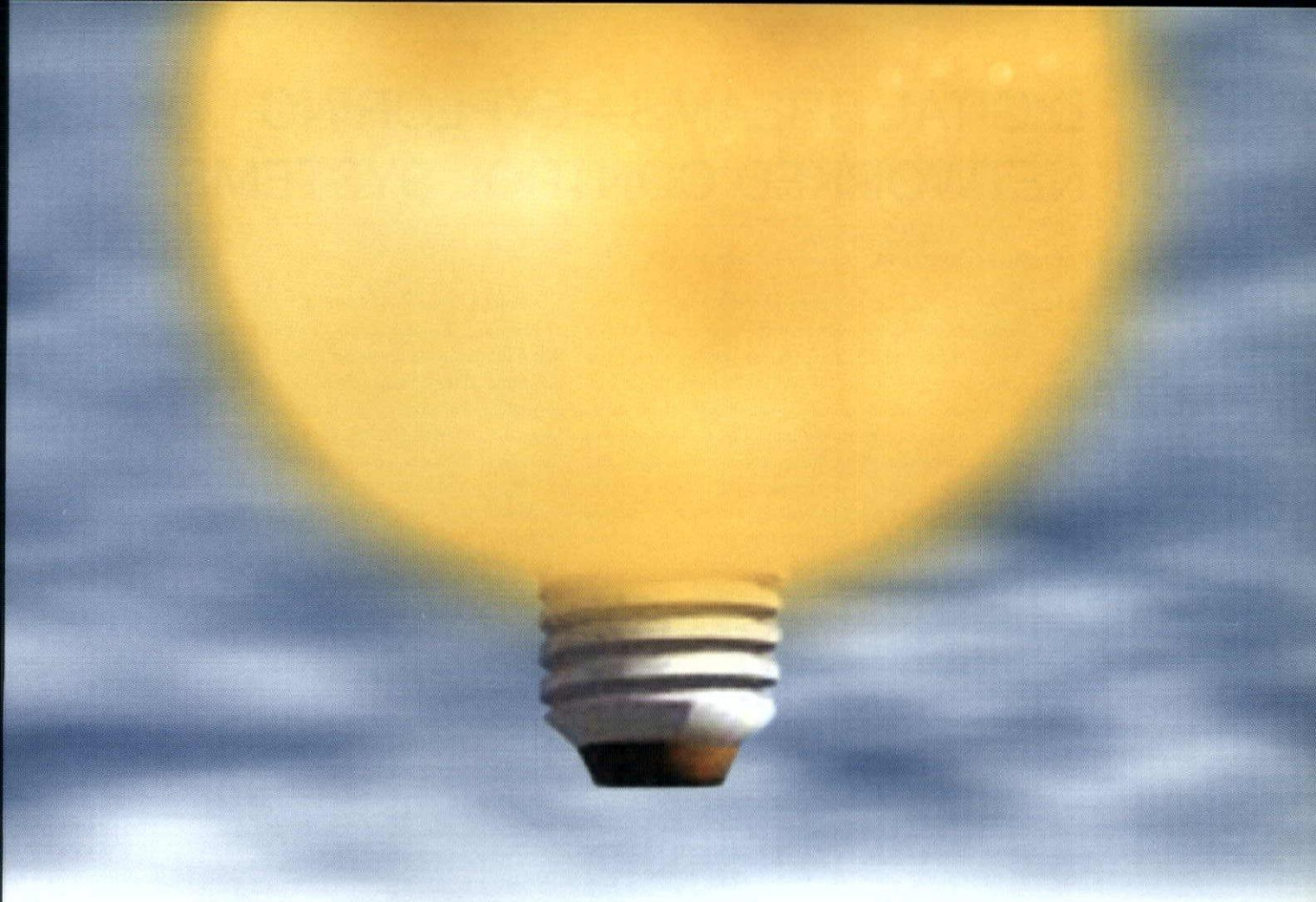
A: When most lighting professionals hear the word "diffusers," they tend to think of standard opal or ground glass, which are of limited use in high-performance optical systems because of their low transmissive efficiency and poor optical control characteristics. By contrast, MesoOptics diffusers deliver both high efficiency and the ability to select from a wide variety of controlled beam patterns, depending on the requirements of the architectural setting (see Figures 5a-b).

Q: What does this mean to the lighting industry?

A: We anticipate MesoOptics' impact on the lighting industry to be both wide-ranging and long-term. For example, it could dramatically change the exterior floodlighting and roadway lighting sectors by offering, low-cost, flat-plane optics that provide the controlled, diffuse distributions required for these applications. In the architectural interior lighting field, the promise is for smaller, more elegant luminaire designs that meet the standards for office lighting without bulky baffles and louvers. As lighting designers and manufacturers begin to understand the potential of this new technology, more and more possibilities and ideas are bound to surface.

Q: What are Ledalite's plans for the technology?

A: Early response from the lighting industry has been highly favorable. Ledalite is being approached by numerous designers and manufacturers to discuss potential applications for the technology and is continuing to discuss ways to disseminate MesoOptics. Overall, its goal is to use licensing and joint-venture agreements to make this technology as widely available as possible to lighting manufacturers, designers, clients and, eventually, end users. However, it will take time for this innovation to be evaluated, taken up by the industry and then incorporated widely in various products. That said, Ledalite is progressing rapidly on its own product development plans and expects its first MesoOptics lighting products to be available beginning in early 2002. Other manufacturers' products may follow shortly thereafter. ■



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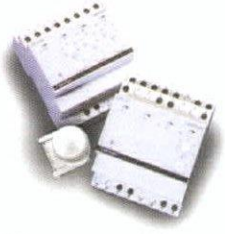

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technology

DIGITAL DREAMS—EXPLORING NETWORKED CONTROL SYSTEMS

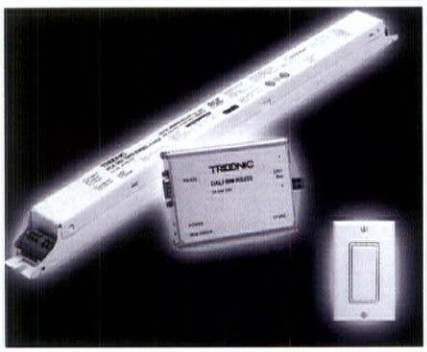
BY DAVID HOUGHTON, PE, CONTRIBUTING EDITOR

In the 12 years I've followed lighting technology, one common theme I've noticed in discussions with designers is a desire for affordable and reliable fluorescent dimming systems. Some regard this as the "Holy Grail" of lighting equipment and speak reverently of a promised land where every lamp is free to operate at its optimal output. Although this reporter has grown just a little weary of visions of glory that await the huddled masses, a new dream now beckons.

The latest developments in lighting technology promise much more than dimming—the digital lighting control products now emerging offer complete flexibility in programming and grouping fixtures, setting scenes and even fading from one scene to the next. In this brave new world, luminaires also have the smarts to tell us when they need servicing. And, just as prophesied, every fixture is dimmable.

Digital dimming applies computer networking technology to lighting. If you work in a modern office, there are probably two networks already operating nearby: the Building Automation System (BAS) that handles HVAC control and your computer's data network. We can't really use either of these for lighting control, however, because they would cost way too much—imagine buying an ethernet card for every luminaire!

For those of you who have enough problems getting your PCs to talk to each other, your suspicion is well-founded. The key is not to make things more complicated than they need to be. Because the communication needs of lighting components are modest, networking systems designed specifically for this purpose can be lean and robust. And if programming instructions are stored in non-volatile RAM, it won't be necessary to reboot the lights after a power flicker.



Top: The European company Tridonic has opened a U.S. office and is shipping DALI-compatible ballasts that are individually addressable as part of a control network.

Bottom: Osram Sylvania plans to ship T8 and T5 DALI ballasts in the fourth quarter of 2001.

COMMUNICATION DEVICE

The emerging standard for digital lighting control is DALI, which stands for Digital Addressable Lighting Interface. DALI is simply a protocol that states the "rules of the road" for communication over a pair of low-voltage wires. A DALI-based lighting system can include addressable dimming ballasts, light and occupancy sensors, a main controller and gateways or adapters to connect to other systems. DALI is a European invention (formally adopted in January 2000 as part of IEC Standard 929) that is now making inroads into the U.S. market.

Conventional fluorescent dimming uses a 0-10V analog voltage signal—also sent over a pair of control wires—to tell the ballast at what level to operate. For daylight dimming, for example, fixtures near windows would be wired together to operate as directed by a photocell and controller. To operate as a group, different fixtures must be physically wired together to receive the same voltage signal.

With digital control, in contrast, fixtures are wired together in "free topology" (any combination of series and parallel connections). Group assignment is handled with a software-driven polling/flashing routine; an individual luminaire can belong to any or all groups. Once luminaires are assigned to groups, scenes can be programmed by setting groups at various dimming levels or by including sensor input to the control logic. Finally, a dynamic element can be added with fade instructions for entering or leaving scenes. For example, if Scene 1 has low output for daylight hours and Scene 2 has full output for night, a 10-minute transition fade could be inserted to make the shift barely noticeable.

The number of groups, scenes, fade capabilities and so on is determined by the builder of the DALI-compatible controllers. Each single network is limited to 64 individual addresses, 16 groups and 16 scenes—some of the compromises that make the system lean and fast. However, multiple networks can communicate with each other over a conventional BAS or other communication network. Depending on the extent of the connectivity, DALI systems can also be programmed, controlled or monitored by BAS panels or front-end computers. Although the controller acts as "traffic cop" to direct information flow, the programming instructions for each DALI luminaire are stored in non-volatile memory at each ballast. In addition to DALI ballasts, the network can control conventional dimming ballasts and incandescent sources through adapter modules.

One of the unique aspects of DALI is that it is a two-way street: lighting components can report their status back to the network, including lamp burnout, percent dimmed and ballast condition. With DALI, a building's control system would be able to alert maintenance staff that an individual lamp or ballast is inoperative. The dimming status can even be used as a proxy for measuring power consumption of the luminaire.

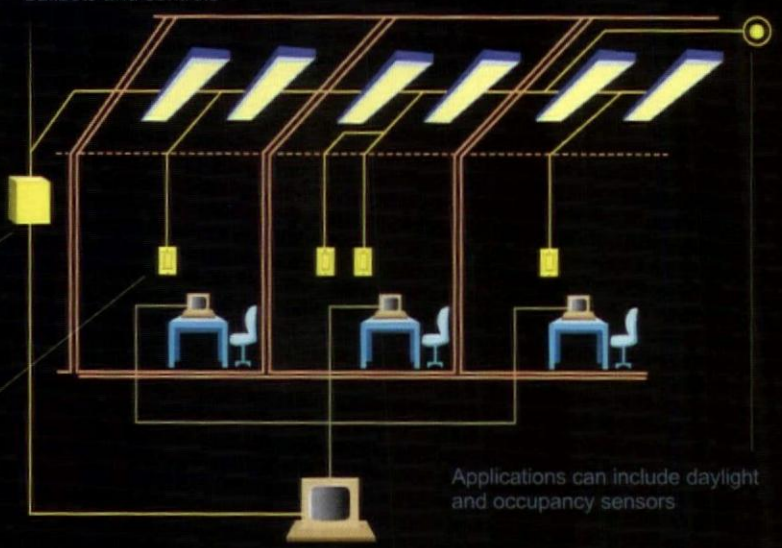
(Continued on page 38)

Fluorescent, digital, dimming lighting system.

In 1991, Tridonic was the first company to introduce digital technology (DSI digital serial interface) into the lighting industry. Since then, digital systems have been tried and tested in Europe, Asia, Australia and Africa. In recent years, the ballast technology evolved to include individual monitoring and control communication capabilities. This technology is known as DALI (Digital Addressable Lighting Interface).

Tridonic offers quality, digital ballast for today's commercial environment. Using DALI compatible controls from various manufacturers like Leviton and The Watt Stopper our DALI/DSI digital interface creates sophisticated lighting control along with increased flexibility and reduction in energy and installation costs.

From simple architectural dimming control of a conference room to individually controlling all fixtures within a multistory building the Tridonic digital ballast provides incremental value.



Service Management

Tridonic's digital lighting system with its two-way communication feature tells you. It pinpoints the locations of the fixture (for example, building 5, 2nd floor, office B-23, fixture above desk #15). It also tells you what kind of lamp must be replaced. With our system, your maintenance personnel can respond to service problems faster and work more efficiently.

Property Management

Tridonic's digital system lets you rearrange the space quickly to suit your tenants' needs without changing the fixture wiring. Then you can reassign fixtures to different control devices and create various lighting scenes. With our flexible system, you keep your design and labor costs down.

Energy Management

Tridonic's unique digital system can help trim your energy costs by 30% to 60 %. From a central location, set the lighting levels during your company's peak demand periods. Or, shut off the lights in some offices or on some floors - after everyone has gone home. Tridonic's system also can set the maximum light output during normal operating hours to a level most workers won't notice and still cut energy costs.

Improved Productivity

When the light is right, everyone works better. From the user's PC, Tridonic's digital system can create a comfortable and productive environment for your workers. For example, you can adjust the light to avoid screen glare, which reduces eyestrain and keeps employee's performance. When it comes to working efficiently, there is no productivity tool like Tridonic's digital lighting system.

For more information call us at 1-866-TRIDONIC or contact us by fax at 770-717-7969 or by email sales_usa@tridonic.com.

TRIDONIC

A Better Way To See Things

(Continued from page 36)

DIGITAL LIGHTING APPLICATIONS AND ADVANTAGES

Application	Advantages
Supermarket	Reprogramming can handle changes in merchandising and layout.
Hotel Lobby	Users can set up lighting scenes for different times of the day or different events.
Restaurant	Different scenes can be altered in appearance from lunch to dinner, or day to day.
Conference room	Programming can adapt for different types of media presentations.
Open-plan office	Occupants can control downlights over their cubicle from their computer.

PRODUCTS AND APPLICATIONS

The European firm Tridonic has been one of the key drivers of the DALI protocol, and is currently the only company shipping DALI ballasts in the U.S. with one- and two-lamp products for T5, T5/HO and T8 lamps. Steve Purdy, Tridonic's VP of marketing and sales at its new U.S. office in Atlanta, says that although the company offers a basic DALI controller, they will be focusing on supplying ballasts. "We'll be relying on vendors such as Leviton and The Watt Stopper to fill out the controls portion of the market," he said.

Purdy is enthusiastic about the possibilities of the new control standard. "The four key benefits of DALI systems are energy savings, occupant control, monitoring capability and ease of remodeling," he said. As an example, Purdy describes an open-plan office lighting system that provides individual luminaire control. "With direct/indirect T5 luminaires like Lightolier's Agili-T, the building operator can control the uplight based on scheduling, load shedding or photocell input," he said. "The worker in the cubicle can control the downlight component with a software tool on their computer screen." Purdy says that although the U.S. product is still new, Tridonic is already supplying ballasts for a half-dozen large DALI systems in the U.S., including a 500-fixture job at Harvard University.

Osram Sylvania is another major lighting company working on DALI products. The company plans to ship T5 and T8 DALI ballasts in the fourth quarter of 2001. Early cost estimates: If distributor cost of a two-lamp T8 ballast is about $15 and a 0-10V dimming ballast is $30, the DALI dimming ballast will be about $45. As with all such predictions, the hope is that volume will drive down costs in the future.

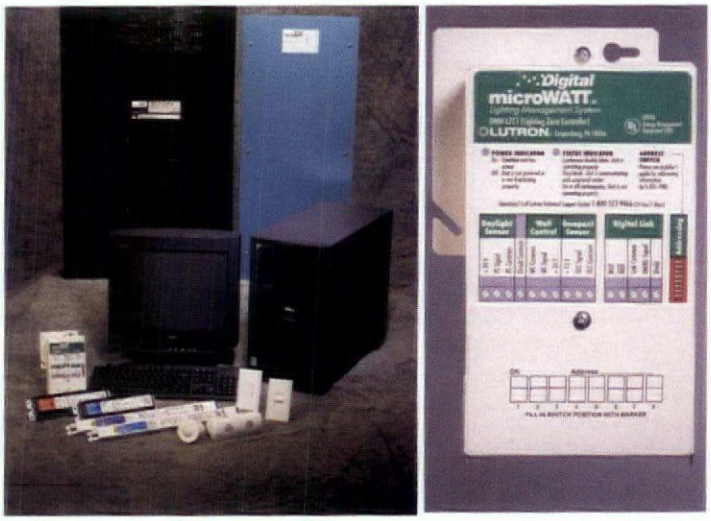
Lighting designer Brian Liebel with AfterImage+Space in Emeryville, CA is cautiously optimistic about this new technology. "We are definitely interested in the concept of networked lighting control," said Liebel. "In California at least, it will be very appealing to integrate dimming ballasts with local controls for energy savings." Liebel noted that currently available systems are relatively expensive, making them difficult to justify to building owners. In addition, he says, many of the products on the market have concentrated on centralized control for energy savings. DALI systems could provide the missing link—a system that also integrates with local controls such as individual room dimmers.

Liebel designed and specified a DALI-based system for a three-story, owner-occupied office building. He said, "We went through the protocol pretty thoroughly and felt it would be helpful for setting up the system the way we wanted it to operate and for handling future changes." Although the system fell victim to value engineering, Liebel thinks it was a good application for the flexibility of network control.

Nancy Clanton, principal of Clanton Engineering in Boulder, CO, agrees that the power of digital control can benefit certain applications, but only if there is a commitment to follow through by the owner. Said Clanton, "Some very motivated users could take advantage of these systems, like campuses or military bases with full-time facility managers." Unless users take the effort to use advanced features like lamp status monitoring, however, Clanton feels that the extra expense is not worthwhile. As an example, she points out that digital HVAC control systems have lots of features that never get used.

OTHER NEW DIGITAL SYSTEMS

Lutron has developed a network control system called Digital MicroWatt that can be used with its dimming ballasts. The Digital MicroWatt controller provides a line-voltage dimming signal to whatever ballasts are wired to that controller. The controllers can be networked together and integrated with BAS systems; most programming is via a web-browser-based interface. Each luminaire control group must have its own controller, so this is not a system where each lamp is addressable and configurable. However, the controller has a powerful feature: a built-in wattmeter that can report energy consumption back to the network. Another advantage of Lutron's system is that it uses the company's dimming ballasts that are already widely known as reliable (although expensive). Lutron estimates that complete Digital MicroWatt systems cost $1-7 per sq. ft., depending on the extent of the control capabilities.



The Digital MicroWatt network control system from Lutron features a built-in wattmeter that can report energy consumption back to the network and uses the company's dimming ballasts.

Largely because of this power monitoring capability, this system is being installed in a prototype Stop-N-Shop supermarket in Quincy, MA, slated for opening in October 2001. "We wanted a high degree of control for the lighting, but the real clincher was our need to monitor lighting power to see how much energy the store's daylighting will save," said lighting consultant Clanton. "With the Lutron system, it's built in, and we can monitor

power consumption over the web." At another recent installation of the Digital MicroWatt system—the recently renovated Thomas Jefferson Memorial (see cover story, August/September 2001)—the power-monitoring feature is being used to detect lamp failures for maintenance purposes.

Ballast manufacturer Energy Savings Inc. (ESI) has also developed a lighting control network protocol called AddressPro. Each AddressPro device is assigned one of 8 million random serial numbers in the factory to create the device's permanent "address." Most programming and control are through handheld devices similar to a television remote control; the control capabilities are similar to the DALI systems, with the removal of the 64-device limitation. This system only allows control of luminaires with no provision for feedback on lamp status.

AddressPro is an open protocol, meaning that anyone can get the instruction set and make their own products using the same format. ESI's embodiment of the AddressPro system is called SuperDim and includes a family of wall-mounted and handheld controllers, IR receivers, and modules that connect the network to analog devices (such as conventional 0-10V dimming systems), PCs and even non-lighting loads. ESI offers addressable digital ballasts for T8 and T5 lamps and the larger CFLs; products for other lamps such as the F39 fluorescent and T5 circlines are in the works.

Another recent entry into the dimming/controls arena is the system offered by Easylite of Boulder, CO. Using an approach similar to Lutron's, ballast controllers are networked to provide a flexible mix of local and central control. Each Address-A-Lite controller (see Figure 1, right) has four output channels with 0-10V signals for conventional dimming ballasts. Local dimmer controls, occupancy sensors and photocell sensors for each of the four zones can be connected to the controllers, while the network connection allows wide-area load shedding or daylight dimming. Low-voltage connections to all components—including the company's own dimming ballasts—are made with RJ-11 plugs (phone jacks) and Easylite's plenum-rated cable carries low-voltage accessory power in addition to the control signal. Up to 32 controllers can be networked with as many as 500 fixtures on each of the four zones on each controller. The front end for programming the system is a Windows-based PC program that plugs into the network via a serial connection.

In both price and performance, the Easylite system is positioned between conventional dimming systems and full-featured DALI systems. Otto Hottendorf of Easylite says that even though the company only began in 1998, their system is operating in more than two dozen projects 100,000 sq. ft. or larger—mostly office buildings.

The new digital technologies hold great promise for flexibility, energy savings and user control. It remains to be seen how much of the U.S. lighting market can be penetrated by digital dimming—or even conventional dimming. Nearly 30 years after the invention of dimming ballasts, they are only about one percent of the fluorescent market. Perhaps this latest idea from Europe—where dimming constitutes about ten percent of the market—will inspire users and manufacturers to reach toward their dimmable, digital dreams.

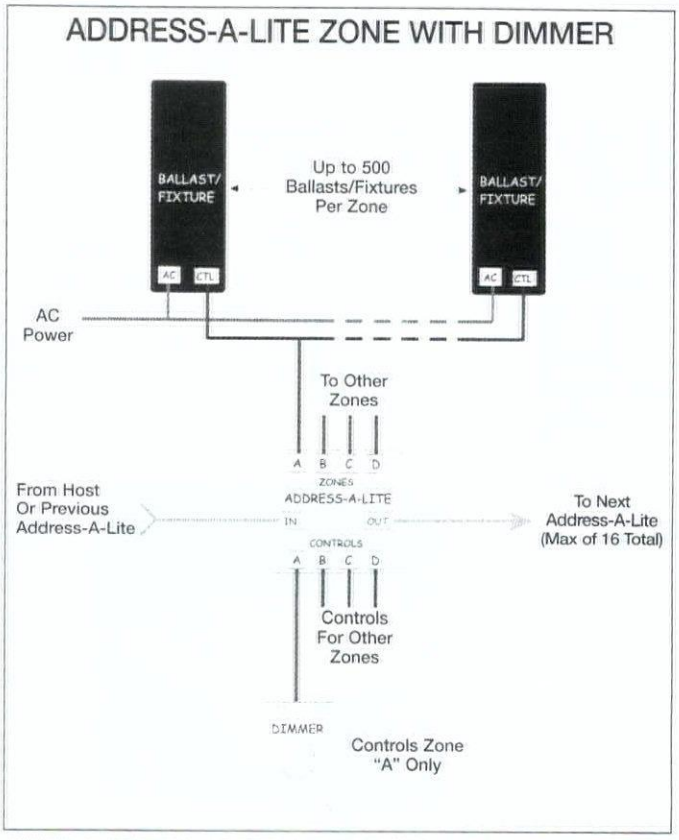
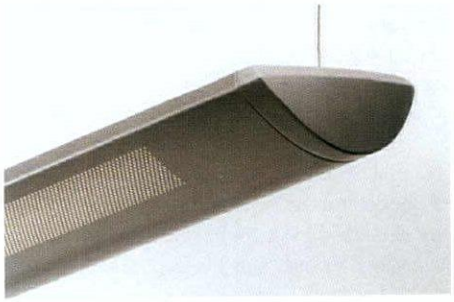


Figure 1: Easylite's Address-A-Lite system is a newcomer to the dimming/controls arena and features ballast controllers that are networked to provide a flexible mix of local and central control.

productpicks

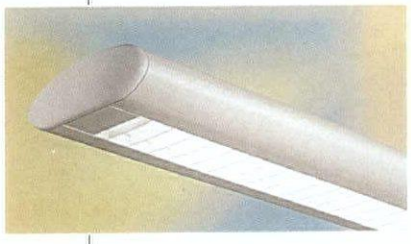
INDIRECT & DIRECT/INDIRECT

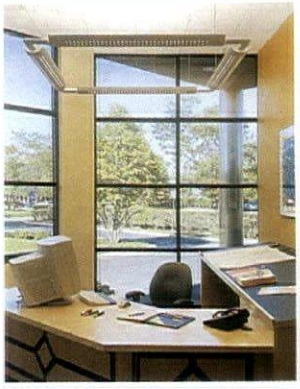
Litecontrol's Arcos Perf II boasts a redesigned perforation pattern for active and uniform illumination of the perforation surface and sculpted end caps for a decorative appearance. Lamping choices include one-, two- and three-lamp cross-sections with T5 or T5/HO lamps and two-, three- and four-lamp cross-sections with T8 lamps. Specular center and side reflectors produce a flat batwing distribution, fixture efficiencies over 90 percent and compliance with RP-1 guidelines. Constructed of heavy-gauge steel, Arcos Perf II is available in 4- and 8-ft. lengths. **Circle No. 40**



The Sculptura series from **Metalumen Mfg.** offers indirect and direct/indirect fixtures constructed of formed aluminum and specifically designed for use with T5 and T5/HO lamps. Measuring 3 1/8 in. high and 6 in. wide, fixtures are available in pendant and wall bracket models with a choice of a solid body for 100-percent indirect lighting and a perforated body for direct/indirect illumination. A100-percent downlight model is also available. An interlocking mechanism ensures straight runs for continuous run applications and fixtures are pre-wired for quick connection of individual sections. A "Quick-Grip" field adjustment suspension system facilitates on-site alignment. **Circle No. 41**

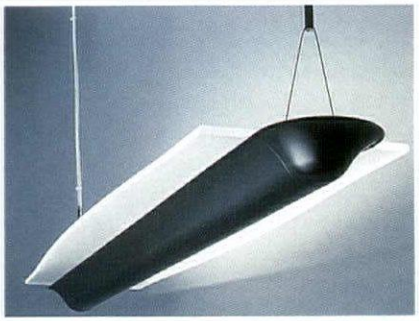
Ledalite Architectural Products' Achieva is a direct/indirect lighting system constructed from rugged, extruded aluminum and suspended with aircraft cables for on-grid or variable position mounting. Fixtures are pre-wired to facilitate installation and quick-wire connectors ensure quick electrical connections. Lamping choices include one, two or three T8 sources or one, two or three T5/HO sources. Field-adjustable optics are also available to add more uplight or downlight where required. Finish is applied powder coat in standard white as well as a range of factory colors. **Circle No. 42**





Peerless Lighting's Cerra Series is the latest addition to the Peerlite family of steel products. Featuring a crescent architectural form, fixtures are available with optional die-cast aluminum sculptured end caps and optional tenon connectors, which together create a 1-ft. break between fixture sections. The 3-in.-high Cerra 10 offers indirect/open, fully perforated and partially perforated optical systems and is designed to accept up to four T8 lamps. Utilizing Peerless' high-output T5 fixture technology, the Cerra 7 is 2 in. high, accepts up to three lamps per section and is available with indirect/open and partially perforated optical systems. **Circle No. 43**

From **H. E. Williams**, the Allure is a suspended indirect fixture that uses T5 or T5/HO lamps and is formed of extruded aluminum finished in a satin nickel metallic powder coat. Fixture depth is 2 3/8 in. Various luminous accents are offered, including frosted acrylic, glass and Knoll Imago. Available in five standard patterns, Knoll Imago is a "frozen fabric" that combines qualities of glass, fabric and high-performance resin. Allure is offered in nominal lengths of 4, 8 and 12 ft. and is suspended by steel adjustable aircraft cables. Factory-installed die-cast aluminum end caps facilitate field installation. **Circle No. 44**



(Continued on page 42)

BRUCK

LIGHTING SYSTEMS

V/A, one of nine systems from Bruck, is a low profile track system that can easily change directions and elevations. Available in straight or curved segments, in chrome, matte chrome, or gold finish.

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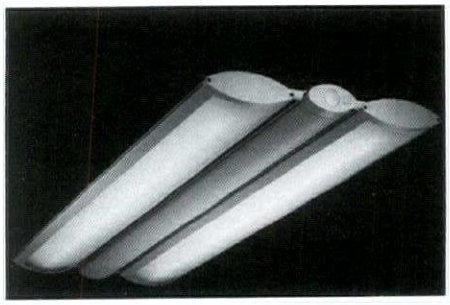
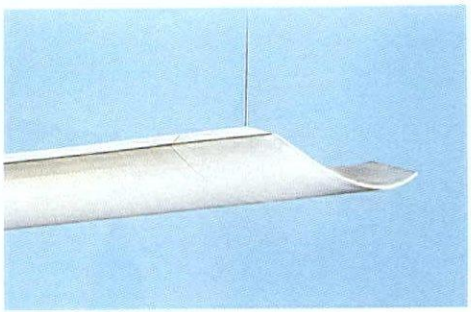
(Continued from page 40)

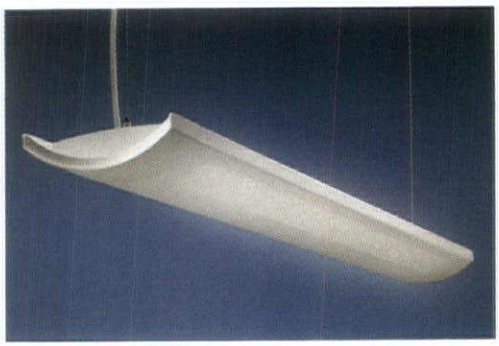
Designed by Basel, Switzerland-based Regent International and imported by **Focal Point LLC**, Slide direct/indirect lighting fixture sports a slim profile distinguished by a repeating oval shape. Pendant-mounted versions are available in 4-ft. lengths and use two T8 lamps; wall-mounted models are offered in 2- and 4-ft. lengths and use one T8 lamp. Fixtures feature extruded aluminum housings with a matte anodized finish and are equipped with reeded satin acrylic diffusers. **Circle No. 45**



From **Alkco**, Mobilé is a track lighting system that combines T5 linear direct/indirect fluorescent fixtures with aimable low- or line-voltage accent lighting on a three-circuit track. Combinations can be varied. An incandescent accent option is also available. Housing is extruded aluminum in a semi-gloss silver finish with specular aluminum parabolic louvers for diffused downlighting. The ends of the aluminum housings are exposed and illuminated through blue colored thermoplastic inserts. **Circle No. 46**

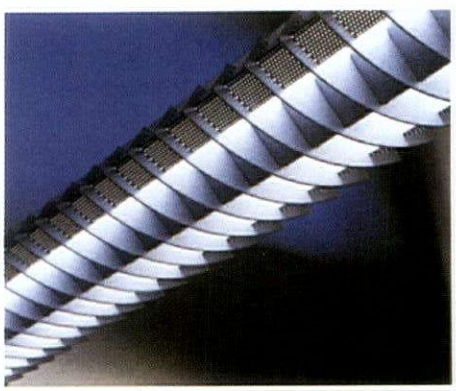


Designed by industrial designer Hartmut S. Engle for **Zumtobel Staff Lighting**, Ethos is only 1 7/16-in. high, features a curved end cap and is offered in 4- and 8-ft. lengths. Side-lit perforation detail is optional. Ethos can be used as an individual fixture or in continuous runs. Ethos E accepts two T5 or T5/HO lamps and provides an indirect light distribution up to 130 degrees. A single-lamp T5/HO model, three-lamp profiles and a larger T8 version are also available. Standard finishes are white or titan. Stainless-steel finish is optional. **Circle No. 47**



Prudential's Wave is a low-profile, cable-suspended indirect fixture, featuring either a solid or perforated, heavy-gauge steel housing and extruded aluminum finish plates. Lamping options include two T8 lamps or one, two and three T5/HO lamps. Optics are specific to the number of lamps being used to control ceiling brightness and maximize throw. Fixtures are designed to mount "on-grid" and have fully adjustable mounting hardware. **Circle No. 48**

Ivalo Lighting's Aliante is a 4-ft.-long linear fluorescent pendant featuring a patented technology of 26 graduated semi-opaque louvers that evenly distribute light from the top of the fixture. Both the louvers and polycarbonate lens are coated with a silicone hard-coat to facilitate cleaning. Fixture is formed of .062-in.-thick, satin or brushed aluminum that is then anodized clear, blue or black. Aliante can be ordered with frosted or clear disks or no disks at all. The suspension system consists of braided stainless-steel sheaths that conceal the four power lines. Fixture can also be suspended with poles. **Circle No. 49**



From the **Lightolier** Spectral collection, the Blade direct/indirect fixture uses two T5 lamps and features laser-cut flat blades bonded to a central ballast compartment. Side perforations mask direct view of the lamp. The fixture is suspended by two stems, with a floating canopy kit available for sloped-ceiling applications. Blade measures 49 7/8 in. long, 5 7/8 in. wide and 2 1/8 in. deep. Finish is textured light gray. **Circle No. 50**

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BOOTH 512

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SEPTEMBER 11, 2001

Words fail...

Emotions flood.

With profound sorrow, all 35,000 VNU employees around the world embrace the victims, their families, and every valiant rescue worker in our thoughts and prayers. Our commitment is to aid in the relief effort and to rebuild hope.

THE ROBERT BRUCE THOMPSON ANNUAL STUDENT LIGHT FIXTURE DESIGN COMPETITION

The Competition

Bruce Thompson was a twenty-five year veteran of the lighting industry. He had a broad background in the profession having worked in theatre, retail, as a factory representative, and concluding his career in manufacturing as vice president of sales and marketing. Throughout his career Bruce emphasized design and innovation. He was also an accomplished light fixture designer. He established this independent competition to encourage creativity and education in light fixture design and manufacturing. The competition organizers are looking for innovative ideas for fixtures that are functional as well as inspiring!

Awards

Three prizes will be awarded annually:

- First Prize: The Thompson Prize is a cash award of $5000, plus a trophy.
- Second Prize: The Award of Distinction is a cash award of $2500, plus a plaque.
- Third Prize: The Award of Merit is a cash award of $1000, plus a plaque.

The First Prize recipient will be flown to LightFair International to receive the award. The winning designs will be announced at LightFair International during the New Products Showcase.

A panel of 5 judges will evaluate the entries. Applicants will be informed of the winning entries by May 1. Prizes will be awarded according to the judges' discretion.

Competition Rules

- Entrants must be full time students, enrolled in an accredited academic degree program in the United States. Approved programs include architectural engineering programs, architecture programs, interior design programs, theatre, or industrial design programs. Because of the high level of competition, it is recommended that entrants be undergraduate seniors or graduate students.
- Only individuals may apply. Group projects are not acceptable.
- The fixture must be designed within the past year and while the entrant is a student.
- A faculty member at the student's school must sponsor the application.
- A copy of this application must accompany all entries, one entry per student per year.
- Include 8 copies of all application material. Application material will not be returned to the applicant.
- The student's proposed light fixture design should be illustrated on a maximum of four 11"x17" sheets. These sheets should include a plan and section of the lighting fixture, a perspective sketch or rendering of the product, and a perspective sketch of the product in use. An optional candlepower distribution curve, without values, may be included to illustrate an understanding of the light distribution. Graphic illustrations may be drawn by hand or computer-rendered. Both presentation and conceptual design will be considered in the judging process.
- In addition to the above requirements, include a maximum 250-word description of the product and its use.
- Optional: In addition to the above requirements, the student may build a model and include up to 5 images of the model, i.e., photographs or digital images. The purpose of the model is to demonstrate aesthetics and design. It need not be a functioning model. It may be constructed out of any material.
- The student is encouraged to consider the following criteria in the design process:
  1. Innovative character of the overall design
  2. Innovative and responsible use of materials
  3. Innovative use of manufacturing techniques
  4. Breadth of practical application
  5. Practicality of manufacturing
  6. Aesthetics
  7. Ease of use and maintenance
  8. Light distribution
  9. Energy Use
- Entries should be postmarked by March 12, marked "Light Fixture Design Competition" and sent to:

Patricia Glasow
c/o Auerbach + Glasow
225 Green Street
San Francisco, California 94111

THE ROBERT BRUCE THOMPSON ANNUAL STUDENT LIGHT FIXTURE DESIGN COMPETITION APPLICATION

The Design Problem

Design an interior decorative pendant fixture using high efficiency fluorescent lamps e.g., compact fluorescent, T5 or T2 linear fluorescent, with ballast(s) integral to the fixture. Identify all major interior and exterior fixture components and materials. The primary application of the fixture is for use over a conference table or other similar task surface.

Name _____

Address _____

_____

Telephone _____

Email _____

College/
University _____

Major _____

Faculty
Sponsor _____

Documents
Submitted _____

_____

_____

I am a full-time student at the above-listed institution, and I warrant that this submission is my original work and that it does not infringe on the intellectual property rights of any third party. I retain the copyright in these documents and this design, but I irrevocably grant a perpetual, royalty-free license to The Robert Bruce Thompson Charitable Trust to use this entry, either partially or in its entirety, to promote the Student Light Fixture Design Competition in any way the Trust sees fit.

_____

Student Signature Date

_____

Faculty Signature Date

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Andorra pendant, sconce, ceiling and linear fluorescent fixtures by Louis A. Lara bring a new aesthetic to interior lighting. Satin-finish acrylic cowls are combined with acrylic materials that frost white when lit, infusing the cowls with a soft glow.

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Circle No. 20

Sunnex

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 room for documents and other desk accessories.

Sunnex, Inc. is a leader in the design and manufacture of high-quality halogen lighting products. The company's products are used in a variety of applications including commercial and residential task lighting. Most of its lamps are backed by a five-year warranty. In addition to its standard products, Sunnex also offers custom configurations.

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. 21

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adindex

endpoint

T5: Is There Truth in Advertising?

BY PETER FRANCK, PE, LC

With high lumen values and high efficiencies, the claims of the T5 lamp seem too good to be true. And, like many advertisements, sometimes they are. In fact, there is often a discrepancy between the efficiency values and the rated lamp lumens that adds to the confusion. The problem can be stated quite simply: 1) Lamp manufacturers, wanting to publish the most impressive lamp lumens, published the (higher) output at 35°C (5000 lumens for the 4-ft. T5/HO lamp); 2) Luminaire manufacturers, eager to publish the most impressive efficiency values, published the (higher) efficiencies at 25°C; and 3) Thus, by incorporating the increase in *both* the efficiency and the lamp lumens, many projects are being designed with the assumption that there will be 8-percent more light than is actually there. Eight percent is a lot!

Not that the lamp manufacturers have made a mistake in making a lamp that has peak light output at 35°C. A compact lamp invites a compact fixture and architects appreciate slimmer luminaires. Tighter spaces usually mean heat buildup, so it's good that the lamp actually gives more light output in such locations. But the question comes up whether this increase in light output should be reflected as a higher efficiency or a higher rated lamp lumens. The immediate danger is that many people are reflecting the change in both!

Some argue the improvement in light output due to the lamp heating up in the fixture shouldn't be reflected as increased efficiency. They imply that end users can't understand that luminaire efficiency is a combination of optical efficiency and thermal effects. But this has been the understanding ever since relative photometry was standardized—if heat buildup in the luminaire reduces light output, this is reflected in a reduced efficiency, not by a change in the rated lamp lumens. Or, too much ventilation in some fixtures could make the lamp run cooler than its optimum operating temperature, also resulting in a loss of efficiency. The change is reflected in the efficiency, not in a change to rated lamp lumens.

Rating the T5/HO lamp lumens at something other than 25°C goes against the established industry standard. This is certainly true of fluorescent lamps. Some have said that this is a unique case because it is designed to give maximum light output at 35°C, rather than 25°C. But this is not the first time a lamp has been designed to perform better at a higher light output. Just look at the amalgam compact fluorescent lamp. It is usually designed to operate at a higher light output, around 35°C. If a luminaire is designed with the proper amount of heat buildup, the efficiency will go up. With too much ventilation, the efficiency will go down. Are these rated lumens published at 35°C? No, they're published at the long-established industry standard of 25°C.

Sound familiar? The T5 lamp is also designed to operate at 35°C and increases in output in a luminaire without too much ventilation. Yet, unlike any other fluorescent lamp in North America, the rated lamp lumens are being published as 5000 lumens (at 35°C, the small print confesses), not as 4650 lumens (at 25°C).

An expressed concern is that with such high-efficiency luminaires and the temperature effect in the value of luminaire efficiency, it is potentially possible to achieve a luminaire efficiency of more than 100 percent. People would look at this and assume it was incorrect because it's impossible to get efficiencies greater than 100 percent, right? This is only true if it is optical efficiency that is reported. But it is difficult—if not impossible—to measure only the optical efficiency, so it was standardized earlier in the 20th century to measure what is called "luminaire efficiency." This combination of optical efficiency and thermal effects can be measured accurately and consistently. These thermal effects can either reduce or increase the efficiency—even above the 100-percent mark.

It shouldn't be difficult for the lighting industry to understand this. After all, we're accustomed to percentages greater than 100 percent. A company's sales can increase by 147 percent. A ballast can run a lamp at 114 percent of the output from the reference ballast. So is it such a stretch to accept that luminaire efficiencies, properly understood, could exceed the 100-percent mark? It has already been empirically proven in independent labs with concept luminaires using special high-reflectance materials.

So why is this issue so important? Because while the higher rated lumens have been accepted by many, a lot of luminaire manufacturers and testing labs are still testing luminaires according to the IES guidelines (which is what they're supposed to do). The IES says that a fluorescent luminaire shall be measured at 25°C, the bare lamps at 25°C and the ratio between the two is the efficiency. This efficiency is only accurate if the rated lumens are *also* at 25°C. If you use a luminaire tested and reported exactly according to IES procedures and then use the lumen value of 5000, your calculations will predict 8-percent more light than you will ever get from your installation So there is this dichotomy between the way many lamp manufacturers are reporting rated lamp lumens for T5 lamps and the way many luminaire manufacturers are reporting luminaire efficiency for T5 luminaires. And the two methods are incompatible.

T5 is certainly useful, but let's not exaggerate its claims.

What is the solution? The most appropriate and consistent thing to do is to report the rated lamp lumens at 25°C (4650 lumens for the 4-ft. nominal T5/HO), as is indeed the standard for every other fluorescent lamp, and continue to do photometric reports according to the current IES standard (at 25°C). Yet I'm aware of only a few manufacturers, lamp or luminaire, that have heeded these suggestions.

It is important to report the performance of T5 lamps honestly and accurately so as to compare it fairly to other options, such as improved T8 lamps or high-wattage twin-tube lamps. If you are doing calculations with luminaires that seem to have very high efficiencies and are also using the rated lumens that were measured at 35°C, beware of your results. If you think these light levels seem too good to be true, you just might be right.

Peter Franck, PE, LC is a research engineer at Lightolier.